Low-Noise Amplifier Series

C-Band Low-Noise Amplifier

Redundant C-Band Low-Noise Amplifier

Redundant Ku-Band Low-Noise Amplifier

Ku-Band Low-Noise Amplifier

APPLICATION

The Comtech EF Data (CEFD) Low-Noise Amplifier (LNA) series includes LNAs and redundant LNA systems (C- or Ku-Band). They meet or exceed system requirements for commercial geosynchronous satellites worldwide. Their compact design and rugged construction make them ideal for transportable applications and severe environments. They have a comprehensive set of options to accommodate systems ranging from Very Small Amplifier Terminal (VSATs) to major earth stations.

The C- or Ku-Band redundant LNA systems include primary and backup LNAs and an automatic switching controller. In case of primary LNA failure, fast automatic switchover to the backup LNA minimizes "down" time.

TECHNOLOGY

The amplifiers incorporate both HEMT devices for Low-Noise temperature performance and GaAs FET devices for low intermodulation. The unit uses surface mounted components for robotic manufacturing techniques, thereby insuring maximum product consistency and enhanced reliability.

RELIABILITY

The amplifier series (CLNA, KLNA, REDCLNA, and REDKLNA) utilizes proprietary circuitry and high quality components to achieve an MTBF in excess of 160,000 hours. Each unit is subjected to a 72-hour burn-in and temperature cycled from -40 to 140°F (-40 to +60°C).

CONSTRUCTION

The LNAs (CLNA and KLNA) are housed in waterproof enclosures with small profiles to better accommodate redundancy configurations. The enclosures also provide a pressurizable, integral waveguide flange.

SUBSYSTEMS

1+1 (one backup for one primary) and 1+2 (one backup for two primary) redundant LNA systems are available, complete with mounting plate, brackets and indoor Redundancy Controller/Power Supply (transmit reject filters, cables and other integration materials are offered as required).

SPECIFICATIONS

Frequency	CLNA and REDCLNA 3.4 to 4.2 GHz 3.625 to 4.2 GHz KLNA and REDKLNA 10.95 to 12.75 GHz
Noise Temperature	CLNA 30, 35, 40, 45K KLNA 80 and 85K
Gain Overall Stability (Over Temp. & Frequency)	50, 60 dB CLNA ±.75 dB from 3.625 to 4.2 GHz ± 1 dB from 3.4 to 4.2 GHz 0.40 dB p-p over 40 MHz REDCLNA ± 1.5 dB over Full Band typ. 0.50 dB p-p over 40 MHz typ. KLNA ± 1.5 dB over Full Band 0.75 dB p-p over 40 MHz REDKLNA ± 2 dB over Full Band typ. 1 dB p-p over 40 MHz typ.
Level @ 1 dB Comp.	+10 dBm
Third Order Intercept	+20 dBm
AM-PM Conversion	0.5°/dB @ -5 dBm
Linear Group Delay	0.01 ns/MHz
Parabolic Group Delay	0.001 ns/MHz^2
Ripple	0.1 ns p-p
Input/Output VSWR	1.25:1 Maximum
Input Waveguide	CLNA and REDCLNA CPR229 KLNA and REDKLNA WR75
Output Connector	Type N Standard, Optional SMA
Operating Temp.	-40 to 140°F (-40 to +60°C)
Input Power	+12 to +24 VDC @ 120 mA
Power Connector	CLNA & KLNA Coaxial or PTA02A-9-4P

