USEFUL ENGINEERING DATA



PRODUCT MATRIX



Return Loss/VSWR Tables

Return Loss (dB)	VSWR	Return Loss (dB) VSWR	Return Loss (dB)	VSWR								
46.064	1.01	22.607	1.16	17.445	1.31	14.564	1.46	12.625	1.61	11.202	1.76	10.097	1.91
40.086	1.02	22.120	1.17	17.207	1.32	14.412	1.47	12.518	1.62	11.120	1.77	10.032	1.92
36.607	1.03	21.664	1.18	16.977	1.33	14.264	1.48	12.412	1.63	11.039	1.78	9.968	1.93
34.151	1.04	21.234	1.19	16.755	1.34	14.120	1.49	12.308	1.64	10.960	1.79	9.904	1.94
32.256	1.05	20.828	1.20	16.540	1.35	13.979	1.50	12.207	1.65	10.881	1.80	9.842	1.95
30.714	1.06	20.443	1.21	16.332	1.36	13.842	1.51	12.107	1.66	10.804	1.81	9.780	1.96
29.417	1.07	20.079	1.22	16.131	1.37	13.708	1.52	12.009	1.67	10.729	1.82	9.720	1.97
28.299	1.08	19.732	1.23	15.936	1.38	13.577	1.53	11.913	1.68	10.654	1.83	9.660	1.98
27.318	1.09	19.401	1.24	15.747	1.39	13.449	1.54	11.818	1.69	10.581	1.84	9.601	1.99
26.444	1.10	19.085	1.25	15.563	1.40	13.324	1.55	11.725	1.70	10.509	1.85	9.542	2.00
25.658	1.11	18.783	1.26	15.385	1.41	13.201	1.56	11.634	1.71	10.437	1.86		
24.943	1.12	18.493	1.27	15.211	1.42	13.081	1.57	11.545	1.72	10.367	1.87		
24.289	1.13	18.216	1.28	15.043	1.43	12.964	1.58	11.457	1.73	10.298	1.88		
23.686	1.14	17.949	1.29	14.879	1.44	12.849	1.59	11.370	1.74	10.230	1.89		
23.127	1.15	17.690	1.30	14.719	1.45	12.736	1.60	11.285	1.75	10.163	1.90		

dBm	- Volts	s - Watt	s Com	pari	son	in a 50 🛭	2 match	ed sys	stem									
dBm	٧	Р	dB	n	٧	Р	dBm	V	Р	dBm	V	Р	dBm	mV	Р	dBm	mV	Р
+53	100.0	200 W	+3	4 1	11.5	2.5 W	+ 17	1.60	50 mW	0	0.225	1.0 mW	-17	31.5		-34	4.5	
+50	70.7	100 W	+3	3 1	10.0	2 W	+ 16	1.41	40 mW	-1	0.200	0.80 mW	-18	28.5		-35	4.0	
+49	64.0	80 W	+3	2 !	9.0	1.6 W	+ 15	1.25	32 mW	-2	0.180	0.64 mW	-19	25.1		-36	3.5	
+48	58.0	64 W	+3	1 8	8.0	1.25 W	+ 14	1.15	25 mW	-3	0.160	0.50 mW	-20	22.5	.01 m W	-37	3.2	
+47	50.0	50 W	+3	0 7	7.10	1.0 W	+ 13	1.00	20 mW	-4	0.141	0.40 mW	-21	20.0		-38	2.85	
+46	44.5	40 W	+2	9 6	5.40	800 mW	+ 12	0.90	16 mW	-5	0.125	0.32 mW	-22	17.9		-39	2.5	
+45	40.0	32 W	+2	B 5	5.80	640 mW	+ 11	0.80	12.5 mW	-6	0.115	0.25 mW	-23	15.9		-40	2.25	0.1 µW
+44	32.5	25 W	+2	7 5	5.00	500 mW	+ 10	0.71	10 mW	-7	0.100	0.20 mW	-24	14.1		-41	2.0	
+43	32.0	20 W	+2	6 4	4.45	400 mW	+ 9	0.64	8 mW	-8	0.090	0.16 mW	-25	12.8		-42	1.8	
+42	28.0	16 W	+2	5 4	4.00	320 mW	+ 8	0.58	6.4 mW	-9	0.080	0.125 mW	-26	11.5		-43	1.6	
+41	26.2	12.5 W	+2	4 3	3.55	250 mW	+ 7	0.500	5 mW	-10	0.071	0.10 mW	-27	10.0		-44	1.4	
+40	22.5	10 W	+2	3 3	3.20	200 mW	+ 6	0.445	4 mW	-11	0.064		-28	8.9		-45	1.25	
+39	20.0	8 W	+2	2 2	2.80	160 mW	+ 5	0.400	3.2 mW	-12	0.058		-29	8.0		-46	1.18	
+38	18.0	6.4 W	+2	1 2	2.52	125 mW	+ 4	0.355	2.5 mW	-13	0.050		-30	7.1	.001 mW	-47	1.00	
+37	16.0	5 W	+2	0 2	2.25	100 mW	+ 3	0.320	2.0 mW	-14	0.045		-31	6.25		-48	0.90	
+36	14.1	4 W	+1	9 2	2.00	80 mW	+ 2	0.280	1.6 mW	-15	0.040		-32	5.8				
+35	12.5	3.2 W	+1	3 1	1.80	64 mW	+ 1	0.252	1.25 mW	-16	0.0355		-33	5.0				

