



# SLICE6 AIR Sensor and System Connections

05 May 2021

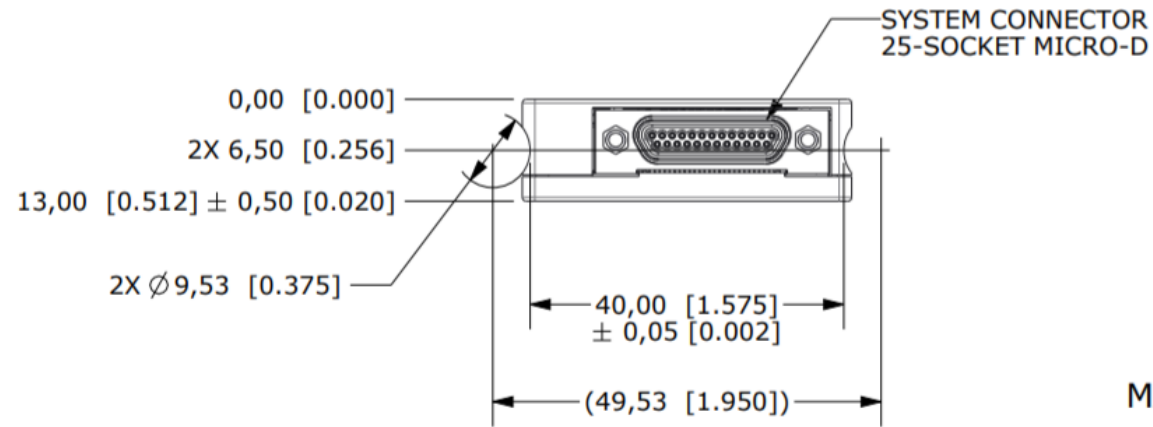
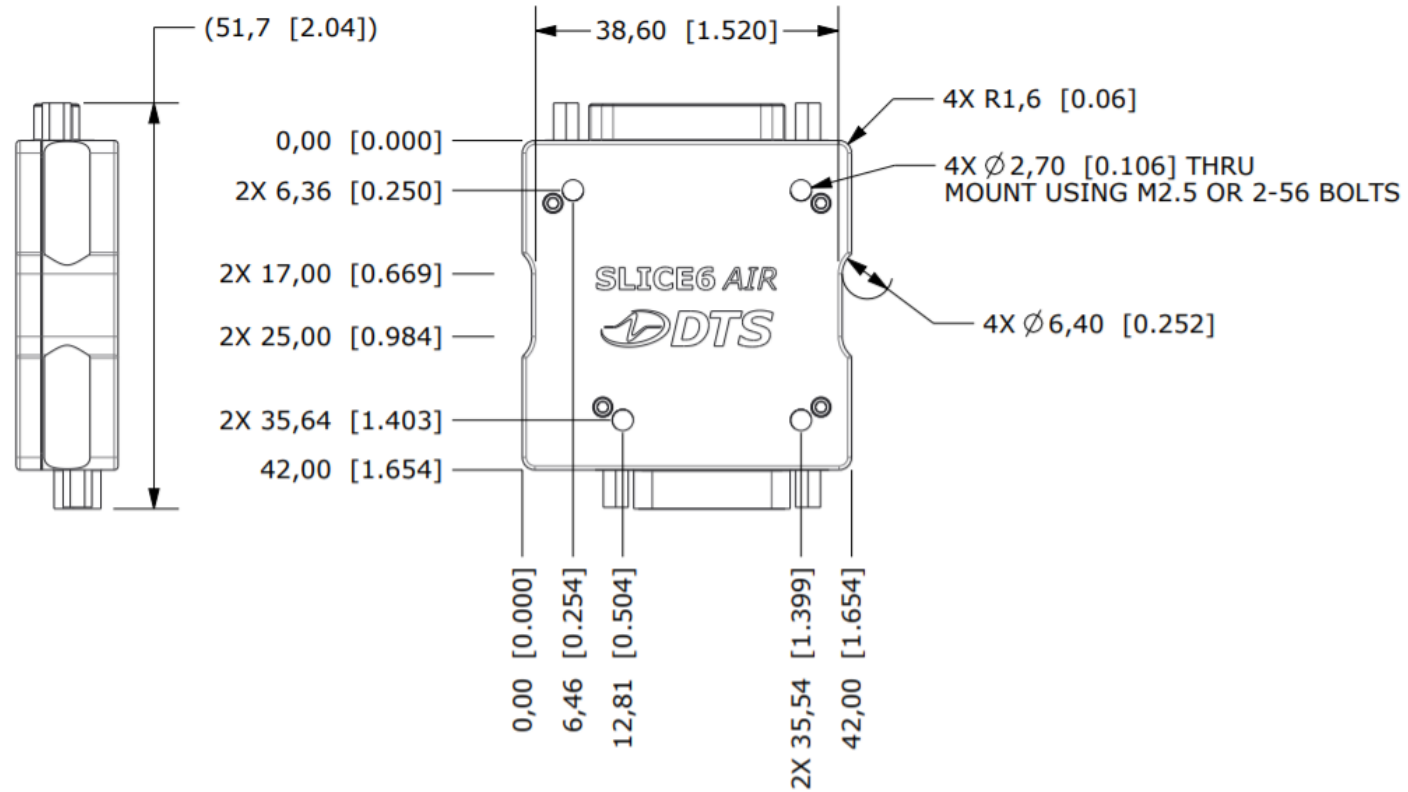
Mike Beckage

