Calibration Services
5750 SW Arctic Drive
Beaverton, Oregon 97005
USA

ACCREDITED
Calibration Cert #2527.01

Calibration Report

Accredited Calibration

Report Number: APx525-XXXXX-XXXXXX-X

Model: APx525 **Data Type: AS RECEIVED** **Program:**
Serial Number: APX2-XXXXX **Date of Cal:** 4-Apr-2014 APxCalibration.exe 3.43

Internal Module Status and Data			
AP Name	***Description***	***Serial No.***	***Revision***
BRIO	Backplane module	XXXX	108
BSOL	Clock module	XXXX	103
BMEG	Analog Output module	XXXX	006
BOTA	Analog Input module	XXXX	007
BAES	Digital I/O module	XXXX	102
BSAT	Option AG52	XXXX	100

Explanatory notes to the last three columns of the calibration report

"MU" - The column labeled "MU" lists the expanded measurement uncertainties derived from equipment specifications, repeatability data, and other significant sources. These are stated at a minimum confidence of 95% using a coverage factor k=2 (except as appropriate) following the recommendations in ISO/IEC 98-3 *Guide to the expression of uncertainty in measurement (GUM:1995)*, BIPM JCGM 100:2008, and NIST Technical Note 1297.

"TUR" - The column labeled "**TUR**" lists the test uncertainty ratio calculated by dividing the lesser of the lower and upper reading tolerances by the 95% expanded measurement uncertainty. An entry of "**na**" indicates [1] the specified limits are one-sided, or [2] the performance characteristic is not accredited.

"Result" - The column labeled "Result" lists color-coded assessments that the observed characteristic is within its specified limits of performance. There are three possible indications:

pass -- *The READING is within the specified upper and lower limits reduced by guard-bands equal to the 95% expanded measurement uncertainty. The probability or risk of false acceptance is very low, typically <0.2%.*

uncertain -- *The READING is within the specified upper and lower limits, but it is close to one of the limits by an amount that is less than the 95% expanded measurement uncertainty. The probability or risk of false acceptance is elevated.*

>> FAIL << -- *The READING is outside of the specified limit range.*

Accredited measurements listed in the following pages correlate to Audio Precision's Scope of Accreditation as noted:

note 1 - Frequency Measurement
note 2 - AC Voltage Measurement
note 3 - AC Flatness Measurement
note 4 - Resistance Measurement
note 5 - DC Voltage Measurement
note 6 - AC Voltage Source for testing AC Measurement Equipment
note 7 - DC Voltage Source for testing DC Measurement Equipment

This report is valid only when accompanied by a signed Certificate of Calibration.

