

# RTM 8-Channel Direct Sampling 1-Channel Vector Modulator

DRTM-DS8VM1

## HIGHLIGHTS

High resolution multi-channel  
direct sampling

Covers wide frequency  
bands from DC to 400 MHz

Vector modulation up to 6  
GHz, up to 15 dBm output  
power



## FEATURES

### Double-width MTCA.4 Rear-transition module (RTM)

Class A1.1 compatible

8 analog input channels (5 to 400 MHz\*) with  
phase resolution of 0.05° at 400 MHz

2 analog input channels (DC to 400 MHz\*)

One high frequency vector modulator channel (0.05  
to 6.0 GHz) with modulation bandwidth from DC to  
50 MHz

ADC clock and RF reference from front panel or  
RF-backplane (optional)

On board:

- Power level monitors
- User I2C support for additional external  
devices

RoHS compliant

Options: RF-backplane support

\* Charakterization pending

The DRTM-DS8VM1 is a 8+2-channel feed through RTM for direct sampling applications combined with a high frequency single channel vector modulator. It is compliant to the MTCA.4 standard and the Rear-transition module (RTM) interface is Class A1.1 compliant.

Eight feed through channels are configured as AC-coupled and two channels are configured as DC-coupled.

The signals can be interfaced to a Class A1.1 compatible AMC digitizer board such as SIS8300L2.

The ADC clock and RF reference input signals can be sourced externally from the front panel as well as internally from an RF-backplane. An on-board PLL/VCO can be used for ultra-low jitter clock generation.

The module features on-board power level monitors and user I2C interfaces for communication and diagnostics.

DESY offers the DRTM-DS8VM1 for licensing to industry. DESY can modify this product to meet special customer requirements.

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# RTM 8-Channel Direct Sampling 1-Channel Vector Modulator

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## TECHNICAL SPECIFICATIONS

### ARCHITECTURE

Physical	Dimensions	Double-Width, Mid-Height with Full-Height option
		Width: 148.5 mm [5.486 inch]
Standards	MTCA.4	Depth: 180.6 mm [7.110 inch]
		Rear-Transition-Module (RTM)
Compatibility	Module management	IPMI Version 2.0
	Zone3 classification	Class A1.1
	RF-backplane support	Yes
Compatible products		SIS8300L, SIS8300L2, DAMC-DS800

### CONFIGURATION

Type	Analog feed through	Number of channels	10 (8 AC / 2 DC)
		Frequency range	DC / 5...450 MHz (600 MHz)
	Vector modulator	Number of channels	1
		Frequency range	0.05...6.0 GHz
Electrical properties	Analog feed through	Spectral purity	< -155 dBc/Hz for offset frequencies > 10 kHz
		Non-linearity	< -55 dBc, 1% error at nom. power level
		Channel isolation	< -65 dB, optional enhancement possible
		Intermediate spurious	< -80 dB
	Up-Conversion	Short-term phase stability	< 60 fs in the range [10 Hz, 1 MHz]
		Spectral purity	< -155 dBc/Hz for offset frequencies > 1 MHz
		RF-output attenuation	0...15.75 dB in 0.25 dB steps
		Non-linearity	< -55 dBc, 0.2% error at nom. power level
		Power consumption	< 20 W

### CONNECTIVITY

Inputs	Analog inputs	Front panel	10 inputs
		Connector type	FBM multi-coax, single-ended
		Impedance / Coupling	50 $\Omega$ / 8 AC / 2 DC
		Frequency range	5..400 MHz (600 MHz) (3 dB bandwidth)
		Return loss	< -10 dB
		Input power level	Typ. +18 dBm / max. +28 dBm
	Reference input (REF)	Front panel	1 input, optional from RF-backplane
		Connector type	SMA type, single-ended
		Impedance / Coupling	50 $\Omega$ / AC
	Clock-input (CLK)	Input power level	Typ. +13 dBm / max. +18 dBm
		Front panel	1 input, optional from RF-backplane
		Connector type	SMA type, single-ended
		Impedance / Coupling	50 $\Omega$ / AC
		Frequency range	10...130 MHz
	BB-inputs (for VM)	Power level	10...13 dBm
		Zone 3	2 inputs, DAC-Ports
		Type	differential, 100 $\Omega$
		Frequency range	DC...50 MHz
		Baseband Input AC Voltage	2 Vpk-pk diff. at 100 $\Omega$

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## TECHNICAL SPECIFICATIONS

### CONNECTIVITY (CONTINUED)

Output	Analog outputs	Zone 3	10 outputs, AC- / DC-Ports
		Type	differential, 100 $\Omega$
		Frequency range	DC/5...100 MHz
		Power level	+7 dBm, 2 Vpk-pk diff. at 100 $\Omega$
	CLK-outputs	Zone 3	RTM_CLK0, RTM_CLK1, ..., RTM_CLK4
		Type Zone 3	differential, 100 $\Omega$
		Front Panel	CLKout
		Type Front Panel	50 $\Omega$ single-ended SMA
		Frequency range	5...400 MHz
		Power level	Typ. +10 dBm
	VM-output	Front panel	1 output
		Connector type	SMA, single-ended
		Impedance / Coupling	50 $\Omega$ / AC
		Return loss	< -15 dB at 1.3 GHz
		Adjustable output attenuation	0.5...15.5 dB
		Output power level	Typ. +10 dBm / max. 15 dBm
Grounding	Zone 3	Compatible to class A1.1	RTM clocks 2,3,4,5 grounded
			DAC outputs 2,3,4 unused open

