



The STA2375 range of Ku-Band TWT amplifiers from e2v technologies provide over 650 W of output power in a compact, lightweight, rugged, weatherproof, antenna mount enclosure. The advanced packaging and cooling techniques (Stellar Cool™, patent pending) enable 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 high efficiency dual collector TWTs powered by an advanced power supply that further advances e2v technologies reputation for robust, reliable product.

The STA2375 is available with a wide range of options and accessories, backed by round-the-clock, worldwide technical support.

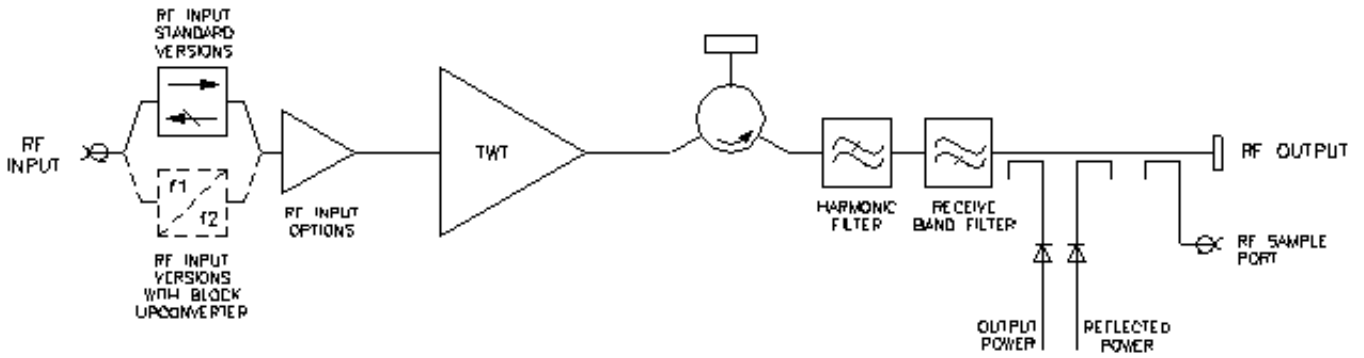
### OPTIONS

- Integral solid-state amplifier (SSA)
- Gain control (requires SSA)
- Lineariser
- L-band block upconverter

### FEATURES

- Advanced cooling design (Stellar Cool™, patent pending) enables operation at +50 °C and in direct sunlight.
- Weatherproof antenna mount construction allows exposed mounting.
- CE compliant.
- cETLus listed.
- CB certified.
- 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.

# BLOCK DIAGRAM



## PERFORMANCE (Without Upconverter)

|   |   |                     |
|---|---|---------------------|
| Frequency range:  |   |                     |
| standard – KU1  | 13.75 to 14.5                             | GHz                 |
| extended – KU2  | 12.75 to 14.5                             | GHz                 |
| Output power:   |   |                     |
| TWT output flange   | 750                                       | W min               |
| HPA rated output  | 650                                       | W min               |
| Gain:   |   |                     |
| at rated power (A, D, Z option)                             | 70  | dB min              |
| SSG $P_{rated} - 10$ dB (A, D, Z option)                    | 75  | dB min              |
| Attenuation range (D, Z option)                             | 25  | dB min              |
| Gain variation:   |   |                     |
| full band   | 2.5                                       | dB max              |
| over any 80 MHz band  | 1.0                                       | dB max              |
| slope   | 0.08 dB/MHz                               | max                 |
| Gain stability 24hrs (constant drive, temperature and load) | 0.5                                       | dB max              |
| Gain stability over full operating temperature              | 2.0                                       | dB max              |
| Intermodulation (two equal carriers)                        |   |                     |
| with total output = $P_{rated} - 4$ dB:                     |   |                     |
| options A, D  | -18                                       | dBc max             |
| performance with linearised option, Z                       | -24                                       | dBc max             |
| Harmonic output   | -60                                       | dBc max             |
| AM to PM conversion at $P_{rated} - 6$ dB                   | 2.5                                       | °/dB                |
| Noise power:  |   |                     |
| transmit band   | -70 dBW/4 kHz                             | max                 |
| receive band  |   |                     |
| 10.95 – 12.75 GHz - standard                                | -150 dBW/4 kHz                            | max                 |
| 10.70 – 11.70 GHz - extended                                | -150 dBW/4 kHz                            | max                 |
| Residual AM:  |   |                     |
| <10 kHz   | -50                                       | dBc max             |
| 10 kHz < f < 500 kHz  | -20(1.5+log f)                            | dBc max             |
| >500 kHz  | -85                                       | dBc max             |
| Group delay:  |   |                     |
| linear  | 0.01                                      | ns/MHz              |
| parabolic   | 0.005                                     | ns/MHz <sup>2</sup> |
| ripple  | 0.5                                       | ns p-p              |
| Phase noise:  |   |                     |
| continuous  | 10 dB lower than IESS phase noise profile |                     |
| AC fundamental  | -50                                       | dBc                 |
| sum of all spurs  | -47                                       | dBc                 |
| Input VSWR (operating)                                      | 1.3:1                                     | max                 |
| Output VSWR (non-operating)                                 | 1.3:1                                     | max                 |
| Load VSWR, no damage  | 2.0:1                                     | max                 |

