

## VMIP and SMIP Power and Cooling Table

Product	+5V		+12V		-12V		+24V		-24V		-5.2V		-2V		Weight Pounds	MTBF's (hours) n/s	Avg. Watts Slot cooling <sup>5</sup> n/a
	IMP	IMD	IMP	IMD	IMP	IMD	IMP	IMD	IMP	IMD	IMP	IMD	IMP	IMD			
<b>Mainframes Product Line</b>																	
E8408A 4-slot Mainframe	17.00	2.50	2.70	1.00	2.00	0.80	2.00	1.00	2.00	1.00	2.00	1.00	2.00	1.00	19		
CT310A 5-slot Mainframe	40.00	5.00	8.00	2.00	4.00	2.00	4.00	2.00	4.00	2.00	10.00	2.00	8.00	2.00	22	100,000	n/a
CT100C 6-slot Mainframe	40.00	5.00	8.00	2.00	4.00	2.00	4.00	2.00	4.00	2.00	10.00	2.00	8.00	2.00	22	100,000	n/a
CT400 13-slot Mainframe	80.00	15.00	12.00	3.00	12.00	3.00	12.00	4.00	12.00	4.00	60.00	10.00	30.00	5.00	49	100,000	n/a
<b>SLOT 0 Product Line</b>																	
GPB-VXI/C															n/s	n/s	n/s
E1406A GPIB-VXI	3.2	0.32	0.01	0.01	0.01	0.01	0.03				0.4	0.04	0.01	0.01	3.3	n/s	19.1
VXI-MXI-2	2.5										0.18		0.08		2.26	77,000	13.2
VXI-8340 MXI3	4.3										0.18		0.11		2.6	n/s	22.6
VXI-1394 Firewire	2.3		0.001								0.176		0.09		2.45	n/s	12.6
E8491B IEEE-1394	2.5	0.001	0.35	0.05	0.015	0.001					0.18	0.001	0.36	0.001	2.1	n/s	18.5
<b>VMIP™ Product Line</b>																	
VM9000 VMIP™	0.74	0.03									0.05	0.01			1.7	165,000	4
VM1548 48-channel Digital I/O	0.44	0.01													0.4	125,000	2
VM1548C 48-channel Open Collector Digital I/O	0.60	0.02	0.06	0.01											0.4	125,000	2
VM1602 32-channel Time Stamp	1.41	0.06									0.35	0.04			0.4	105,000	9
VM2164 200 MHz 1nS Universal Counter Timer	0.40	0.03	0.15	0.01	0.15	0.01									0.5	97,500	4
VM2601/02/03 - 80/40/20 MSa/s Digitizers	1.86	0.06	0.25	0.02	0.24	0.02					0.06	0.01			0.8	92,500	16
VM2608 8-channel Digitizer	0.46	0.01	0.16	0.01			0.08	0.01	0.06	0.01	0.07	0.01			0.4	93,000	8
VM2616 16-channel Digitizer	0.68	0.02	0.33	0.03			0.18	0.02	0.10	0.01	0.07	0.01			0.6	78,000	15
VM2710A 6.5 digit DMM	0.45	0.04					0.30	0.03			0.08	0.01			0.4	82,000	10
VM2716A 16-channel Scanning DVM	0.32	0.04	0.01	0.01			0.04	0.01	0.04	0.01	0.07	0.01			0.4	91,000	4
VM3608A 8-channel D/A <sup>1</sup>	0.25	0.02					0.16	0.02	0.06	0.01	0.05	0.01			0.4	84,300	7
VM3616A 16-channel D/A <sup>1</sup>	0.30	0.03					0.27	0.03	0.23	0.02	0.10	0.01			0.4	63,000	14
VM3618 8-channel Isolated D/A <sup>2</sup>	0.66	0.07	0.10	0.01			0.70	0.05			0.05	0.02			0.7	58,000	22
VM3640A 50 MSa/s Arb-20 MHz Function Generator	0.55	0.06	0.20	0.03	0.20	0.03	0.30	0.03	0.30	0.03	0.04	0.02			0.6	74,000	22
VM4016 16-channel Analog Comparator	0.69	0.07					0.05	0.01	0.05	0.01	0.12	0.01			0.4	96,500	6
VM4018 16-channel Precision Analog Comparator	0.69	0.07					0.05	0.01	0.05	0.01	0.17	0.01			0.4	102,000	6
VM6068 4-channel High-speed Serial	0.96	0.02	0.10	0.01	0.10	0.01									0.4	135,000	7
VM7000 Custom Prototyping Board	0.25	0.02													0.3	150,000	2
VM7004 4-channel Programmable Resistor	1.7	0.22													0.8	89,500	9
VM8016 16-Channel Low Thermal Offset MUX <sup>3</sup>	0.10	0.01													0.8	81,000	2
<b>C-Size VXI Modules (non-VMIP)</b>																	
AXI429 ARINC 429 Simulator and Analyzer	4.0		0.67												2.64	n/s	28
AXI1553-1 Single-channel 1553 (dual redundant)	3.0		0.33												2.64	n/s	18
AXI1553-2 Dual-channel 1553 (dual redundant)	3.5		0.70												2.90	n/s	21
CSM-S-11056 Trigger Distribution Module	1.5		0.2												2.0	94,000	10
VT1563A 2 channel 800 kSa/s Digitizer	1.1	0.5	0.6	0.1	0.6	0.1					0.1	0.01	0.1	0.01			20.6
VT1564A 4 channel 800 kSa/s Digitizer	1.1	0.5	1.2	0.1	1.2	0.1					0.1	0.01	0.1	0.01			37.4
VT1802 120 ch High Voltage DAC																	
VT2000 DMM/Counter-Timer/AWG	2.14	0.16	0.35	0.04	0.35	0.04	0.60	0.06	0.30	0.03	0.12	0.03			3.2	23,800	40
VT4101 DMM/Counter-Timer	1.59	0.1	0.15	0.01	0.15	0.01	0.30	0.03			0.08	0.01			2.6	35,000	18
VT6065 Serial Interface	2.0	1.5	0.1		0.1		0.2		0.2		0.12				2.2	91,500	22

