

Sierra Monolithics, Inc., a wholly owned subsidiary of Semtech Corporation

SMIVT5GRX

C-band Video/Telemetry Receiver

July 8, 2010 (Revision C)

Description:

The SMIVT5GTX and SMIVT5GRX set consists of one each transmitter and receiver. The SMIVT5GRX receives and demodulates either broadcast quality FM video (6 MHz Bandwidth) or telemetry. In video mode the receiver also simultaneously receives FM telemetry data on two subcarriers at a data rate of up to 30 kbits per second each. This field proven product is used today on unmanned aerial vehicles (UAVs).

Applications:

- Unmanned Aerial Vehicle (UAV) video links
- Airborne command and telemetry links
- FLIR links
- Fixed site surveillance
- Video and data relay

Features:

- Tested for full broadcast quality video per EIA 250C (NTSC & PAL)
- Proven flight history
- Wide dynamic range
- Wide tuning range (600 MHz)
- Signal strength indicator
- 10 mile range
- · Easily customized to work in L-band or Ku-band
- For customized products contact factory



RF Characteristics

Parameter	Min	Nom.	Max	Units	Comments
RF Output Frequency	5250		5850	MHz	
Output Freq Step Size		1 MHz			Commanded with 10 bit TTL word.
Output Frequency Accuracy	-20		20	ppm	
Image Rejection	60			dBc	
Spurious Rejection	60			dBc	Over input frequency range
Noise Figure	1		2	dB	
Input VSWR			2:1		Referenced to 50 ohms
Dynamic Range					
Video Mode	-84		-20	dBm	
Telemetry Mode	-103		-20	dBm	
Telemetry Sensitivity SNR	6			dB	With -103 dBm input and 14 kHz post detection BW.
Telemetry IF BW	0.9	1	1.1	MHz	
Video Sensitivity SNR	20			dB	With -84 dBm input and using the standard NTSC luminance weighted post detection filter
Video IF BW	18	20	22	MHz	
Maximum RF Input			10	dBm	No damage

2.0 Demodulation Characteristics

Video / Telemetry BW Select	IF BW
0	Video (20 MHz nominal)
1	Telemetry (1 MHz nominal)

2.1 Telemetry Demodulation

Input FM Deviation:300 kHz peak to peak Output Voltage Produced: 5V peak to peak +/- 10% Input impedance: 75 ohms +/- 10% Polarity: Positive (increasing frequency increases voltage) 3 dB modulation BW: 50Hz to 300 kHz Non-linearity: < 3% when measured with sinusoidal input

2.2 Video Demodulation

Input FM Deviation: 4 MHz peak to peak Output Voltage Produced: 1V peak to peak +/- 10% Input impedance: 75 ohms +/- 10% Polarity: Positive (increasing frequency increases voltage) 3 dB modulation BW: 8Hz to 5 MHz Non-linearity: < 3% De-emphasis: either 525 line standard or 625 line standard, specified at order

2.3 Subcarrier Demodulation

Subcarrier Frequencies: 6.8 MHz and 7.5 MHz Subcarrier frequency variation with temperature: +/- 30 kHz FM Deviation: 200 kHz/V +/-10% Output Produced: 5V peak to peak +/- 20% Input Impedance: 600 ohm +/- 10% Polarity: Positive (increasing frequency increases voltage) 3 dB post-detection BW: 50 Hz to 50 kHz IF BW: 280 kHz +/-5%

3.0 DC Power

3.1 +28 Volt Characteristics

Range: +21 Volts to +32 Volts Ripple: <1 Volt rms ripple. Maximum Current; 1 Amp Spikes: No damage when 50 Volt spikes lasting 1 mS are applied Powers Transmitter except last two stages

4.0 Telemetry Outputs

4.1 Phase lock Indication Output

Locked: TTL Low Unlocked: TTL high Output Impedance: < 100 ohms Pin 19 of D Connector

4.2 Signal Strength Indicator

Output Type: Analog Pin 13 of D Shell Connector Output Impedance: 600 ohms +/- 10 %. Output Transfer Function: Video Mode: 0 Volts at -85 dBm +10 Volts for -20 dBm Telemetry Mode: 0 Volts at -105 dBm +10 Volts for -20 dBm Deviation from straight line fit: <1 Volt

4.3 AM Tracking Output

Output Type: Buffered Analog AC Coupled Pin 14 of D Connector Output Impedance: 600 ohms +/- 10% 3 dB Bandwidth 50 Hz to 10 kHz With 6% AM modulation of the input power the AM tracking output voltage shall be 0.80 Volts rms nominal over the input power range of -85 dBm to -20 dBm

5.0 Commanding

The transmitter frequency is set with a 10 bit digital word commanded on pins 1-10 of the D Connector. These are TTL levels, the step size is set at 1 MHz.

Command Decoder: 5250 MHz = 0 (binary) 5850 MHz = 601 (binary)

Pin 1 is LSB Pin 10 is MSB

If a frequency is selected which is out of band, the transmitter will automatically select an output frequency of 5800 MHz.

Interfaces

RF Input:	50 ohms SMA Female
Video outp	out: 50 ohms SMA Female
Other Sigr	als 25 Pin D-shell as noted below:

	0
Pin	Description
1	PLL Command Word bit 0 (LSB)
2	PLL Command Word bit 1
3	PLL Command Word bit 2
4	PLL Command Word bit 3
5	PLL Command Word bit 4
6	PLL Command Word bit 5
7	PLL Command Word bit 6
8	PLL Command Word bit 7
9	PLL Command Word bit 8
10	PLL Command Word bit 9 (MSB)
11	
12	
13	Signal Strength output (Analog Output)
14	AM Tracking Output (Analog Output)
15	Telemetry Output (Analog Output)
16	6.8 MHz Subcarrier Output (Analog Output)
17	7.5 MHz Subcarrier Output (Analog Output)
18	Bandwidth Select (TTL Input, 1=Telemetry, 0 = Video)
19	Phase Lock Indication (TTL Output)
20	Configuration Status (TTL Output)
21	+28 Volts
22	+28 Volts
23	Ground
24	Ground
25	Ground

6.0 Environmental

7.1 Temperature

Operational: -40 to +70 degrees C, Case Temperature. Storage: -55 to +125 degrees C

- 7.2 **Vibration:** Meets all operational specifications while being vibrated at 5 G's at frequencies up to 50 Hz.
- 7.3 **Shock:** No damage with a shock of 20G's with a duration of 11 mS tested per MIL-STD-810C.
- 7.4 **Humidity, Dust and Rain:** Sealed against humidity, dust, rain and salt spray as per MIL-STD-810C.

7.0 Mechanical:



8.0 Ordering Information

Semtech Corp. 200 Flynn Road, Camarillo, CA 93012 Contact: Semtech Sales Representative

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