## ELECTRICAL

|                   |   |
|-------------------|---|
| Prime power       | single phase, line-neutral or line-line |
| Voltage           | 180 to 265 V                            |
| Frequency         | 47 to 63 Hz                             |
| Power requirement | 2600 VA max                             |
| Power factor      | 0.95 min                                |

## MECHANICAL

|            |                     |
|------------|---------------------|
| Weight     | 34.0 kg (75 lb) typ |
| Dimensions | see outline         |
| Cooling    | integral forced-air |

## CONNECTORS

|                   |  |
|-------------------|--|
| RF input          | N-type female                          |
| RF output         | PBR120 with 6-32 UNC 2B threaded holes |
| RF sample port    | N-type female                          |
| Prime power       | ITT Cannon - CGL02A20-3P-E1B-B         |
| Control interface | 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          | -40 to +50 °C                                  |
| Derating                       | 2 °C/300 m above sea level<br>(3.6 °F/1000 ft) |
| Solar gain                     | 1120 W/m <sup>2</sup>                          |
| 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)    |  |
| FCC CFR47 Part 15B             |  |

## CE CERTIFIED

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

## SAFETY (see note)

**cETLus Listed** to ANSI/UL 60950-1-2002 and CAN/CAS-C22.2 No 60950-1-3.

**CB Certified** to IEC 60950-1:2001

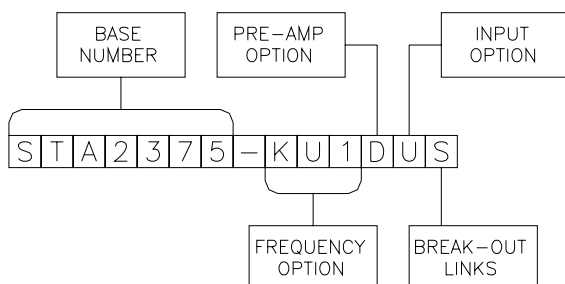
**Note:** Safety applies for operating altitude up to 2000 m.

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

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

## OPTIONS

Extensive options are offered with the STA2375 and include: integral pre-amplifiers, gain control, linearisers and block upconverters. The options are defined by adding to the base number as shown below:



(Consult e2v technologies for availability of options).

### Frequency Options

The STA2375 is offered in two frequency bands:

KU1 - 13.75 – 14.50 GHz

KU2 - 12.75 – 14.50 GHz

KU3 - 14.00 – 14.50 GHz (upconverter option only)

### Pre-Amp Option

The pre-amp option can be selected from any of the following:

A - Integral solid-state amplifier (typical SSG, 78 dB).

D - As option 'A' but includes an attenuator to provide 25 dB (min.) of gain control.

Z - Integral lineariser that improves the linearity of the HPA, providing a C/I of typically -26 dBc at 4 dB OPBO. The lineariser also incorporates the pre-amp and gain control options. (Consult e2v technologies for availability).

### Input Option

The STA2375 can be offered with an L-Band Block Upconverter. Specify:

N - Standard RF

U - L – Ku-Band Block Upconverter (see page 4)

**Note:** the upconverter requires the inclusion of either the 'D' or 'Z' options. (Consult e2v technologies for availability).