Amplifiers

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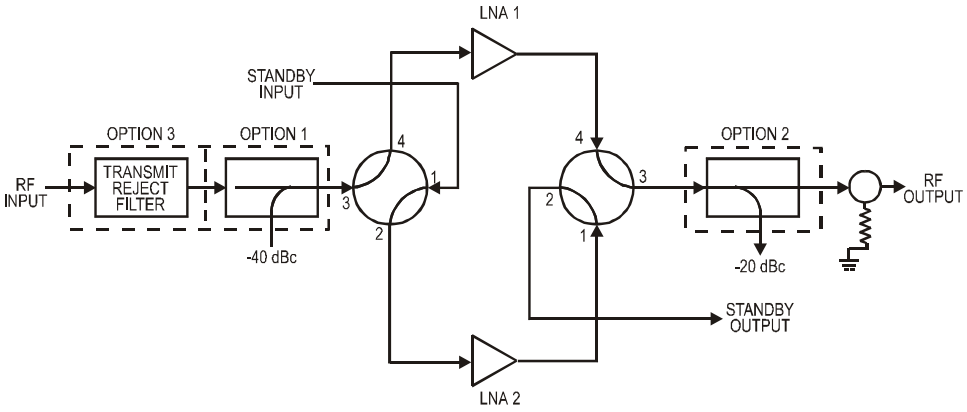
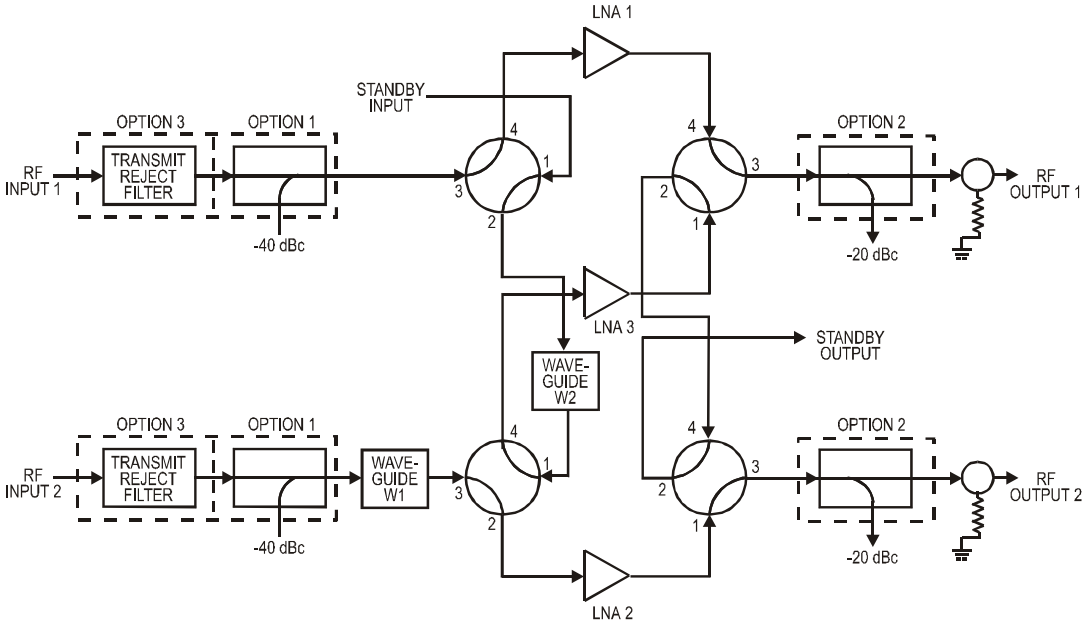
System Diagrams

1:1 Redundant LNA System Block Diagram



1:2 Redundant LNA System Block Diagram



Typical system noise temperature calculation

1:1 Redundant LNA System

$T_{system} = T_{LNA} + T_{SWITCH} + T_{OPTION\ 3} + T_{OPTION\ 1}$

1:2 Redundant LNA System

RF input 1:LNA on-line signal path

$T_{system} = T_{LNA} + T_{SWITCH} + T_{OPTION\ 3} + T_{OPTION\ 1}$

RF Input 1:LNA 3 on-line signal path (LNA 1 standby)

$T_{system} = T_{LNA} + 2*T_{SWITCH} + T_{W2} + T_{OPTION\ 3} + T_{OPTION\ 1}$

RF input 2:LNA 2 on-line signal path

$T_{system} = T_{LNA} = T_{W1} + T_{SWITCH} + T_{OPTION\ 3} + T_{OPTION\ 1}$

RF input 1:LNA 3 on-line signal path (LNA 2 standby)

$T_{system} = T_{LNA} + 2*T_{SWITCH} + T_{W1} + T_{W2} + T_{OPTION\ 3} + T_{OPTION\ 1}$

Typical Noise Temperature in Kelvin at 23°C			
Band (GHz)	**3.62 – 4.205**	**3.4 – 4.2**	**10.7 – 12.75**
	WR-229	WR-229	WR-75
T_{SWITCH}	1.5^0	1.5^0	3.5^0
T_{W1}	1.5^0	1.5^0	4.0^0
T_{W2}	1.5^0	1.5^0	4.0^0
$T_{OPTION1}$	0.5^0	0.5^0	2.0^0
$T_{OPTION3}$	2.4^0	7.0^0	7.0^0