Title	*OMC DCPD Preamplifier Test Procedure*
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Hardware Version	*D060572-v1*

1 Overview

The following brief procedure documents the test results of an OMC DCPD Preamplifier.

Table 1

Preamplifier Serial Number		
Date		
Tested By		
Overall Test Result	PASS	FAIL
	☐	☐

2 DC Measurements Section

2.1 Quiescent current draw

Using an adapter cable to D-Sub 9 pin, apply +/-15VDC to the preamplifier with two Fluke DVMs in series to measure current. Record the results in the following table. Mark each measurement as Pass or Fail.

Table 2, D-Sub Pin Map for Rack Interface

Pin (+,-)	Function
1	Out +
6	Out -
7, 8	GND
2	+15VDC
3	-15VDC
4	Bias (+V)
9	Transimpedance Select

Table 3 Quiescent Current Draw

Quiescent Current Draw (mA)	Specified Value	Measured Value	Pass	Fail
+15V Supply	23mA +/- 5mA		☐	☐
-15V Supply	23mA +/- 5mA		☐	☐

2.2 Output DC Offsets

Using a Fluke DVM, measure the DC offset voltages between pins 1 and 6 of the output Rack Interface D-Sub connector. Record the results in the following table.

Table 4 Output DC Offsets

D-Sub Pin	Specified Value	Measured Value	Pass	Fail
Pin 1	0mV +/- 2mV		☐	☐
Pin 6	0mV +/- 2mV		☐	☐

2.3 Oscillation Check

Using an oscilloscope, verify that there are no oscillations at each pin of the differential output. Mark the measurement as Pass or Fail in the following table.

Table 5 Oscillation Check

D-Sub Pin to Observe With Scope	Pass	Fail
Pin 1	☐	☐
Pin 6	☐	☐

3 Transfer Function

Use an SR785 to measure the transfer function between the preamplifier input and the differential output. An additional D-Sub breakout cable/fixture is needed go between the preamplifier input and a D-Sub breakout board. Mark the results and indicate Pass or Fail in in the following data table.

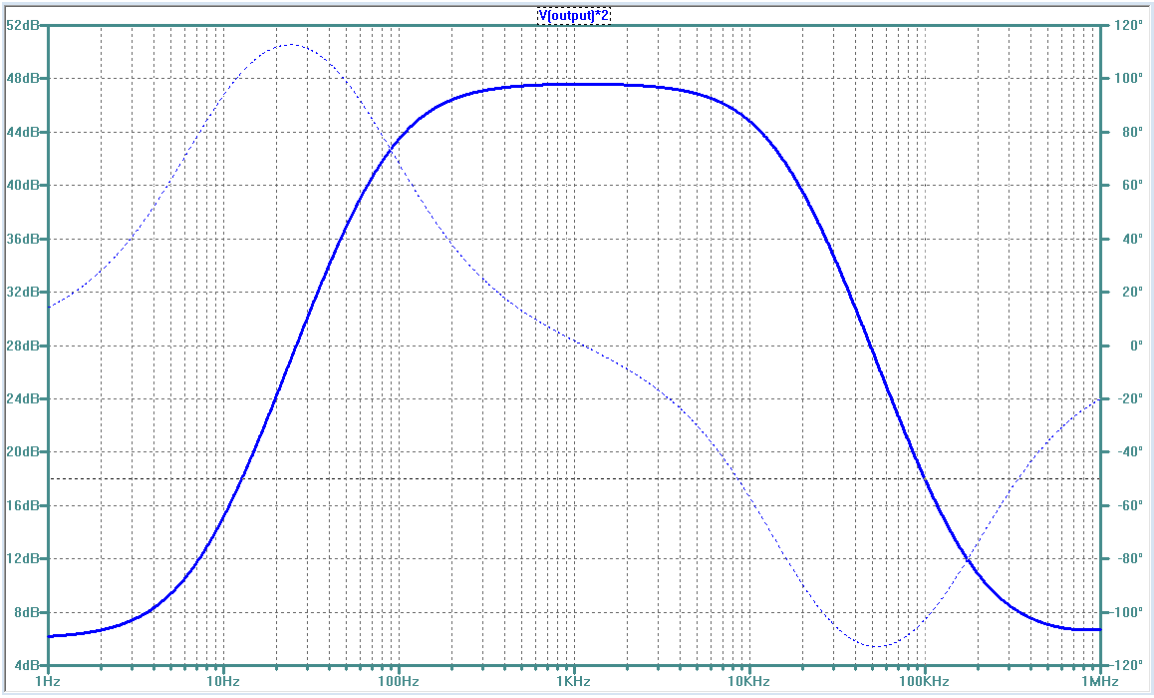
Table 6, D-Sub Pin Map Preamplifier Input

