

# **RDM-Apps**

Capability Statement

Contact Information



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Voltage Amplifier Modules ... Both Precision and High Speed Amplifiers

Current to Voltage Converter Modules... Pico-Amp, Nano-Amp, Milli-Amp ... 1A, 10A/V, 100A/V

Transimpedance Amplifiers... Pico-Amp, Nano-Amp, Milli-Amp ... 1A, 10A/V, 100A/V

Constant Current Source / Sink Modules...  $\pm 10\text{pA}$  to 125mA, 1A, 5A & 10A full range output modules

Voltage to Constant Current Converter Modules...  $\pm 10\text{pA}$  to 125mA, 1A, 5A & 10A full range output modules

Precision Isolation Amplifiers

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DOCUMENTATION**

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## Current to Voltage Converter Module Selection Table

CTVM Series Mid-Size Module 4 Gain Selections ( $\pm 1, \pm 10, \pm 100, \pm 1000$ )	CTVS Series Small-Size Module Fixed Gain	Full Scale Accuracy	Output Range	Input / Output Impedance	Load Impedance Requirements (For max. accuracy)	BW (-3dB) DC to ... @Min. Gain
Ctvm10pfa (10pA/V, 100pA/V, 1nA/V, 10nA/V)	Ctvs10pfa ( $\pm 10$ pA/V)	0.25%	$> \pm 10$ Vdc / 20Vpp	200 $\Omega$ / 600 $\Omega$	$\geq 1$ M $\Omega$	15KHz
Ctvm10pf (100pA/V, 1nA/V, 10nA/V, 100nA/V)	Ctvs10pf ( $\pm 100$ pA/V)	0.1%	$> \pm 10$ Vdc / 20Vpp	200 $\Omega$ / 600 $\Omega$	$\geq 1$ M $\Omega$	30KHz
Ctvm09nf (1nA/V, 10nA/V, 100nA/V, 1uA/V)	Ctvs09nf ( $\pm 1$ nA/V)	0.1%	$> \pm 10$ Vdc / 20Vpp	200 $\Omega$ / 600 $\Omega$	$\geq 1$ M $\Omega$	30KHz
Ctvm08nf (10nA/V, 100nA/V, 1uA/V, 10uA/V)	Ctvs08nf ( $\pm 10$ nA/V)	0.1%	$> \pm 10$ Vdc / 20Vpp	200 $\Omega$ / 600 $\Omega$	$\geq 1$ M $\Omega$	30KHz
Ctvm07nf (100nA/V, 1uA/V, 10uA/V, 100uA/V)	Ctvs07nf ( $\pm 100$ nA/V)	0.1%	$> \pm 10$ Vdc / 20Vpp	200 $\Omega$ / 600 $\Omega$	$\geq 1$ M $\Omega$	50KHz
Ctvm07nf8 (100nA/V, 1uA/V, 10uA/V, 100uA/V)	Ctvs07nf8 ( $\pm 100$ nA/V)	0.5%	$> \pm 10$ Vdc / 20Vpp	200 $\Omega$ / 600 $\Omega$	50 $\Omega$	1MHz
Ctvm07nf81 (100nA/0.1V, 1uA/0.1V, 10uA/0.1V, 100uA/0.1V)	Ctvs07nf81 ( $\pm 100$ nA/0.1V)	0.5%	$\pm 1.4$ Vdc / $\pm 2.8$ Vpp / $\pm 1.0$ Vrms	200 $\Omega$ / 50 $\Omega$	50 $\Omega$	10MHz
Ctvm06uf (1uA/V, 10uA/V, 100uA/V, 1mA/V)	Ctvs06uf ( $\pm 1$ uA/V)	0.1%	$> \pm 10$ Vdc / 20Vpp	200 $\Omega$ / 600 $\Omega$	$\geq 1$ M $\Omega$	300KHz
Ctvm06nf8 (1uA/V, 10uA/V, 100uA/V, 1mA/V)	Ctvs06nf8 ( $\pm 1$ uA/V)	0.5%	$> \pm 10$ Vdc / 20Vpp	200 $\Omega$ / 50 $\Omega$	50 $\Omega$	5MHz
Ctvm06nf81 (1uA/0.1V, 10uA/0.1V, 100uA/0.1V, 1mA/0.1V)	Ctvs06nf81 ( $\pm 1$ uA/0.1V)	0.5%	$\pm 1.4$ Vdc / $\pm 2.8$ Vpp / $\pm 1.0$ Vrms	200 $\Omega$ / 50 $\Omega$	50 $\Omega$	10MHz
	Ctvs05uf ( $\pm 10$ uA/V)	0.1%	$> \pm 10$ Vdc / 20Vpp	200 $\Omega$ / 600 $\Omega$	$\geq 1$ M $\Omega$	50KHz
	Ctvs05mf81 ( $\pm 10$ uA/0.1V)	0.5%	$\pm 1.4$ Vdc / $\pm 2.8$ Vpp / $\pm 1.0$ Vrms	500 $\Omega$ / 50 $\Omega$	50 $\Omega$	50MHz
	Ctvs04uf ( $\pm 100$ uA/V)	0.1%	$> \pm 10$ Vdc / 20Vpp	100 $\Omega$ / 600 $\Omega$	$\geq 1$ M $\Omega$	150KHz
	Ctvs04mf81 ( $\pm 100$ uA/0.1V)	0.5%	$\pm 1.4$ Vdc / $\pm 2.8$ Vpp / $\pm 1.0$ Vrms	50 $\Omega$ / 50 $\Omega$	50 $\Omega$	300MHz
	Ctvs03mf ( $\pm 1$ mA/V)	0.1%	$> \pm 10$ Vdc / 20Vpp	10 $\Omega$ / 600 $\Omega$	$\geq 1$ M $\Omega$	300KHz
	Ctvs03mf81 ( $\pm 1$ mA/0.1V)	0.5%	$\pm 1.4$ Vdc / $\pm 2.8$ Vpp / $\pm 1.0$ Vrms	5 $\Omega$ / 50 $\Omega$	50 $\Omega$	300MHz
	Ctvs02mf ( $\pm 10$ mA/V)	0.1%	$> \pm 10$ Vdc / 20Vpp	1 $\Omega$ / 600 $\Omega$	$\geq 1$ M $\Omega$	1MHz
	Ctvs02mf81 ( $\pm 10$ mA/0.1V)	0.5%	$\pm 1.4$ Vdc / $\pm 2.8$ Vpp / $\pm 1.0$ Vrms	0.5 $\Omega$ / 50 $\Omega$	50 $\Omega$	300MHz
	Ctvs01mf ( $\pm 100$ mA/V)	0.1%	$> \pm 10$ Vdc / 20Vpp	200 $\Omega$ / 600 $\Omega$	$\geq 1$ M $\Omega$	1MHz
	Ctvs01mf81 ( $\pm 100$ mA/0.1V)	0.5%	$\pm 1.4$ Vdc / $\pm 2.8$ Vpp / $\pm 1.0$ Vrms	0.05 $\Omega$ / 50 $\Omega$	50 $\Omega$	300MHz