# SLICE6 AIR

- Ethernet-based data acquisition unit (DAU)
- 6-channel universal sensor inputs
- 16GB non-volatile flash memory
- Installation near sensors
- Record in place
- Real-time streaming
- Time synchronization



# Dimensions mm [in.]



MASS = 50  $\pm$  5 GRAMS



# Making Connections

- SLICE6 AIR has two high-density “D” connectors.
  - One for connecting sensors to a highly programmable signal conditioning circuit.
  - Another for connecting Power, Control and Communication signals.
  - Extensive sensor connection information is available in the User’s Manual and on the DTS Help Center. A brief overview of the Sensor Interface is included here.

Sensor Connector



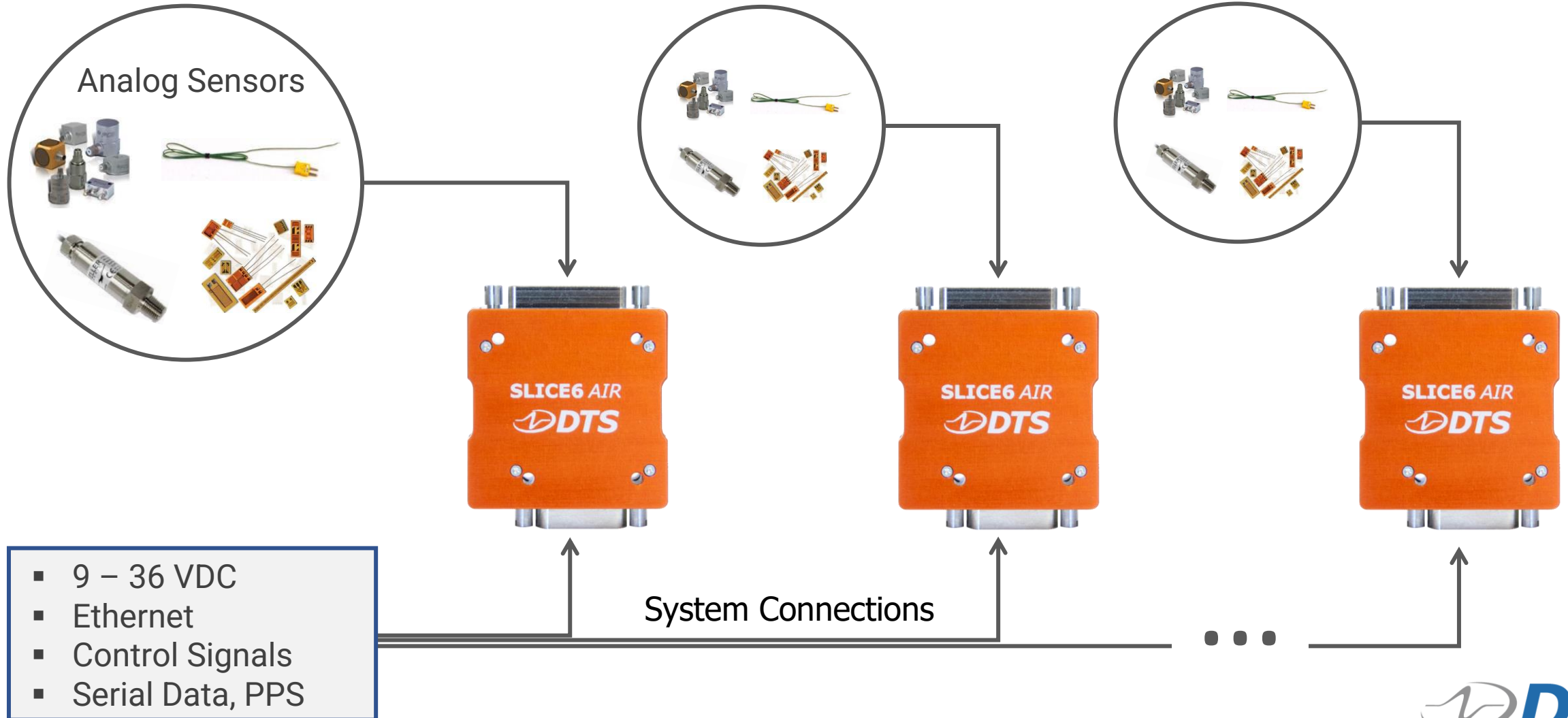
System Connector

- DTS offers many standard system connection cables, however users may want to install a SLICE6 system in a unique application, and therefore desire to make a custom power, communication & control cable system.
- The following is intended to provide sufficient information to help the user make proper system connections.



# Making Connections

- Power and Control signals can be connected as a parallel bus
- Ethernet signals must be connected as a daisy chain. (i.e. PC to Port1, Port2 to Port1 on next unit, etc.)