### Break-Out Links

Available only with the upconverter option, this enables bypassing of the upconverter and can be used for monitoring, set-up, redundant switching etc. Specify 'S' for Break-Out Links (leave blank if not required).

## ACCESSORIES

The STA2375 is supplied with an operation manual, prime power connector mating part, interface connector mating part and air cowls. Additional accessories include:

- **N6080 Override Controller**  
Provides automatic power-up for 'emergency' situations.
- **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 STA2375 to controllers and waveguide switches. Refer to data sheet A1A-Stellar\_Cables.
- **DAS563750AA**  
Additional mains connector parts.
- **DAS563751AA**  
Additional interface connector parts.

For more information on accessories, contact e2v technologies.

## PERFORMANCE WITH INTEGRAL BLOCK UPCONVERTER

|  |                                |                     |
|--|--------------------------------|---------------------|
| Output frequency range:  |                                |                     |
| option KU1 .....   | 13.75 to 14.5                  | GHz                 |
| option KU3 .....   | 14.0 to 14.5                   | GHz                 |
| L-band input:  |                                |                     |
| frequency range option KU1 .....   | 950 to 1700                    | MHz                 |
| frequency range option KU3 .....   | 950 to 1450                    | MHz                 |
| level .....  | 10                             | dBm max             |
| LO frequency:  |                                |                     |
| option KU1 .....   | 12.8                           | GHz                 |
| option KU3 .....   | 13.05                          | GHz                 |
| External reference (see note):   |                                |                     |
| frequency .....  | 10                             | MHz                 |
| level .....  | -3 to +7                       | dBm                 |
| impedance .....  | 50                             | $\Omega$            |
| Output power:  |                                |                     |
| TWT output flange .....  | 750                            | W min               |
| HPA rated output .....   | 650                            | W min               |
| Gain:  |                                |                     |
| at rated power (D, Z option) .....   | 70                             | dB min              |
| SSG $P_{rated} - 10$ dB (D, Z option) .....                                  | 75                             | dB min              |
| Attenuation range (D, Z option) .....  | 25                             | dB min              |
| Gain variation:  |                                |                     |
| full band .....  | 4.0                            | dB max              |
| over any 40 MHz band .....   | 1.5                            | dB max              |
| slope .....  | 0.08                           | dB/MHz max          |
| Gain stability 24hrs (constant drive, temperature and load) .....            | 0.5                            | dB max              |
| Gain stability over full operating temperature .....                         | 2.0                            | dB max              |
| Intermodulation (two equal carriers) with total output = $P_{rated} - 4$ dB: |                                |                     |
| options C, A, D .....  | -18                            | dBc max             |
| performance with linearised option, Z .....                                  | -24                            | dBc max             |
| Harmonic output .....  | -60                            | dBc max             |
| AM to PM conversion at $P_{rated} - 6$ dB .....                              | 2.5                            | $^{\circ}$ /dB      |
| Noise power:   |                                |                     |
| transmit band .....  | -70                            | dBW/4 kHz max       |
| receive band (10.95 – 12.75 GHz) .....                                       | -150                           | dBW/4 kHz max       |
| Residual AM >100 kHz from carrier .....                                      | -60                            | dBc max             |
| Group delay:   |                                |                     |
| linear .....   | 0.01                           | ns/MHz              |
| parabolic .....  | 0.005                          | ns/MHz <sup>2</sup> |
| ripple .....   | 0.5                            | ns p-p              |
| Phase noise:   |                                |                     |
| Continuous .....   | meets IESS phase noise profile |                     |
| AC fundamental .....   | -50                            | dBc                 |
| Sum of all spurs .....   | -47                            | dBc                 |
| Input VSWR (non-operating) .....   | 1.6:1                          | max                 |
| Output VSWR (non-operating) .....  | 1.3:1                          | max                 |
| Load VSWR, no damage .....   | 2.0:1                          | max                 |

**Note:** the BUC can be operated without the external reference, typical frequency stability  $\pm 0.25$  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.