Product	+5V		+12V		-12V		+24V		-24V		-5.2V		-2V		Weight Pounds	MTBFs (hours)	Avg. Watts Slot cooling <sup>5</sup>	
	IMP	IMD	IMP	IMD	IMP	IMD	IMP	IMD	IMP	IMD	IMP	IMD	IMP	IMD				
<b>SMIPII Product Line</b>																		
<b>GENERAL PURPOSE/RF</b>																		
SMP1100 SMIP//™ Single Base Unit	0.30	0.07										0.10	0.01	0.10	0.01	2.1	285,000	2.22
SMP1200 SMIP//™ Double Base Unit	0.30	0.07										0.10	0.01	0.10	0.01	3.2	285,000	2.22
SMP2001A 20 SPST Power (16 A) <sup>4</sup>	0.02	0.01														1.3	1x10 <sup>5</sup>	0.10
SMP2002A 12 SPDT Power (16 A) <sup>4</sup>	0.02	0.01														1.0	1x10 <sup>5</sup>	0.10
SMP2003 8 SPDT Power (20 A) <sup>6</sup>	0.05	0.01														1.4	1x10 <sup>5</sup>	0.25
SMP2004 12 SPST Power (20 A) <sup>6</sup>	0.05	0.01														1.7	1x10 <sup>5</sup>	0.25
SMP2005 3 SPDT & 3 (1x4) 20 A <sup>6</sup>	0.05	0.01														1.7	1x10 <sup>5</sup>	0.25
SMP2007 1x48 High Voltage MUX <sup>7</sup>	0.05	0.01														1.7	1x10 <sup>5</sup>	0.25
SMP2008 16 DPST 500 V 1A <sup>7</sup>	0.05	0.01														1.7	1x10 <sup>5</sup>	0.25
SMP2009 16 SPDT 500 V 1A <sup>7</sup>	0.05	0.01														1.7	1x10 <sup>5</sup>	0.25
SMP2012 10 SPST, 250 VAC, 30 A <sup>6</sup>	0.05	0.01														1.5	1x10 <sup>5</sup>	0.25
SMP2104 10 channel (20 A) Solid State																0.9	1x10 <sup>11</sup>	
SMP2300 24 SPST, 50 Ω, 2 A carry <sup>5</sup>	0.03	0.01														1.7	1x10 <sup>6</sup>	0.15
SMP2300-93 24 SPST, 93 Ω, 2 A Carry <sup>5</sup>	0.03	0.01														1.7	1x10 <sup>6</sup>	0.15
SMP3001 1 x 64 2-wire Multiplexer <sup>5</sup>	0.03	0.01														1.3	1x10 <sup>6</sup>	0.15
SMP3001 DS Multiplexer W/Discharge <sup>5</sup>	0.03	0.01														1.3	1x10 <sup>6</sup>	0.15
SMP3002 (16) 1x8 1-wire mux <sup>5</sup>	0.03	0.01														1.3	1x10 <sup>6</sup>	0.15
SMP3005 (12) 1x5 2-wire mux <sup>5</sup>	0.03	0.01														1.2	1x10 <sup>6</sup>	0.15
SMP400x 2-Wire 144 Crosspoint Matrices <sup>5</sup>	0.03	0.01														1.9	1x10 <sup>6</sup>	0.15
SMP4028 (8) 2x8 50 Ω Matrices <sup>5</sup>	0.03	0.01														1.7	1x10 <sup>6</sup>	0.15
SMP4044 8x20 50 Ω Matrix <sup>5</sup>																1.4	1x10 <sup>6</sup>	0.15
SMP5001 (80) 2 A Relays SPST <sup>5</sup>	0.03	0.01														1.3	1x10 <sup>6</sup>	0.15
SMP5002 (50) 2 A Relays SPDT <sup>5</sup>	0.03	0.01														1.0	1x10 <sup>6</sup>	0.15
SMP5003 (26) (1x4) 2 A Switch <sup>5</sup>	0.03	0.01														1.0	1x10 <sup>6</sup>	0.15
SMP5004 (30) SPDT 5 A Switch <sup>4</sup>	0.03	0.01														1.1	1x10 <sup>6</sup>	0.15
SMP5005 (48) SPST 5 A Switch <sup>4</sup>	0.03	0.01														1.6	1x10 <sup>6</sup>	0.15