Pin (+,-)	Function
1	Bias (V+)
2	Preamplifier Input
3	GND

Table 7, Main Path Transfer Function

Frequency(Hz)	Gain (dB)	Phase (Deg.)	Measured Gain (dB)	Measured Phase (Deg.)	Pass	Fail
10	15.2dB +/- 1dB	93.9 +/- 3 deg.			☐	☐
100	43.5dB +/- 1dB	68.0 +/- 3 deg.			☐	☐
1kHz	47.6dB +/- 1dB	1.8 +/- 3 deg.			☐	☐
10kHz	44.8dB +/- 1dB	-56.9 +/- 3 deg.			☐	☐
100kHz	18.0dB +/- 2dB	-102.7 +/- 6 deg.			☐	☐

Figure 1, Predicted Transfer Function



4 Output Noise Measurement

The figure below shows the output voltage noise measured differentially at pins 1&6 of the Rack Interface output with the preamplifier input open circuited (Z=100Ω).

Figure 2, Differential Output Voltage Noise

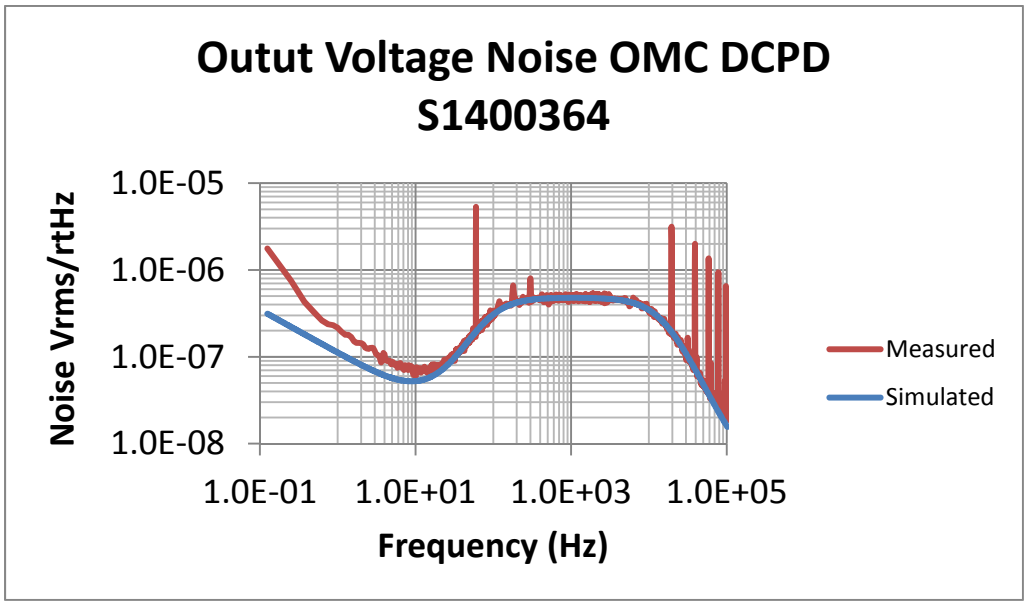


Table 8

Frequency	Predicted Noise (nVrms/√Hz)	Measured Noise (nVrms/√Hz)	Pass	Fail
20Hz	67n +/-5 nV/√Hz		☐	☐
1kHz	477n +/-10 nV/√Hz		☐	☐
10kHz	345n +/-10 nV/√Hz		☐	☐

5 Transimpedance Relay Functionality

Using a Fluke DVM, measure the resistance between the preamplifier input (Pin 2 of the input D-Sub) to ground. By applying +5V on the Rack Interface D-Sub between pins 9 and ground (Transimpedance Switch or Z-switch), the transimpedance can be switched between 100Ω and 400Ω. Verify this functionality and record the results in the table below.

Table 9 Transimpedance Select Relay

Voltage applied to Z-switch	Specified Value	Measured Value	Pass	Fail
0VDC	100Ω +/- 2 Ω		☐	☐
5VDC	400 Ω +/-5 Ω		☐	☐

6 Bias Path Protection Path Voltage Knee

A transient voltage suppressor (TVS) diode is included from the bias path to ground. The voltage rating of the correct component is 18VDC. Voltages above this will begin to cause conduction in the diode. The following test requires a power supply to be attached to TP9 though a 1kΩ resistor. The current flowing through the TVS can be obtained by measuring the voltage across the series 1kΩ resistor. In the following table, record the *applied voltage* that causes 1mA to flow (1 volt drop across the 1kΩ resistor).

Table 10 TVS Voltage Knee

	Specified Value	Measured Value	Pass	Fail
Voltage applied to TP9 corresponding to 1mA current flow	21.2 VDC +/- 1 VDC		☐	☐