



Marin Catholic Existing Sports Field Public Address System Sound Leakage Report.

Report Date: March 15, 2013

Testing Date: March 2nd, 2013 – 9am to 11:30am

Testing Engineer: Barry Grzebik

School Representative Present: Peter McDonnell

Neighborhood Representative Present: GPOA President Jack Valinoti and John Holzwarth

General Conditions:

Temp: 60F, Rising
RH: 70%, Falling
DP: 49, Rising
Wind: NNE @1mph, gusts to 3mph
Sky: Clear

Test Equipment:

Ivie IE-45 Audio Analysis System
Ivie IE-5P/MP201 Type 1 Microphone and Preamp
Larson Davis CAL200 Precision Acoustic Calibrator

Summary:

Tests were performed with the existing sound system operating at the limit of its capability. This represents a worst case scenario in that the system is not capable of generating Sound Pressure Levels louder than those generated for these tests. Under these conditions, the average sound levels reaching residences on the hill to the North East was 62dBA. During these tests, neighborhood background noise levels, predominantly vehicular traffic noise from Sir Francis Drake Boulevard was 54dBA.

This correlates well with our initial neighborhood measurement taken on September 29th, 2012 during the Homecoming Game where sound from the public address system was measured at a level of 56dBA. The difference of 6dBA in these measurements represents a common reduction referred to as "Head Room", meaning that a system cannot be operated for extended periods at its absolute maximum capability. Normal operation would commonly be at a level 6 to 10dB below the absolute maximum to maintain fidelity and long term reliability.



Detailed Findings:

All test locations (residences) were measured with the system operating at its maximum possible level except for location #2. At this location, the system was operated at what was believed to be a normal operating level as determined by the announcer that operates the system during games. With the system at this level, 55dBA was measured. This correlates well with the previous Homecoming Game measurement of 56dBA.

| | | Background Noise Level | Speech Level Min. | Speech Level Max. | Notes |
|------------|------------------|---------------------------|----------------------|----------------------|---|
| Reference | Home Bleachers | 49dBA | 89dBA | 91dBA | This test level exceeds normal operating levels. System was in heavy clip. |
| Location 1 | 15 Almenar | 49dBA | 58dBA | 62dBA | Same level measured at bottom of driveway and in the home's side yard. |
| Location 2 | 130 Corte Balboa | 53dBA | 54dBA | 55dBA | This test was performed with a lower SPL in bleachers, 77dBA for a 23dB Delta |
| Location 3 | 100 Corte Elena | 52dBA | 60dBA | 63dBA | |
| Location 4 | 172 Vista Grande | 54dBA | 62dBA | 66dBA | |
| Location 5 | At Property Line | 62dBA | 63dBA | 65dBA | School property line at Sir Francis Drake, facing center of press box. |

Note: All measurements A weight, Slow detection

Barry Grzebik
 Managing Director
 Grzebik Design Group
 Consultants in Audio, Video and Acoustics

END



CERTIFICATE OF IE-45IM INPUT MODULE CALIBRATION

This is your factory Calibrator dB SPL number. Save this number. If you need to reenter this number refer to the IE-45 Manual (available on www.ivie.com or on your IE-45 software CD ROM.)



Calibrator Information

Calibrator Model: Larson Davis
CAL 200
Serial # 3791
Calibration Frequency: 1 kHz
Barometric Pressure: 650 m bar
Temperature: 73 °F

CALIBRATION CONSTANT: 94.4

Calibrator dB SPL : 94.0

IE-45IM Serial Number: 17084367F0

Microphone Model: IE-45M

1201-IE5P

-IE5P

Other: _____

Certified By: JP

Effective Date: Aug 12, 2008

Important Note: For accurate measurements please confirm that the Calibration Constant (CC) in the IE-45 Calibration Screen matches the Calibrator dB SPL number on this Certificate. Traceable to National Institute of Standards.



Certificate of Calibration and Conformance

Certificate Number 2008-112168

Instrument Model CAL200, Serial Number 6718, was calibrated on 24OCT2008. The instrument meets factory specifications per Procedure D0001.8190.

New Instrument
Date Calibrated: 24OCT2008
Calibration due:

Calibration Standards Used

| MANUFACTURER | MODEL | SERIAL NUMBER | INTERVAL | CAL. DUE | TRACEABILITY NO. |
|-----------------|--------------|---------------|-----------|-----------|------------------|
| Larson Davis | 2559 | 2506 | 12 Months | 18FEB2009 | 15564-1 |
| Schaevitz | P3061-15PSIA | 17588 | 12 Months | 26MAR2009 | 3852683 |
| Larson Davis | 2900 | 0661 | 12 Months | 07APR2009 | 2008-105268 |
| Hewlett Packard | 34401A | US36033460 | 12 Months | 06JUN2009 | 3941596 |
| Hewlett Packard | 34401A | 3146A10352 | 12 Months | 02JUL2009 | 3964750 |
| Larson Davis | PRM915 | 0112 | 12 Months | 11SEP2009 | 2008-110617 |
| Larson Davis | PRM902 | 0480 | 12 Months | 11SEP2009 | 2008-110613 |
| Larson Davis | MTS1000/2201 | 0111 | 12 Months | 11SEP2009 | 2008-SM908 |

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Environmental test conditions as shown on calibration report.

Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Provo Engineering & Manufacturing Center. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

This calibration complies with the requirements of ISO 17025 and ANSI Z540. The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended, however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

Signed: *Scott Montgomery*
Technician: Scott Montgomery

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Toll Free: 888.258.3222 Telephone: 716.926.8243 Fax: 716.926.8215
ISO 9001-2000 Certified



**Larson Davis CAL200 Acoustic Calibrator, SN: 6718
Certificate of Measured Output**

Performance at Reference Conditions

| | | |
|-----------------------------|---------------|---------------|
| Nominal Level (dB SPL): | 94 | 114 |
| Measured Level (dB SPL): | 93.99 | 114.00 |
| Expanded Uncertainty (dB): | 0.153 | 0.152 |
| Level Error Limit (dB): | ±0.35 | ±0.35 |
| Nominal Frequency (Hz): | 1000 | 1000 |
| Measured Frequency (Hz): | 1000.2 | 1000.1 |
| Expanded Uncertainty (Hz): | 0.2 | 0.2 |
| Frequency Error Limit (Hz): | ±10.0 | ±10.0 |
| Measured Distortion (%): | 0.65 | 0.61 |
| Expanded Uncertainty (%): | 0.25 | 0.25 |
| Distortion Limit (%): | 2.0 | 2.0 |

The data is acquired by the insert voltage calibration method using the reference microphone's open circuit sensitivity.

Environmental Conditions

| | | |
|------------------------|-------|-------|
| Temperature (°C): | 24 | 24 |
| Relative Humidity (%): | 26 | 26 |
| Static Pressure (kPa): | 101.1 | 101.1 |

Reference Microphone

Model: Larson Davis 2559
 Serial Number: 2506
 Open Circuit Sensitivity: 12.417 mV/Pascal
 Uncertainty: 0.130 dB

Influence of Static Pressure

| Nominal Level (dB SPL): | | 114 | | |
|-------------------------|----------------|-------------------|-----------------------|----------------|
| Nominal Pressure (kPa) | Pressure (kPa) | Level Change (dB) | Frequency Change (Hz) | Distortion (%) |
| 108.0 | 107.9 | -0.01 | -0.00 | 0.61 |
| 101.3 | 101.2 | 0.00 | 0.00 | 0.61 |
| 92.0 | 91.9 | -0.00 | -0.00 | 0.60 |
| 83.0 | 82.9 | -0.03 | -0.00 | 0.61 |
| 74.0 | 73.9 | -0.10 | -0.00 | 0.62 |
| 65.0 | 65.1 | -0.21 | -0.01 | 0.64 |
| Expanded Uncertainty: | 1.0 | 0.04 | 0.20 | 0.25 |
| Limit: | | ±0.30 | ±10.0 | 2.0 |

Reference microphone corrections applied.

Environmental Conditions

| | |
|------------------------|----|
| Temperature (°C): | 22 |
| Relative Humidity (%): | 37 |

Reference Microphone

Model: Larson Davis 2559
 Serial Number: 2506

Static pressure was measured with a calibrated Motorola pressure sensor MPX2100AP.
 Temperature and humidity was measured with a calibrated Fluke 1620A sensor.
 Expanded uncertainty of environmental measurements: 0.3 °C, 3 %RH, 1.0 kPa
 Uncertainty values are given at 95% confidence level (k = 2).

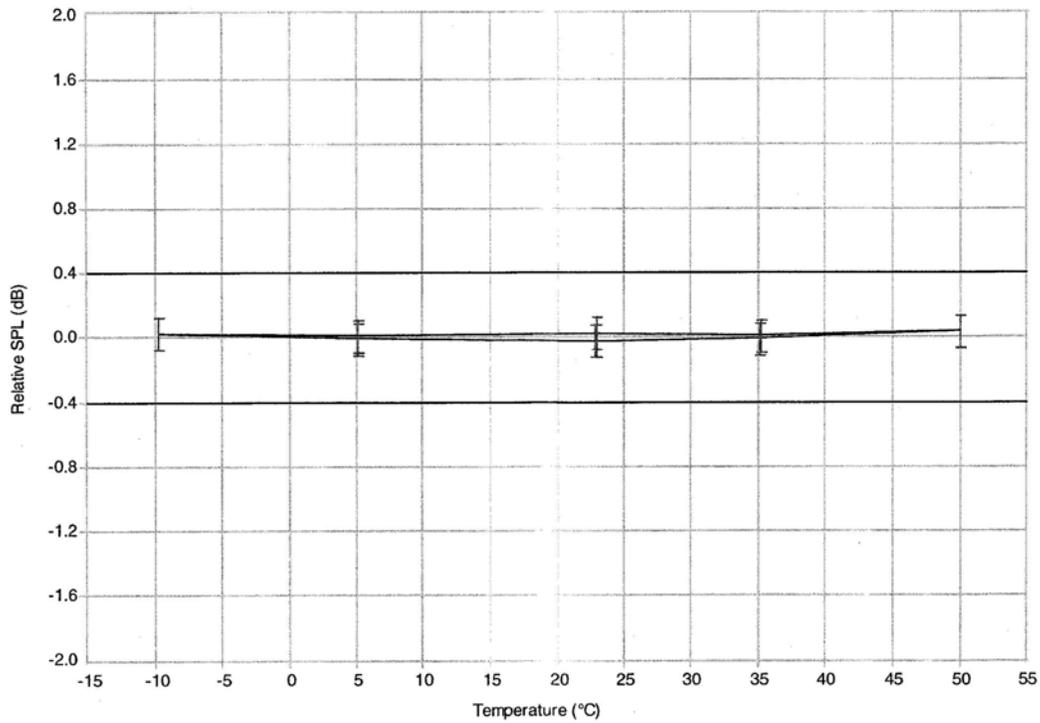
A Sound Level Meter can be calibrated to a level (L) defined as: L = measured level + pressure sensitivity
 or if a Sound Level Meter is calibrated using the nominal level, the adjustments to data (X) are defined as:
 X = measured level - nominal level - pressure sensitivity



