



## STR2175 Series, 750W, C-Band, Rack Mount TWTA

The new generation of STR Series rack mount TWTA's provide an easy to operate, colour touch screen interface with a multi-functional selector wheel. The colour touch screen display provides clear, easy to read status of the amplifier's operation, including: RF output power monitoring, heater, helix monitoring, & TWT temperature. Set up screens are intuitive and simple to manage and the touch panel allows full local control and monitoring of all amplifier parameters, including automatic level control, system event logging and graphical trend analysis. Remote control operation can be made via RS485 or through an Ethernet interface, and a web page interface is also available. If a redundancy system is required, this can be set up and controlled via the touch screen. Changes to operating parameters can be locked and password protected if required.

The HPA incorporates a high efficiency multi-collector TWT powered by an advanced power supply built on over 30 years of experience in the design and manufacture of satellite amplifiers. The company's products have an enviable reputation for performance, robust quality and reliable service.

The STR2175 is available with a wide range of options and accessories, backed by worldwide technical sup-

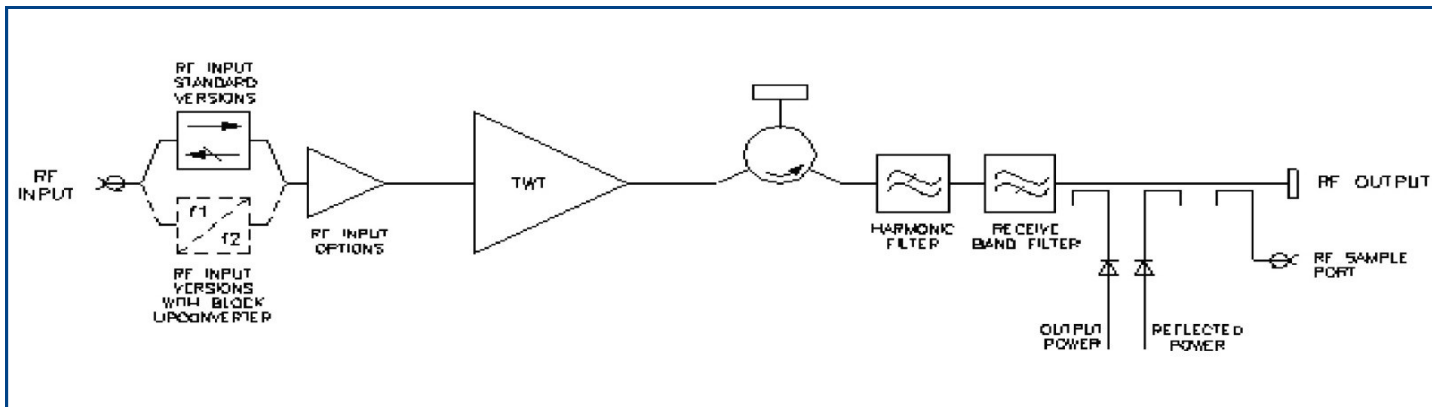
### Options

- Integral solid-state amplifier (SSA)
- L-Band Block upconverter
- 10MHz reference
- Lineariser
- Redundant system control
- Quick connect waveguide options

### Features

- Compact 4RU enclosure
- Touch screen control
- Ethernet interface
- Remote diagnostics
- Forward and reverse power monitoring
- TWTA performance Data and Event logging

