N6612 Series
120 W, Tri-Band
Antenna Mount TWTA

The N6612 range of Tri-Band TWT Amplifiers from e2v technologies provides performance over the; C, X and Ku Bands and can deliver over 120 W of output power in X-Band in a compact, lightweight, rugged, weatherproof, antenna mount, enclosure. The advanced packaging and cooling techniques enables the unit to operate in extreme environmental conditions from direct rain to direct sunlight. The amplifiers can be simply deployed anywhere in the world, are user-friendly, and incorporate a comprehensive remote control facility as standard, including RS485.

The HPA incorporates a high reliability TWT, designed and manufactured by e2v, powered by an advanced power supply that further advances e2v technologies reputation for robust, reliable product.

The N6612 is available with a wide range of options and accessories, including a state-of-the-art Tri-Band upconverter that enables operation in C-, X- or Ku-Band from an L-Band input.

OPTIONS

- Integral solid-state amplifier (SSA)
- Gain control
- Tri-Band upconveter (requires gain control)

FEATURES

- Wide operating temperature range –40 °C to +55 °C.
- Weatherproof antenna mount construction allows exposed mounting.
- CE compliant
- Redundant control – contains control and drive circuits for 1:1 redundancy.
- Stand-alone setting – automatically sequences to transmit mode.
- Round-the-clock hotline support.
- Wide range of accessories including: controllers, waveguide networks, cable assemblies.

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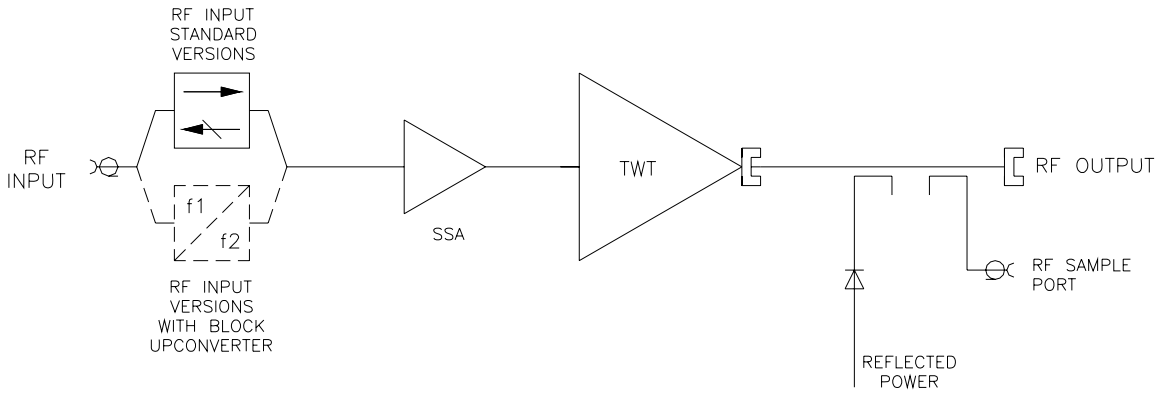
BLOCK DIAGRAM



PERFORMANCE (Without Upconverter)