SMP6001 (10) 1x4 900 MHz RF <sup>4</sup>	0.03	0.01														1.3	1x10 <sup>6</sup>	0.15
SMP6002 (17) 1x2 900 MHz RF <sup>4</sup>	0.03	0.01														0.9	1x10 <sup>6</sup>	0.15
SMP6004 (3) 1x8 and (3) 1x2 500 MHz RF Star <sup>4</sup>	0.03	0.01														0.9	1x10 <sup>6</sup>	0.15
SMP6005 (8) 1x4 500 MHz RF Star <sup>4</sup>	0.03	0.01														0.9	1x10 <sup>6</sup>	0.15
SMP6006 (2) 1x16 250 MHz RF Star <sup>12</sup>	0.05	0.01														1.3	1x10 <sup>6</sup>	0.15
SMP6101 (10) 1x4 >1.3 GHz RF <sup>4</sup>	0.03	0.01														1.8	1x10 <sup>6</sup>	0.15
SMP6102 (17) 1x2 >1.3 GHz RF <sup>4</sup>	0.03	0.01														1.4	1x10 <sup>6</sup>	0.15
SMP6103 1x31 mux RF <sup>4</sup>	0.03	0.01														1.8	1x10 <sup>6</sup>	0.15
SMP6122 (6) 2x2 Matrix >1 GHz RF <sup>4</sup>	0.03	0.01														1.4	1x10 <sup>6</sup>	0.15
SMP6144 4x4 Matrix > 1 GHz RF <sup>4</sup>	0.03	0.01														1.4	1x10 <sup>6</sup>	0.15
SMP6201 (10) 1x4 75 Ω RF <sup>4</sup>	0.03	0.01														1.8	1x10 <sup>6</sup>	0.15
SMP6202 (17) 1x2 75 Ω RF <sup>4</sup>	0.03	0.01														1.4	1x10 <sup>6</sup>	0.15
SMP6301 (4) 1x4 50 Ω >1.8 GHz RF <sup>4</sup>	0.03	0.01														1.0	1x10 <sup>6</sup>	0.15
SMP6905 (6) 2-Way Splitter/Combiner RF																		
SMP7500 96-channel 300mA I/O (Relay Driver)	0.60	0.01	0.12	0.01												1.0	85,000	4
SMP7600 5 W Programmable Load <sup>5</sup>	0.03	0.01														0.9	1x10 <sup>6</sup>	0.15
<b>MICROWAVE</b>																		
SM7000N Single-slot Base Unit	0.30	0.07					8					0.10	0.01	0.10	0.01	1.8 <sup>11</sup>	246,000	2.22
SM7001A Double-slot Base Unit	0.30	0.07					8					0.10	0.01	0.10	0.01	1.8 <sup>11</sup>	246,000	2.22
SM7002 Double-slot 40 GHz Base Unit	0.30	0.07					8					0.10	0.01	0.10	0.01	1.8 <sup>10</sup>	246,000	2.22
SM7100 True Non-Blocking 4x4 20 GHz Matrix	0.30	0.07					8					0.10	0.01	0.10	0.01	1.8 <sup>10</sup>	246,000	2.22
<b>OPTICAL</b>																		
SM8001 Single Slot Multi-Channel Base Unit <sup>9</sup>	0.30	0.07										0.10	0.01	0.10	0.01	2.4	246,000	2.22
SM8002 Double Slot Multi-Channel Base Unit <sup>9</sup>	0.30	0.07										0.10	0.01	0.10	0.01	2.6	246,000	2.22
SM8003 Single Slot Prism Switch Base Unit	0.30	0.07										0.10	0.01	0.10	0.01	2.4	246,000	2.22
SM8101 Single Ch. Programmable Attenuator	0.30	0.07										0.10	0.01	0.10	0.01	2.4	246,000	2.22
SM8102 Double Ch. Programmable Attenuator	0.30	0.07										0.10	0.01	0.10	0.01	2.4	246,000	2.22
SM8000 1xN switch			0.30	0.05												0.8		3.60
SM8003 Prism Switches	0.12	0.03														0.1		0.60
SM8101/8102 Attenuator			0.35	0.05												0.8		4.20