## BLOCK DIAGRAM



### PERFORMANCE (Without Upconverter)

|   |  |                     |
|---|--|---------------------|
| Frequency range:  |  |                     |
| Standard - CC1.....   | 5.85 to 6.425                            | GHz                 |
| Other frequency ranges available— see page 3                              |  |                     |
| Output Power:   |  |                     |
| TWT output flange (peak).....   | 750                                      | W min               |
| HPA rated output (CW).....  | 650                                      | W min               |
| Gain:   |  |                     |
| At rated power (A,D, Z option).....                                       | 70                                       | dB min              |
| SSG P rated - 10dB (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 40 MHz band.....   | 1.0                                      | dB max              |
| Slope.....  | 0.08                                     | dB/MHz max          |
| Gain stability 24hrs (constant drive,<br>temperature and load).....       | 0.5                                      | dB max              |
| Gain stability over full operating<br>temperature.....                    | 2.0                                      | dB max              |
| Intermodulation (two equal carriers) with<br>total output = P rated -4dB: |  |                     |
| Options A, D.....   | -18                                      | dBc max             |
| Performance with linearised option, Z.....                                | -26                                      | dBc max             |
| Harmonic output.....  | -60                                      | dBc max             |
| AM to PM conversion at P rated -6dB.....                                  | 2.5                                      | °/dB                |
| Noise Power:  |  |                     |
| Transmit band.....  | -70                                      | dBW/4 kHz max       |
| Receive band (3.2-4.2GHz).....  | -150                                     | dBW/4 kHz max       |
| Residual AM:  |  |                     |
| <10kHz.....   | -50                                      | dBc max             |
| 10kHz < f < 500kHz.....   | -20 (1.5+ log f)                         | dBc max             |
| >500kHz.....  | -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.....   | 10dB lower than IESS phase noise profile |                     |
| AC fundamental.....   | -50                                      | dBc max             |
| Sum of all spurs.....   | -47                                      | dBc max             |
| 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 |
| Voltage.....           | 180 to 265 V |
| Frequency.....         | 47 to 63 Hz  |
| Power requirement..... | 2600 VA max  |
| Power factor.....      | 0.95 min     |

### MECHANICAL

|                 |                     |
|-----------------|---------------------|
| Weight.....     | 34Kg (75lb) typ     |
| Dimensions..... | see outline         |
| Cooling.....    | integral forced-air |

### CONNECTORS

|                           |  |
|---------------------------|--|
| RF input.....             | N-type female                            |
| RF output.....            | CPR137G with 10-32 UNC 2B threaded holes |
| RF Sample port.....       | N-type female                            |
| Prime Power.....          | C20 Male IEC                             |
| RS232 .....               | D-Sub 9P                                 |
| RS485 (4-Wire) .....      | D-Sub 9S                                 |
| Ethernet .....            | RJ45                                     |
| Auxiliary Interface ..... | D-Sub 25P                                |
| WG Switch.....            | D-Sub 15S                                |
| USB Port .....            | USB A                                    |

**Note:** Mating connectors for the mains supply, RS232, RS485, Aux Int and WG Switch are included.

### ENVIRONMENTAL

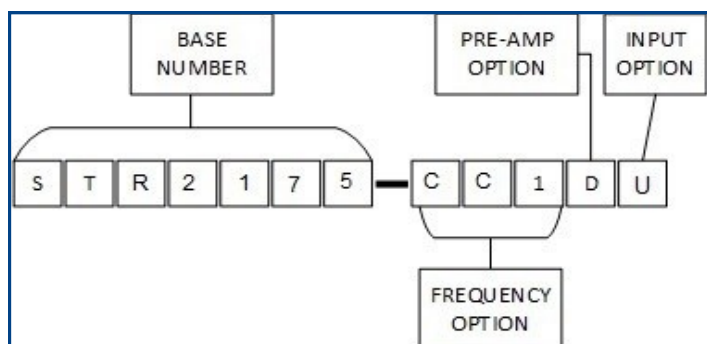
|   |   |
|---|---|
| For operation outside these parameters, refer to SpacePath Communications for guidance. |   |
| Operating temperature (see note 1).....   | -10 to +50 °C                                 |
| Derating.....   | 2 °C/300 m above sea level<br>(3.6 °F/1000ft) |
| Storage temperature.....  | -40 to +80 °C                                 |
| Relative humidity (condensing).....   | 9 %   |
| Altitude:   |   |
| Operating.....  | 4.5 Km (15,000 ft) max                        |
| Non-operating.....  | 12 Km (40,000 ft) max                         |
| Vibration.....  | BS EN 600668-2-64 test Fh, transportation     |
| Shock.....  | IEC Publication 68-2-27 Part 2 test Ea, 25g   |
| EMC:  |   |
| EN61000-6-3:2001 (Emissions)  |   |
| EN61000-6-2:2001 (Immunity)   |   |
| FCC CFR47 Part 15B  |   |
| Acoustic Noise.....   | 68 dBa typ                                    |
| Heat Dissipation.....   | 1500W to duct<br>350W to room                 |