### Applications:

Picoampere or Microvolt Instrumentation, Opamp Instrumentation Amplifier, Thermocouple and Bridge Amplifier, Low Frequency Active Filter, Photo Current Amplifier, Battery-Powered Systems, Standard Cell Buffers, Electrometer, Charge Integrator, Low Current Ammeter, Long Term Integrator, PH Meter, Light Meter, Proximity Detector, Logarithmic Amplifier, Photo-diode Preamplifier, Low energy measurements, Low energy electron measurements ...

### Application Notes:

[CTVM - Photovoltaic and Photoconductive PhotoDiode current amplifier modes of operation.](#)



[CTVM - Low Current Ratiometric Measurements](#)

[CTVM - Ion Chamber Application](#)



[CTVM - Beam Energy Ratiometric Measurement Procedure. Applications: Gen. Purpose Radiation & Light field analysis.](#)

[Dosimetry, Radiation Oncology, Radiology, Diode Detector, Ion Chamber and Xray, Photon, Electron, Neutron, Gamma Radiation](#)



### Ctvm10pfA / CtvS10pfA

Specifications	Value	Unit	Specifications	Value	Unit
Ctvm10pfA Gain Range #1	±10	pA / V	Max. Input Offset Current @25deg.C	< 100	fA
Ctvm10pfA Gain Range #2	±100	pA / V	Max. Input Offset Current Drift .. 0 to 70 deg.C	< 15	fA / deg.C
Ctvm10pfA Gain Range #3	±1.0	nA / V	Max. Input Offset Voltage @25deg.C	< 30	uV
Ctvm10pfA Gain Range #4	±10	nA-/ V	Max. Input Offset Voltage Drift .. 0 to 70 deg.C	< 2.0	uV / deg.C
-Ctvs10pfA Gain	±10	pA / V	Input capacitance typ.	1.5	pf
			Input Current Noise	< 1	fA / sqr(Hz)
Accuracy ( 0-50deg.C )	0.25	%	Input Voltage Noise	< 20	nV / sqr(Hz)
Max. Input Current	±100	nA	Output Voltage Noise	<1	uV / sqr(Hz)
Output voltage range	±10	V	Freq. Response; small signal	15	KHz
Output voltage: Max. Load Current	±10	mA	Operating Temperature	-10 to 70	C
Output voltage: Output impedance	600	Ω	DC Supply Max. Current ... +5VDC Supply	~200	mA
Max. Output Voltage Drift	< 20	uV / Deg.C	Signal In / Out connector	SMA	female
Max. Input Bias Current ... less than	0.1	pA	CTVS - Dimensions - L x H x W; Enclosure D		
Input Impedance ... less than	200	Ω	CTVM Dimensions - L x H x W; Enclosure B		



### Ctvm10pf / CtvS10pf

Specifications	Value	Unit	Specifications	Value	Unit
Ctvm10pf Gain Range #1	±100	pA / V	Max. Input Offset Current @25deg.C	< 100	fA
Ctvm10pf Gain Range #2	±1.0	nA / V	Max. Input Offset Current Drift .. 0 to 70 deg.C	< 30	fA / deg.C
Ctvm10pf Gain Range #3	±10	nA / V	Max. Input Offset Voltage @25deg.C	< 50	uV
Ctvm10pf Gain Range #4	±100	nA / V	Max. Input Offset Voltage Drift .. 0 to 70 deg.C	< 2.0	uV / deg.C
-Ctvs10pf Gain	±100	pA / V	Input capacitance typ.	1.5	pf
			Input Current Noise	< 1	fA / sqr(Hz)
Accuracy ( 0-50deg.C )	0.1	%	Input Voltage Noise	< 20	nV / sqr(Hz)
Max. Input Current	±100	nA	Output Voltage Noise	<1	uV / sqr(Hz)
Output voltage range	±10	V	Freq. Response; small signal	30	KHz
Output voltage: Max. Load Current	±10	mA	Operating Temperature	-10 to 70	C
Output voltage: Output impedance	600	Ω	DC Supply Max. Current ... +5VDC Supply	~200	mA
Max. Output Voltage Drift	< 20	uV / Deg.C	Signal In / Out connector	SMA	female
Max. Input Bias Current ... less than	0.25	pA	CTVS - Dimensions - L x H x W; Enclosure D		
Input Impedance ... less than	200	Ω	CTVM Dimensions - L x H x W; Enclosure B		



