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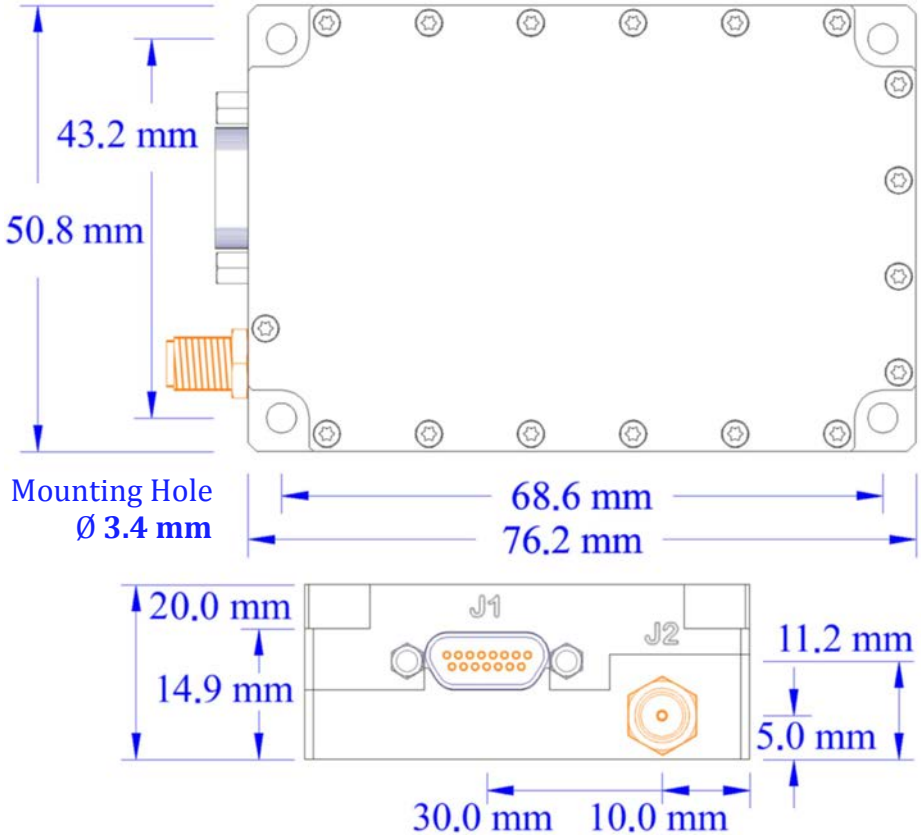
S-BAND TELEMETRY TRANSMITTER **TXS**

INSTRUCTION MANUAL

Dimensions
76.2 x 50.8 x 20 mm

OUTLINE DRAWING



latest version of this instruction manual → txs_manual.pdf
latest version of the TXS datasheet → txs_datasheet.pdf

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INSTALLATION INSTRUCTION

The bottom surface must be securely attached to a baseplate capable of dissipating the power produced by the device. This mounting baseplate must be flat, smooth, and clean.

Mounting Material

4x cylinder head hexagon screw stainless steel A2 DIN 912 M3x20

4x spring lock washer stainless steel A2 DIN 127 3mm

4x washer for cylinder head screws stainless steel A2 DIN 433 for M3

Cooling

VERY IMPORTANT !

► The device must be cooled adequately !

► The device must be mounted on a heat sink.

► A thermal compound between module and heat sink is obliged for low thermal contact resistance.
Recommended is the thermal interface sheet material Graftech HT-2505
datasheet → txs_cooling_material_hitherm.pdf
distributor → RS Components

► Heat sink flatness should be less than 100 µm
a heat sink that is not flat or particles between module and heat sink may cause too much mechanical stress

► If you operate the device without adequate cooling the reliability will be drastically reduced.
Please do not underestimate the produced dissipation heat !

