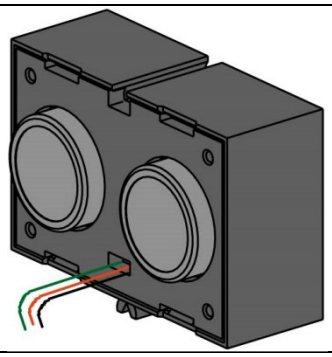
FT-T-KN
2017-07-18

Art.-Nr. ***part. no.***	**133009**	
Bezeichnung ***name***	**Ultraschall-Abstandssensor** ***Ultra sonic distance sensor***	
Abmessungen *dimensions:*	45x30x15mm	
Gewicht *weight:*	20,5g	
Spannungsversorgung *Supply voltage:*	5-10 VDC	

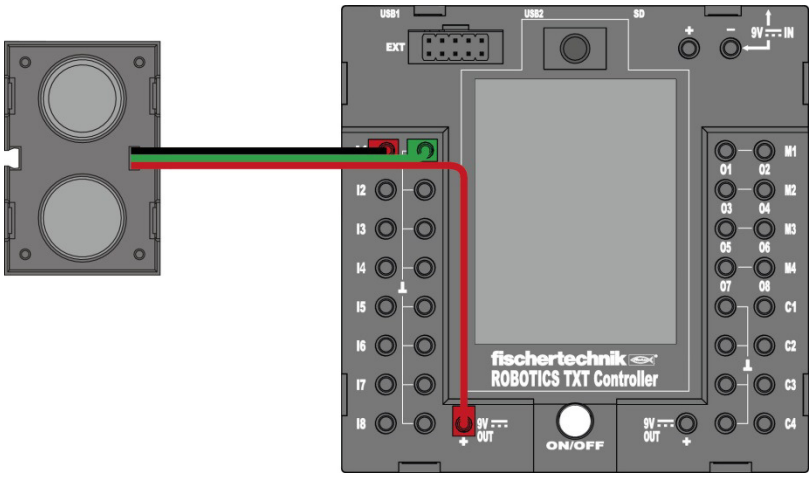
Signal: digital codierte Datenübertragung zwischen ROBO TX Controller/ROBO Interface und Sensor
Signal: digital coded data transfer between ROBO TX Controller and sensor

Anschlüsse: rot=9VDC, grün=Masse, Schwarz=Signal
connection: red=9VDC, green=ground, black=signal

Anschluss an TXT Controller an Eingängen I1-I8, Eingangsart: Ultraschall
connection to TXT Controller at Inputs I1-I8, Input mode: Ultrasonic

Wertebereich 3-400cm, Ausgabewert entspricht Abstand in cm. Genauigkeit +/- 0,5cm, 1023=unendlich
Value range: 3-400cm, value corresponds to distance in cm. Resolution +/-0.5cm, 1023=infinite

Anschluss an TXT Controller:
Connetction to TXT Controller:



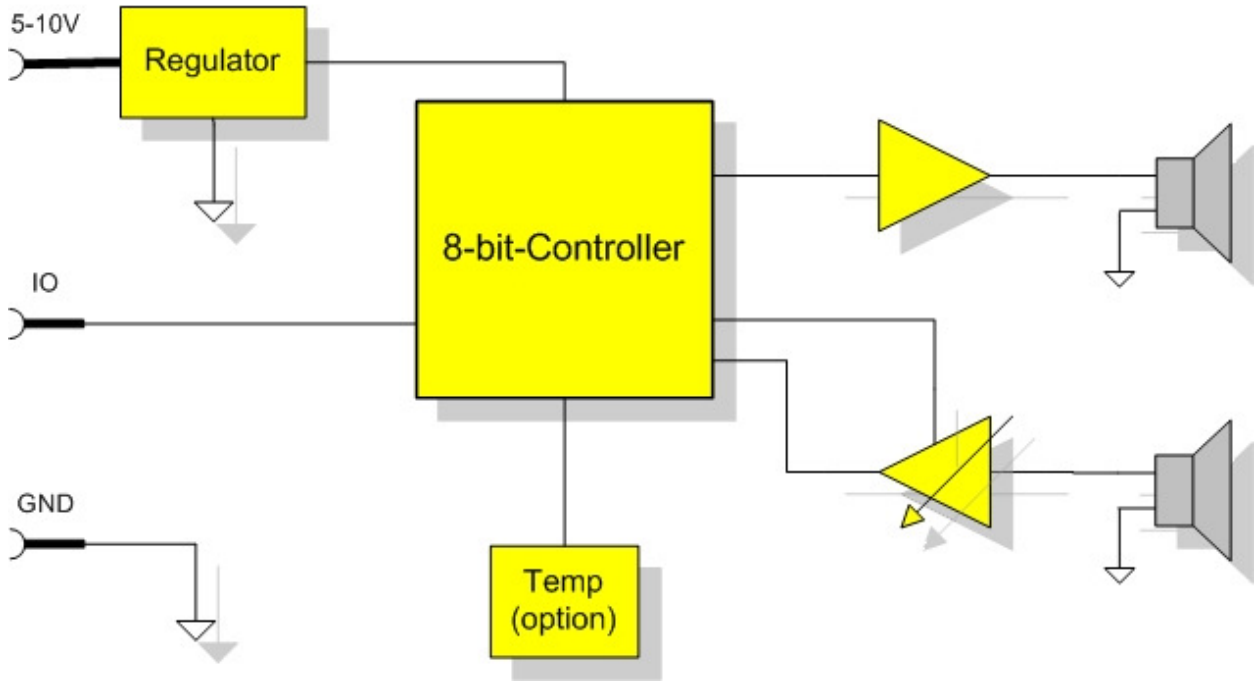
Daten-Protokoll: siehe Anhang "hardware concept"
data protocol: see attached file "hardware concept"

Hardware - Concept USONIC2008 RevA Ultrasonic distance sensor modul

1. Features

- Distance measurement from 4 – 400 cm
- Double ultrasonic speaker for low distance recognition
- accuracy better than 2% or 1 cm (partly temperature compensated)
- bidirectional digital interface, resolution 0,5 cm (10bit)
- 3-wire interface, connectable to universal Interface2008 inputs
- Multi sensor use without influence (up to 8)
- Voltage supply 5 – 10 Volt

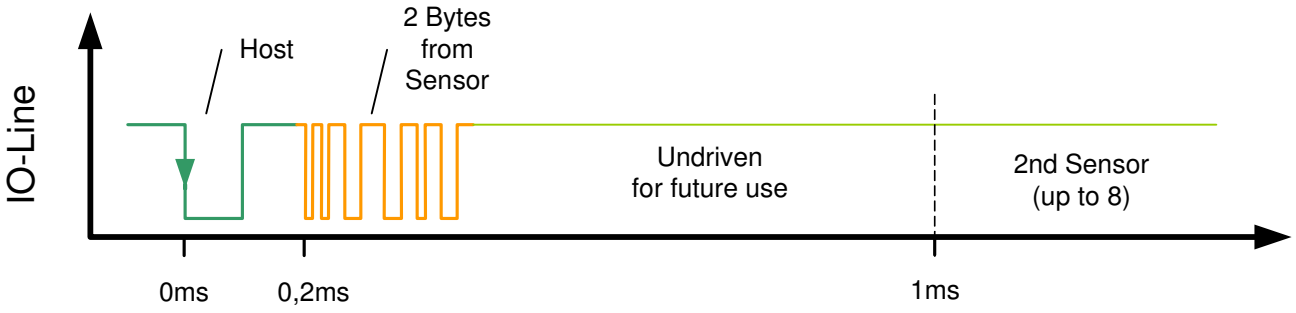
2. Diagram



2. Protocol

2.1 Single bidirectional IO-Line

- Ultrasonic sensor waits for host trigger pulse to synchronize all sensors



2.2 Host query

- low pulse with 78,125us duration (= '0'-Byte with 115200 Baud, 8N1)
- tristate after 90us
- repeated every 10ms