### Ctvm09nf / Ctvs09nf

Specifications	Value	Unit	Specifications	Value	Unit
Ctvm09nf Gain Range #1	±1.0	nA / V	Max. Input Offset Current @25deg.C	< 100	fA
Ctvm09nf Gain Range #2	±10	nA / V	Max. Input Offset Current Drift .. 0 to 70 deg.C	< 30	fA / deg.C
Ctvm09nf Gain Range #3	±100	nA / V	Max. Input Offset Voltage @25deg.C	< 50	uV
Ctvm09nf Gain Range #4	±1.0	uA / V	Max. Input Offset Voltage Drift .. 0 to 70 deg.C	< 2.0	uV / deg.C
-Ctvs09nf Gain	±1.0	nA / V	Input capacitance typ.	1.5	pf
			Input Current Noise	< 1	fA / sqr(Hz)
Accuracy ( 0-50deg.C )	0.1	%	Input Voltage Noise	< 20	nV / sqr(Hz)
Max. Input Current	±100	nA	Output Voltage Noise	<1	uV / sqr(Hz)
Output voltage range	±10	V	Freq. Response; small signal	100	KHz
Output voltage: Max. Load Current	±10	mA	Operating Temperature	-10 to 70	C
Output voltage: Output impedance	600	Ω	DC Supply Max. Current ... +5VDC Supply	~200	mA
Max. Output Voltage Drift	< 20	uV / Deg.C	Signal In / Out connector	SMA	female
Max. Input Bias Current ... less than	0.5	pA	CTVS - Dimensions - L x H x W; Enclosure D		
Input Impedance ... less than	200	Ω	CTVM Dimensions - L x H x W; Enclosure B		



### Ctvm08nf / Ctvs08nf

Specifications	Value	Unit	Specifications	Value	Unit
Ctvm08nf Gain Range #1	±10	nA / V	Max. Input Offset Current @25deg.C	< 100	fA
Ctvm08nf Gain Range #2	±100	nA / V	Max. Input Offset Current Drift .. 0 to 70 deg.C	< 30	fA / deg.C
Ctvm08nf Gain Range #3	±1.0	uA / V	Max. Input Offset Voltage @25deg.C	< 50	uV
Ctvm08nf Gain Range #4	±10.0	uA / V	Max. Input Offset Voltage Drift .. 0 to 70 deg.C	< 2.0	uV / deg.C
-Ctvs08nf Gain	±10	nA / V	Input capacitance typ.	1.5	pf
			Input Current Noise	< 1	fA / sqr(Hz)
Accuracy ( 0-50deg.C )	0.1	%	Input Voltage Noise	< 20	nV / sqr(Hz)
Max. Input Current	±1.0	mA	Output Voltage Noise	<1	uV / sqr(Hz)
Output voltage range	±10	V	Freq. Response; small signal	100	KHz
Output voltage: Max. Load Current	±10	mA	Operating Temperature	-10 to 70	C
Output voltage: Output impedance	600	Ω	DC Supply Max. Current ... +5VDC Supply	~200	mA
Max. Output Voltage Drift	< 20	uV / Deg.C	Signal In / Out connector	SMA	female
Max. Input Bias Current ... less than	0.5	pA	CTVS - Dimensions - L x H x W; Enclosure D		
Input Impedance ... less than	200	Ω	CTVM Dimensions - L x H x W; Enclosure B		



### Ctvm07nf / Ctvs07nf

Specifications	Value	Unit	Specifications	Value	Unit
Ctvm07nf Gain Range #1	±100	nA / V	Max. Input Offset Current @25deg.C	< 100	fA
Ctvm07nf Gain Range #2	±1.0	uA / V	Max. Input Offset Current Drift .. 0 to 70 deg.C	< 30	fA / deg.C
Ctvm07nf Gain Range #3	±10	uA / V	Max. Input Offset Voltage @25deg.C	< 50	uV
Ctvm07nf Gain Range #4	±100	uA / V	Max. Input Offset Voltage Drift .. 0 to 70 deg.C	< 2.0	uV / deg.C
-Ctvs07nf Gain	±100	nA / V	Input capacitance typ.	1.5	pf
			Input Current Noise	< 1	fA / sqr(Hz)
Accuracy ( 0-50deg.C )	0.1	%	Input Voltage Noise	< 20	nV / sqr(Hz)
Max. Input Current	±1.0	mA	Output Voltage Noise	<1	uV / sqr(Hz)
Output voltage range	±10	V	Freq. Response; small signal	50	KHz
Output voltage: Max. Load Current	±10	mA	Operating Temperature	-10 to 70	C
Output voltage: Output impedance	600	Ω	DC Supply Max. Current ... +5VDC Supply	~200	mA
Max. Output Voltage Drift	< 20	uV / Deg.C	Signal In / Out connector	SMA	female
Max. Input Bias Current ... less than	1.0	pA	CTVS - Dimensions - L x H x W; Enclosure D		
Input Impedance ... less than	200	Ω	CTVM Dimensions - L x H x W; Enclosure B		