# Sensor Interface

## Excitation

- 5V, 20mA (Bridge/PR)
- 24V, 5mA (IEPE)

## Input Range

- 0 to 5 V, 2.5V center (Bridge/PR)
- 0.5 to 23.5 V (IEPE)

## Gain

- 1 to 1,280 software programmed

## Bandwidth

- DC to 50 kHz

## Anti-Alias Filter

- Adjustable 5-pole Butterworth: 20Hz – 40kHz

## Analog to Digital Conversion

- Individual 16-bit SAR ADC
- < 10  $\mu$ sec, via IEEE 1588 PTPv2 or PPS



# Sensor Connector Detail

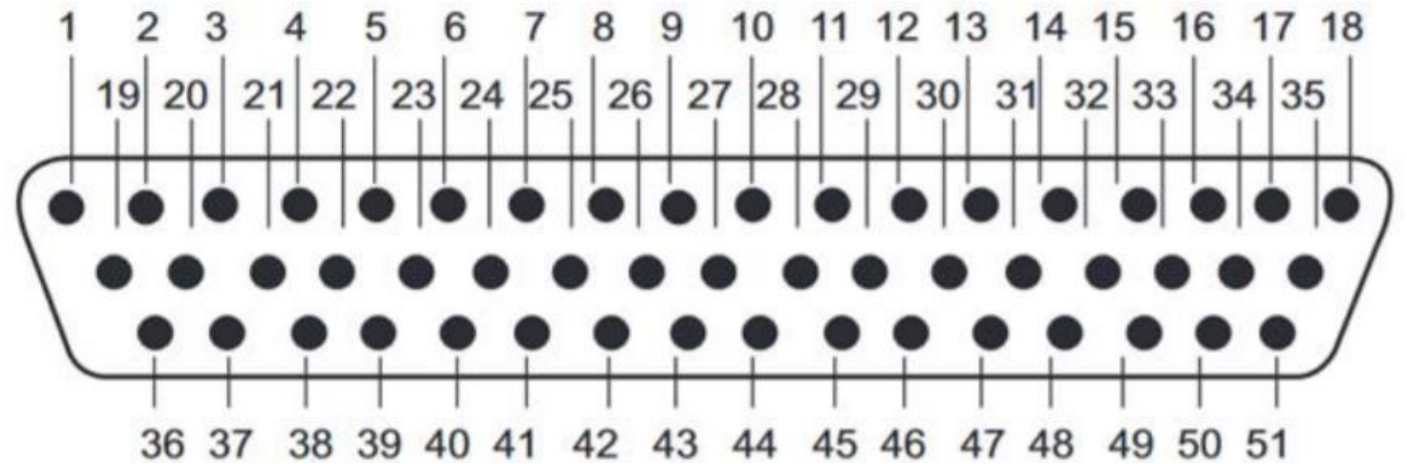
## SENSOR CONNECTOR PIN ASSIGNMENTS

PIN	SIGNAL	PIN	SIGNAL
1	-SIG_CH1	26	+IEPE_CH3
2	+SIG_CH1	27	GND/SHIELD
3	GND/SHIELD	28	+IEPE_CH4
4	-SIG_CH2	29	-EX_CH4
5	+SIG_CH2	30	GND/SHIELD
6	GND/SHIELD	31	+IEPE_CH5
7	-SIG_CH3	32	-EX_CH5
8	+SIG_CH3	33	GND/SHIELD
9	-ID/-IEPE_CH3	34	+IEPE_CH6
10	-ID/-IEPE_CH4	35	-EX_CH6
11	+SIG_CH4	36	+EX_CH1
12	-SIG_CH4	37	+ID_CH1
13	GND/SHIELD	38	-ID/-IEPE_CH1
14	+SIG_CH5	39	+EX_CH2
15	-SIG_CH5	40	+ID_CH2
16	GND/SHIELD	41	-ID/-IEPE_CH2
17	+SIG_CH6	42	+EX_CH3
18	-SIG_CH6	43	+ID_CH3
19	-EX_CH1	44	+ID_CH4
20	+IEPE_CH1	45	+EX_CH4
21	GND/SHIELD	46	-ID/-IEPE_CH5
22	-EX_CH2	47	+ID_CH5
23	+IEPE_CH2	48	+EX_CH5
24	GND/SHIELD	49	-ID/-IEPE_CH6
25	-EX_CH3	50	+ID_CH6
		51	+EX_CH6

