Validyne
ENGINEERING CORPORATION

REVISIONS				
LTR	ECO	DESCRIPTION	DATE	APPROVED
A		See DCN	1/15/81	RJB RPK

SIGNATURE		DATE
PROD TEST	J Kitzy	12-10-80
ENGINEERING	R Bruno PKG	12/10/80
QUAL CONTROL	RP Kunkel	12-10-80

TITLE: AD296-Q2-1,-2 Digital PCBA

NUMBER: ATP 447 REV: A

SHEET 1 OF 11

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ACCEPTANCE TEST PROCEDURE

AD296 Q2-1,-2

1.0 LIST OF TEST EQUIPMENT

1.1

A. AD296 Test Set - No Equivalent

B. Digital Multimeter, 4 1/2 place 0.01% basic DC accuracy - Fluke 8100.

C. Oscilloscope, dual trace - Tektronix T992

D. Voltage Calibrator, Datel DVC 8500

E. Fiber Optic Test Cable

F. Optical Power Meter, Photodyne 88XL with Model 150 Sensor

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AD296 Q2-1,-2

2.0 SCOPE

2.1 General - This document defines the test equipment and procedural steps which must be followed for complete acceptance testing of the AD296 Q2-1,-2 Digital PCBA. The card will be found acceptable if its performance is within the limits specified in this document.

2.1.1 Conditions - The following conditions will be established for the AD296 acceptance tests, unless noted otherwise herein.

2.1.2 Standard Conditions:

Temperature: Room ambient (68°F to 86°F)
Altitude/Pressure: Normal ground
Humidity: 90% or less

2.1.3 Power Requirements for Test Equipment:

115V AC ± 5%, single phase, 60 Hz ± 2%

2.2 FAILURES

2.2.1 Failure Definitions - Any test result which does not fall within the tolerances noted in this test procedure shall be construed to be a test failure. Should a failure occur, the following action will be taken:

A. Prepare a failure report, noting the suspected cause of the failure, and submit the report in accordance with established procedures.

B. Determine the cause of failure. Document defects and repair.

C. Submit analysis to the procuring activity, if required.

D. Rerun the area(s) of this test procedure associated with the failure to insure that the failure has been repaired.

2.2.2 Test Equipment Failures - A failure which occurs in any of the associated test equipments listed shall NOT be considered a test failure. Should a test equipment failure occur, the following action will be taken:

A. Determine the cause of failure

B. Repair the failure

C. Continue the test procedure

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2.3 Human Induced Failures - Failures which occur due to human error in the operation of the test are considered human induced failures and shall not be considered test failures. Should a human induced failure occur, that portion of the test affected shall be rerun to satisfactorily demonstrate that the failure was due to operator error.

3.0 ACCEPTANCE TESTS

3.1 Visual acceptance Test - The Digital Card shall be visually inspected to insure that it has been constructed in a professional manner.

3.1.1 Workmanship - The equipment, including all parts and accessories, shall be determined to be constructed and finished in a thoroughly professional manner. Particular attention shall be given to neatness and thoroughness of soldering, wiring, impregnation of coils, correct marking and installation of components and assemblies, welding and brazing, plating, painting, riveting, machining, machine screw assemblies, fitting, and freedom of parts from burrs and sharp edges.

3.1.2 Finish - Inspect the finish of the Card. Observe that the external surface is free of scratches or burrs. Observe that all threaded parts show no indication of cross threading, detrimental or hazardous burrs, or mutilation between attached parts as possible.

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ACCEPTANCE TEST PROCEDURE
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4.0 ELECTRICAL ACCEPTANCE TEST FOR AD296 Q2-1,-2

4.1 After visual inspection is complete, insert Card into Test Fixture connector and apply power to the unit under test.

4.1.1 Current measurements will be made indirectly by reading the Voltage across the sampling resistor Test-Terminals marked +5, +15, and -15 while holding the appropriate Test Switch (+5 or ±15).