### Ctvm06uf / Ctvs06uf

Specifications	Value	Unit	Specifications	Value	Unit
Ctvm06uf Gain Range #1	±1.0	uA / V	Max. Input Offset Current @25deg.C	< 100	fA
Ctvm06uf Gain Range #2	±10	uA / V	Max. Input Offset Current Drift .. 0 to 70 deg.C	< 30	fA / deg.C
Ctvm06uf Gain Range #3	±100	uA / V	Max. Input Offset Voltage @25deg.C	< 50	uV
Ctvm06uf Gain Range #4	±1.0	mA / V	Max. Input Offset Voltage Drift .. 0 to 70 deg.C	< 2.0	uV / deg.C
-Ctvs06uf Gain	±1.0	uA / V	Input capacitance typ.	1.5	pf
			Input Current Noise	< 1	fA / sqr(Hz)
Accuracy ( 0-50deg.C )	0.1	%	Input Voltage Noise	< 20	nV / sqr(Hz)
Max. Input Current	±10.0	mA	Output Voltage Noise	<1	uV / sqr(Hz)
Output voltage range	±10	V	Freq. Response; small signal	300	KHz
Output voltage: Max. Load Current	±10	mA	Operating Temperature	-10 to 70	C
Output voltage: Output impedance	600	Ω	DC Supply Max. Current ... +5VDC Supply	~200	mA
Max. Output Voltage Drift	< 20	uV / Deg.C	Signal In / Out connector	SMA	female
Max. Input Bias Current ... less than	1.0	pA	CTVS - Dimensions - L x H x W; Enclosure D		
Input Impedance ... less than	200	Ω	CTVM Dimensions - L x H x W; Enclosure B		



### Ctvs05uf

Specifications	Value	Unit	Specifications	Value	Unit
			Max. Input Offset Current @25deg.C	< 100	fA
			Max. Input Offset Current Drift .. 0 to 70 deg.C	< 30	fA / deg.C
			Max. Input Offset Voltage @25deg.C	< 50	uV
			Max. Input Offset Voltage Drift .. 0 to 70 deg.C	< 2.0	uV / deg.C
			Input capacitance typ.	1.5	pf
<b>-Ctvs05uf Gain</b>	±10	uA / V	Input Current Noise	< 1	fA / sqr(Hz)
Accuracy ( 0-50deg.C )	0.1	%	Input Voltage Noise	< 20	nV / sqr(Hz)
Max. Input Current	±25	mA	Output Voltage Noise	<1	uV / sqr(Hz)
Output voltage range	±10	V	Freq. Response; small signal	300	KHz
Output voltage: Max. Load Current	±10	mA	Operating Temperature	-10 to 70	C
Output voltage: Output impedance	600	Ω	DC Supply Max. Current ... +5VDC Supply	~200	mA
Max. Output Voltage Drift	< 20	uV / Deg.C	Signal In / Out connector	SMA	female
Max. Input Bias Current ... less than	1.0	pA	CTVS - Dimensions - L x H x W; Enclosure D		
Input Impedance ... less than	200	Ω	CTVM Dimensions - L x H x W; Enclosure B		



### Ctvs04uf

Specifications	Value	Unit	Specifications	Value	Unit
			Max. Input Offset Current @25deg.C	< 100	fA
			Max. Input Offset Current Drift .. 0 to 70 deg.C	< 30	fA / deg.C
			Max. Input Offset Voltage @25deg.C	< 50	uV
			Max. Input Offset Voltage Drift .. 0 to 70 deg.C	< 2.0	uV / deg.C
			Input capacitance typ.	1.5	pf
<b>-Ctvs04uf Gain</b>	±100	uA / V	Input Current Noise	< 1	fA / sqr(Hz)
Accuracy ( 0-50deg.C )	0.1	%	Input Voltage Noise	< 20	nV / sqr(Hz)
Max. Input Current	±50	mA	Output Voltage Noise	<1	uV / sqr(Hz)
Output voltage range	±10	V	Freq. Response; small signal	300	KHz
Output voltage: Max. Load Current	±10	mA	Operating Temperature	-10 to 70	C
Output voltage: Output impedance	600	Ω	DC Supply Max. Current ... +5VDC Supply	~200	mA
Max. Output Voltage Drift	< 20	uV / Deg.C	Signal In / Out connector	SMA	female
Max. Input Bias Current ... less than	3.0	pA	CTVS - Dimensions - L x H x W; Enclosure D		
Input Impedance ... less than	100	Ω	CTVM Dimensions - L x H x W; Enclosure B		







**Ctvs03uf**

Specifications	Value	Unit	Specifications	Value	Unit
			Max. Input Offset Current @25deg.C	< 100	fA
			Max. Input Offset Current Drift .. 0 to 70 deg.C	< 30	fA / deg.C
			Max. Input Offset Voltage @25deg.C	< 50	uV
			Max. Input Offset Voltage Drift .. 0 to 70 deg.C	< 2.0	uV / deg.C
			Input capacitance typ.	1.5	pf
<b>-Ctvs03uf Gain</b>	±1.0	mA / V	Input Current Noise	< 1	fA / sqr(Hz)
Accuracy ( 0-50deg.C )	0.1	%	Input Voltage Noise	< 20	nV / sqr(Hz)
Max. Input Current	±100	mA	Output Voltage Noise	<1	uV / sqr(Hz)
Output voltage range	±10	V	Freq. Response; small signal	300	KHz
Output voltage: Max. Load Current	±10	mA	Operating Temperature	-10 to 70	C
Output voltage: Output impedance	600	Ω	DC Supply Max. Current ... +5VDC Supply	~200	mA
Max. Output Voltage Drift	< 20	uV / Deg.C	Signal In / Out connector	SMA	female
Max. Input Bias Current ... less than	3.0	pA	CTVS - Dimensions - L x H x W; Enclosure D		
Input Impedance ... less than	10	Ω	CTVM Dimensions - L x H x W; Enclosure B		