Parameter	C-Band	X-Band	Ku-Band	Units
Frequency range	5.85 to 6.425	7.9 to 8.4	13.75 to 14.5	GHz
Rated power (at TWTA flange)	90	125	85	W max
Gain:				
at rated power	55	60	55	dB min
small signal gain	60	65	60	dB min
attenuator range (optional)	25	25	25	dB min
Gain variation:	-	-	-	-
any 500 MHz	3.0	3.0	3.0	dB max
any 40 MHz	1.0	1.0	1.0	dB max
slope	0.08	0.08	0.08	dB/MHz max
Gain stability:				
over 24 hrs (const. temp and drive)	0.5	0.5	0.5	dB max
over operating temperature	2.0	2.0	2.0	dB max
Intermodulation (two equal carriers) at:	-18	-18	-18	dBc max
P_{rated} -4.0 dB	-17	-17	-17	dB
P_{rated}-7.0 dB	-23	-23	-23	dB
Harmonic output	-3	-7	-12	dBc max
AM to PM conversion (at P_{rated} –6 dB or at linear power)	2.5	2.5	2.5	°/dB max
Noise power:	-	-	-	-
transmit band	-70	-70	-70	dBW/4kHz max
receive band	-70 (3.2-4.2 GHz)	-70 (7.25-7.75 GHz)	-70 (10.95-12.75 GHz)	dBW/4kHz max
Group delay:				
bandwidth	40	40	80	MHz
linear	0.01	0.01	0.01	ns/MHz max
parabolic	0.005	0.005	0.005	ns/MHz^2 max
ripple	1.0	1.0	1.0	ns pk-pk
Residual AM noise:				
<10 kHz	-50	-50	-50	dBc max
10 kHz<F<500 kHz	-20(1.5+logf)	-20(1.5+logf)	-20(1.5+logf)	dBc max
>500 kHz	-85	-85	-85	dBc max
Phase noise:				
continuous	Meets IESS Phase Noise Profile			
AC fundamental	-50	-50	-50	dBc max
sum of all spurs	-47	-47	-47	dBc max
Input VSWR	1.35:1	1.35:1	1.35:1	
Output VSWR	2.5:1	2.1:1	2.0:1	
Load VSWR max. – no damage	2.0:1	2.0:1	2.0:1	

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ELECTRICAL

Prime power.....single phase, line-neutral or line-line
Voltage.....99 to 265 V
Frequency.....47 to 63 Hz
Power requirement .....1050 VA max
Power factor..... 0.95 min

MECHANICAL

Weight..... 12.0 kg (26 lb) typ
Dimensions.....see outline
Cooling..... integral forced-air

CONNECTORS

RF input .....N-type female
RF output..... WRD580 with 6-32 UNC 2B threaded holes
RF sample port .....N-type female
Prime power.....Amphenol – T3110-000
Control interface ..... Amphenol – 62GB-12E-2041-PN

Note: Mating connectors for the mains supply and control interface are supplied.

ENVIRONMENTAL

For operation outside these parameters, refer to e2v technologies for guidance.

Operating temperature (see note) ..... -40 to +55 °C
Derating.....2°C/300 m above sea level
(3.6 °F/1000 ft)
Storage temperature ..... -40 to +80 °C
Relative humidity (condensing) 100%
Altitude:
operating .....4.5 km (15,000 ft) max
non-operating .....12 km (40,000 ft) max
Vibration: .....BS EN 60068-2-64 test Fh, Transportation
Shock: .....IEC Publication 68-2-27 Part 2 Test Ea, 25 g
EMC: .....EN61000-6-3: 2001 (Emissions)
EN61000-6-2: 2001 (Immunity)

CE CERTIFIED

EMC Directive 89/336/EEC, Low Voltage Directive 73/23/EEC

SAFETY

EN60950

Note: +55 °C operation applies when the input supply voltage is between 180 and 265 V. Below 180 V the maximum operating temperature is +50 °C.

CONTROLS		
TYPE	**FUNCTION**	
REMOTE CONTROL	Off Standby Transmit RF Inhibit Band Select	Auto Redundancy Control* RF Switch Control* Gain Control* (when fitted)
REMOTE STATUS/MONITOR	Off Warm-Up Standby Transmit Fault Summary Reflected Power External Interlock TWT Too Hot Mean Helix Current Peak Helix Current High Power Alarm* Low Power Alarm*	Reflected Power Monitor* Helix Current Monitor* Elapsed Hours*
INTERFACES: Serial User	 RS-422/485 Dry Relay Contact	
Other Features	Auxiliary Output Voltage Redundant system and waveguide switch drive 'Stand-Alone' setting for automatic power-up	

Note: Controls/Monitoring marked * are only available via Serial Interface.

