



Model Number: **22253-N5N5-E**

RF Engineering  
and Custom Build

# VSAT TX-RX Hybrid Unit

With LNB Powering, BUC Powering & 10MHz Source



Front View of Model 22253-N5N5-E

The VSAT TX-RX module is an L-band hybrid splitter and combiner shelf designed to power and reference VSAT terminals, as well as facilitate the use of multiple modems.

The receive section comprises of a 4-way splitter and provides 18V DC LNB power. The transmit section comprises of a 4-way combiner and provides 24 or 48V DC BUC power. Both sections have a selectable amplifier and provide a 10MHz reference signal via the common port. An optional Ethernet port & web browser interface are also available.



Rear View of Model 22253-N5N5-E

A DIL switch on the rear panel is used to select the BUC voltage and also the internal or external 10 MHz reference source. The shelf incorporates monitoring of LNB and BUC current, as well as 10MHz signal presence. Alarms are triggered if LNB or BUC power, 10MHz signal, or PSU's fail. Alarms are indicated via the front panel LED's and also remotely via a serial port.

The shelf is housed in a 1U high rack with a single mains inlet (there are 3 internal power supplies), and has 50 ohm N-type RF connectors. Other connectors and impedances are also available.





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Technical specifications and operating parameters

RF Parameters			
<b>RX SIDE</b>			
Capacity	4-way Splitter		
Frequency Range	850-2150 MHz (L-band)		
Insertion Gain	Passive	- 10 dB $\pm$ 1 dB	
	Active	3 dB $\pm$ 1 dB	
Flatness over 850-2150MHz	Passive	$\pm$ 2 dB	
	Active	$\pm$ 1 dB	Slope compensating amplifier
1dB Compression	+ 10 dBm		
Noise Figure	9 dB		
Input Return Loss	15 dB typical		
Output Return Loss	15 dB typical		
10MHz Tone	Always supplied via common (RF in) port		
<b>TX SIDE</b>			
Capacity	4-way Combiner		
Frequency Range	850-2150 MHz (L-band)		
Insertion Gain	Passive	- 10 dB $\pm$ 1 dB	
	Active	3 dB $\pm$ 1 dB	
Flatness	Passive	$\pm$ 2 dB	
	Active	$\pm$ 1 dB	Slope compensating amplifier
1dB Compression	+ 15 dBm	-40 dB to +5 dBm signal per channel	
Noise Figure	9 dB		
Input Return Loss	15 dB typical		
Output Return Loss	15 dB typical		
10MHz Tone	Always supplied via common (RF out) port		

Power	
AC Power	85-264Vac 50/60Hz single PSU & mains inlet
PSU 24V	3.2A, 24V DC
PSU 48V	4.15A, 48V DC 200W max
LNB Power (RX)	18V DC, 500mA via common port, always on
BUC Power (TX)	24V or 48V DC via common port, always on

Physical	
Input Connector	N-type
Input Impedance	50 $\Omega$
Output Connector	N-type
Output Impedance	50 $\Omega$
Dimensions	1U high x 450mm deep x 19" wide
Weight	8 kg
Colour	White 00-E-55 semi-gloss

RF Parameters		
<b>10MHz SOURCE</b>		
10MHz Internal Source	Similar performance to Morion OCXO MV85 unit	
10MHz Reference Source	Internal/external (via BNC on rear panel)	Selectable internally/externally, always supplied to both Rx & Tx common ports
Frequency	10MHz	Factory setting is to $\pm$ 1ppm, $\pm$ 10Hz
Output Level	-3.5 $\pm$ 2 dBm (Tx & Rx ports terminated)	10MHz levels measured using high quality spectrum analyser. Web Browser can be used for indicative measurements with typical uncertainty of $\pm$ 3 dB plus the true variations in levels
	-3.5 $\pm$ 3 dBm (all conditions)	
Output Type	Sine Wave	
Harmonic & Spuri Levels	2nd Harmonic Level	<- 60 dBc
	3rd Harmonic Level	<- 55 dBc
	All other spuri	<- 65 dBc
Internal Reference	10MHz Sine Wave	Ovenised Crystal Oscillator
Frequency Stability Over Temperature	$\pm$ 1 x 10 <sup>-8</sup>	0 to +55°C
Reference Source Ageing	$\pm$ 5 x 10 <sup>-8</sup> / year	
	$\pm$ 5 x 10 <sup>-10</sup> / day	
Reference Source Phase Noise	<-85 dBc / Hz @ 1Hz	
	<-115 dBc / Hz @ 10Hz	
	<-140 dBc / Hz @ 100Hz	
	<-155 dBc / Hz @ 10000Hz	
Warm up time	<2 minutes	At 25°C to within $\pm$ 1 x 10 <sup>-7</sup>

System Control	
Local Control	DIL switch on rear panel
Display	Front panel LED's for LNB Power, 24V BUC, 48V BUC & amplifier condition
Remote Connection	RS232/RS485 & optional RJ45 ethernet port & WBI

Environmental	
Operating temp.	0 to 45°C
Location	Indoor use only
Storage temp.	-20°C to +75°C
Humidity	85% non-condensing

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