**Ctvs02mf**

Specifications	Value	Unit	Specifications	Value	Unit
			Max. Input Offset Current @25deg.C	< 100	fA
			Max. Input Offset Current Drift .. 0 to 70 deg.C	< 30	fA / deg.C
			Max. Input Offset Voltage @25deg.C	< 50	uV
			Max. Input Offset Voltage Drift .. 0 to 70 deg.C	< 2.0	uV / deg.C
			Input capacitance typ.	1.5	pf
<b>-Ctvs02mf Gain</b>	±10.0	mA / V	Input Current Noise	< 1	fA / sqr(Hz)
Accuracy ( 0-50deg.C )	0.1	%	Input Voltage Noise	< 20	nV / sqr(Hz)
Max. Input Current	±300	mA	Output Voltage Noise	<1	uV / sqr(Hz)
Output voltage range	±10	V	Freq. Response; small signal	300	KHz
Output voltage: Max. Load Current	±10	mA	Operating Temperature	-10 to 70	C
Output voltage: Output impedance	600	Ω	DC Supply Max. Current ... +5VDC Supply	~200	mA
Max. Output Voltage Drift	< 20	uV / Deg.C	Signal In / Out connector	SMA	female
Max. Input Bias Current ... less than	3.0	pA	CTVS - Dimensions - L x H x W; Enclosure D		
Input Impedance ... less than	1	Ω	CTVM Dimensions - L x H x W; Enclosure B		

**Ctvsxxmf8**

Model	Gain	Accuracy ( 0-50°C )	Input / Output Impedance	BW (-3dB)	Enclosure
Ctvs06mf8	±1uA / 0.1V	0.5%	200Ω / 50Ω	10MHz	
Ctvs05mf8	±10uA / 0.1V	0.5%	500Ω / 50Ω	50MHz	
Ctvs04mf8	±100uA / 0.1V	0.5%	50Ω / 50Ω	>300MHz	
Ctvs03mf8	±1mA / 0.1V	0.5%	5Ω / 50Ω	>300MHz	
Ctvs02mf8	±10mA / 0.1V	0.5%	0.5Ω / 50Ω	>300MHz	
Ctvs01mf8	±100mA / 0.1V	0.5%	0.05 / 50Ω	>300MHz	

**Ctvsxxmf8**

Specifications	Value	Unit
Input Bias	3	pA
Output voltage range w/ 50Ω load	±1.0	V
Max. Load Current	±40	mA
Output Impedance	50	Ω
Load impedance requirement	50	Ω
Max. Output Voltage Drift	< 10	uV / dec.C
Absolute Operating Temperature	-10 to 70	C
DC Supply Voltage	+5	VDC
Signal In / Out connector	SMA	female
Noise: 4 nV/√Hz @ 100 kHz		
Noise 2.5 fA/√Hz @ 100 kHz		
Input Capacitance	1.3	pf



**Power Input:**  
4.5VDC to 9VDC

Input Power	PWR OUT	Digital Inputs	Signal Out
PWR IN	PWR COM	IO-LP IO-B	IO-A IO GND
PWR OUT		VOULT GND	GND

Dimensions: 2, 2, 1.66, .25, 4.92, 5.43, 1.22, 2.38

PROJECT: RDM-Apps  
TITLE: CTVM Current to Voltage Converter

- Four IO Selectable Gain Stages 0dB, 20dB, 40dB, 60dB
- ±10V Max Output Voltage
- SMA Connectors for Signal
- 600Ω Output Impedance
- ±0.1% Accuracy
- ±0.5% Mechanical Dimensions

APPROVED	Bob Martin	11/14/2018	SIZE	CODE	DWG NO	REV
CHECKED	Mark Medina	11/14/2018	A		100258	L1.5
DRAWN	Mark Medina	11/14/2018	SCALE 1:2	WEIGHT 1lb		SHEET 1/1