Band Designations

Old	New	Frequency GHz	Wavelength
HF 3 - 30 MHz	A 0 - 250 MHz	0.1 0.15	3m 2m
VHF 30 - 300 MHz	B 250 - 500 MHz	0.2	1.5m 100cm
UHF 300 - 1000 MHz	C 500 - 1000 MHz	0.5 0.75 1.0	60cm 40cm 30cm
L 1 - 2 GHz	D 1 - 2 GHz	1.5 2	20cm 15cm
S 2 - 4 GHz	E 2 - 3 GHz F 3 - 4 GHz	3 4	10cm 7.5cm
C 4-8 GHz	G 4 - 6 GHz H	5	6cm 5cm
X 8-12 GHz	6 - 8 GHz I 8 - 10 GHz	10	3.75cm 3cm
Ku 12 - 18 GHz	10 - 20 GHz	15	2cm
K 18 - 26.5 GHz	K	20	1.5cm
Ka 26.5 - 40 GHz	20 - 40 GHz	30	10mm 7.5mm
V 40 - 75 GHz	L 40 - 60 GHz	50	6mm
	M 60 - 140 GHz	— 60 75	5mm 4mm
W 75 - 110 GHz		100 110	3mm
mm 110 - 300 GHz		140	2mm

VSWR	Q	RL (dB)	Trans. loss (dB)	Trans. power %	Refl. power %
1.0	0		0	100	0
1.05	0.02	32.3	0.002	99.9	0.1
1.1	0.05	26.4	0.010	99.8	0.2
1.15	0.07	23.1	0.021	99.5	0.5
1.2	0.09	20.8	0.036	99.2	0.8
1.25	0.11	19.1	0.054	98.8	1.2
1.3	0.13	17.7	0.075	98.3	1.7
1.35	0.15	16.5	0.10	97.8	2.2
1.4	0.17	15.6	0.12	97.2	2.8
1.45	0.18	14.7	0.15	96.6	3.4
1.5	0.20	14.0	0.18	96.0	4.0
1.55	0.21	13.3	0.21	95.3	4.7
1.6	0.23	12.7	0.24	94.7	5.3
1.7	0.26	11.7	0.30	93.3	6.7
1.8	0.29	10.9	0.37	91.8	8.2
1.9	0.31	10.2	0.44	90.4	9.6
2.0	0.33	9.5	0.51	88.9	11.1
2.5	0.43	7.4	0.88	81.6	18.4
3.0	0.5	6.0	1.25	75	25

Our customers enjoy great technical support, service and products that satisfy the industry's demanding criteria of performance, cost and on-time delivery.