## Data Acquisition Power and Cooling Table

Product	+5V		+12V		-12V		+24V		-24V		-5.2V		-2V		Weight Pounds	MTBF's (hours)	Avg. Watts Slot cooling <sup>5</sup>
	IMP	IMD	IMP	IMD	IMP	IMD	IMP	IMD	IMP	IMD	IMP	IMD	IMP	IMD			
<b>Data Acquisition &amp; Signal Conditioning</b>																	
<b>Static Acquisition &amp; Closed Loop Control</b>																	
VT1413C 64-channel 100 kSa/s ADC	1.00	0.02	0.06	0.01	0	0	0.1	0.01	0.1	0.01	0.15	0.01	0	0	2.8	>40,000	11.3
VT1415A 64-channel Algorithmic Control	1.00	0.02	0.06	0.01	0	0	0.1	0.01	0.1	0.01	0.15	0.01	0	0	2.8	>40,000	11.3
VT1419A 64-channel Multifunction/Measurement	1.00	0.02	0.06	0.01	0	0	0.1	0.01	0.1	0.01	0.15	0.01	0	0	2.8	>40,000	11.3
VT1422A 64-channel Remote DAC and Control	1.00	0.02	0.06	0.01	0	0	0.1	0.01	0.1	0.01	0.15	0.01	0	0	2.8	>40,000	11.3
VT1501A 8-channel Direct I/O SCP	0.01	0	0	0	0	0	0.01	0	0.01	0	0	0	0	0	0.07	>40,000	0.5
VT1502A 8-channel 7 Hz LPF SCP	0.01	0	0	0	0	0	0.02	0	0.02	0	0	0	0	0	0.08	>40,000	1
VT1503A 8-channel Prog. Filter/Gain SCP	0.01	0	0	0	0	0	0.06	0	0.06	0	0	0	0	0	0.09	>40,000	2.9
VT1505A 8-channel Current Source SCP	0.02	0	0	0	0	0	0.03	0	0.03	0	0	0	0	0	0.09	>40,000	1.5
VT1506A 8-channel 120 Ω Strain SCP	0.28	0	0	0	0	0	0.032	0	0.027	0	0	0	0	0	0.08	>40,000	2.8
VT1507A 8-channel 350 Ω Strain SCP	0.09	0	0	0	0	0	0.032	0	0.027	0	0	0	0	0	0.08	>40,000	1.9
VT1508A 8-channel x16 Gain/7 Hz LPF SCP	0.01	0	0	0	0	0	0.02	0	0.02	0	0	0	0	0	0.08	>40,000	1
VT1509A 8-channel x64 Gain/7 Hz LPF SCP	0.01	0	0	0	0	0	0.02	0	0.02	0	0	0	0	0	0.08	>40,000	1
VT1510A 4-channel Sample and Hold SCP	0.01	0	0	0	0	0	0.125	0	0.125	0	0	0	0	0	0.1	>40,000	6.1
VT1511A 4-channel Transient Strain SCP	0.55	0	0	0	0	0	0.145	0	0.143	0	0	0	0	0	0.1	>40,000	9.7
VT1512A 8-channel 25 Hz LPF SCP	0.01	0	0	0	0	0	0.02	0	0.02	0	0	0	0	0	0.08	>40,000	1
VT1513A 8-channel ±16 Attenuator/7 Hz LPF SCP	0.005	0	0	0	0	0	0.02	0	0.02	0	0	0	0	0	0.08	>40,000	1
VT1518A 4-wire Resistance Measurement SCP	0.01	0	0	0	0	0	0.033	0	0.039	0	0	0	0	0	0.1	>40,000	1.8
VT1521 4-channel high-speed bridge SCP	0.65	0	0	0	0	0	0.18	0	0.18	0	0	0	0	0			
VT1531A 8 -channel Voltage Output SCP	0.015	0	0	0	0	0	0.075	0	0.075	0	0	0	0	0	0.09	>40,000	3.7