**CTVMxx Series Multi-Range Module**

Dimensions: 3.03, 2.56, 1.27, .26, 1.22, 1.99

PROJECT: RDM-Apps  
TITLE: CTVS Current to Voltage Converter

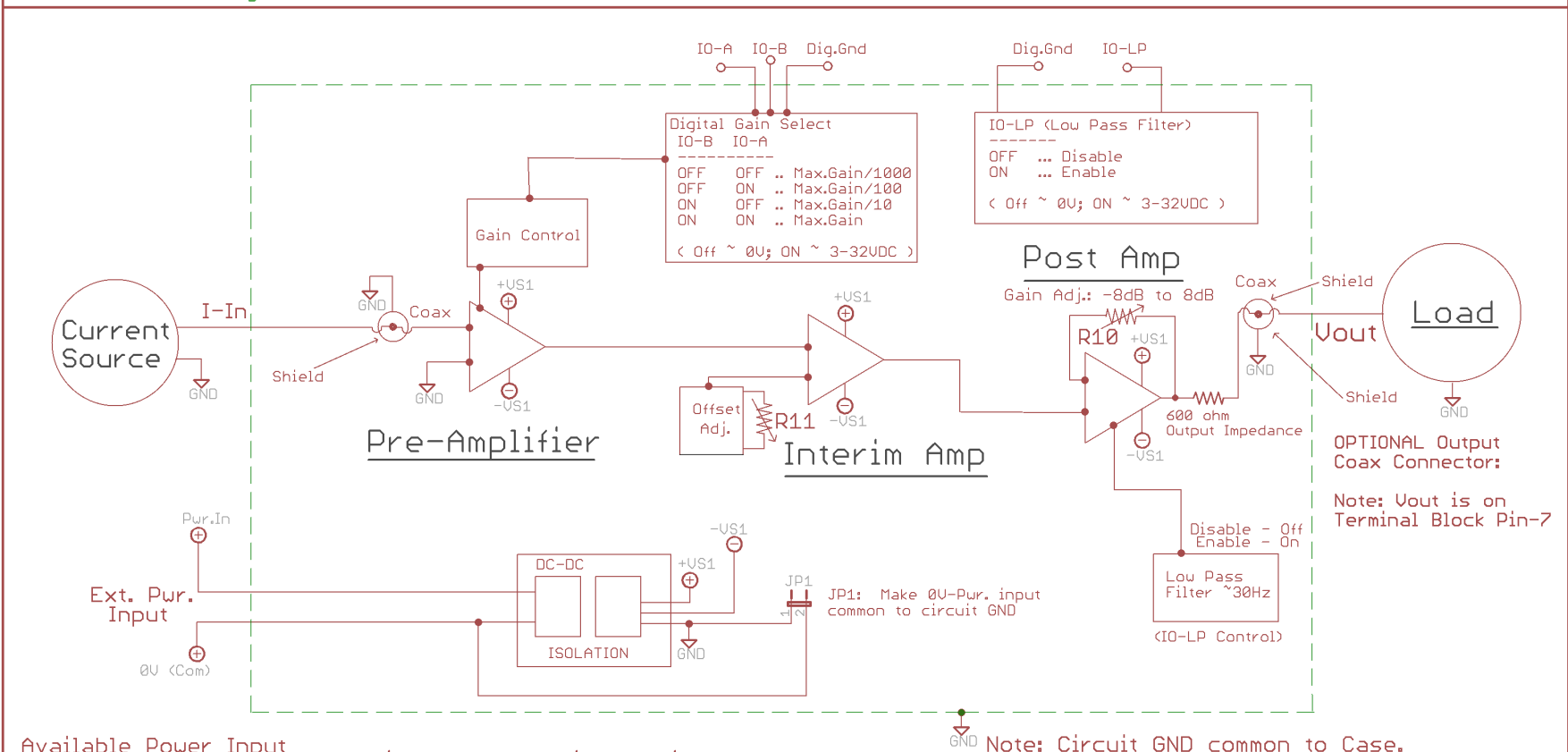
- ±10V Output
- ±0.1% Accuracy
- SMA Connectors for Signal
- 2.1mm Barrel Connector for Power Input
- ±0.5% Mechanical Dimensions

APPROVED	Bob Martin	11/14/2018	SIZE	CODE	DWG NO	REV
CHECKED	Mark Medina	11/14/2018	A		100251	J12
DRAWN	Mark Medina	11/14/2018	SCALE 1:1	WEIGHT 1lb		SHEET 1/1