Item	Setting(s)	Lower Limit	READING	Upper Limit	MU	TUR	Result
ANALOG GENERATOR CHARACTERISTICS							
[1] Sine Frequency Accuracy (Hz) - *note 1*							
	10 kHz	9999.9700	**10000.0013**	10000.0300	0.0054	5.6	**pass**
[2] Sine Amplitude Accuracy, 1 kHz (Volts, mVolts) - *note 2*							
Channel 1	13.33 V	13.2840	**13.3325**	13.3761	0.0058	8.0	**pass**
	5.000 V	4.9828	**5.0047**	5.0173	0.0013	≥10	**pass**
	3.000 V	2.98966	**3.00104**	3.01038	0.00096	≥10	**pass**
	1.500 V	1.49483	**1.50064**	1.50519	0.00048	≥10	**pass**
	1.000 V	0.99655	**1.00008**	1.00346	0.00034	≥10	**pass**
	100 mV	99.655	**100.017**	100.346	0.037	9.5	**pass**
	12 mV	11.9586	**12.0065**	12.0415	0.0061	6.9	**pass**
Channel 2	13.33 V	13.2840	**13.3328**	13.3761	0.0058	8.0	**pass**
	5.000 V	4.9828	**5.0041**	5.0173	0.0013	≥10	**pass**
	3.000 V	2.98966	**3.00132**	3.01038	0.00096	≥10	**pass**
	1.500 V	1.49483	**1.50075**	1.50519	0.00048	≥10	**pass**
	1.000 V	0.99655	**1.00016**	1.00346	0.00034	≥10	**pass**
	100 mV	99.655	**100.027**	100.346	0.037	9.5	**pass**
	12 mV	11.9586	**12.0066**	12.0415	0.0061	6.9	**pass**
[3] Sine Flatness, 1.15 Vrms (dB) - *note 3*							
Channel 1	10 Hz	-0.0080	**-0.0001**	0.0080	0.0016	5.0	**pass**
	20 Hz	-0.0080	**-0.0001**	0.0080	0.0015	5.3	**pass**
	20 kHz	-0.0080	**-0.0039**	0.0080	0.0019	4.2	**pass**
	50 kHz	-0.0300	**-0.0056**	0.0300	0.0038	7.9	**pass**
	80 kHz	-0.1000	**-0.0024**	0.1000	0.0075	≥10	**pass**
Channel 2	10 Hz	-0.0080	**-0.0001**	0.0080	0.0016	5.0	**pass**
	20 Hz	-0.0080	**0.0000**	0.0080	0.0015	5.3	**pass**
	20 kHz	-0.0080	**-0.0044**	0.0080	0.0019	4.2	**pass**
	50 kHz	-0.0300	**-0.0065**	0.0300	0.0038	7.9	**pass**
	80 kHz	-0.1000	**-0.0049**	0.1000	0.0075	≥10	**pass**
[4] DC Offset (mV), Unbal - *note 5*							
Channel 1	10.0 V	-25.10	**3.86**	25.10	0.40	≥10	**pass**
	1.000 V	-2.600	**0.337**	2.600	0.046	≥10	**pass**
	100 mV	-0.350	**0.049**	0.350	0.024	≥10	**pass**
	10 mV	-0.125	**0.018**	0.125	0.024	5.2	**pass**
Channel 2	10.0 V	-25.10	**4.38**	25.10	0.40	≥10	**pass**
	1.000 V	-2.600	**0.449**	2.600	0.046	≥10	**pass**
	100 mV	-0.350	**0.055**	0.350	0.024	≥10	**pass**
	10 mV	-0.125	**0.034**	0.125	0.024	5.2	**pass**
[5] Source Resistance Accuracy (Ω) - *note 4*							
Channel 1	20 Ω	19.600	**20.064**	20.400	0.010	≥10	**pass**
Unbalanced	50 Ω	49.250	**50.046**	50.750	0.020	≥10	**pass**
	75 Ω	74.100	**74.921**	75.900	0.020	≥10	**pass**
	100 Ω	99.000	**99.805**	101.000	0.040	≥10	**pass**
	600 Ω	594.00	**598.63**	606.00	0.16	≥10	**pass**
Channel 1	40 Ω	39.400	**39.874**	40.600	0.020	≥10	**pass**
Balanced	100 Ω	99.000	**99.834**	101.000	0.040	≥10	**pass**
	150 Ω	148.500	**149.592**	151.500	0.060	≥10	**pass**
	200 Ω	198.000	**199.345**	202.000	0.060	≥10	**pass**
	600 Ω	594.00	**598.44**	606.00	0.16	≥10	**pass**
Channel 2	20 Ω	19.600	**20.098**	20.400	0.010	≥10	**pass**
Unbalanced	50 Ω	49.250	**50.070**	50.750	0.020	≥10	**pass**
	75 Ω	74.100	**74.956**	75.900	0.020	≥10	**pass**
	100 Ω	99.000	**99.828**	101.000	0.040	≥10	**pass**
	600 Ω	594.00	**598.77**	606.00	0.16	≥10	**pass**
Channel 2	40 Ω	39.400	**39.913**	40.600	0.020	≥10	**pass**
Balanced	100 Ω	99.000	**99.867**	101.000	0.040	≥10	**pass**
	150 Ω	148.500	**149.638**	151.500	0.060	≥10	**pass**
	200 Ω	198.000	**199.377**	202.000	0.060	≥10	**pass**

Item	Setting(s)	Lower Limit	READING	Upper Limit	MU	TUR	Result
	600 Ω	594.00	**598.60**	606.00	0.16	≥10	**pass**

