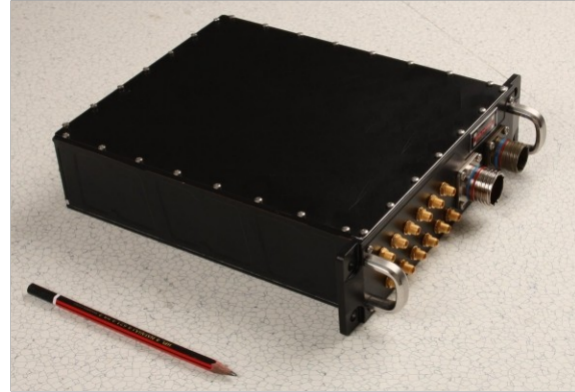


KEY FEATURES AND BENEFITS

- In-built frequency synthesizer for up converter and down converter.
- Engineered OXCO for better phase noise under vibration environment
- Supports a step size of 500KHz tuning frequency at Ku band output.
- Optimized for Airborne SATCOM applications.
- Rs422 and RS232 standard bus interface for programming

APPLICATIONS

- SATCOM Applications
- Up down converter interface for Modem
- Airborne Up Down Converter (AUDC)



DESCRIPTION

The AUDC performs the up conversion of a 70MHz Intermediate Frequency (IF) signal to Ku band frequency of 14.00GHz to 14.50GHz / 13.75GHz to 14.25GHz / 13.75GHz to 14.50GHz (exact band is configurable) and down conversion of L band frequency (950MHz to 1700MHz) to 140MHz.

The Airborne Up-Down Converter (AUDC) functionally consists of the following sub modules.

1. L band up converter
2. KU band up converter
3. L band down converter
4. Frequency synthesizer
5. OCXO module
6. Monitor and control module.
7. Power supply module

BLOCK LEVEL EXPLANATION

L BAND UP CONVERTER

The up converter selects either of the dual payloads IF signals in the transmit chain at the first stage. The selected IF signal is mixed with a two-stage programmable frequency synthesizer to generate an IF in L band. This L band frequency is further up converted to Ku band frequency of 13.75GHz to 14.5GHz, using a fixed 12.8GHz band Phase Locked Oscillator (PLO).

KU BAND UP CONVERTER

The Ku band up converter converts the modulated L-band signal to Ku-band frequency in the range of 13.75 GHz to 14.50GHz using a single stage up-conversion. The required fixed frequency LO is given from the Frequency synthesizer module. The up-converted Ku-band signal is then passed through band-pass filter to reject the spurious and harmonics signals generated by mixer. The output of band pass filter is further passed through a 2-stage cascaded amplifier followed by a low-pass filter before being made available on the front-panel of the AUDC.

L BAND DOWN CONVERTER

The down converter chain accepts the RF signal in the frequency band of (950MHz- 1700MHz) which is mixed with a two- stage programmable frequency synthesizer to generate IF of 140MHz.

FREQUENCY SYNTHESIZER MODULE

The programmable frequency synthesizers in transmit and receive chains provide the tuning capability for channel selection at RF level from the total available spectrum. The synthesizers are tunable in 1MHz steps through internal programmable synthesizer. Programming is accomplished using an RS-422 interface

OXCO MODULE

The OXCO module employs a highly stable Oven Controlled Crystal Oscillator at 60 MHz to provide a uniform reference signal source to all the fixed PLL and programmable frequency synthesizers.

MONITOR AND CONTROL MODULE

The Monitor and Control (M and C) module facilitates frequency selection from the external world using RS-422 interface. It also monitors the Lock Detect (LD) signals of all the PLOs / synthesizers.

POWER SUPPLY MODULE

The power supply module accepts nominal 28V DC from the UAV bus and generates fixed DC output of +12 V required by different sections using DC-DC converters

SPECIFICATIONS

UP CONVERTER SECTION

Input IF frequency	: 70 ± 4Hz/Configurable BW
Input IF power level	: 0dBm nominal
Output RF band	: 13.75GHz to 14.50GHz
Output RF selection step size	: 1MHz/500Hz through internal programmable synthesizer
Output power level	: 0dBm ± 3dB over the RF band and operating temperature
Spurious	: ≤ -55dBc
Ref. Oscillator phase noise	: 10Hz to 58 dBc/Hz 100Hz to 79 dBc/Hz 1KHz to 90 dBc/Hz 10KHz to 95 dBc/Hz 100KHz to 97 dBc/Hz 1MHz to 118dBc/Hz

DOWN CONVERTER SECTION

Input IF frequency	: 950MHz to 1700MHz
Input RF selection step size	: 1MHz/500Hz through internal programmable synthesizer
Max. Input RF level	: -30dBm
Output IF	: 140 ± 4MHz/ Configurable BW
RF IF Gain	: (33±2)dB over the RF band and operating temperature
Spurious	: Signal dependent ≤ -50dBc Signal independent ≤ -85dBc within output IF band

LOCAL OSCILLATOR SECTION

Ref. Oscillator (Common for all internal LOs/synthesizer)	: 60MHz internal
Ref. Oscillator Stability	: ±0.01ppm over the operating temperature range
Initial frequency accuracy at the time of shipment	: ±0.1ppm
Ref. Oscillator aging after 1 year	: ±0.1ppm / year or better
Ref. Oscillator warm-up time	: 3 min. for 1x10 ⁻⁸ stability at 25°C
At 100Hz offset	-120dBc / Hz or better
At 1KHz offset	-130dBc / Hz or better
At 10KHz offset	-140dBc / Hz or better
LO Programming	Via external jig connected to Monitor and Control port - RS422 Interface

POWER SUPPLY AND MONITORING

Power supply	: (28±4) VDC
Health monitor	: Through RS-422 monitor and Control port (LO phase lock and Power supply status)

CONNECTORS

DC Supply, Monitor and Control (M and C)	: MIL-DTL-38999
RF / IF & Monitor ports	: SMA (F)
Impedance	: 50 Ω

MECHANICAL

Overall Dimension (LxWxH) in mm	: 200x290x62 (Including connectors, handle Projections)
(Other Rack Mountable options also available)	
Finish	: Black powder coating/ Hard Anodization

ENVIRONMENT

Operating temperature	: -50°C to +110°C
Storage temperature	: -60°C to +125 °C
Vibration compatibility	: Random vibration level: rising at +3dB/Octave from 20Hz to 80Hz, 0.04g ² /Hz, and falling at 3dB/octave from 350Hz to 2000Hz
EMI/EMC compatibility	: MIL-STD-461E
Relative humidity	: 95% Max.
Operational altitude	: 3000 ft. above sea level

BLOCK DIAGRAM OF NM-UDC-1146