**CTVSxx Series Single Range Module**

## CTVMxx Series Multi-Range Module Documentation

### Block Diagram – Precision Multi-Range Current-Voltage Converter Module



Available Power Input Options:  
5V, 12V, 15V, & 24V

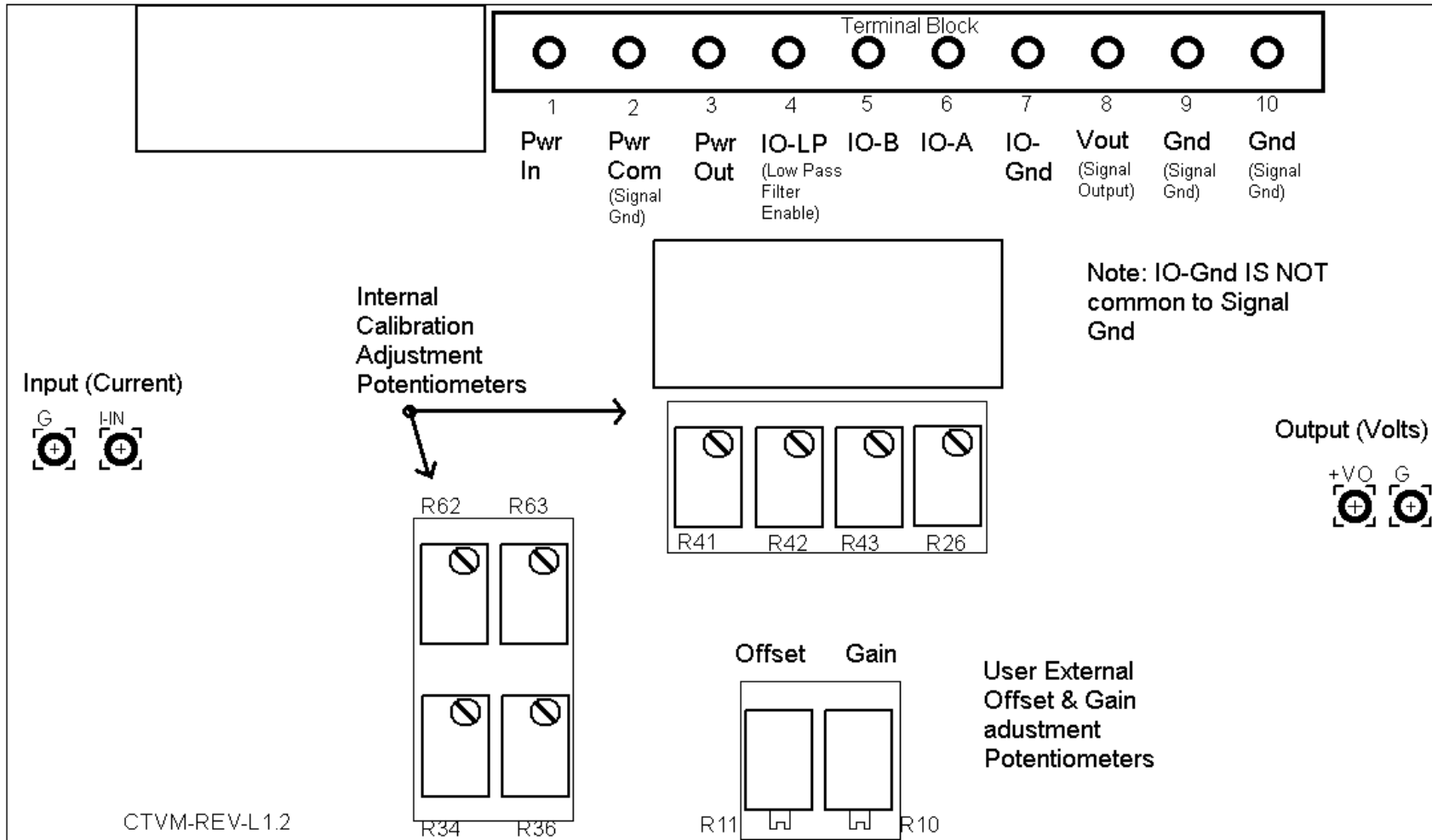
#### Terminal Block Pin Assignments

1	2	3	4	5	6	7	8	9	10
Input	Com	Out	IO-LP	IO-B	IO-A	IO Gnd	Vout	Gnd	Gnd
Power Input			Digital Control			Signal Output Signal Gnd			

TERM.BLK. Vout: 600 ohm Output Impedance

RDM-Apps <a href="http://www.rdm-apps.com">www.rdm-apps.com</a>	
TITLE: CtvM-Rev-L12-Block Diagram	
Document Number:	REV: 7.3
Date: 6/1/2016 1:31:18 PM	Sheet: 1/1

## CTVMxx Series Multi-Range Module Documentation



**PCB Lay-out**

**CTVM PCB Diagram:**

## CTVMxx Series Multi-Range Module Documentation

### JP1: Isolate Input Power Common (Gnd) from Circuit GND:

JP1 ON ... (Default; Most applications) Input Power GND common to Circuit GND.

JP1 Off ... Isolate Input Power GND from Circuit GND.

**Table #1**

#### Binary Logic Table

**Digital Gain Control:** ( 3.3V, 5V, 12V & 24V compatible logic levels )

Dig. Input	Max. Gain / 1000	(Max. Gain) / 100	(Max. Gain) / 10	Max. Gain
<b>IO-B</b>	0	0	1	1
<b>IO-A</b>	0	1	0	1

Example: If (Max. Gain) = 1nA/V then ...

(Max. Gain) / 10 =10nA/V

(Max. Gain) / 100 =100nA/V

(Max. Gain) / 1000 =1000nA/V

**Table #2**

#### Binary Logic Table

**Digital Gain Control:** ( 3.3V, 5V, 12V & 24V compatible logic levels )

Dig. Input	Low Pass Filter ON	Low Pass Filter Off
<b>IO-LP</b>	1	0

Continue to next page ...

## CTVMxx Series Multi-Range Module Documentation

### Calibration ...SPECIFIC Gain / Offset Adjustment Procedure for Ctmv series:

**Note: Use this below procedure to independently calibrate each gain selection.**

Required Conditions:

- 1.) CTVM Module must have required DC power applied.
- 2.) Allow CTVM module to warm up for at least 3 mins. Before continuing to the procedure.
- 3.) It is advised to set the 25 turn R10 & R11 trim pots. to their mid-range positions. This can be done by turning each trim pot. to it's most clockwise position and then turn 12.5 turns back in the counter-clockwise position. You will know the trim pot. is in it's most clockwise position when you hear a mechanical click.

#### **Binary Logic Table Settings & Gain / Offset adjustment potentiometers**

**Digital Gain Control:** ( 3.3V, 5V, 12V & 24V compatible logic levels )

Dig. Input	Max. Gain / 1000	(Max. Gain) / 100	(Max. Gain) / 10	Max. Gain
IO-B	0	0	1	1
IO-A	0	1	0	1
Gain Pot.	R36	R34	R63	R62
Offset Pot.	R41	R42	R43	R26

#### **Procedure:**

- 1.) Refer to the above table and digitally set the IO-B & IO-A to the Gain setting you require. Use the applicable Gain / Offset potentiometers for adjustment. Connect your current source to the CTVM input. Set the current source to zero current out and then adjust OFFSET pot. until the CTVM output is approximately 0.000V.
- 2.) With a known current applied to the CTVM input adjust the GAIN pot. until the output voltage corresponds to the applicable input. For example, if 500nA is applied to the CTVM input and the desired gain is 100nA/V (Input/Output) then adjust the GAIN until the output is approximately 5.000V.

Note(s):

You will probably have to repeat procedure steps 1 and 2 a couple of times to assure proper calibration. If the Gain adjustment potentiometer is set to one of the extreme top or bottom extents extremely high or low gain states can occur which may cause confusion when making sequential offset and gain adjustments. Also, we advise you adjust the gain using an input current that is a mid-range value. For example, if the desired gain is 100pA/V (Input/Output) and the maximum output is 10V then apply 500pA to the CTVM input and adjust the gain so the CTVM output is 5.000V. You can conversely do this using a -500pA and -5V, respectively.