Item	Setting(s)	Lower Limit	READING	Upper Limit	MU	TUR	Result
ANALOG ANALYZER CHARACTERISTICS							
[6] Input Termination Accuracy (Ω) *- note 4*							
Channel 1	300 Ω	297.000	**301.597**	303.000	0.080	≥10	**pass**
	600 Ω	594.00	**603.40**	606.00	0.16	≥10	**pass**
Channel 2	300 Ω	297.000	**301.774**	303.000	0.080	≥10	**pass**
	600 Ω	594.00	**602.89**	606.00	0.16	≥10	**pass**
[7] DC Measurement Accuracy (Volts, mVolts) *- note 7*							
Channel 1	+160 V	158.720	**159.906**	161.280	0.064	≥10	**pass**
	+100 V	99.200	**99.943**	100.800	0.040	≥10	**pass**
	+30 V	29.758	**29.984**	30.242	0.012	≥10	**pass**
	+10 V	9.9200	**9.9943**	10.0800	0.0040	≥10	**pass**
	+3 V	2.9758	**2.9982**	3.0242	0.0012	≥10	**pass**
	+1 V	0.99200	**0.99939**	1.00800	0.00040	≥10	**pass**
	+300 mV	297.10	**299.83**	302.90	0.12	≥10	**pass**
	0 mV	-0.800	**-0.013**	0.800	0.046	≥10	**pass**
	-300 mV	-302.90	**-299.86**	-297.10	0.12	≥10	**pass**
	-1 V	-1.00800	**-0.99938**	-0.99200	0.00040	≥10	**pass**
	-3 V	-3.0242	**-2.9981**	-2.9758	0.0012	≥10	**pass**
	-10 V	-10.0800	**-9.9940**	-9.9200	0.0040	≥10	**pass**
	-30 V	-30.242	**-29.981**	-29.758	0.012	≥10	**pass**
	-100V	-100.800	**-99.938**	-99.200	0.040	≥10	**pass**
	-160 V	-161.280	**-159.900**	-158.720	0.064	≥10	**pass**
Channel 2	+160 V	158.720	**159.897**	161.280	0.064	≥10	**pass**
	+100 V	99.200	**99.935**	100.800	0.040	≥10	**pass**
	+30 V	29.758	**29.980**	30.242	0.012	≥10	**pass**
	+10 V	9.9200	**9.9936**	10.0800	0.0040	≥10	**pass**
	+3 V	2.9758	**2.9981**	3.0242	0.0012	≥10	**pass**
	+1 V	0.99200	**0.99930**	1.00800	0.00040	≥10	**pass**
	+300 mV	297.10	**299.76**	302.90	0.12	≥10	**pass**
	0 mV	-0.800	**-0.069**	0.800	0.046	≥10	**pass**
	-300 mV	-302.90	**-299.90**	-297.10	0.12	≥10	**pass**
	-1 V	-1.00800	**-0.99939**	-0.99200	0.00040	≥10	**pass**
	-3 V	-3.0242	**-2.9980**	-2.9758	0.0012	≥10	**pass**
	-10 V	-10.0800	**-9.9937**	-9.9200	0.0040	≥10	**pass**
	-30 V	-30.242	**-29.983**	-29.758	0.012	≥10	**pass**
	-100V	-100.800	**-99.939**	-99.200	0.040	≥10	**pass**
	-160 V	-161.280	**-159.903**	-158.720	0.064	≥10	**pass**
[8] Input Common Mode Rejection (mV) *- note 6*							
Channel 1	3.2V range, 200 H	0	**0.017**	0.500	0.070	na	**pass**
(5V CM signal)	3.2V range, 5 kHz	0	**0.050**	0.500	0.082	na	**pass**
	3.2V range, 20 kH	0	**0.195**	1.256	0.180	na	**pass**
	10V range, 20 kH:	0	**0.88**	15.81	0.22	na	**pass**
	100V range, 20 kH	0	**2.11**	28.12	0.27	na	**pass**
Channel 2	3.2V range, 200 H	0	**0.017**	0.500	0.070	na	**pass**
(5V CM signal)	3.2V range, 5 kHz	0	**0.029**	0.500	0.082	na	**pass**
	3.2V range, 20 kH	0	**0.109**	1.256	0.180	na	**pass**
	10V range, 20 kH:	0	**2.11**	15.81	0.22	na	**pass**
	100V range, 20 kH	0	**2.04**	28.12	0.27	na	**pass**