The technical data on this page is provided for guide purposes only. Melcom are not responsible for the accuracy of the information.

							z								ů,	2				ш								
							COPPER MOUNTAIN		CRAINE CRAINE DOI VEI ON		SOUP	G2 ENGINEERING	Ξ		2	MICROWAVE DEVICES				NOVA MICROWAV	¥				JSA			۵
	SS	F		>	5	Ψ	ER MC	١,	<u>г</u>	Z	LIAGE	GINE	WOR	Ĺ	SC	T L	9	SE	ü	MICR	TRON	ICS .	<u>L</u>	I WE	MAX	¥	ATON	SPEE
	AA-MCS	AVANTI	AVL	BLILEY	C-COM	СОВНАМ	СОРР	CPC		FLCOM	EXXELIA GROUP	G2 EN	HOLZWORTH	inTEST	KRATOS	Z Z Z	MODCO	M PULSE	NEWTEC	NOVA	NOVOTRONIK	PICONICS	RES-NET	SOUTHWEST	TENNMAX USA	¥ F	WERLATONE	WOLFSPEED
Amplifiers	•							•							•	ľ												•
Antennas			•		•							•				C			•									
Attenuators															•								•					
Beamformers									· [
Connectors, Cable and Cable Assemblies & Adaptors																								•				
Calibration Kits							•																	_				
Capacitors (Film, Ceramic, Alu Electrolytic, Tantalum)											•																	
Combiners/Dividers	•				4	4		_																4	4		•	-
Couplers Crystal Products	•			•																								
Detectors Detectors				-	-	-																		4				
Digital Frequency Discriminator (DFD)															•													
Diodes																												
Diplexers, Duplexers, Multiplexers & Triplexers	•																											
Optical Encoders & Potentiometers																												
Environmental/EMI Gasket (Form In Place)																									•			
Environmental Test Systems & Hot/Cold Plates														•														
Filters	•			•					•		•					٠										•	•	
Frequency Comparators, Converters & Discriminators										•						ŀ			•									
Frequency Doublers & Multipliers													•		•	ľ												
Heat Pipes																									•			
I & Q Networks								- 1																				
Inductors																						•						
Integrated Microwave Assemblies (IMAs)	•								1						•													
Isolators / Circulators					4	4			1											•				4	4		1	
Limiters					_	_			1	_	_				•	_	_					_		4	4	4	_	
LNBs/LNAs	•			-	-	7			۰															7	7			
Magnetics Millimetric Components				-	-	-			۰		•													-	-			
Mixers				-	-	7	-										-				-	-	-	7	7	+	٠	
MMICs						-																		-			٠	
Modems, Modulators & Demodulators																												
Motors					i	i																		ė				
Multi-Mix Technology																												
Oscillators (VCOs, OCXOs, TCXOs, PLOs, DROs)				•												ı												
Phase Noise Analysers													•															
Phase Shifters															•													
Plating on Teflon									1																	Т		
Quadrature Hybrids	•																											
Radar Sub-Systems	•							- 1							•													
Radar Transponders & Test Sets												•																
Receivers										•					•				•							•		
Resistors																							•					
RF Monitoring Systems																										•		
RF Routers, Matrices & Redundancy Switches																			•		•							
Rotary Joints						•																						
Satellite Bandwidth Samiconductors																												
Semiconductors Slip Rings & Assemblies																												•
Space Approved Products				•												C						•		•				
Spectrum Analysers																									-			
Substrate Materials																												
Switches															•						•							
Synthesisers				•									•		•													
Terminations																							•					
Thermal Interface Materials																									•			
Transceivers																										4		
Transformers											•																	
Vector Network Analysers & Reflectometers							•																					
Waveguide																												

Tel: +44 (0)1932 565544 // www.melcom.co.uk

Melcom Electronics Ltd., Quantum House, 59-61 Guildford Street, Chertsey, Surrey, KT16 9AX





- SSPAs up to 500W CW and
- · Combiners and Dividers.
- · Ultra Broadband Couplers. Filters
- PIN Diode 'Hot Switches'
- Non-ITAR Product & Available from Stock.



