

U688 Series

720MHz to X-band Upconverters

INPUT SPECIFICATION		Options
1. Frequency range:	720MHz $\pm$ 200MHz	(see product table)
2. Connector:	SMA	
3. Impedance:	50 Ω	
4. Return loss:	$\geq$ 15dB	
OUTPUT SPECIFICATION		
5. Frequency range:	Any 1GHz or 2GHz slot within 7 to 9GHz	(see product table)
6. Connector:	SMA	
7. Impedance:	50 Ω	
8. Return loss:	$\geq$ 18dB	
9. 1dB compression point:	+10dBm	
10. Third order intercept:	+20dBm	
TRANSFER CHARACTERISTICS		
11. Gain:	0 to 30dB, adjustable in 0.1dB steps	
12. Gain ripple:	over $\pm$ 200MHz: $\leq$ 1.5dB p.t.p.	(1)
	over output band, 1GHz: $\leq$ 3dB p.t.p.	(1)
	over output band, 2GHz: $\leq$ 4dB p.t.p.	(1)
13. Group delay distortion:	ripple, $\pm$ 40MHz: $<$ 3ns ptp	
	linear, $\pm$ 40MHz: $<$ 0.03ns/MHz	
	parabolic, $\pm$ 40MHz: $<$ 0.01ns/MHz ²	
14. Gain stability, 0°C to 50°C:	$\pm$ 1dB	
	24hr. at constant temperature: $\pm$ 0.1dB	
15. Frequency stability, -10°C to +60°C:	10 ⁻⁷ from -10°C to +60°C	
	10 ⁻⁸ at constant temperature over 24 hrs.	
16. External reference:	10MHz, 0dBm	5MHz, 0dBm
17. Synthesiser step size:	1kHz	
18. Noise figure (full gain):	$<$ 20dB	
Spurii		
19. Image rejection:	$>$ 50dB	
20. In-band spurii (at 0dBm output):	$<$ -55dBc	(2)
PHASE NOISE		
21. 10Hz:	$<$ -45dBc/Hz	
22. 100Hz:	$<$ -70dBc/Hz	
23. 1kHz:	$<$ -80dBc/Hz	
24. 10kHz:	$<$ -85dBc/Hz	
25. 100kHz:	$<$ -95dBc/Hz	
26. 1MHz:	$<$ -110dBc/Hz	
27. Mains related:	$<$ -50dBc	
MISCELLANEOUS		
28. Power supply:	115V/230V $\pm$ 10% 50/60Hz $\pm$ 10%, 50VA	
29. Mechanical:	1U 19" frame, 500 or 520mm deep (depends on model)	
30. Temperature:	Operating: 0° to 50°C Storage: -40° to 85°C	
31. Relative humidity:	Operating: 0 to 90% Storage: 0 to 95%	
32. Summary alarm:	NO and NC dry relay contacts via rear mounted connector	
33. Summary alarm indication:	Front panel LED	
34. Remote control:	• RS232 or RS422/RS485, connector D-type 9P F • SNMP and HTTP over TCP/IP Ethernet, connector RJ45	

(1) Ripple spec measurement does not include 200MHz segment below the lowest limit and above the highest.

(2) Measured at maximum gain.

Model	Input (c)	Output
U688-1	720 ± 200MHz	7.0 - 9.0GHz (b)
U688-2	720 ± 200MHz	7.7 - 8.5GHz (b)
U688-3	720 ± 200MHz	8.0 - 8.4GHz (b)
U688-4	720 ± 200MHz	8.0 - 8.5GHz (b)
U688-5	720 ± 200MHz	8.0 - 9.0GHz (b)
U688-6	720 ± 200MHz	7.2 - 7.8GHz (b)
U688-7	720 ± 200MHz	7.945 - 8.945GHz (b)
U688-8	720 ± 200MHz	7.8 - 8.8GHz (b)
U688-9	720 ± 200MHz	7.7 - 7.9GHz (b)

- (a) This specification covers ALL frequency agile upconverters with 720MHz IF and RF output from 7GHz to 9GHz. **This table lists ONLY more common models.** Consult out office for other models configurations.
- (b) Output frequencies are an illustrative sample.
 Any other values from 7GHz to 9GHz, in 50MHz steps, are possible.
- (c) Other input bandwidths possible: ±20MHz, ±40MHz, ±50MHz, ±200MHz, ±300MHz.

NOTE

All Novella's frequency converter synthesisers are of the conventional phase-locked type. No DDS techniques or ICs are used. DDS synthesisers suffer from an inherent phase uncertainty (due to the inevitable residual frequency error) rendering them unsuitable for differential phase measurements used typically in satellite ranging and monopulse tracking systems which rely on differential phase measurements between two coherent signals processed by two downlink chains.