Model CAL200 Relative SPL vs. Temperature
Larson Davis Model CAL200 Serial Number: 6718

Model CAL200 Relative SPL vs. Temperature at 50% RH.
A 2259 Mic (SN: 2893) with a PRM901 Preamp (SN: 0160), station 5 was used to check the levels.

Test Date: 26 Aug 2008 16:53:41



0.1dB expanded uncertainty at ~95% confidence level (k=2)

Test performed at: Larson Davis, a division of PCB Piezotronics, Inc.
1681 West 820 North, Provo, Utah 84601

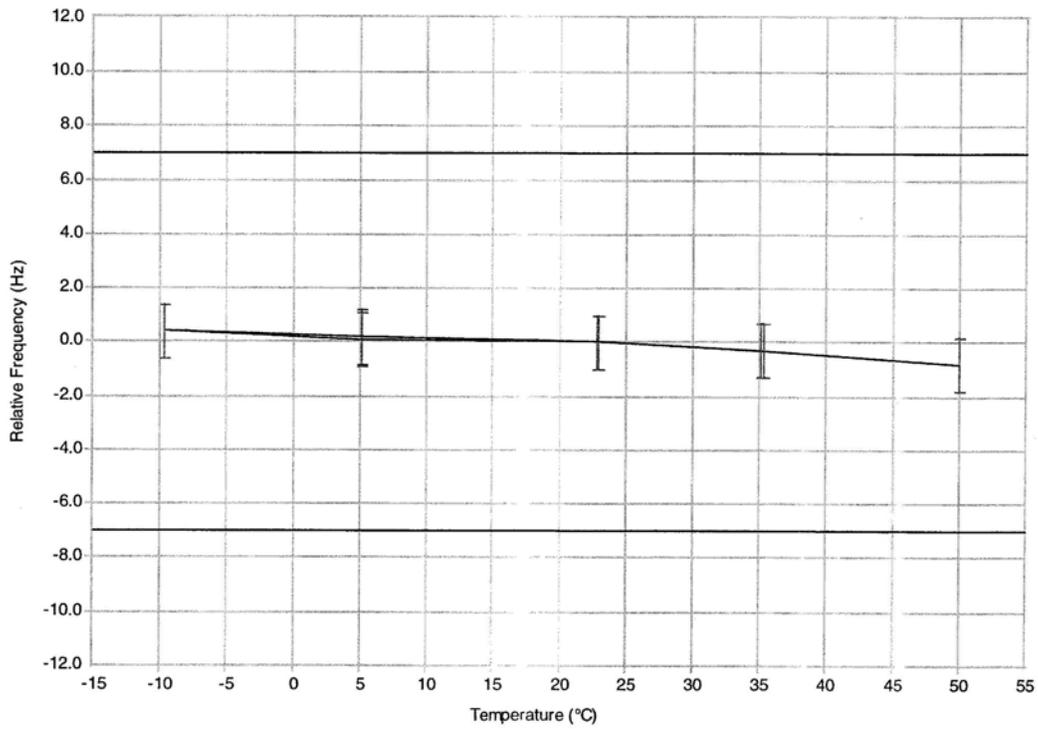
Larson Davis, a division of PCB Piezotronics, Inc.
Tel: 716 684-0001 www.LarsonDavis.com



 **Model CAL200 Relative Frequency vs. Temperature**
Larson Davis Model CAL200 Serial Number: 6718

Model CAL200 Relative Frequency vs. Temperature at 50% RH.
A 2259 Mic (SN: 2893) with a PRM901 Preamp (SN: 0160), station 5 was used to check the levels.

Test Date: 26 Aug 2008 16:53:41



1.0 Hz expanded uncertainty at ~95% confidence level (k=2)

Test performed at: Larson Davis, a division of PCB Piezotronics, Inc.
1681 West 820 North, Provo, Utah 84601

Larson Davis, a division of PCB Piezotronics, Inc.
Tel: 716 684-0001 www.LarsonDavis.com