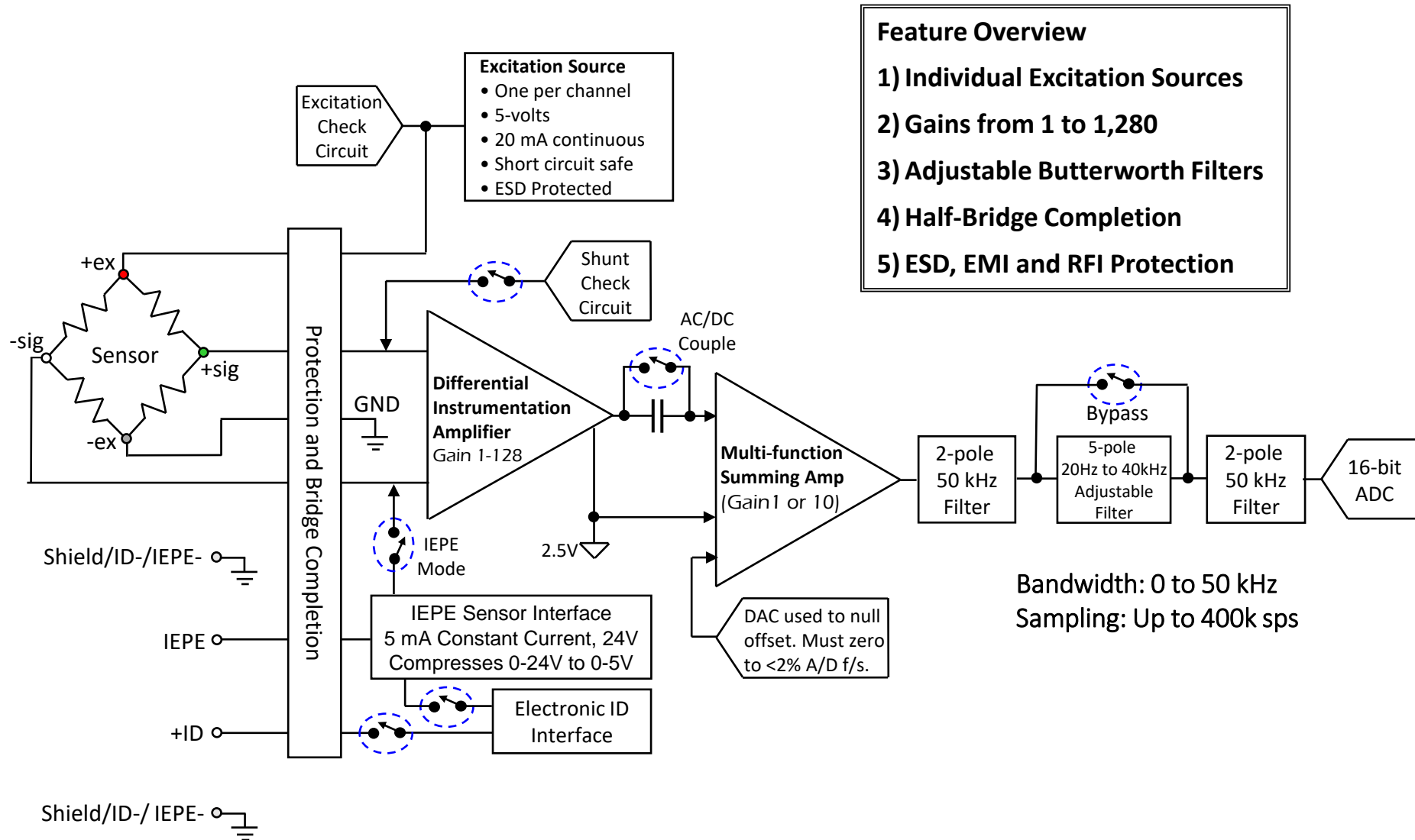
The Sensor Connector has 8 dedicated pins per channel.