Parameters: Switches on U.U.T. closed (DOWN)
A/D input Grounded

TABLE ONE - VOLTAGE MEASUREMENTS

Supply Voltage (V)	Measured Voltage(mV)	Max. Voltage (mV)
+5	_____	49 (for -1)
	_____	59 (for -2)
+15	_____	55
-15	_____	45

Test Terminals: +5 - 1mV/10mA
+15 - 1mV/1mA
-15 - 1mV/1mA

4.1.2 Verify GREEN LED (Output Active) is Illuminated.

4.1.2.1 Depress "Cal" Switch and observe "Cal Buss" lamp on test set illuminated. _____Record "OK".

4.1.3 RS 422 Output Fault Test is performed by depressing the appropriate Out Fault Button for less than five seconds and observing that the Green "Output Active" Light is extinguished.

Depress "+ to GRD" _____Record "OK"
"- to GRD" _____Record "OK"
"+ to -" _____Record "OK"

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4.1.3.1 Set All "Piano" Dip Switches to Zero (Down) and observe Link, Sublink and Channel Lamps on test fixture are extinguished. From Left to Right enable one switch at a time and observe that the corresponding lamp on the Display is illuminated.
_____Record "OK".

4.1.3.2 Operate all Switches to the Logical "1" position and observe all Link, Sublink, and Channel Lamps are illuminated. _____Record "OK".

4.1.3.3 Operate Switches to Link 1, Sublink 1, Channel 1.

4.1.4 MUX Addressing Test:

4.1.4.1 Remove Power from the Unit under test and install Test Socket in U-5. Apply Power to the Unit under test.

4.1.4.2 Enable each of the Channel Switches one at a time from Left to Right and observe MUX Address Lights. Verify that Lamps increment to max. selected channel, then start count over at Channel 1. _____Record "OK".

4.1.4.3 Remove Power, reinstall U-5 and reapply Power.

4.2 A/D Converter Calibration:

4.2.1 Adjust Input Voltage to -9.997 VDC and adjust Potentiometer identified as "Zero" for a code of 111 111 111 11Z (Note Z is a term used for the LSB changing between 1 and 0).

4.2.2 Adjust Input Voltage to +9.993 VDC and adjust Potentiometer identified as "SPAN" for a code of 000 000 00Z.

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4.3 A/D Accuracy Test

4.3.1 NOTE: Values recorded are the most Negative voltage possible to hold the specified code for five seconds.

	NOMINAL VOLTAGE	CODE	ACTUAL VOLTAGE
1.	+ 9.9951	000000000000	_____
2.	+ 7.5000	000111111111	_____
3.	+ 5.0000	001111111111	_____
4.	0.0000	011111111111	_____
5.	- 5.0000	101111111111	_____
7.	- 7.5000	110111111111	_____
8.	- 9.9970	111111111112	_____

4.3.2 Subtract Actual from Nominal and Record Results

1.	_____	5.	_____	
2.	_____	6.	_____	
3.	_____	7.	_____	± 11 MV MAX.
4.	_____	8.	_____	

4.4 Adjust Input Voltage for approximately -3.333 VDC for a Code of 101 010 101 010. Operate Polarity switch to Plus (+) and adjust input for a code of 010 101 010 101. This test verifies all Data Lines are independent. _____ Record "OK".

4.5 Differential Linearity Test

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4.5.1 Using the Voltage Calibrator as in Paragraph 4.3.1 record the Voltages for Codes listed in Table 2.

TABLE TWO

Differential Linearity

Step	Display	Measured Voltage(mV)	Calculations
1	001 111 111 101	_____ = A	A-B = _____
2	001 111 111 111	_____ = B	B-C = _____
3	010 000 000 001	_____ = C	TOTAL=_____
4	110 000 000 001	_____ = D	D-E = _____
5	101 111 111 111	_____ = E	E-F = _____
6	101 111 111 101	_____ = F	TOTAL=_____

CALCULATION LIMITS OF ACCEPTANCE - Difference: Min. = 5mV Max. = 15mV; Total: Min = 14mV Max. = 28mV

4.6 Fiber Optic Transmitter Test - Dash 2 Only:

4.6.1 Remove Power from the Card under test and install Test Cable from Fiber Transmitter on the AD296 to Sensor Head on the Optical Power Meter. Select microwatts Range to 199.9.