Item	Setting(s)	Lower Limit	READING	Upper Limit	MU	TUR	Result
ANALOG ANALYZER, continued							
[9] Level Meter AC Accuracy, 1 kHz (Volts, mVolts) *- note 6*							
Channel 1	160 V	159.448	**159.900**	160.554	0.059	9.5	**pass**
	90 V	89.690	**89.943**	90.311	0.033	9.5	**pass**
	30 V	29.897	**29.982**	30.104	0.011	9.5	**pass**
	9 V	8.9690	**8.9945**	9.0311	0.0032	9.8	**pass**
	3 V	2.9897	**2.9982**	3.0104	0.0011	9.5	**pass**
	0.9 V	0.89690	**0.89945**	0.90311	0.00032	9.8	**pass**
	300 mV	298.97	**299.85**	301.04	0.11	9.5	**pass**
	5 mV	4.9828	**4.9969**	5.0173	0.0022	8.0	**pass**
Channel 2	160 V	159.45	**159.90**	160.55	0.059	9.5	**pass**
	90 V	89.690	**89.940**	90.311	0.033	9.5	**pass**
	30 V	29.897	**29.980**	30.104	0.011	9.5	**pass**
	9 V	8.9690	**8.9940**	9.0311	0.0032	9.8	**pass**
	3 V	2.9897	**2.9981**	3.0104	0.0011	9.5	**pass**
	0.9 V	0.89690	**0.89941**	0.90311	0.00032	9.8	**pass**
	300 mV	298.97	**299.84**	301.04	0.11	9.5	**pass**
	5 mV	4.9828	**4.9967**	5.0173	0.0022	8.0	**pass**
[10] Level Meter AC Flatness, 1.15 Vrms (dB) *- note 6*							
Channel 1	10 Hz	-0.0080	**-0.0014**	0.0080	0.0030	2.7	**pass**
	20 Hz	-0.0080	**-0.0003**	0.0080	0.0029	2.8	**pass**
	20 kHz	-0.0080	**0.0021**	0.0080	0.0023	3.5	**pass**
	50 kHz	-0.0300	**0.0080**	0.0300	0.0030	≥10	**pass**
	80 kHz	-0.1000	**-0.0112**	0.1000	0.0059	≥10	**pass**
Channel 2	10 Hz	-0.0080	**-0.0013**	0.0080	0.0030	2.7	**pass**
	20 Hz	-0.0080	**-0.0003**	0.0080	0.0029	2.8	**pass**
	20 kHz	-0.0080	**0.0019**	0.0080	0.0023	3.5	**pass**
	50 kHz	-0.0300	**0.0069**	0.0300	0.0030	≥10	**pass**
	80 kHz	-0.1000	**-0.0138**	0.1000	0.0059	≥10	**pass**

Item	Setting(s)	Lower Limit	READING	Upper Limit	MU	TUR	Result
ANALOG ANALYZER, continued							
[11] Phase Measurement Offset (Deg) - non-accredited, self test							
Ch1 - Ch 2	50Hz, AC couple	-0.200	**0.008**	0.200	0.001	na	**pass**
	200Hz, DC couple	-0.200	**0.000**	0.200	0.001	na	**pass**
	5kHz, DC couple	-0.200	**0.001**	0.200	0.001	na	**pass**
	20kHz, DC couple	-0.800	**0.004**	0.800	0.002	na	**pass**
	50kHz, DC couple	-2.000	**0.010**	2.000	0.004	na	**pass**
[12] Frequency Measurement Accuracy (uHz/Hz) - *note 1*							
	10 kHz	-3.00	**-0.13**	3.00	0.54	5.6	**pass**
[13] Input Residual Crosstalk at 20 kHz (dB) - *note 6*							
Ch2 into Ch 1		-999	**-148.8**	-140.0	4.0	na	**pass**
Ch 1 into Ch 2		-999	**-149.0**	-140.0	4.0	na	**pass**
OPTION AG52 CHARACTERSITICS							
[14] Squarewave Amplitude Accuracy (Volts) - *note 2*							
	100 Hz, 1 Vpk	0.98855	**0.99990**	1.01158	0.00073	≥10	**pass**
[15] Squarewave Risetime (usec)- non-accredited, oscilloscope referenced							
	5 kHz, 1 Vpk	0.00	**1.56**	2.00	0.06	na	**pass**
[16] Squarewave Even Harmonic Content (dB) - non-accredited, self test							
	20 Hz, 1 Vpk	-999	**-112.6**	-100.0	4.0	na	**pass**
	5 kHz, 1 Vpk	-999	**-108.1**	-100.0	1.0	na	**pass**
	20 kHz, 1 Vpk	-999	**-98.7**	-90.0	1.0	na	**pass**
[17] DIM Amplitude Accuracy (Volts) - *note 2*							
	DIM100, 1Vpk	0.79579	**0.80465**	0.81432	0.00059	≥10	**pass**
[18] Residual IMD, DIM100 (%) - non-accredited, self-test							
Balanced,	Ch 1	0.00000%	**0.00078%**	0.00180%	0.00020%	na	**pass**
21.2Vrms	Ch 2	0.00000%	**0.00077%**	0.00180%	0.00020%	na	**pass**