+/- Excitation, +/- Signal, +/- IEPE, +/- ID

LOOKING INTO FRONT OF SLICE6 AIR SENSOR CONNECTOR



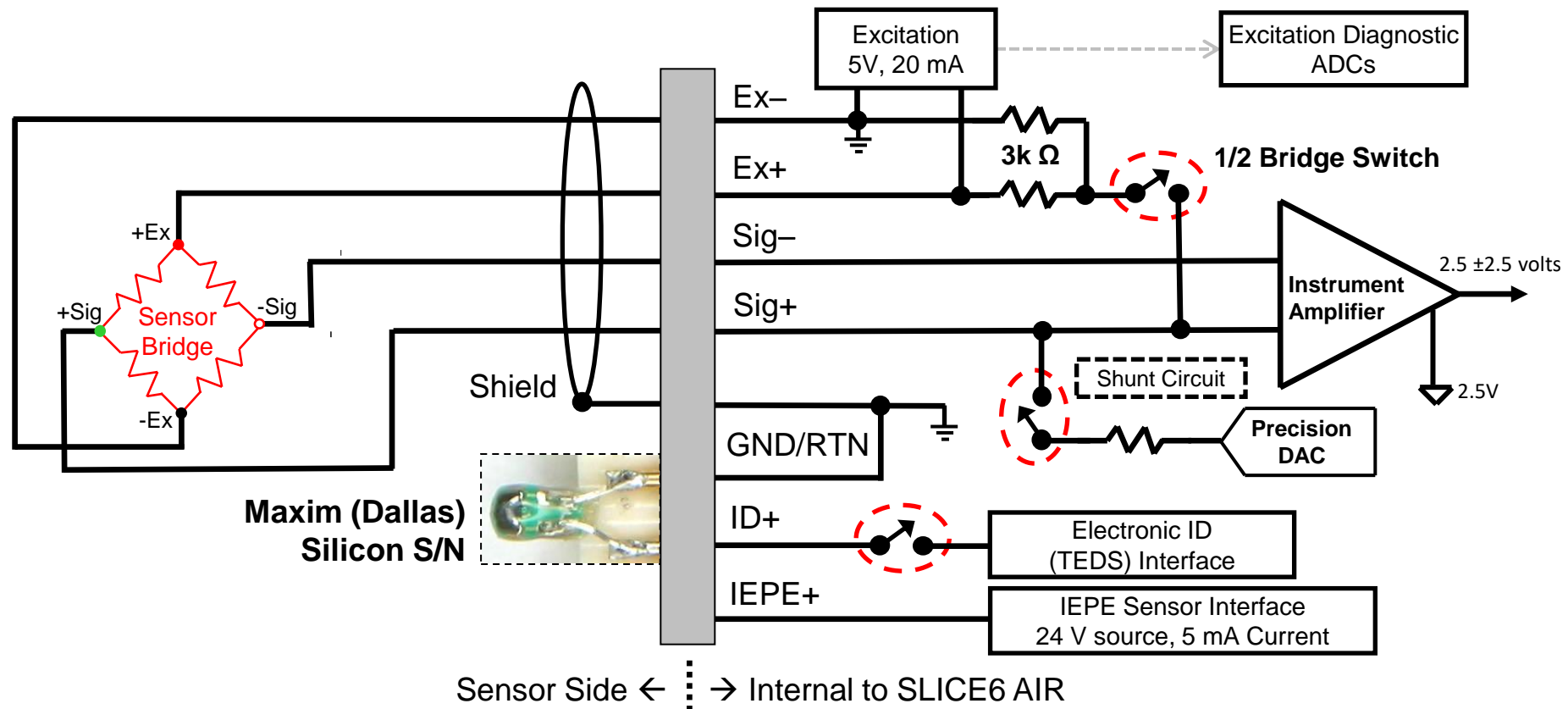
# SLICE6 AIR Sensor Channel Architecture





# SLICE6 AIR Sensor Interface Detail

- +/- Signal are connected to a true Differential Instrumentation Amplifier (IA)
- Common Mode Range of the IA is 0-5 volts with respect to ground and -excitation.
- +/- Signal inputs must both be connected either externally or using 1/2 bridge completion.
- The maximum signal swing is 0-5 volts or  $\pm 2.5$  volts (with a 2.5 volt center)