Antenna Connector

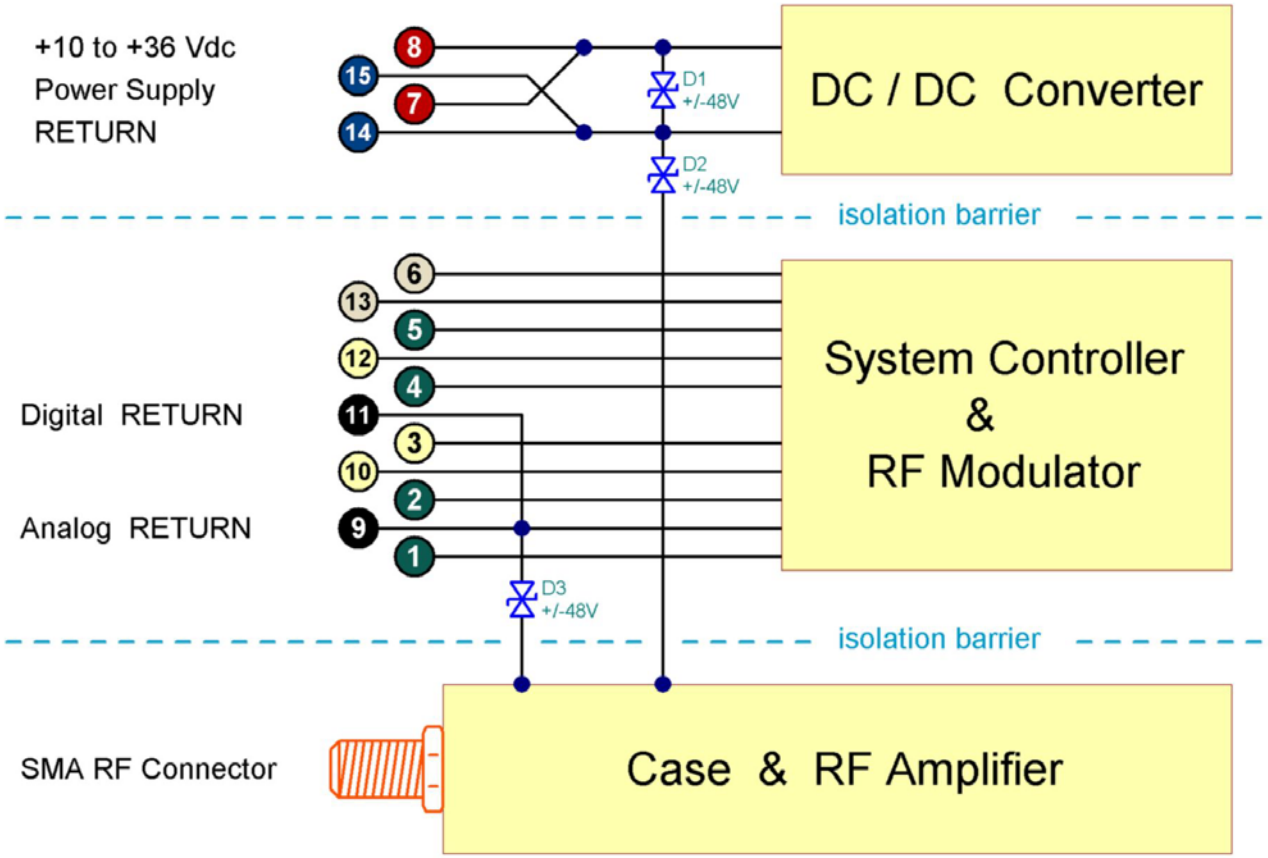
In most cases SMA connectors are applied with far too much torque. It is strongly recommended to use a SMA torque wrench: → fairviewmicrowave_torque_wrench.pdf

preliminary instruction manual … will be continued….

ISOLATION CONCEPT

There are 3 isolated areas:
(1) Power Supply Input
(2) System Controller & RF Modulator
(3) RF Amplifier (connected to case)

To prevent damage caused by ESD events overvoltage protection devices are connected between the isolated areas. For this the voltage between the isolated areas must not exceed 47Volt.



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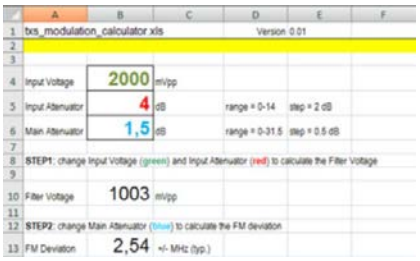
MODULATION

ATTENUATORS:
There are two attenuators to adapt to different input voltages and to set the desired FM deviation.
The input attenuator range is 14 db in steps of 2 dB.
The main attenuator range is 31.5 db in steps of 0.5 dB.
The modulation level calculator should be used to calculate the proper attenuator settings: txs_modulation_calculator.xls



INPUT LEVEL RANGE:

Inp.Attenuator dB	Gain	min.InpVoltage mVpp	typ.InpVoltage mVpp	max.InpVoltage mVpp	
0	0,795	1000	1258	3901	
2	0,631	1258	1584	4911	*
4	0,501	1584	1995	6183	*
6	0,398	1995	2511	7784	*
8	0,316	2511	3161		
10	0,251	3161	3980		
12	0,200	3980	5010	*	
14	0,159	5010	6307	*	

* max. Input Voltage (single ended) = 4100 mVpp

For digital modulation set input attenuator to 2

PREMODULATION FILTER:
The main premodulation filter is a phase-linear 5th-order lowpass set to 10MHz in the "-10" version and 6MHz in the "-6" version. In the digital section there is an additional 5th-order Gaussian lowpass filter to achieve perfect pulse shaping and sideband suppression.