VT1532A 8-channel Current Output SCP	0.011	0	0	0	0	0	0.065	0	0.065	0	0	0	0	0	0.08	>40,000	3.2
VT1533A 16-bit Digital I/O SCP	0.08	0	0	0	0	0	0.015	0	0.006	0	0	0	0	0	0.07	>40,000	0.9
VT1536A 8-Bit Isolated Digital I/O SCP	0.072	0	0	0	0	0	0	0	0	0	0	0	0	0	0.09	>40,000	0.4
VT1538A Enhanced Frequency/Totalize/PWM SCP	0.2	0	0	0	0	0	0.054	0	0.025	0	0	0	0	0	0.13	>40,000	2.9
VT1539A Remote Channel Strain SCP	0.168	0	0	0	0	0	0	0	0	0	0	0	0	0	0.08	>40,000	0.8
<b>Dynamic Signal Analysis</b>																	
VT1432A 16-channel 51.2 kSa/s 16-bit Digitizer	4.6	0.1	0.19	0.02	0.05	0.01	0.82	0.01	0.47	0.01	0.28	0.1	0.03	0.01	4.1	35,000	58.4
VT1432B 16-channel 102.5 kSa/s 24-bit Digitizer	5.3	0.1	0.19	0.02	0.05	0.01	0.82	0.01	0.47	0.01	0.28	0.1	0.03	0.01	4.1		58.4
VT1435 8-channel Digitizer with IEPE	4.1	0.1	0.19	0.02	0.05	0.01	0.99	0.01	0.47	0.01	0.28	0.1	0.03	0.01	4.0		58.4
VT1436 16-channel Digitizer with IEPE	5.68	0.1	0.19	0.02	0.05	0.01	1.16	0.01	0.47	0.01	0.28	0.1	0.03	0.01	4.1		58.4
1DD Delete 12 channels	-0.84	0	0	0	0	0	-0.339	0	-0.3	0	0	0	0	0	-1.1		-19.5
1DE Delete 8 channels	-0.56	0	0	0	0	0	-0.226	0	-0.2	0	0	0	0	0	-0.6		-13
AYF Tachometer Option	0.14	0	0	0	0	0	0.095	0	0.063	0	0	0	0	0	n/a		4.5
1D4 Arb Source Option	0.6	0	0.19	0	0.18	0	0.03	0	0.03	0	0	0	0	0	n/a		8.9
UGV Local Bus Upgrade	0.18	0	0	0	0	0	0	0	0	0	0.52	0	0.003	0	n/a		3.6
AFW ICP Breakout Box	0	0	0	0	0	0	0.17	0	0	0	0	0	0	0	n/a		4.1
VT3242A Charge Breakout Box	0	0	0	0	0	0	0.26	0	0.22	0	0	0	0	0	2.2		11.5
VT3243A Microphone Breakout Box	0	0	0	0	0	0	0.25	0	0.15	0	0	0	0	0	2.0		9.6
VT1433A/B 8-channel 196kSa/s digitizer	6.24	0.2	0.75	0.02	0.23	0.01	0.74	0.01	0.51	0.01	0.95	0.02	0.03	0.01	3.8	23,000	78
VT1434A 4-channel Arbitrary Source	4.9	0.03	0.6	0.04	0.55	0.05	0.02	0.01	0.025	0.01	0.6	0.03	0.003	0.01	3.5	>40,000	42.5
VT2216A VXi SCSI Drive Module (No Disks)	1.9	0.54	0	0	0	0	0.02	0	0	0	0.54	0.06	0.06	0.01	10.8*	17,700	6.5
011 73 GByte Disk	2.9	1.15	0	0	0	0	0.46	1.18	0	0	0.54	0.06	0.06	0.01			14.2
012 146 GByte Disk	3.75	2.15	0	0	0	0	0.84	2.25	0	0	0.54	0.06	0.06	0.01			20.9
* w/ option 012 (dual disk) installed																	