UK based Satellite Operator providing Ka Services in Europe, Africa and the Middle East.

- · Excellent footprint coverage in the UK and Ireland.
- · Fixed Satellite Broadband Hardware and Contended Bandwidth Tariffs.
- · Focus on Quality and Flexibility.
- Highly Resilient
- Infrastructure and Support. · Occasional Use and
- **Dedicated Bandwidth**



Design and Supply Military and Commercial Grade Antenna Systems from 0.6 to

- · Fly Away Antennas. · Manual or Motorised
- Platforms with Controller.
- · SNG Antennas.



Established 1930, a Leader in Design and Manufacture of Low Phase Noise Frequency Generation Products.

- Oscillators (XO, OCXO, TCXO, VCXO and TCVCXO).
- Low power and G Sensitive Products.



Design and Supply Rugged Antenna Systems with broad market appeal.

- Fixed Motorised Antennas.
- · Fly Away Antennas.
- Manual or Motorised Platforms with Antenna Controller.
- · SNG Antennas.

COBHAM

Cobham Antenna Systems, incorporating Continental Microwave and Kevlin.

Continental Microwave:

- Spiral and Flat Plate Antennas.
- · Sub-Systems.
- Waveguide Components.

Applicable for Hi-Rel, Defence and Space Applications.

Kevlin:

- · Rotary Joints. · Rotating Systems.
- Slip Ring Assemblies to 40GHz.

Applicable for Defence. Air Traffic Control, Satcom, Space and Commercial Applications.

Sivers Labs:

- · Rotating Joints.
- · Hybrid Rotary Systems.

Applicable for Defence, Air Traffic Control, Satcom and Commercial Applications.



- · Crystal Products.
- Integrated Assemblies. accuracy, wide dynamic range, • Low Cost & Precision a familiar UI and a broad variety of standard features at an affordable cost.
- Military and Space Heritage.
- 110GHz). · Compact VNAs up to 8.5GHz. · Full Size Two and Four Port with Direct Reciever Access.

· High Performance Vector

Network Analysers (up to

Copper Mountain

Technologies (CMT) produce

lab-grade Vector Network

Analyzers that provide high

 Vector Reflectometers. · Calibration & Accessories.



Communication Power Corporation (CPC) provides World Class, Pulsed and CW, High Power Amplifier Technology for Medical, Scientific, Industrial and **Defence Applications** including NMR, MRI, MRS, NQR and EPR.

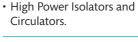


Microwave Solutions, incorporating:

- Merrimac
- Signal Technology

Crane Aerospace and **Electronics Microwave** Solutions designs and manufactures Critical Systems and Microwave Components.

- Applicable for the Space. Defence and Aerospace and Commercial Markets.
- Integrated Modules to 60GHz
- Multi-Mix Multilayer Technology.
- · RF and Microwave Components.
- · Sub-Systems.
- Frequency Converters and Integrated Microwave Assemblies.
- Frequency Generators and Sources.



CRANE. Polyflon

Manufacture High Performance Microwave Laminate and Substrate Materials.

Specialises in electroplated PTFE to any shape, any size to suit any specification. It is has been successfully proven in many diverse applications ranging from microwave communications to magnetic resonance imaging.

Applicable for Commercial and Defence Applications ranging from 10kHz to 40GHz including ELINT, COMINT, RWR, DF and SATCOM.

- · RF & Microwave Frequency Sources.
- · Synthesizers.