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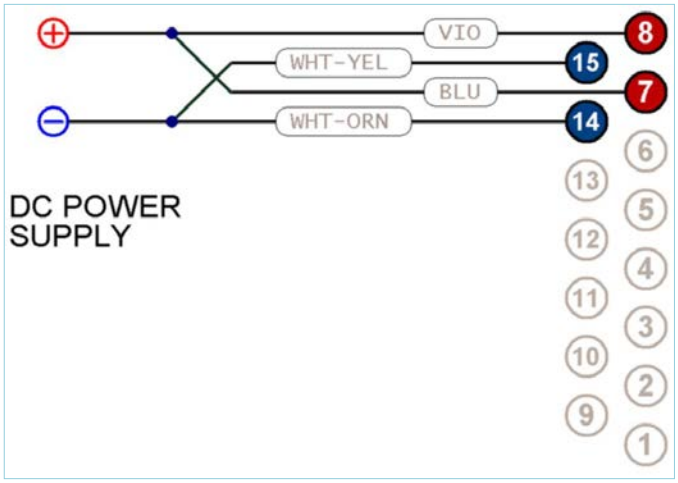
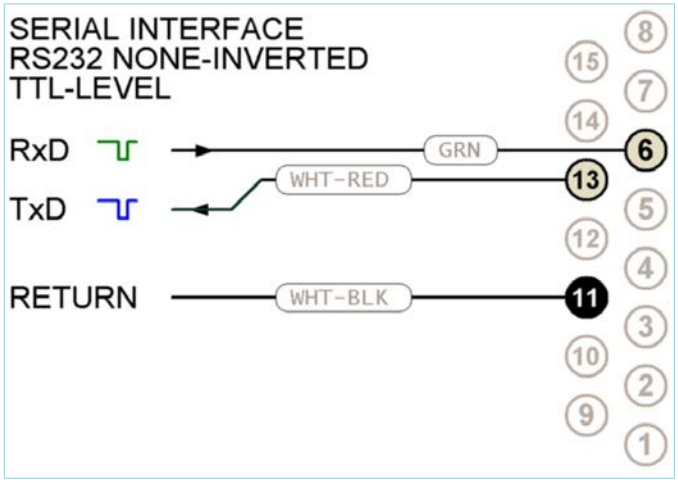
POWER SUPPLY



The power supply operating range is 10 Vdc to 36 Vdc. The power supply input is gavanically isolated (floating) against all other parts of the device.
To prevent excessive static voltages between the different isolated areas of the device 48 Volt overvoltage protectors are connected across the isolation barriers. So the maximum voltage between the return levels of the different isolated areas must not exceed 47 Volt.
The power supply input is reverse polarity protected up to -47 Vdc.

SERIAL INTERFACE RS232 NONE-INVERTED TTL LEVEL



The none-inverting TTL level serial interface can be directly connected to the UART port of an external microcontroller, or via a TTL/USB adaptor to any PC with USB connection.
An easy to use USB adaptor is available as accessory.
The default UART setting is 57600,N,8,1.