### OTHER FEATURES

On board	Reference power level monitor	Yes, readout via user I2C Zone 3
	Temperature monitor	Yes, readout via user I2C Zone 3
Interface	LEDs	IPMI management control, LO power
	Mechanical	Hot swap ejector handle
Environmental	Operating temperature	0 °C...50 °C
	Storage temperature	-40 °C...+90 °C
	Relative humidity	5% ... 90%, non-condensing
	Weight	0.3 kg

### OTHER

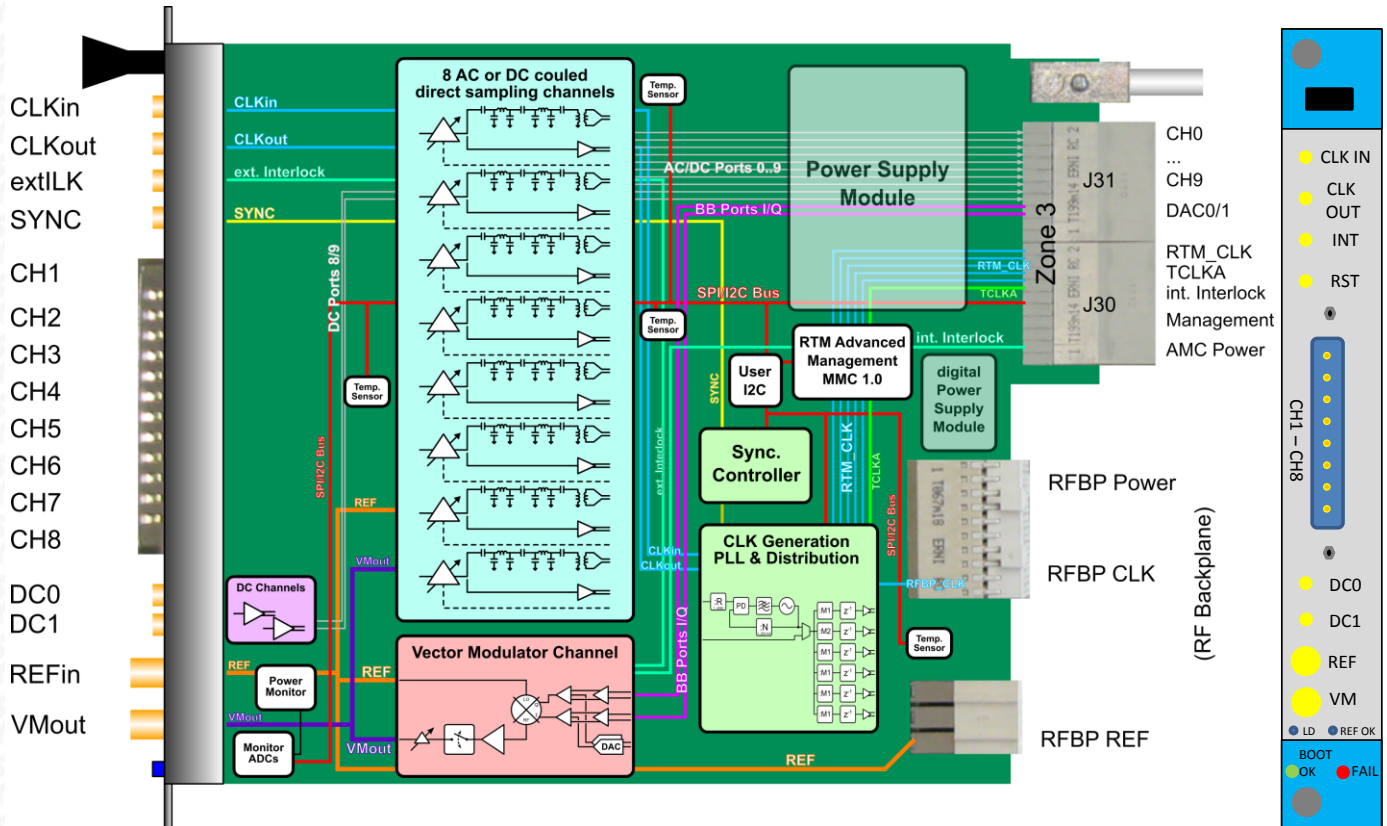
Compliance	RoHS
Licensing to industry	Yes / Deutsches Elektronen-Synchrotron - Notkestr. 85, 22607 Hamburg - Germany Email: mtca-techlab@desy.de



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## FUNCTIONAL BLOCK DIAGRAM AND FRONT PANEL



## OPTIONS

DRTM-DS8VM1 – A – B – C – D – E – F – G – H – J – K – L

<b>A</b> Channel Frequency Option	<b>E</b> Reference Input (REF) Source	<b>H</b> Reference Divider Configuration
WB = 5-500MHz	0 = Front Panel	0 = bypass
or other, e.g. 200, 260, 352, 500 [MHz]	1 = RF Backplane	1 = active
<b>B</b> Channel 7 Configuration	<b>F</b> Clock Generation Configuration	<b>J</b> VM Bypass Mode
0 = Front Panel	0 = CLK Distr./single PLL Mode	0 = VM active
1 = REF Monitor	1 = double PLL Mode	1 = VM bypassed
<b>C</b> Channel 8 Configuration	<b>G</b> Channel AC/DC Coupling	<b>K</b> RF Backplane Reference Amplifier
0 = Front Panel	G is hexadecimal value of individual channel configuration. E. g. x00 is all channels AC coupled and xFF is all channels DC coupled	0 = active
1 = VM Monitor	<b>L</b> Interlock Input	1 = bypassed
<b>D</b> RF Reference Input (REF) Source	0 = AC Coupling	0 = AMC
0 = Front panel	1 = DC Coupling	1 = Frontpanel
1 = RF-backplane		



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