4.6.1.1 Verify Zero Microwatts.

4.6.2 Apply Power and verify Power Reading in excess of 40 Microwatts.

4.7 Remove Power and route to next Manufacturing sequence.

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TEST REPORT

ASSY AD296-Q2-1, -2

S/O _____ CUSTOMER _____

W/O _____ SERIAL NO. _____

TESTED BY _____ DATE _____

Paragraph/Step		Accepted	Specification
4.1.1	Current +5V (-2)	_____	≤590mA
	+5V (-1)	_____	≤490mA
	+15V	_____	≤55mA
	-15V	_____	≤45mA
4.1.2	Green LED	_____	Illuminated
4.1.2.1	Cal Buss LED	_____	Illuminated
4.1.3	Output Fault Test		
	+ to GRD	_____	Green LED Extinguished
	- to GRD	_____	
	+ to -	_____	
4.1.3.1	All Piano-dip switches "down"	_____	Link Sub-link & Channel Lamps "OFF"
	One Switch at a time "up"	_____	Corresponding Lamp - one at a time "ON"
4.1.3.2	All switches up	_____	All Lamps "ON"
4.1.4.1	Channel Switches up one at a time, left to right	_____	MUX Address lamps increment to selected max. selected channel, then start over at Channel 1.
4.2.1	Input @ -9.997 VDC Adjust ZERO Pot	_____	Output Code 111 111 111 11Z
4.2.2	Input @ +9.993 VDC Adjust SPAN Pot	_____	Output Code 000 000 000 00Z

QC _____

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ASSY AD296-Q2-1, -2

S/O _____ CUSTOMER _____

W/O _____ SERIAL NO. _____

TESTED BY _____ DATE _____

Paragraph/Step			Accepted	Specification
4.3.1	Nominal Voltage	Code	Actual Voltage	
(1)	+9.995	000 000 000 000	_____	
(2)	+7.500	000 111 111 111	_____	
(3)	+5.000	001 111 111 111	_____	
(4)	0.000	011 111 111 111	_____	
(5)	-5.000	101 111 111 111	_____	
(6)	-7.500	110 111 111 111	_____	
(7)	-9.997	111 111 111 11Z	_____	
4.3.2	Nominal minus Actual from above.			
(1)	_____		_____	
(2)	_____		_____	
(3)	_____		_____	
(4)	_____		_____	0 ±0.011V
(5)	_____		_____	
(6)	_____		_____	
(7)	_____		_____	
4.4	Input approximately -3.333 VDC (Adjust for code of 101 010 101 010) Apply reverse polarity.		_____	Adjust for Output code 010 101 010 101

QC _____

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TEST REPORT

ASSY AD296-Q2-1, -2

S/O _____ CUSTOMER _____

W/O _____ SERIAL NO. _____

TESTED BY _____ DATE _____

Paragraph/Step	Accepted	Specification

4.5.1 TABLE 2 - DIFFERENTIAL LINEARITY

Step	Code	Measured Voltage (mV)	Calculations
1	001 111 111 101	_____ = A	A-B = _____
2	001 111 111 111	_____ = B	B-C = _____
3	010 000 000 001	_____ = C	Total _____
4	110 000 000 001	_____ = D	D-E = _____
5	101 111 111 111	_____ = E	E-F = _____
6	101 111 111 101	_____ = F	Total _____

_____ Difference - Min. 5 mV Max. 15mV

_____ Total - Min. 14 mV Max. 28 mV

4.6 AP296-Q2 (-2 only)

4.6.1.1 Power off optical power _____ 0 ±0.1 μW

4.6.2 Power on optical power _____ ≥40μW

QC _____

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