

Contents

1	I ² C	1
1.1	ADC /MB	1
1.1.1	Read	1
1.1.2	Write	2
1.1.3	Read conversion register	2
1.2	Inertial Measurement Unit IMU	2
1.2.1	Acceleration and Magnet Sensor	2
1.2.1.1	Read	3
1.2.1.2	Write	4
1.2.2	Gyroscope Sensor	4
1.2.2.1	Read	5
1.2.2.2	Write	5
1.2.3	Pressure Sensor	6
1.2.3.1	Read	6
1.2.3.2	Write	7
1.3	Motor Driver	8
1.3.1	Read	8
1.3.2	Write	8

List of Figures

1.1	Packages read ADC	1
1.2	Packages write ADC	2
1.3	Packages conversion read ADC	2
1.4	ACC read single data	3
1.5	ACC read multiple data	3
1.6	ACC write single data	4
1.7	ACC write multiple data	4
1.8	Gyro read single data	5
1.9	Gyro read multiple data	5
1.10	Gyro write single data	5
1.11	Gyro write multiple data	6
1.12	Pressure read single data	6
1.13	Pressure read multiple data	7
1.14	Pressure write single data	7
1.15	Pressure write multiple data	7
1.16	Motor write	8

List of Tables

1 I²C

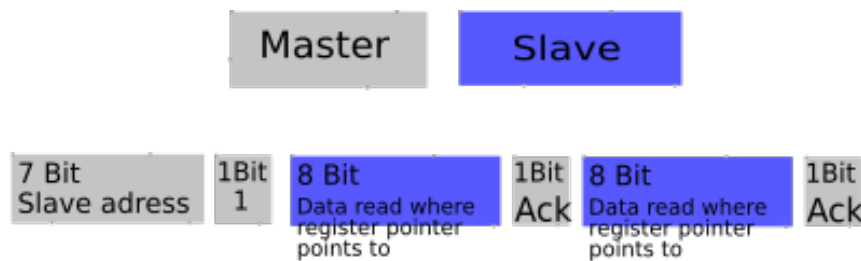
This document shows all necessary transmissions which are needed for a successful interfacing on the I²C bus.

1.1 ADC /MB

I²C slave address:
0b1001001 (0x49)

1.1.1 Read

The read command get's the data from the address, which is stored in the pointer register (blue colour). See figure [1.1](#)



1.Transmission

Figure 1.1: Packages read ADC

1.1.2 Write



1.Transmission

Figure 1.2: Packages write ADC

1.1.3 Read conversion register

To enable a read from a conversion register, several packages need to be sent. They can be seen in figure 1.3. All slave and master acknowledges are not shown because they are handled direct by the interface and so not important for the application.

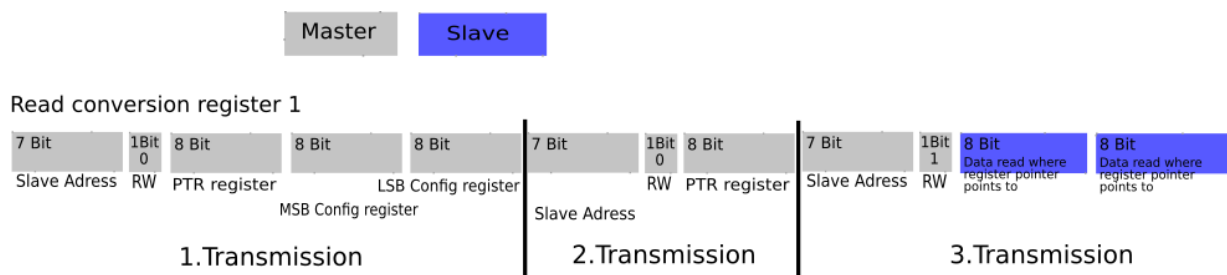


Figure 1.3: Packages conversion read ADC

1.2 Inertial Measurement Unit IMU

The Inertial measurement unit (IMU) has three different chips mounted. Each chip solves one of the measurements of this unit. Each chip has a different I²C address. All slave and master acknowledges are not shown because they are handled direct by the interface and so not important for the application.