Item	Setting(s)	Lower Limit	READING	Upper Limit	MU	TUR	Result
NON-ACCREDITED CHARACTERISTICS							
[19] Sine THD+N (dB) - non-accredited, self-test							
Channel 1	0 Hz, 21.2V, 20k BW	-999	**-110.4**	-105.0	0.8	na	**pass**
Balanced	kHz, 21.2V, 20k BW	-999	**-111.4**	-105.0	0.8	na	**pass**
	5 kHz, 21.2V, 20k BW	-999	**-111.4**	-105.0	0.8	na	**pass**
	20 kHz, 21.2V, 20k BW	-999	**-111.7**	-105.0	1.0	na	**pass**
Unbalanced	20 Hz, 2.5V, 20k BW	-999	**-110.9**	-105.0	0.8	na	**pass**
	1 kHz, 2.5V, 20k BW	-999	**-113.0**	-105.0	0.8	na	**pass**
	20 kHz, 2.5V, 20k BW	-999	**-112.7**	-105.0	1.0	na	**pass**
	1 kHz, 2.5V 40k BW	-999	**-109.5**	-100.0	0.8	na	**pass**
	10 kHz, 2.5V, 40k BW	-999	**-107.5**	-100.0	0.8	na	**pass**
	1 kHz, 2.5V 80k BW	-999	**-102.4**	-92.0	0.8	na	**pass**
	20 kHz, 2.5V, 80k BW	-999	**-99.9**	-92.0	0.8	na	**pass**
Channel 2	0 Hz, 21.2V, 20k BW	-999	**-110.3**	-105.0	0.8	na	**pass**
Balanced	kHz, 21.2V, 20k BW	-999	**-111.1**	-105.0	0.8	na	**pass**
	5 kHz, 21.2V, 20k BW	-999	**-111.0**	-105.0	0.8	na	**pass**
	20 kHz, 21.2V, 20k BW	-999	**-111.9**	-105.0	1.0	na	**pass**
Unbalanced	20 Hz, 2.5V, 20k BW	-999	**-110.7**	-105.0	0.8	na	**pass**
	1 kHz, 2.5V, 20k BW	-999	**-112.9**	-105.0	0.8	na	**pass**
	20 kHz, 2.5V, 20k BW	-999	**-113.1**	-105.0	1.0	na	**pass**
	1 kHz, 2.5V 40k BW	-999	**-109.6**	-100.0	0.8	na	**pass**
	10 kHz, 2.5V, 40k BW	-999	**-107.6**	-100.0	0.8	na	**pass**
	1 kHz, 2.5V 80k BW	-999	**-102.4**	-92.0	0.8	na	**pass**
	20 kHz, 2.5V, 80k BW	-999	**-99.9**	-92.0	0.8	na	**pass**
[20] Residual Crosstalk (dB), Output Related, 20kHz - non-accredited, self-test							
Unbalanced,	*2 into 1*	-999	**-153.6**	-130.0	2.0	na	**pass**
10.6V, 20 kHz.	*1 into 2*	-999	**-153.4**	-130.0	2.0	na	**pass**
Balanced,	*2 into 1*	-999	**-163.7**	-130.0	4.0	na	**pass**
21.2V, 20 kHz.	*1 into 2*	-999	**-163.4**	-130.0	4.0	na	**pass**
[21] Residual Noise (uVolts) - non-accredited, self-test							
Balanced Input,	Ch 1, 20 kHz BW	0	**1.06**	1.30	0.06	na	**pass**
inputs shorted.	Ch 2, 20 kHz BW	0	**1.06**	1.30	0.06	na	**pass**
[22] Residual SMPTE IMD (%), 4:1, 60Hz:7kHz - non-accredited, self-test							
Balanced,	Ch 1	0%	**0.00051%**	0.00180%	0.00020%	na	**pass**
21.2 Vrms.	Ch 2	0%	**0.00058%**	0.00180%	0.00020%	na	**pass**
[23] Residual MOD IMD (%), 4:1, 60Hz:7kHz - non-accredited, self-test							
Balanced,	Ch 1	0%	**0.00034%**	0.00180%	0.00020%	na	**pass**
21.2 Vrms.	Ch 2	0%	**0.00046%**	0.00180%	0.00020%	na	**pass**
[24] Residual DFD IMD (%), mean 19.5kHz, diff 1kHz - non-accredited, self-test							
Balanced,	Ch 1	0%	**0.00013%**	0.00050%	0.00010%	na	**pass**
21.2 Vrms.	Ch 2	0%	**0.00012%**	0.00050%	0.00010%	na	**pass**
[25] Digital Output Amplitude Accuracy (Volts) - non-accredited							
Unbal, consumer	0.5 Vpp	0.450	**0.496**	0.550	0.006	na	**pass**
Unbal, professional	1.0 Vpp	0.900	**0.979**	1.100	0.012	na	**pass**
Balanced	5.0 Vpp	4.500	**5.076**	5.500	0.059	na	**pass**

END OF REPORT