Applicable for High Performance Applications in Professional. Defence. Aerospace and Space Markets.

- Incorporating Eurofarad
- Sic Safco
- Firadec Microspire
- Dearbon Electronics
- Temex Ceramics Astema
- Vertura

Capacitors

- · Multi-layer Ceramic and Plastic Film Capacitors.
- · Aluminium Electrolytic Capacitors.
- · Capacitor Banks.
- · Modules. Tantalum (Wet and Solid) Capacitors.

Magnetics

- · High Precision Inductors.
- Motor Stators. · Transformers.
- · Windings.

Filters.

Electromechanical · EMI/RFI, energy and HEMP

- · Optical Encoders. • Precision Potentiometers.
- RVDTs.
- · Slip Rings. · Sub-Assemblies.

G2 Engineering Ltd

Radar Transponders.

Test Equipment.

· Manned Aircraft

· Missile Systems.

to 10GHz.

UAV.

· Towed Target.

Antennas and Switches.

Providing complete Radar

Surface Vessel Applications up

Tracking Solutions for:

- · Receivers.
- · Sub-Systems.



Modules and Test Systems for Hi-Rel and Defence Applications. • Phase Noise Test Systems.

- Single and Multichannel Phase Coherent RF
 - Synthesisers up to 20GHz. · Ultra Low Phase Noise.



inTEST Thermal Solutions incorporating Temptronic, Thermonics and Sigma Systems.

inTEST Thermal Solutions provides Thermal Products for:

- · Environmental Test.
- Process Chillers. Semiconductor, IC and Module Test Applications.



ATS Series ThermoStreams providing Accurate, Controlled Temperatures at the Test Site from -95degC to +300degC.

THRMONICS

Precision Temperature Forcing Systems (PTFS) have been replaced by the new ATS Series ThermoStream Systems.



Convection Chambers and

Hot/Cold Plates.



Control Components, Modules and IMAs.

- · Attenuators. · Limiters.
- · Power Amplifiers to 40GHz
- Frequency Sources and Synthesizers.
- Switches.
- · Integrated Microwave Assemblies.

Applicable for use in Hi-Rel and Defence Applications.



Microwave Devices supply mmW Components.

- · Attenuators.
- · Circulators & Isolators.
- · High Power Loads. · Millimetre Wave Horn Antennas.
- · Parabolic and Cassegrain
- Antennas up to 110GHz. • Rotary Joints from 0.64GHz to 110GHz.
- Switches.
- Waveguide Adaptors.



- Millimetre and Sub-Millimetre Wave Products.
- · Antenna and Quasioptical Products.
- · Mixers and Detectors. · Sources.
- · Amplifiers. Multipliers and Control
- Components. · Filters and Ferrite Products.
- Passive Waveguide Components.
- · Converters and Test Modules. · Space Heritage.

MODCO!

Modco, Inc. Designs and Manufactures High Quality Voltage Controlled Oscillators for Commercial. Industrial. Medical, and Military

- Frequencies from 10MHz to 12GHz
- · Surface Mount, TO8, Surface Mount.

 Custom and off the shelf solutions.

Applicable for Wireless

Communications to 12GHz.

Microwave (M)

MMICs.

Applications.

- RF. Microwave and
- Millimetre Wave Diodes. · Silicon Transistors.



Market Leader in Satcom Technologies for a Wide Range of Applications Across Market Sectors.

- Modems.
- Modulators.
- Demodulators. Fixed Satellite Broadband Hardware (Low cost Antenna
- System with Modem). · Frequency Converters.
- IP Accelerators and Performance Enhancing Proxy.
- 'Dialog'. · OEM Solutions.

• IP Hub Platforms including

MICROWAVE

Redundancy Switches.





High Quality Products Range from DC to 27.5GHz.