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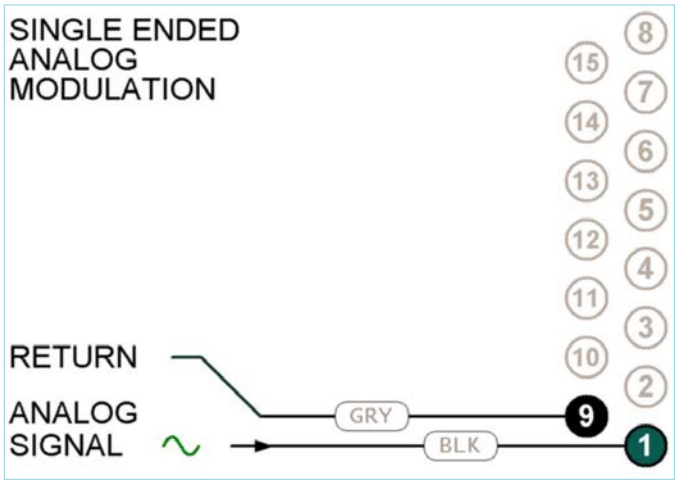
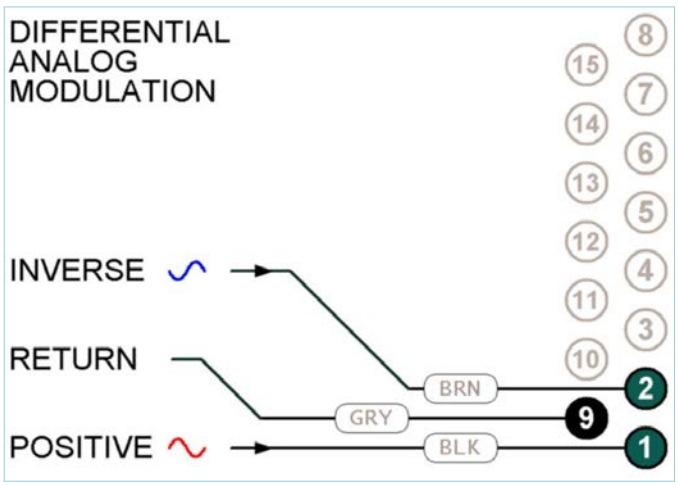
MODULATION INPUT ANALOG SINGLE ENDED



The single ended analog modulation mode is the most commonly used input type for video transmitters.

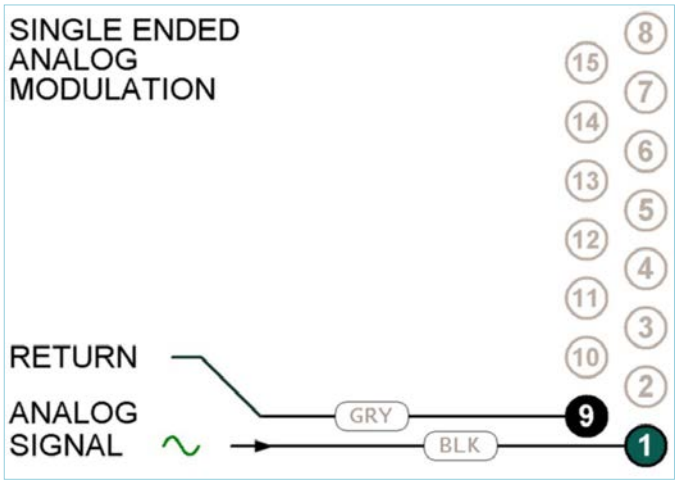
MODULATION INPUT ANALOG DIFFERENTIAL



The analog differential input can be used with twisted pair cable connection or if maximum signal-to-noise ratio is requested.

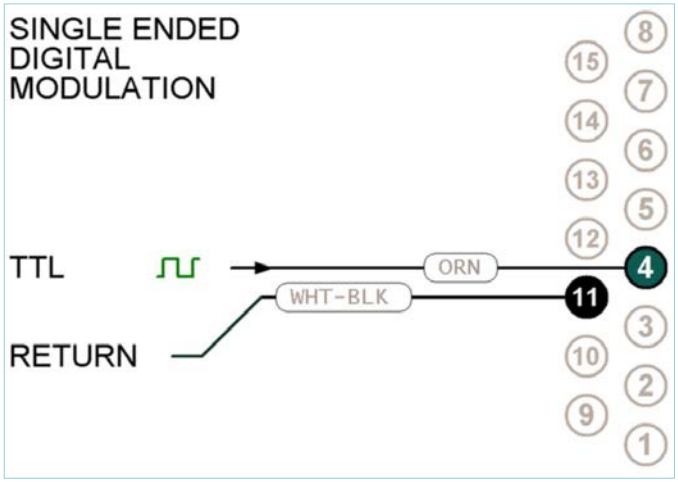
preliminary instruction manual … will be continued….

MODULATION INPUT ANALOG SINGLE ENDED WITH OFFSET



The single ended analog modulation input with offset allows the direct dc-coupled connection to an analog source with 1.65 V dc offset (this is ½ of the commonly used 3.3V supply).