1.2.1 Acceleration and Magnet Sensor

I²C slave address:
0b0011110

There are several registers which have to be configured before reading and also several register where the acceleration, magnetic strength and if needed temperature can be read. To reduce the amount of pages of this document, they will be not listed here. All the registers can be found in the Datasheet 'IMU_LSM303D.pdf', which is stored in the SVN directory '\doc\se\Datasheets\IMU'.

1.2.1.1 Read

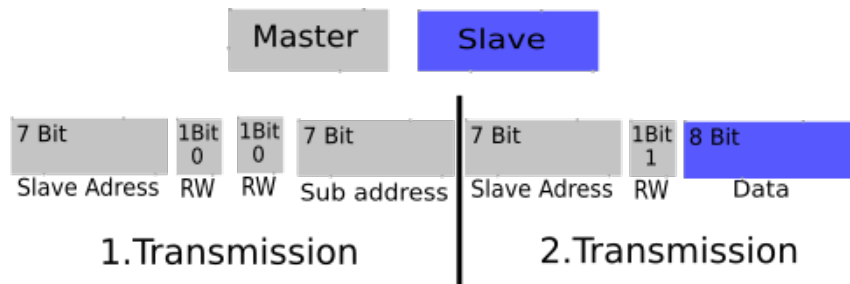


Figure 1.4: ACC read single data

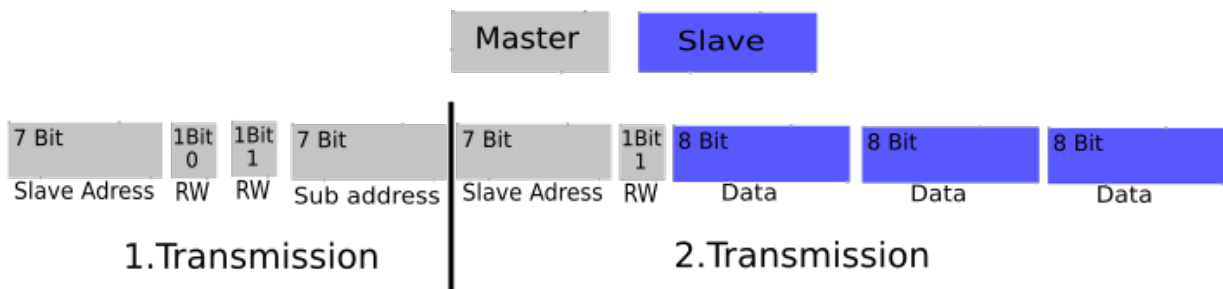


Figure 1.5: ACC read multiple data

1.Transmission: Slave address including RW bit ('0'): 0x3C

2.Transmission: Slave address including RW bit ('1'): 0x3D

1.2.1.2 Write

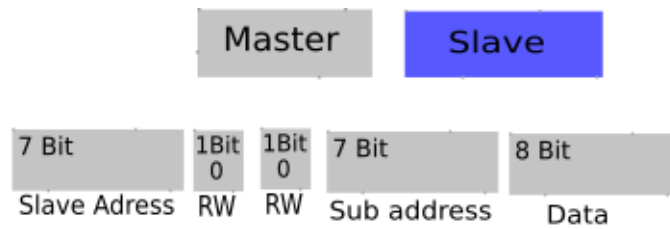


Figure 1.6: ACC write single data



Figure 1.7: ACC write multiple data

1.Transmission: Slave address including RW bit ('0'): 0x3C

1.2.2 Gyroscope Sensor

I²C slave address:

0b1101010

There are several registers which have to be configured before reading and also several register where the rotational speed and if needed the temperature can be read. To reduce the amount of pages of this document, they will be not listed here. All the registers can be found in the Datasheet 'IMU_L3GD20H.pdf', which is stored in the SVN directory '\doc\se\Datasheets\IMU'.

