



The STA1140 range of C-Band TWT amplifiers from e2v technologies provide over 350 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 STA1140 is available with a wide range of options and accessories, backed by round-the-clock, worldwide technical support.

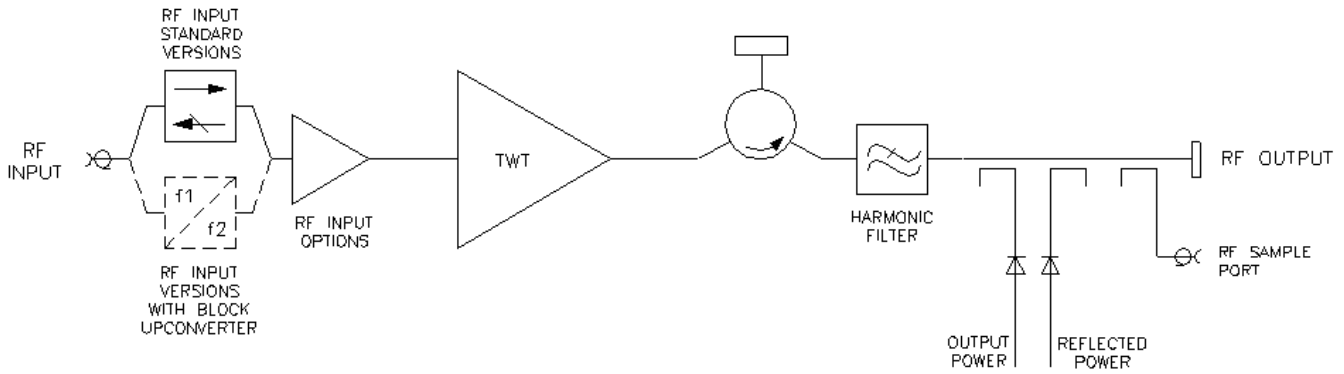
## OPTIONS

- 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 +55 °C and in direct sunlight.
- Weatherproof antenna mount construction allows exposed mounting.
- CE compliant.
- cETLus listed.
- CB certified.
- Wide input voltage range – can operate from mains supplies worldwide.
- 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 – CC1	5.85 to 6.425	GHz
extended – CC2	5.85 to 6.65	GHz
Output power:		
TWT output flange	400	W min
HPA rated output	350	W min
Gain:		
at rated power (C option)	45	dB min
at rated power (A, D, Z option)	70	dB min
SSG $P_{rated} - 10$ dB (C option)	50	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 40 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 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	°/dB
Noise power:		
transmit band	-70 dBW/4 kHz	max
receive band (3.2 – 4.2 GHz)	-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	99 to 265 V
Frequency	47 to 63 Hz
Power requirement	1500 VA max
Power factor	0.95 min

## MECHANICAL

Weight	25.0 kg (55 lb) typ
Dimensions	see outline
Cooling	integral forced-air

## CONNECTORS

RF input	N-type female
RF output	CPR137G with 10-32 UNF 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 (see note 1)	-40 to +55 °C
Derating	2°C/300 m above sea level (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 2)

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

CB Certified to IEC 60950-1:2001

## NOTES

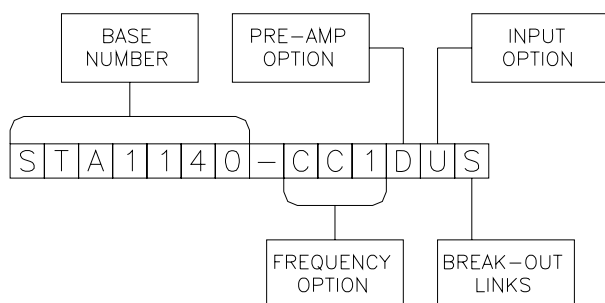
- +55 °C applies when the input supply voltage is between 180 and 265 V. Below 180 V, the maximum operating temperature is +50 °C.
- Safety applies for operating altitude up to 2000 m and operating temperature up to +50 °C.

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

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

## OPTIONS

Extensive options are offered with the STA1140 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 STA1140 is offered in two frequency bands:

CC1 - 5.85 – 6.425 GHz

CC2 - 5.85 – 6.65 GHz

### Pre-Amp Option

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

C - No pre-amp (typical SSG 52 dB).