2.3 Sensor answer

- sensor synchronizes to falling edge
- 2 Byte answer in 0.2 – 1ms timeslot
- Asynchron, 115200 Baud, 1 Startbit, no parity, 1 Stopbit
- Output: open collector, 100K-Pullup to Vin (5-10V)
- answer is not mendatory
- without host trigger sensor goes into standby
- weak pullup at sensor side (avoids floating during undriven states)
- protocol expandable to ASN1 protocol chain

2.4 Sensor answer: 2 Bytes

- First Byte

D7	D6	D5	D4	D3	D2	D1	D0
1	Valid#	W/D#	ID1	ID0	L9	L8	L7

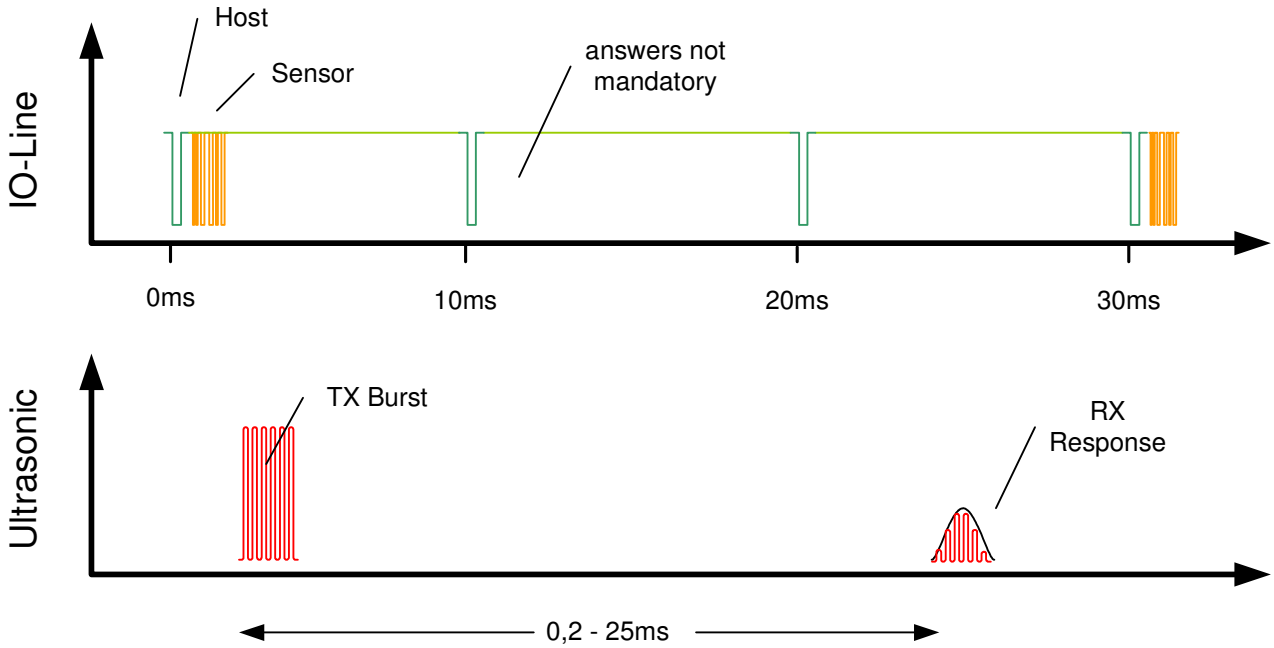
- Second Byte

D7	D6	D5	D4	D3	D2	D1	D0
0	L6	L5	L4	L3	L2	L1	L0

  - Bit Definition
  - Valid#: 0 = valid, 1= unvalid
  - W/D#: 0 = distance, 1 = weight
  - ID: 0 = first echo, 1 = second echo, 2 = third echo
  - L9..0: 10 bit, distance (0.5 cm), weight in range from 0 - 64
  - Val=0x000 distance lower than 4 cm
  - Val=0x3FF distance higher than 400 cm

2.5 IO protocol vs. Ultrasonic timing

- Ultrasonic burst should start after data transmit
- Sequential procedure for easy firmware timing



2.6 Options

- Further protocol options on request
  - e. g. firmware update via IO-line
  - multi echo recognition
  - controller frequency adjustment by triggersensing