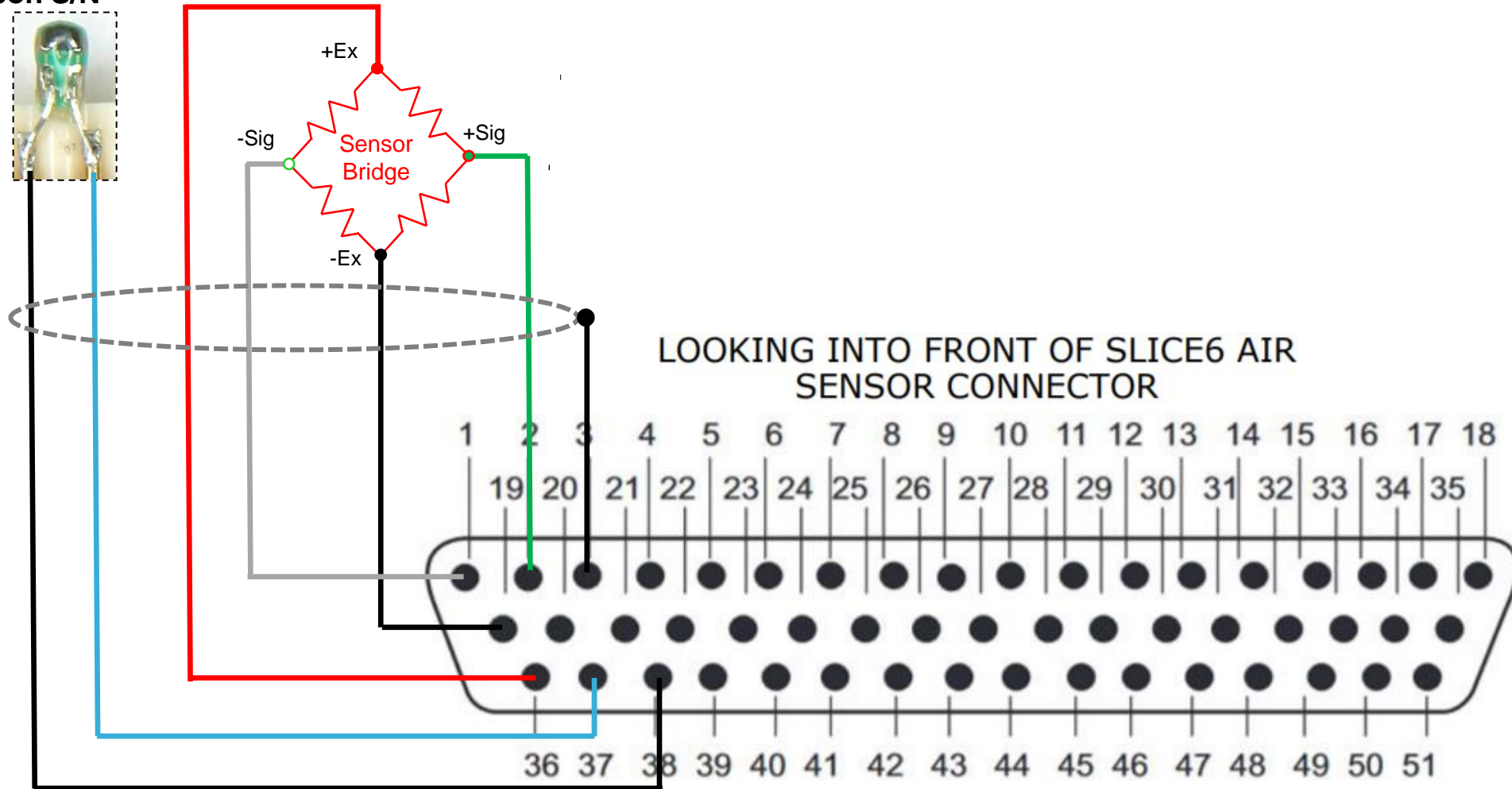


# Example Bridge Sensor on Channel 1

Maxim (Dallas)  
Silicon S/N

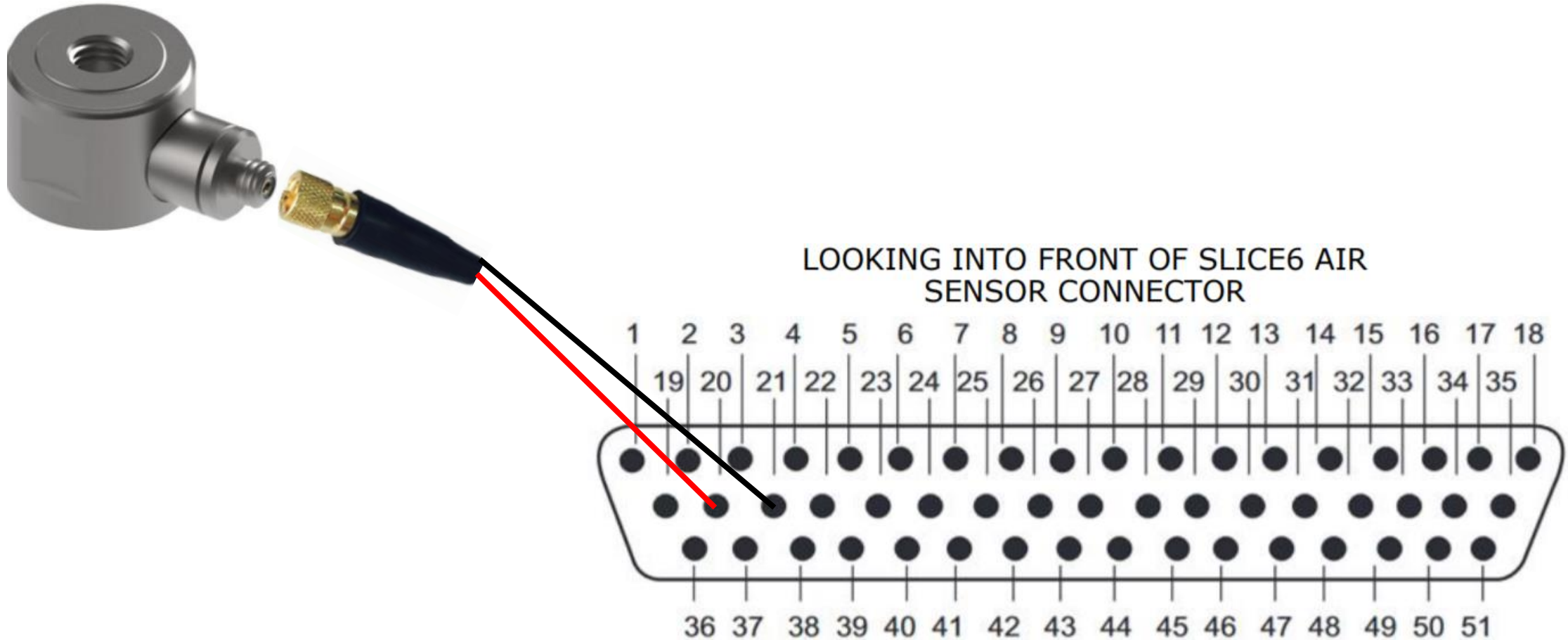


Any Bridge Sensor



# Example IEPE Sensor on Channel 1

Any IEPE Sensor



# System Connections

## Power

- 9 – 36 VDC
- <3 W consumption

## Communication

- Ethernet 10/100 (2-ports per SLICE6 Unit)
- IRIG Chapter 10 PCM Format 1. Available TmNS