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 STA1140 can be offered with an L-Band Block Upconverter. Specify:

N - Standard RF

U - L – C-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 STA1140 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 STA1140 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 CC1 .....	5.85 to 6.425	GHz
option CC2 .....	5.85 to 6.65	GHz
L-band input:		
frequency range option CC1 .....	950 to 1525	MHz
frequency range option CC2 .....	950 to 1750	MHz
level .....	10	dBm max
LO frequency (option CC1/CC2) .....	4.9	GHz
External reference (see note):		
frequency .....	10	MHz
level .....	-3 to +7	dBm
impedance .....	50	$\Omega$
Output power:		
TWT output flange .....	400	W min
HPA rated output .....	350	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
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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 (3.2 – 4.2 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.

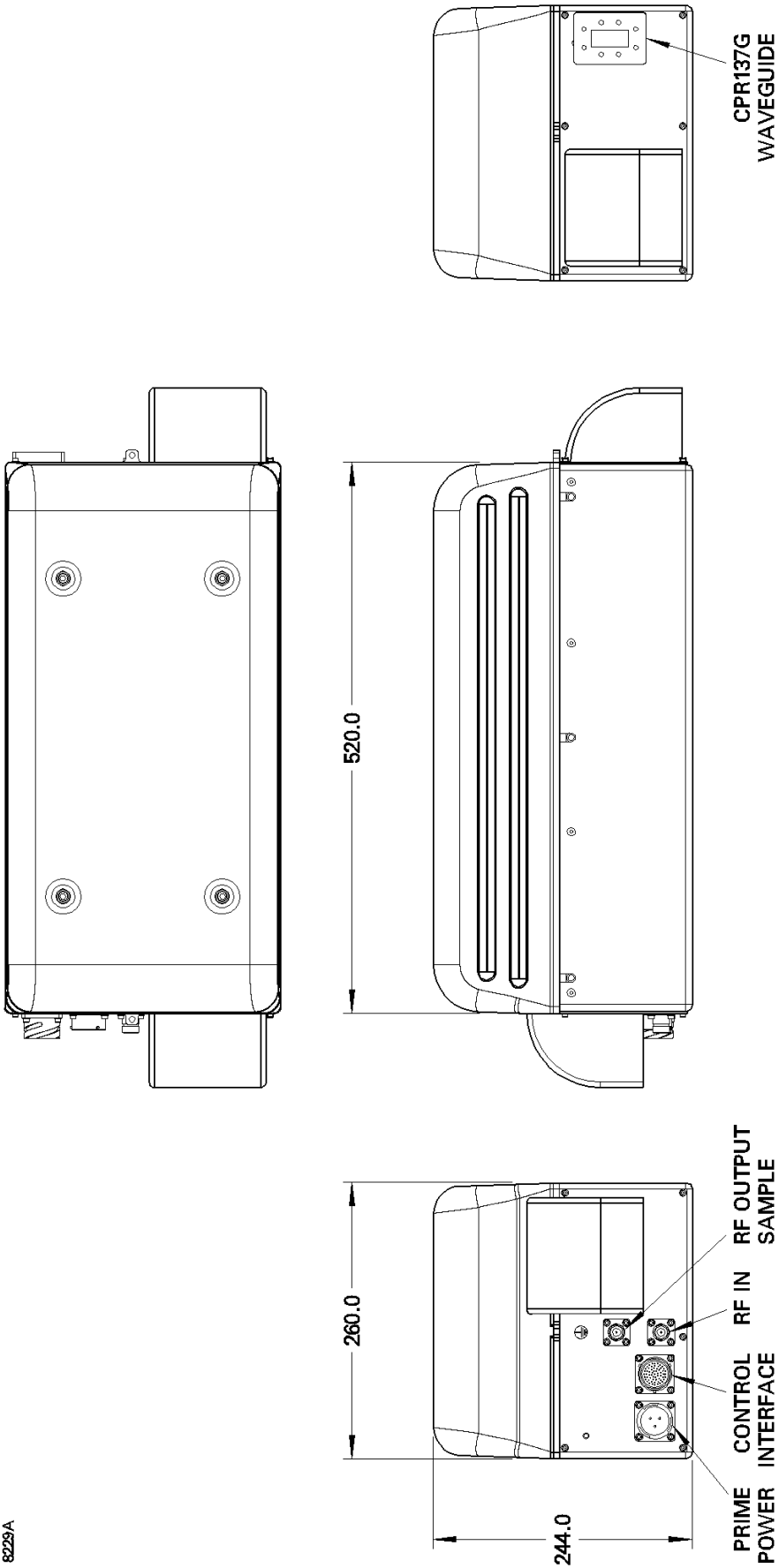
### RF Radiation

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



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