1.2.2.1 Read

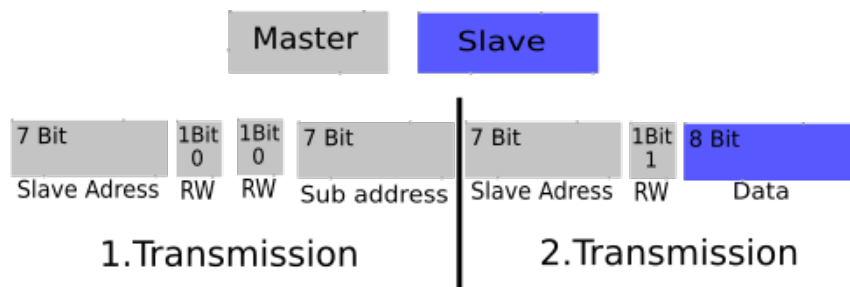


Figure 1.8: Gyro read single data



Figure 1.9: Gyro read multiple data

1. Transmission: Slave address including RW bit ('0'): 0xD4

2. Transmission: Slave address including RW bit ('1'): 0xD5

1.2.2.2 Write

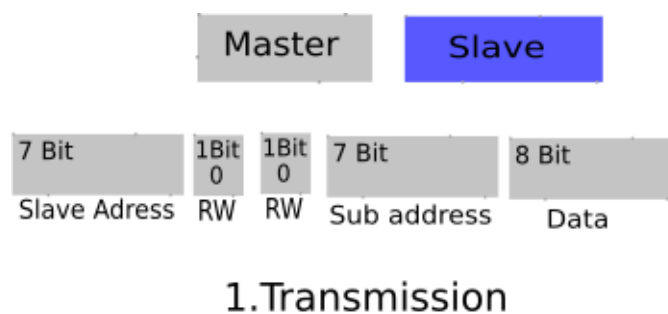


Figure 1.10: Gyro write single data

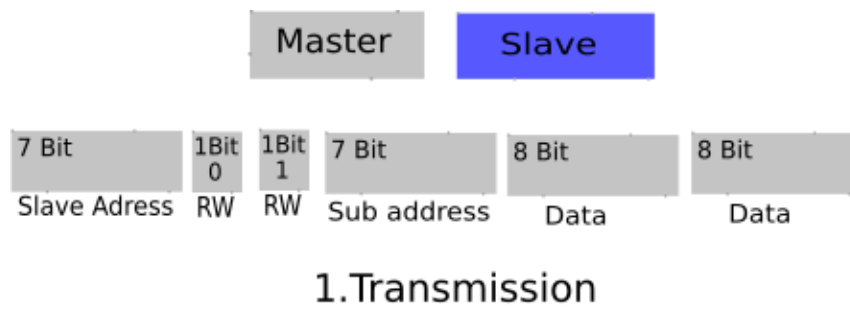


Figure 1.11: Gyro write multiple data

1.Transmission: Slave address including RW bit ('0'): 0xD4

1.2.3 Pressure Sensor

I²C slave address:
0b1011100

There are several registers which have to be configured before reading and also several register where the pressure and if needed the temperature can be read. To reduce the amount of pages of this document, they will be not listed here. All the registers can be found in the Datasheet 'IMU_LPS331AP.pdf', which is stored in the SVN directory '\doc\se\Datasheets\IMU'.