OPTIONS

The options are defined by adding to the base number as shown below:

N6612
N6612D
N6612DU
N6612DUS

- - Standard, includes integral solid-state amplifier.
- D - Digitally controlled attenuator to provide 25 dB (min.) of gain control.
- U - Tri-band upconverter provides L-band input (see page 5)
- S - Bypass link, provides access to the upconverter output and the RF input.

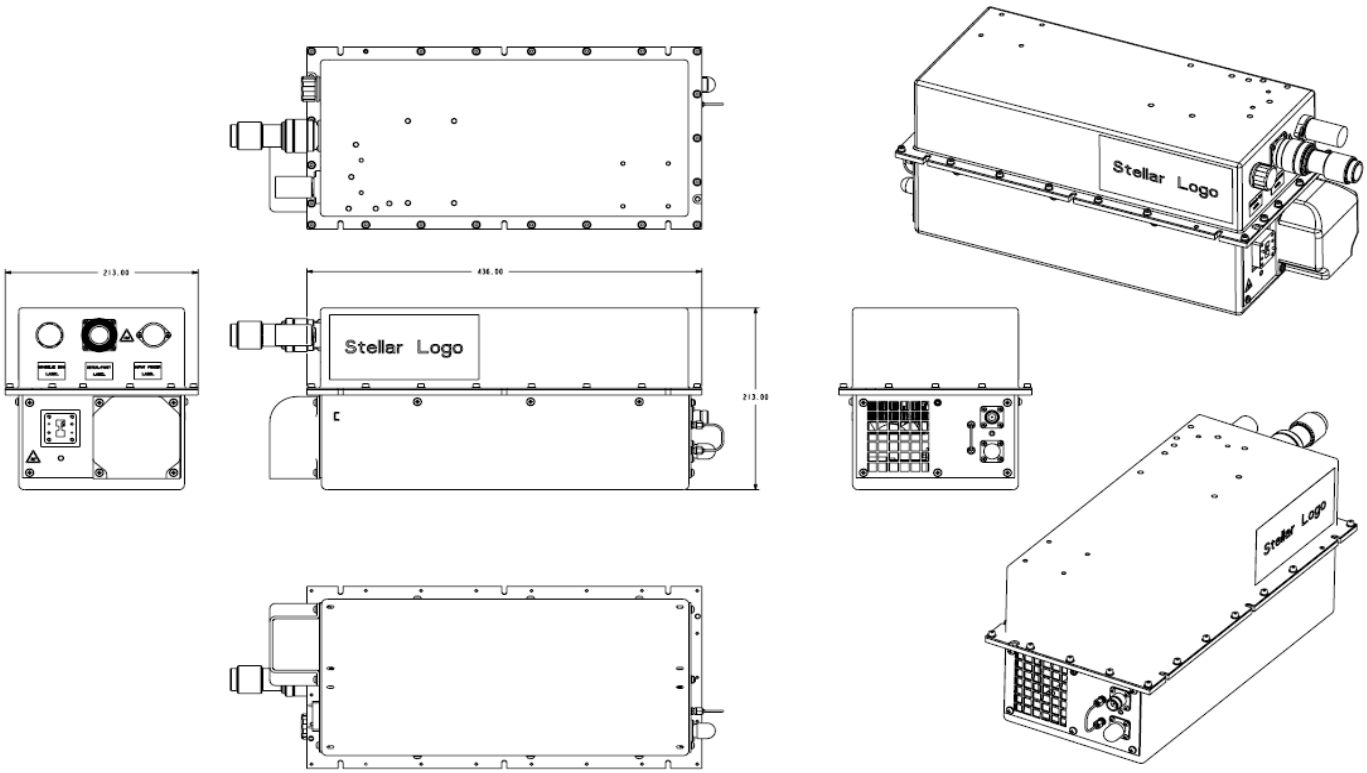
ACCESSORIES

The N6612 is supplied with an operation manual, prime power connector mating part, interface connector mating part and air cowls. Additional accessories include:

- **N6080/N6080-1 Override Controller**
  Provides automatic power up for 'emergency' situations (N6080-01 allows selection of output frequency).
- **N6143 1:1 Control Unit**
  Provides control of 2 HPA's in 1:1 switch configuration. (The waveguide switch network can also be supplied). Refer to data sheet A1A-N6143.
- **Cable Assemblies**
  For connecting N6612 to controllers and waveguide switches. Refer to data sheet A1A-Stellar_Cables.
- **DPP563119AA - Additional air cowl.**
- **DPP563119BA - Circular duct adaptor.**
  Can be fitted to either the cooling air inlet or outlet and provides a method of connecting to a circular duct.
- **DAS563751AA – Additional interface connector parts.**

For more information on accessories, contact e2v technologies.

OUTLINE



PERFORMANCE WITH INTEGRAL BLOCK UPCONVERTER (BUC)

Parameter	C-Band	X-Band	Ku-Band	Units
Output frequency range	5.85 to 6.425	7.9 to 8.4	13.75 to 14.5	GHz
L-band input frequency range	950 to 1525	950 to 1450	950 to1700	MHz
LO frequency	4.9	6.95	12.8	GHz
External reference:	see note	see note	see note	
frequency	10	10	10	MHz
level	-3 to +7	-3 to +7	-3 to +7	dBm
impedance	50	50	50	Ω
Rated power (at TWTA flange)	90	125	85	W max
Gain:	-	-	-	-
at rated power	55	60	55	dB min
small signal gain	60	65	60	dB min
attenuator range (optional)	25	25	25	dB min
Gain variation:	-	-	-	-
any 500 MHz	5.0	5.0	5.0	dB max
any 40 MHz	1.5	1.5	1.5	dB max
slope	0.08	0.08	0.08	dB/MHz max
Gain stability:				
over 24 hrs (const. temp and drive)	0.5	0.5	0.5	dB max
over operating temperature	2.0	2.0	2.0	dB max
Intermodulation (two equal carriers) at:	-18	-18	-18	dBc max
P_{rated} -4.0 dB	-17	-17	-17	dB
P_{rated} -7.0 dB	-23	-23	-23	dB
Harmonic output	-3	-7	-12	dBc max
AM to PM conversion (at P_{rated} –6 dB or at linear power)	2.5	2.5	2.5	°/dB max
Noise power:				
transmit band	-70	-70	-70	dBW/4kHz max
receive band	-70 (3.2-4.2 GHz)	-70 (7.25-7.75 GHz)	-70 (10.95-12.75 GHz)	dBW/4kHz max
Group delay:				
bandwidth	40	40	80	MHz
linear	0.01	0.01	0.01	ns/MHz max
parabolic	0.005	0.005	0.005	ns/MHz^2 max
ripple	1.0	1.0	1.0	ns pk-pk
Residual AM noise >100 kHz from carrier	-60	-60	-60	dBc
Phase noise:				
continuous	Meets IESS Phase Noise Profile			
AC fundamental	-50	-50	-50	dBc max
sum of all spurs	-47	-47	-47	dBc max
Input VSWR	1.6:1	1.6:1	1.6:1	
Output VSWR	2.5:1	2.1:1	2.0:1	
Load VSWR max. – no damage	2.0:1	2.0:1	2.0:1	

Note: The BUC can be operated without the external reference, typical frequency stability ±0.25 ppm)

HEALTH AND SAFETY HAZARDS

e2v technologies electronic devices are safe to handle and operate provided that the relevant precautions are observed. e2v technologies does not accept responsibility for damage or injury resulting from the use of electronic devices it produces.

High Voltage

Dangerous voltages are present within the TWT amplifier when operating normally. However, the equipment is designed so that personnel cannot come into contact with high voltage circuits unless covers are removed.

RF Radiation

All RF connectors must be correctly fitted before operation.

Beryllia

The TWT in the amplifier contains beryllium oxide ceramic parts. These are not accessible unless the TWT casing is damaged. Consult e2v technologies regarding the disposal of damaged or life-expired tubes.