- Up to 20 ksps real-time streaming per channel

## Synchronization Options

- IEEE 1588 PTPv2
- IRIG B122
- GPS (NMEA Data) + PPS
- PPS Only

## Hardware Controls for Onboard Recording

- Remote on/off Control
- Status LED
- Start Record
- Status
- Event
- TTL Compatible

Sensor Connector



System Connector





# System Connections

Sensor Connector

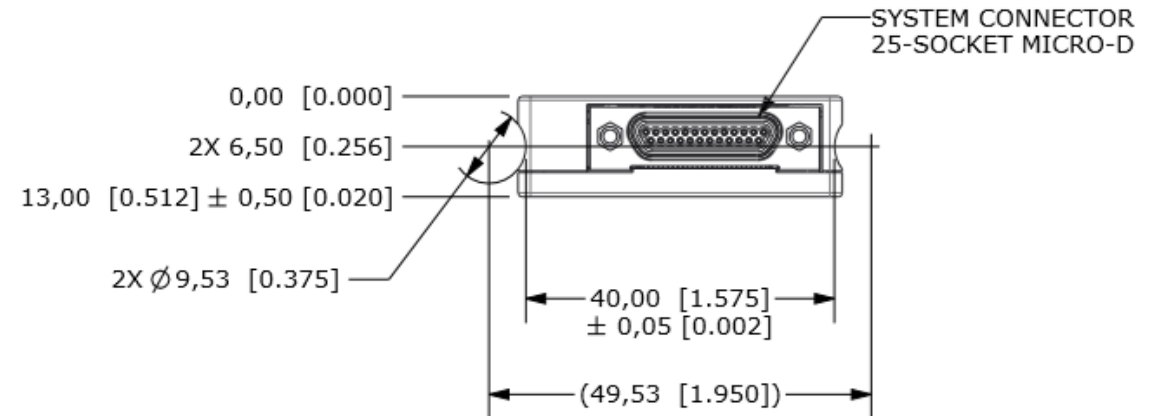
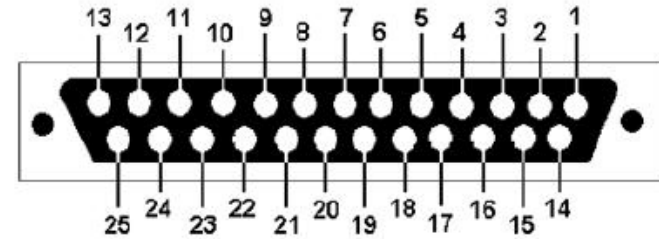