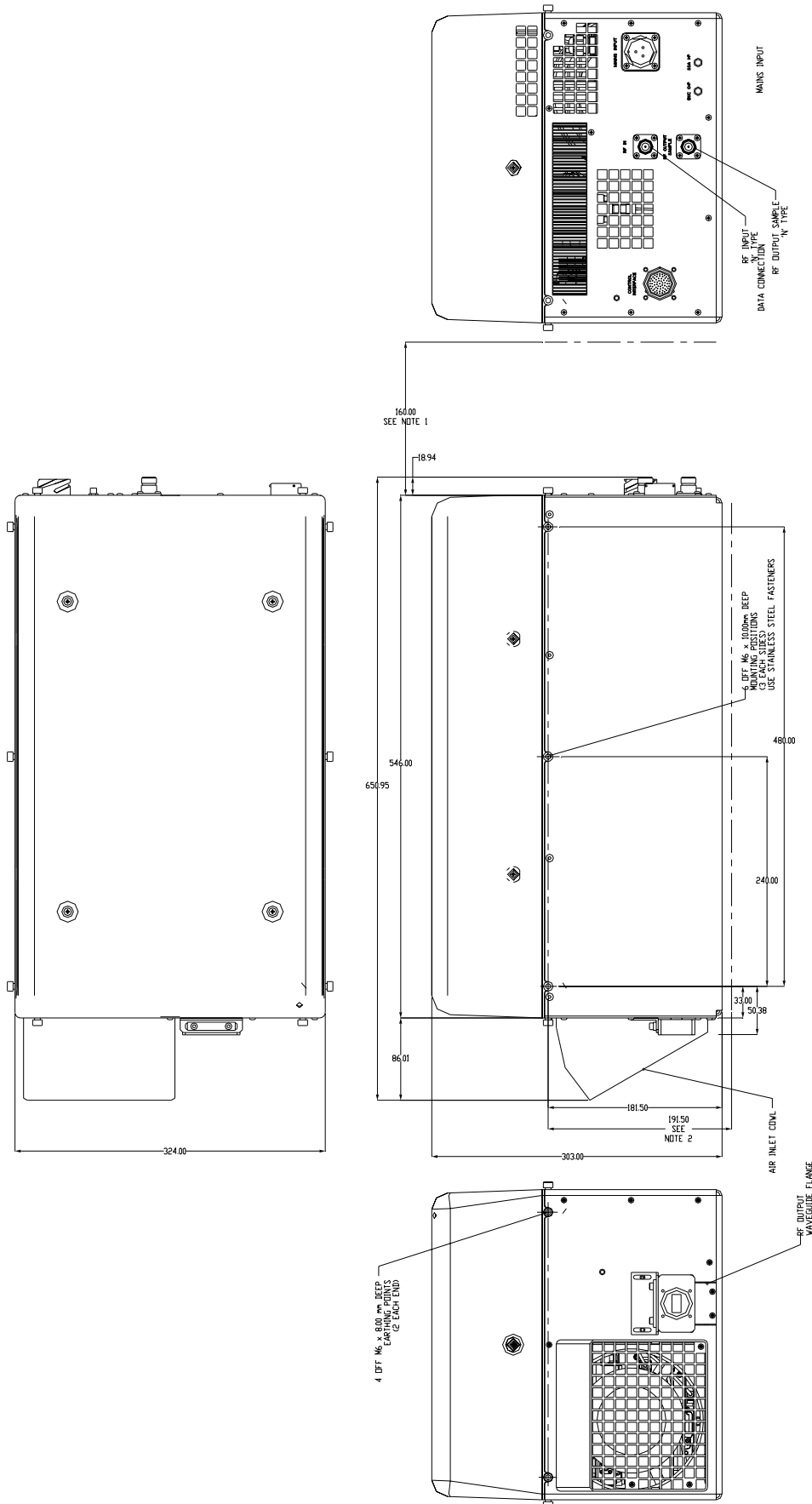
### RF Radiation

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.

# OUTLINE



Whilst e2v technologies has taken care to ensure the accuracy of the information contained herein it accepts no responsibility for the consequences of any use thereof and also reserves the right to change the specification of goods without notice. e2v technologies accepts no liability beyond the set out in its standard conditions of sale in respect of infringement of third party patents arising from the use of tubes or other devices in accordance with information contained herein.