## INTERFACE

| Type   | Function  |
|--|---|
| <b>LOCAL</b>   | AC Power On/Off   |
| <b>FRONT PANEL TOUCH SCREEN</b><br>(Front panel touch screen controls include but are not limited to the functions opposite) | HPA State (Standby, Transmit etc)<br>Gain<br>Automatic Level Control and Go To Power Configuration, single HPA, 1:1 Redundant<br>High/Low power Alarms<br>System Set Up |
| <b>FRONT PANEL TOUCH SCREEN</b><br>(Front panel touch screen status include but are not limited to the parameters opposite)  | HPA State<br>Forward and Reverse Power<br>TWT Parameters (Temperature, Voltages)<br>Logs and Trend Analysis<br>Fault Conditions<br>Elapsed Hours                        |
| <b>DRY-FORM- C RELAY CONTACTS</b>  | Summary Fault   |
| <b>SERIAL<br/>ETHERNET</b>   | RS232 and RS485 (4-wire)<br>Webpage, TVN, TCP, SNMP   |
| <b>AUXILIARY INTERFACE</b>   | Summary Fault<br>RF Inhibit<br>+24V, +15V Supply  |
| <b>WG SWITCH</b>   | WG Switch drives for 1:1 Redundant System   |
| <b>USB Port</b>  | Log and Trend Analysis download   |

### OPTIONS

Extensive options are offered with the STR2175 and include; integral pre-amplifiers, gain control, linearisers and block up-converters. The options are defined by adding to the base number as shown below:



(Consult SpacePath Communications for availability of options)

### Frequency Options

The following frequency options are available

| Ref | Frequency Range (GHz) | BUC Option |
|-----|-----------------------|------------|
| CC1 | 5.85—6.425            | Yes        |
| CC2 | 5.85—6.65             | Yes        |
| CC3 | 5.85—6.75             | Yes        |
| CC4 | 5.85—7.025            | Yes        |
| CC5 | 5.725—6.725           | Yes        |
| CC6 | 6.725—7.025           | Yes        |

### 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 4dB OPBO. The lineariser also incorporates the pre-amp and gain control options.

(Consult SpacePath Communications for availability)

### Input Option

The STR2175 can be offered with an L-Band Block Upconverter. Specify:

N - Standard RF

U - L to C-Band Block Upconverter (see page 4)

### Note:

The upconverter requires the inclusion of the 'D' or 'Z' option. (Consult Spacepath Communications for availability)

For more information contact Spacepath Communications.

## PERFORMANCE WITH INTEGRAL BLOCK UPCONVERTER

Output frequency range - see Frequency Options

L-Band input:

|                                  |             |         |
|----------------------------------|-------------|---------|
| Frequency range option CC1 ..... | 950 to 1525 | MHz     |
| Frequency range option CC2 ..... | 950 to 1750 | MHz     |
| Frequency range option CC3 ..... | 950 to 1850 | MHz     |
| Frequency range option CC4 ..... | 950 to 2125 | MHz     |
| Frequency range option CC5.....  | 950 to 1950 | MHz     |
| Frequency range option CC6.....  | 950 to 1250 | MHz     |
| Level.....                       | 10          | dBm max |

LO frequency

|                  |     |     |
|------------------|-----|-----|
| All options..... | 4.9 | GHz |
|------------------|-----|-----|

External reference (see note):

|                 |          |          |
|-----------------|----------|----------|
| Frequency ..... | 10       | MHz      |
| Level.....      | -3 to +7 | dBm      |
| Impedance ..... | 50       | $\Omega$ |

Gain Variation:

|                            |     |        |
|----------------------------|-----|--------|
| Over Any 575 MHz band..... | 4.0 | dB max |
| Over any 40 MHz band ..... | 1.5 | dB max |

Phase Noise Continuous .....

