

NM-COMM-6553

Radio Telemetry/Payload Receiver

KEY FEATURES AND BENEFITS

- Supports all amateur frequency bands from VHF to S-band
- Configurable option for Ax25, HDLC, CCSDS and raw pattern formats
- Configurable data rate from 0.1kbps to 2Mbps
- Single channels integrated in high data-rate and low data-rate receivers
- VHF, UHF, L-band and S-band frequency bands used
- Demodulation schemes like BPSK, QPSK, OQPSK, FSK, GFSK, 4-FSK, MSK, GMSK, ASK, AFSK and FM
- -130dBm to -20dBm wide dynamic range
- CCSDS, HDLC, AX.25 and SYNC WORD MATCH protocols used
- FEC (Forward Error Correction) Viterbi decoder
- In-built doppler correction upto Low Earth orbits (LEO) and doppler frequency compensation by estimation
- Spectrum RF monitoring and front-panel status monitoring

APPLICATIONS

- CUBESAT telemetry and payload
- High data rate telemetry and payload
- Satellite communications



DESCRIPTION

The NM-COMM-6553 is a configurable receiver/ demodulator that has a low data-rate receiver and a high data rate receiver integrated in a single channel. The Radio Frequency (RF) input is simultaneously available at low data-rate receiver and high data-rate receiver which are interfaced to the signal processing unit.

BLOCK LEVEL EXPLANATION

FRONT PANEL

A front panel is used for user control and monitoring of the receiver unit. It contains the numerical and navigation keys for configuration, Light Emitting Diodes (LED's) for status indication and Liquid Crystal Display (LCD) for displaying the status and other information.

POWER SUPPLY

A 230V AC input power supply is used to generate required power to all the sub-systems.

DEMODULATOR

The demodulator section supports Forward Error Correction (FEC) based on Viterbi decoding with variable code rate scheme to improve the sensitivity of the receiver. This covers both commercial and amateur satellite radio communication bands (VHF to S-band).

TELEMETRY RECEIVER

The telemetry receiver supports a 420MHz to 450MHz RF frequency range in the low data rate telemetry processing.

DOWN CONVERTER RECEIVER MODULE (VHF to S-Band)

The down conversion of RF frequency band into 70MHz IF frequency band is done by the down converter receiver module.

SPECIFICATIONS

LOW DATA RATE RECEIVER SPECIFICATIONS

RF frequency range	: 420MHz to 450MHz
Modulations	: FSK, GFSK, 4- FSK, MSK, GMSK, ASK, AFSK and FM
BT values	: GFSK - 0.3 GMSK - 0.5
Data rate	: 0.1kbps to 115.2kbps (Except FM and AFSK 1.2kbps only)
Dynamic range	: -130dBm to -40dBm*
Protocols	: HDLC, AX.25 and SYNC WORD MATCH
Frequency resolution	: <10Hz
Adjacent channel rejection	: >45dB
Frequency stability	: <3ppm
Error correction	: Viterbi (1/2) for HLDC
Descrambler	: K9NG/G3RUH
Decoding scheme	: NRZ, NRZI with descrambler
Doppler frequency	: Doppler frequency compensation by estimation and in-built Automated Frequency Controller (AFC) for doppler correction with bandwidth expansion

Modulations	: BPSK, QPSK and OQPSK
Data rate	: CCSDS
FEC	: Viterbi decoder (1/2,3/4 and 7/8)
Descrambler	: Required
Spectrum monitoring	: RF and IF monitoring
Software monitoring	: AFC drift, SNR estimation, carrier lock
Data rate	: 9.6kbps to 2Mbps
In-built doppler correction	: Upto LEO orbit

AVAILABLE PRODUCT OPTIONS OF LOW DATA RECEIVER

Maximum data rate	: 0Mbps to 5Mbps
Modulation support	: 3 / 4 D Q P S K , 8 P S K , 1 6 Q A M , 16APSK,32APSK,PCM-FM and PCM-PM
Other protocol support	: INTELSAT
FEC	: Reed solomon
PCM codes	: NRZ - L / M / S, BP - L / M / S, DM - M / S, differential
Bit synchronization	: At LVTTTL output pin

AVAILABLE PRODUCT OPTIONS OF LOW DATA RECEIVER

Custom frequency	: 27MHz to 525MHz : 800MHz to 1050MHz
Stability	: Better clock stability

HIGH DATA RATE RECEIVER SPECIFICATIONS

RF Frequency Range	
S-band	: 2200MHz to 2500MHz
Upper L-band	: 1680MHz to 1920MHz
Lower L-band	: 1430MHz to 1560MHz
UHF band	: 410MHz to 440MHz
VHF band	: 130MHz to 150MHz
IF frequency	: 70MHz
Frequency resolution	: <10Hz
Dynamic range	: -20dBm to Noise threshold*
AGC range (Automatic Gain Control)	: 60dB (Automatic/Manual)
Spurious signal rejection	: > 60dB
IF phase noise	: -100dBc/Hz at 1kHz
* External LNA is required to achieve better stability	

FOR HIGH AND LOW RECEIVERS

Electrical specifications

External reference	: 40MHz at +3dBm*
VSWR (Voltage Standing Wave Ratio)	: 2:1
Supply current maximum	: 0.2A(220V)
Polarity switch control	: RHCP/ LHCP at +15V level
Monitoring and control	: Front panel/Remote P

Power

Maximum input power level	: +15dBm
Supply voltage	: 85~264V AC(47Hz~43Hz)

Interface

Interface	: Ethernet
User interface	: Front panel with LDC display, keypad and LED status indication

Connectors

Input connector	: SMA female
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Environmental

Temperature range	: 0°C to 55°C
Weight	: 6.5Kg

BLOCK DIAGRAM OF DP-COMM-8005