- · Baseband Routers and
- Components. • RF Matrices. • RF Routers.
- · Multi Couplers. · Standard and Custom Solutions available.
- **PICONICS**
- Broadband Conical Inductors. · Fixed and Tunable
- assemblies, including Inductors. multi-pin connectors up · High Quality, to 110 GHz. Microelectronic Coil
- Suitable for hi-Rel / Space, Inductors. Defence, Instrumentation, • RF & Microwave Air Coil integrated-circuit and PCB and Spiral Chip Inductors.

Applicable for Space, Aerospace, Defence and Commercial Applications.

RES-NET Tennmax USA provide **MICSOMANE** innovative and high performance Thermal Products and Solutions Res-Net designs and

- manufactures: • Microwave attenuators.
- Terminations. Diode detectors.
- · Resistors. The microwave attenuators and terminations range from the small flange type to large 2.000 watt power attenuators
- ISO 9001: 2012 and NASA Specification NPC 200-3.

and/or terminations.

laser trim capabilities. · Large choice of substrate materials.

• In-house photo etch and



Manufacture PC Driven High Performance Signal / Spectrum Analyser with a highly configurable Software Defined Radio receiver coupled with real-time digitisation and digital signal processing.

- Up to 160MHz Real Time
- (POI) as short as 1.02 µs. Spurious Free Dynamic
- Optional Support for External Local Oscillator
- Preselect Filtering. Compact housing with rack
- · Available as OEM Module.



- (SOTM) Antenna Systems.

E-mail: melcomsales@melcom.co.uk // Tel: +44 (0)1932 565544 // www.melcom.co.uk



ThinkRF Design and

- Ideal for Spectrum Monitoring Applications. • 8, 18 & 27GHz options.
- Bandwidth.
- Range (SFDR) up to 100 dBc.
- Optional Pre Amp and
- mount option.



TTI Designs and Manufactures RF and Microwave Modules/Equipment from **UHF/VHF Frequency Bands**

- · Block Up Converters in X, Ku
- and Ka Band. · Ka Band LNBs
- Phase Shifters, Oscillators and other RF Products. Satcom on the Move



- 0° Combiners/Dividers. • 90° Hybrid Couplers. • 180° Hybrid Combiners and
- Absorptive Filters from DC to 6GHz. High Power, Multi-Octave **Directional Couplers**

Markets include Defence, Commercial, Industrial and Test & Measurement Mismatch Tolerant® Designs Operate at Rated Power into Severe Mismatches. Power Capability from 5W CW to 100kW CW.



Wolfspeed's GaN RF Power

devices provide the best-inclass in efficiency and performance, including the lowest Failure-in-Time (FIT)

· Unmatched Transistors. Pre-matched Transistors. · Fully matched Transistors.

MMICs.

Satcom.

· Packaged MMCs. Suitable for hi-Reliability applications including Defence, Industrial/Scientific

Commercial Comms and

PRINCIPALS A-Z



PRINCIPALS A-Z

E-mail: melcomsales@melcom.co.uk // Tel: +44 (0)1932 565544 // www.melcom.co.uk

PRINCIPALS A-Z

SOUTHWEST MICROWAVE

and manufactures a broad

Adapters with the lowest

Insertion Loss and VSWR,

· Panel mount Connectors.

Edge Launch Connectors

'SuperMini' vertical or end

launch board-to-board

from DC to 110 GHz.

for PCB evaluation.

Adapters.

connectors.

Cable and harness

evaluation applications.

TENN ()AX

suitable for all industry

· Thermal Pads and Iellies

with best in industry

· Form In Place (FIP) -

Computer controlled

and EMC gasket onto

CNC Machining.

Heat Pipes

chassis Thermal analysis

service and cost effective

Metallisation of Plastics.

dispensing of Environmental

performance.

sectors.

Southwest Microwave designs range of high-performance Microwave Connectors and

- Probability of Intercept



- up to Ka Band.
- · Ka Band Solid State Power Amplifier up to 200W.

rate in the industry.