System Connector

**SYSTEM  
CONNECTOR  
PIN ASSIGNMENTS**

PIN	SIGNAL
1	+PWR
2	+PWR
3	+PWR
4	GND
5	GND
6	TX_2_P
7	TX_2_N
8	RX_2_P
9	RX_2_N
10	TX_1_P
11	TX_1_N
12	RX_1_P
13	RX_1_N
14	#ON
15	#START
16	#EVENT
17	STATUS
18	UART_RX_P
19	UART_RX_N
20	UART_TX_P
21	UART_TX_N
22	GND
23	GND
24	IRIGB
25	PPS

LOOKING INTO FRONT OF SLICE6 AIR  
SYSTEM CONNECTOR



# SYSTEM CONNECTOR PIN ASSIGNMENTS

PIN	SIGNAL
1	+PWR
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22	GND
23	GND
24	IRIGB
25	PPS

**+PWR**

- 9-36V DC, 3W Maximum
- Reverse current & ESD Protection

**GND - All GNDs are internally common**

- GND is connected to the enclosure
- GND is connected to negative excitation

**Ethernet – 2 Ports used for daisy chaining**

- 100M bit/sec (transformer-less)
- IEEE-1588 Switch, PTPv2 Compliant
- Maximum cable length ~10m
- Cable quality may affect maximum length & performance

**#ON - Pull to GND to turn unit on. (Required current is <1mA)**

- Open circuit voltage is  $\cong$  +PWR

**#START & #EVENT – Active Low - Pull to GND to activate**

- Open circuit voltage is 5V (Required current is  $\cong$  10 mA)

**Record Serial Data (RS-232 or RS-422)**

- Simple ASCII, GPS Date, Time, Position

**STATUS**

- Normally low (pulled to GND)
- Status “OK” provides ~4.5-volts via a 10K resistor

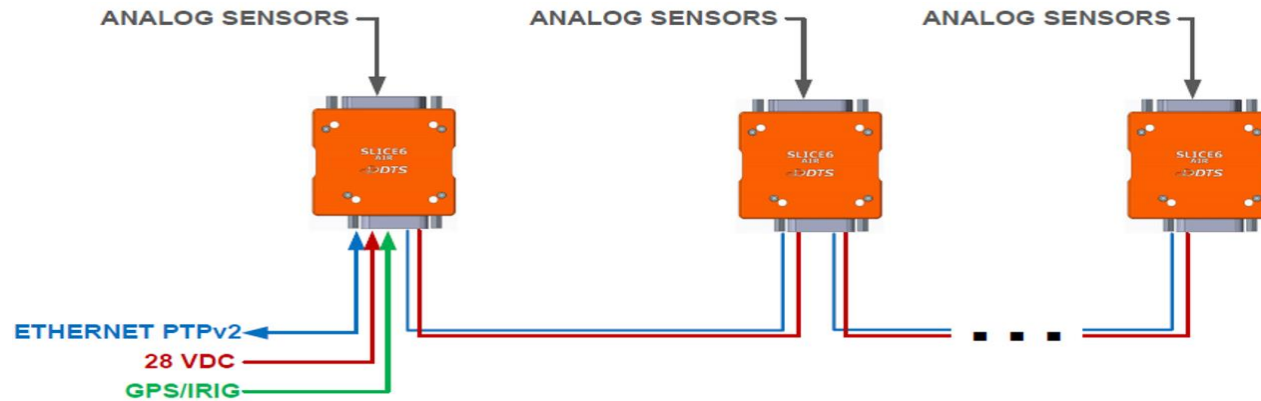
**IRIG-B → 1k Hz IRIG-B122 (analog waveform or digital)**

**PPS – Precision Timing, 0-5V, Input or Output. Possible to use with or without GPS.**



# Ethernet Chaining

- When chaining SLICE6 AIR units together for shared Ethernet communications, use the following guide:



SLICE6 AIR #1		SLICE6 AIR #2		SLICE6 AIR #3	
Function	Pin #	Function	Pin #	Function	Pin #
		TX_2_P	6	RX_1_P	12
		TX_2_N	7	RX_1_N	13
		RX_2_P	8	TX_1_P	10
		RX_2_N	9	TX_1_N	11
TX_2_P	6	RX_1_P	12		
TX_2_N	7	RX_1_N	13		
RX_2_P	8	TX_1_P	10		
RX_2_N	9	TX_1_N	11		

**THANK YOU**