## CTVMxx Series Multi-Range Module Documentation



Terminal Block Plug-In:  
Part# OSTTJ105153 (Digikey) or  
Part# 1757093 (Mouser )

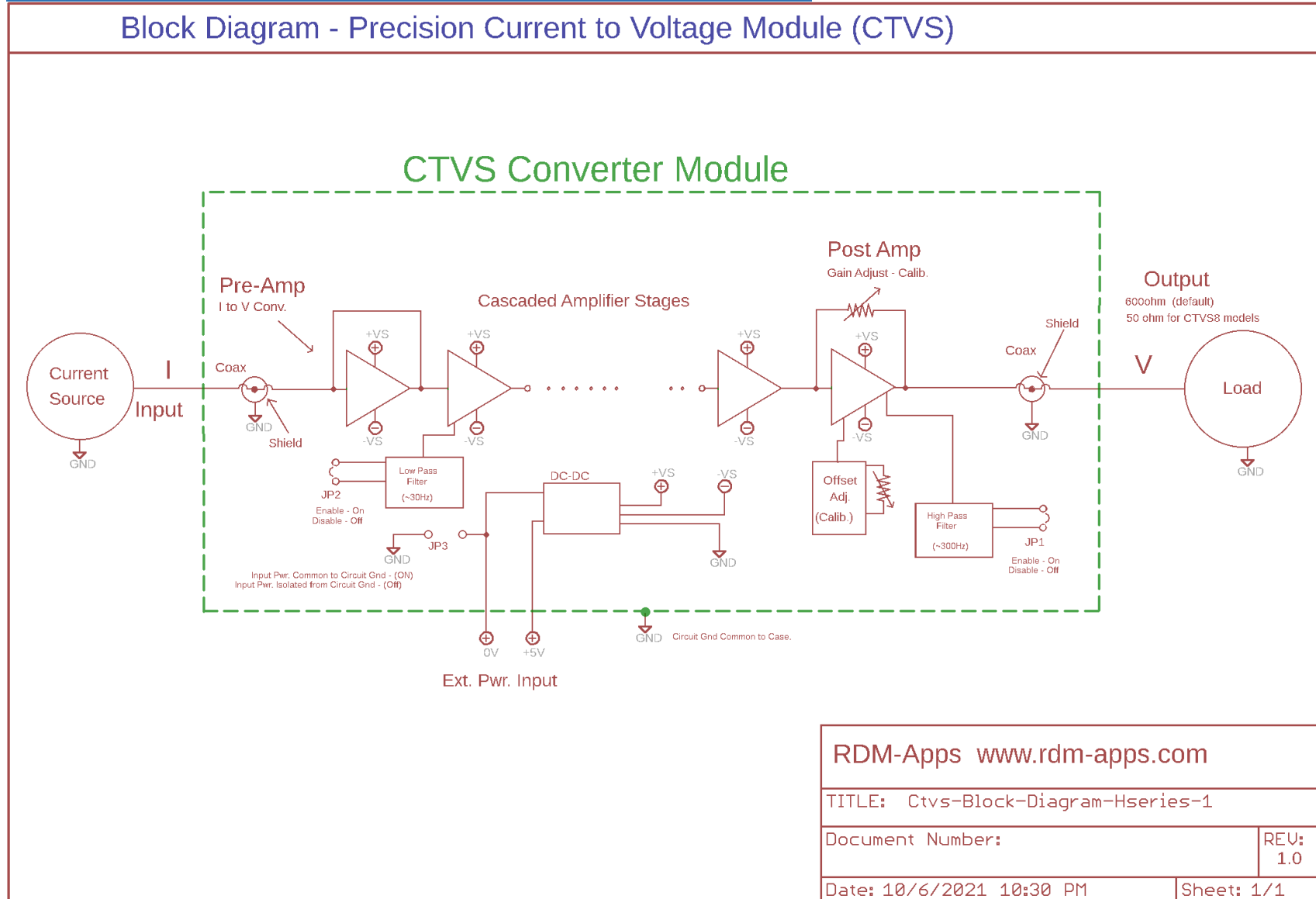
Pluggable Terminal Blocks 10 Pos 5.08mm pitch Plug 24-12 AWG Screw

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## CTVS Series Single Range Module Documentation

### Block Diagram - Precision Current to Voltage Module (CTVS)



RDM-Apps <a href="http://www.rdm-apps.com">www.rdm-apps.com</a>	
TITLE: CtvS-Block-Diagram-Hseries-1	
Document Number:	REV: 1.0
Date: 10/6/2021 10:30 PM	Sheet: 1/1

## CTVS Series Single Range Module Documentation

### **Calibration Procedure:**

- 1.) Use the applicable Gain / Offset potentiometers inside the enclosure for adjustment. Connect your current source to the CTVM input. Set the current source to zero current out and then adjust OFFSET pot. until the CTVS output is approximately 0.000V.
- 2.) With a known current applied to the CTVS input adjust the GAIN pot. until the output voltage corresponds to the applicable input. For example, if 500nA is applied to the CTVS input and the desired gain is 100nA/V (Input/Output) then adjust the GAIN until the output is approximately 5.000V.

### Note(s):

You will probably have to repeat procedure steps 1 and 2 a couple of times to assure proper calibration. If the Gain adjustment potentiometer is set to one of the extreme top or bottom extents extremely high or low gain states can occur which may cause confusion when making sequential offset and gain adjustments. Also, we advise you adjust the gain using an input current that is a mid-range value. For example, if the desired gain is 100pA/V (Input/Output) and the maximum output is 10V then apply 500pA to the CTVS input and adjust the gain so the CTVS output is 5.000V. You can conversely do this using a -500pA and -5V, respectively.