1.2.3.1 Read

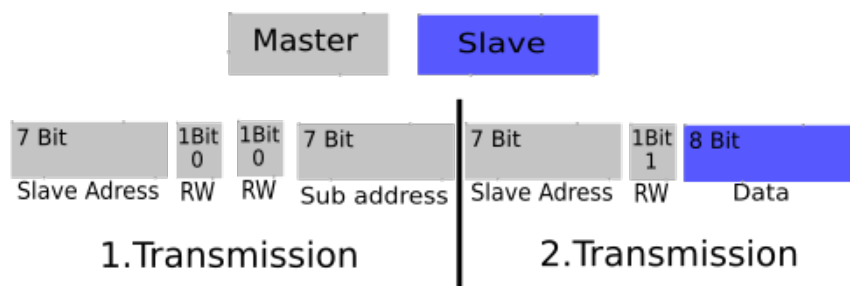


Figure 1.12: Pressure read single data

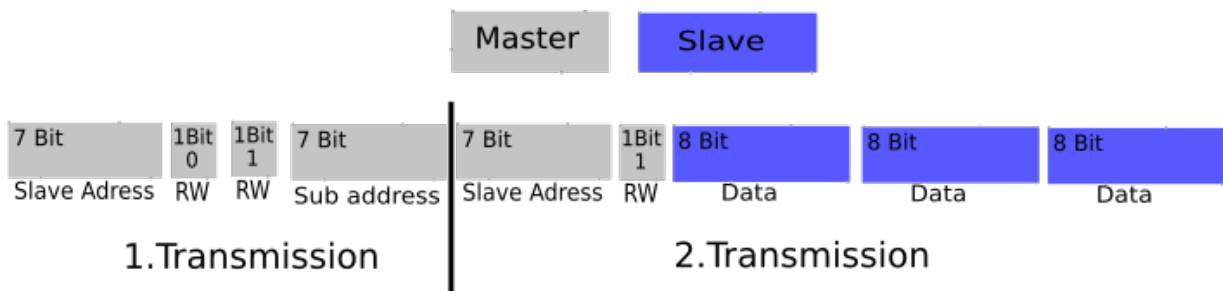


Figure 1.13: Pressure read multiple data

1. Transmission: Slave address including RW bit ('0'): 0xB8

2. Transmission: Slave address including RW bit ('1'): 0xB9

1.2.3.2 Write

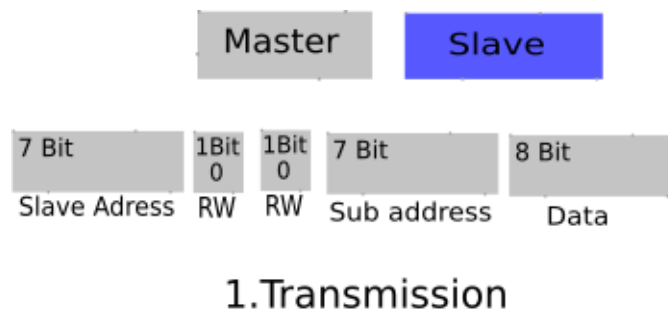


Figure 1.14: Pressure write single data

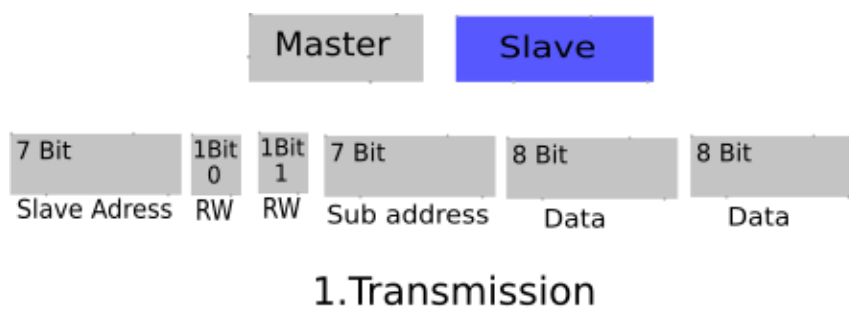


Figure 1.15: Pressure write multiple data

1. Transmission: Slave address including RW bit ('0'): 0xB8

1.3 Motor Driver

All slave and master acknowledges are not shown because they are handled direct by the interface and so not important here. To enable flying with a Quadrocopter there are four motors and so four brushless drivers needed. Each of them has an individual address.

I²C slave address:

Motor 1 → 0b0101001

Motor 2 → 0b0101010

Motor 3 → 0b0101011

Motor 4 → 0b0101100

1.3.1 Read

NOT DEFINED

1.3.2 Write



1.Transmission

Figure 1.16: Motor write

1.Transmission: Slave address including RW bit ('0'):

Motor 1 → 0x52

Motor 2 → 0x54

Motor 3 → 0x56

Motor 4 → 0x58

Possible Data values are in the range of 10 (Decimal) up to 255 (Decimal). So in the range from 0x0A to 0xFF.