Input VSWR (non-operating)..... 1.6:1 max

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

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

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

### High Voltage

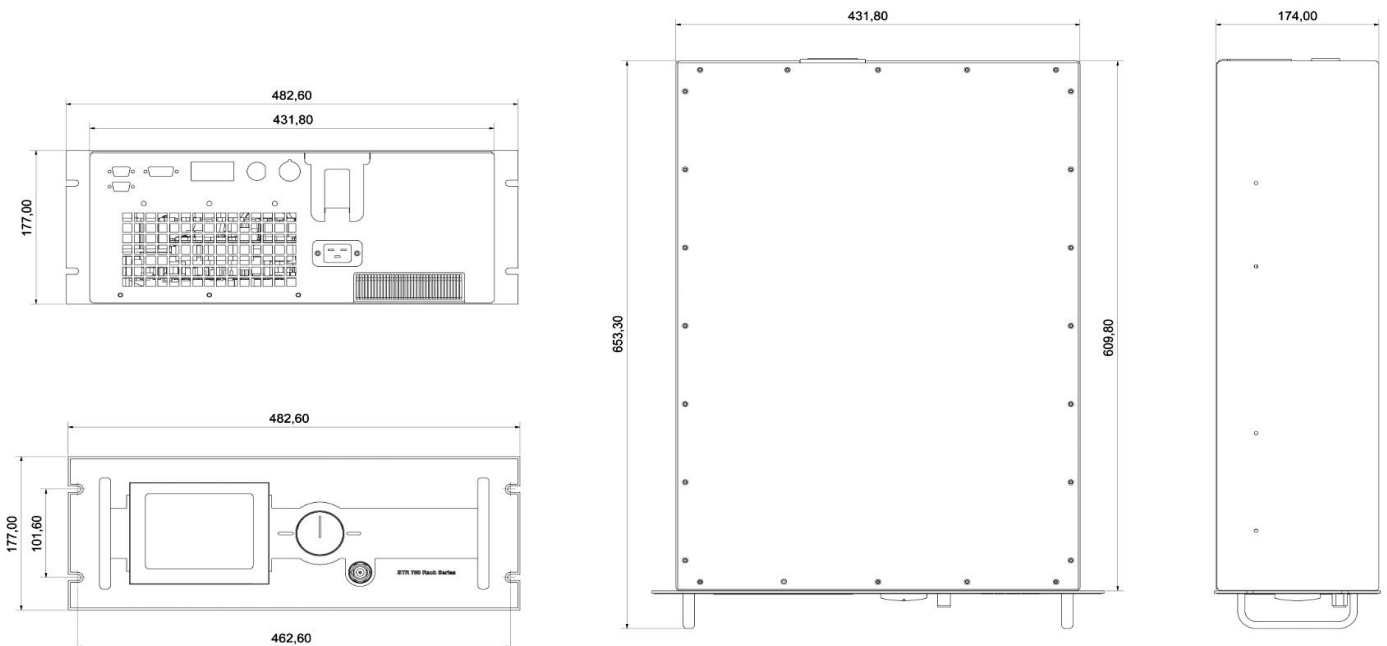
Dangerous voltages are present within the TWT amplifier when operating normally. However, the equipment is designed so that personnel cannot come into contact with high voltage circuits unless covers are removed.

### 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



Whilst SpacePath Communications 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. SpacePath Communications accepts no liability beyond the set out in its standard conditions of sale in respect of