## Footnotes and Environmental Specifications

### Notes:

1. Based upon 0 outputs per VM module. Add 50 mA to the +24 V supply line for each positive D/A voltage sinking 50 mA, and 50 mA to the -24 V supply line for each negative D/A voltage sinking 50 mA
2. Based upon 0 outputs per VM module. Add 50 mA to the +24 V supply line for each D/A voltage sinking 50 mA positive or negative
3. Based upon all relays in the opn position. Add 30 mA to the +5 V line per closed relay
4. Add 0.04 A to the +5 V line per close relay
5. Add 0.03 A to the +5 V line per closed relay
6. Add 0.08 A to the +12 V line per closed relay
7. Add 0.05 A to the +5 V line per closed relay
8. Add 0.16 A per relay closure
9. Current drawn when changing channels
10. Add 0.1 lb per relay
11. Add 0.3 lb per relay
12. Add 0.07 A per relay closure

Electro-mechanical relays are the determining component for the MTBF of switch modules. Therefore, MTBFs are specified in terms of relay life expectancy.

Worst case cooling requirement for SMIP//™ is 3.0 l/s 0.7 mm H2O  
 Worst case cooling requirement for VMIP is 3.8 l/s 0.5 mm H2O

Characteristics	Description
<b>Classification</b>	MIL-T-28800E Type III, Class 5, Style E or F
<b>Temperature</b> Operating Non-operating	Meets the limits stated in MIL-T-28800E for Type III, Class 5 0 °C to 55 °C -40 °C to 71 °C
<b>Relative Humidity</b> Operating Non-operating	Up to 95% at up to 30 °C; Up to 45% at up to 55 °C Up to 95% at up to 55 °C
<b>Altitude</b> Operating Non-operating	15,000 ft. (4570m) 40,000 ft. (12,190m)
<b>Random Vibration</b> Operating Non-operating	Three axis, 30 minutes total, 10 minutes per axis 0.27 g-rms total from 5 Hz to 55 Hz 2.28 g-rms total from 5 Hz to 55 Hz
<b>Functional Shock</b> Operating	Half sine, 30 g, 11 ms duration. Meets functional shock requirements of MIL-T-28800E, Type III, Class 5

### EMC

Conformance to LV Directive 73/23/EEC and EMC Directive 89/366/EEC and carries "CE Marking"

SAFETY  
 EN61010 (2001)  
 EMC  
 EN61326 (1997 w/A1:98) Class A  
 CISPR 22 (1997) Class A

VCCI (April 2000) Class A  
 ICES-003 Class A (ANSI C63.4 1992)  
 AS/NZS 3548 (w/A1 & A2:97) Class A  
 FCC Part 15 Subpart B Class A  
 EN 61010-1:2001