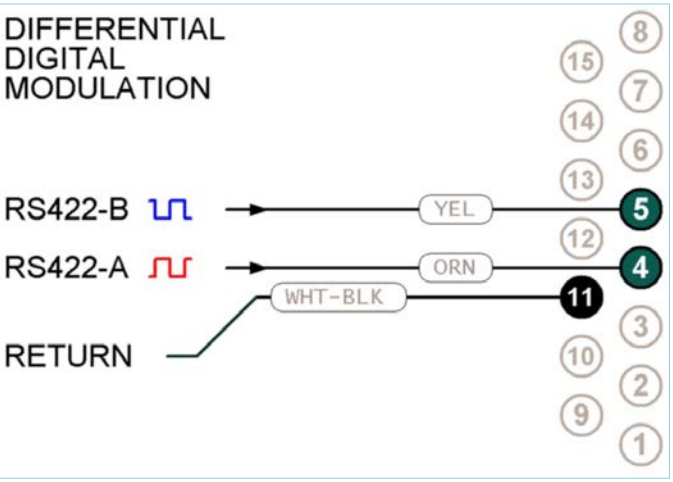
MODULATION INPUT DIGITAL SINGLE ENDED (TTL)



The TTL level input can be used with digital signal sources.

preliminary instruction manual … will be continued….

MODULATION INPUT DIGITAL DIFFERENTIAL (RS422)



The RS422 input is suitable for longer distances with twisted-pair cable. This mode guarantees the best noise immunity performance.

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SERIAL INTERFACE PROTOCOL DESCRIPTION

THIS MANUAL IS UNDER CONSTRUCTION !
A detailed protocol description will be included in one of the next document versions. Please check → txs_manual.pdf for updates.

Quick startup guide:

(1) you'll need a non-inverting TTL-level RS232 connection:
    TxD(PC) to RxD(TXS)(Pin6)
    RxD(PC) to TxD(TXS)(Pin13)
    GND(PC) to GND(TXS)(Pin11)

(2) start terminal software 57600,N,8,1

(3) connect power supply
    TXS will send status screen:

```
RESET; EEPROM_CS=ED85; '?' = HELP MENUE

====[ TXS-S1-P6-Z-X ]=============================================================
PIC24FJ64GB004;  SW=TXS1; V=001; SN=012345;    FREQ=2250.000000; STEP=0.200000;
INP=ANA_SINGLE; POL=POS; ATT1=04.00; ATT2=01.50; DCC=OFF; PWR=9;
-------------------------------------------------------------------------------
```

(4) single character commands:
'?' = help screen
ESCAPE(27) = abort command sequence in progress
RETURN(13) = status screen

(5) command protocol:
parameter + control character + RETURN(13)
Example (change frequency to 2300 MHz):
"2300F" + RETURN

(6) choose input configuration:
factory setting is analog single ended, 2Vpp for +/-2.6MHz deviation

** until now all changes are temporarily **
So you can try out several configurations without affecting the saved settings.

(7) save the current setting in nonvolatile EEPROM:
send “OPEN” + RETURN this will open the EEPROM write mode
    the TXS answers “_OK” (screen display is “OPEN_OK”)
send “SAVE” + RETURN this will save the current setting in the EEPROM
    the TXS answers “_OK” (screen display is “SAVE_OK”)

preliminary instruction manual … will be continued….

COMMANDS:

Command Format: pppppp[CR] (pppppp = Parameter, [CR] = ASCII 13)
[CR] without parameter = Status; [ESC] = abort current action;

Change Frequency: 2250F[CR] (2200=2.2GHz; 2300=2.3GHz)

Attenuator 1: 200A[CR] Attenuator 2: 1000B[CR]
'(' or ')' = change Input-Attenuator (1) in single steps
'-' or '+' = change Main-Attenuator (2) in single steps
Parameter: Value in 0.01dB (example: 200 = 2dB)
ATT1: The input attenuator range is 14 db in steps of 2 dB.
ATT2: The main attenuator range is 31.5 db in steps of 0.5 dB.

Modulation Polarity: 0V[CR] (0=positive; 1=inverted)

DC Compensation Mode: 0D[CR] (0=OFF, 1=ON)

Power Step: 9P[CR] (0=OFF; 8=LOW; 9=HIGH)

Input Configuration 4C[CR] (0=OFF; DIGITAL: 1=RS422; 2=TTL; ANALOG:
4=SINGLE_ENDED_ZERO; 5=DIFFERENTIAL; 6=SINGLE_ENDED_WITH_OFFSET)

Restart Device: RESET[CR]

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preliminary instruction manual … will be continued….