OSC2

Pink Noise / Sinewave Digital Oscillator

IM-1

Impedance Meter

Operation Manual

OSC2 INTRODUCTION

The ***Rockford Fosgate*** OSC2 Digital Sinewave/Pink Noise Oscillator is designed to provide a convenient means for tweaking almost every autosound installation

Connecting the OSC2 to an autosound system is as easy as plugging in 2 RCA plugs. Since the OSC2 is battery powered, there are no power wires or ground loops to contend with.

The OSC2 can inject a signal anywhere line level signals are present in the system. Just unplug the existing source unit and plug in the OSC2.

OSC2 FEATURES

- Portable Battery Powered Operation
- Accurate Digital Readout
- Switchable Sinewave/Pink Noise Outputs
- Continuously Variable Sinewave Output in Three Ranges
- Adjustable Output Level
- Low Distortion

OSC2 WARNINGS

To prevent possible system damage, please follow the guidelines below.

- **NEVER** connect or disconnect any component of the sound system while power is applied to the system
- **ALWAYS** turn OSC2 on **BEFORE** applying power to the system
- **ALWAYS** turn the system off **BEFORE** turning the OSC2 off
- **ALWAYS** verify that the volume control on the OSC2 is fully counterclockwise (minimum) **BEFORE** turning the system on

OSC2 APPLICATIONS

Testing for Proper Phase

Testing for proper phasing of low frequency drivers is easily accomplished with the OSC2. Set the output for Sinewave and adjust the frequency to somewhere between 20 and 60Hz. Slowly bring the volume up until a moderate output is obtained. Now, try reversing the polarity of one of the woofers. If the sound output increases, the drivers are now in phase. If the output decreases, the drivers were in phase before and the polarity should be restored to its original configuration.

Adjusting Equalization

By using the OSC2's Pink Noise outputs and a Real Time Spectrum Analyzer (RTA), an autosound system can be fine-tuned for an extremely smooth response curve. In order to do this, the OSC2 should be connected ahead of the equalizer. Slowly bring the volume up until a moderate output is obtained. By monitoring the RTA display, you can now adjust the equalizer for the smoothest response.

Determining Resonant Frequency of Vehicle

For people involved in Car Audio competitions, the OSC2 can provide a substantial advantage. In order to obtain maximum Sound Pressure Level (SPL) scores at these contests, it is important to know the resonant frequency of the vehicle. Set the OSC2 to Sinewave and adjust the frequency to around 50Hz. Slowly bring the volume up until a moderate output is obtained. Now, slowly vary the frequency between 30 and 100Hz. At one point, the output of the system will increase. Observe the frequency displayed on the OSC2's digital readout. This is the resonant frequency of your vehicle. For competition purposes, select a song that contains a sustained note that very closely approximates this frequency.

Setting Crossover Points

Crossover points and midrange/tweeter polarity are easily checked with the use of the OSC2's Pink Noise outputs. As with equalization, an RTA will be necessary. Overlapping crossover points will show up as Peaks in the response curve, while underlapping crossover points will show up as Dips. Since phase shifts occur in crossover networks, it is important that midrange and tweeters that are mounted in close proximity to each other be in phase. Otherwise, *Hot Spots* and *Holes* will occur in the frequency response of the system. Try reversing the phase of either the midrange or tweeter and see if the response on the RTA smooths out at the crossover point. This should be done PRIOR to equalization.

Troubleshooting an Installation

The troubleshooting uses of the OSC2 are limited only by your imagination and resourcefulness. Some of the more common uses are given below.

- Verify Operation of Source Unit
- Locate Ground Loops
- Locate Faulty RCA cables
- Locate Faulty Line Level Accessories

Tuning Vented Enclosures

The OSC2 is the perfect companion for the installer that designs and builds vented enclosures. The variable output frequency makes it very simple to determine the tuning frequency of the enclosure. Slowly bring the volume up until a moderate output is obtained. Now, slowly vary the frequency from 20 to 100Hz. At the tuning frequency, **MINIMUM** cone excursion will occur.

OSC2 SPECIFICATIONS

Frequency Range:	20Hz to 20kHz in 3 ranges
Output Amplitude:	Continuously Variable: 700mV RMS Max
Distortion:	0.15%
Display:	LCD digital readout
Battery Type:	9V Alkaline
Dimensions:	5.75"H x 3.5" W x 1.29"D
Weight:	1 lb.

IM-1 INTRODUCTION

The ***Rockford Fosgate*** IM-1 is designed to test the impedance of speakers, passive crossover networks and speaker systems over the full audio frequency range.

The IM-1 measures the impedance of a circuit by supplying an A.C. current to the circuit under test and measuring the voltage developed across the circuit. Since the test signal from the IM-1 is A.C., the IM-1 can measure circuit impedance measurements, detection of open or short circuits in speaker systems, and frequency response characterization of speakers and speaker systems.

IM-1 FEATURES

- Hand held operation
- Operates on 9V battery
- Impedance measurement range: full audio spectrum/20Hz-20kHz
- Two operating modes:
  a. Frequency dependent impedance measurements
  b. Frequency counter
- Built-in signal generator
- Low battery indicator
- Ideal for determining circuit impedance and frequency of measurement
- Perfect for troubleshooting and characterizing systems
- Can “see” through passive crossovers in a system

IM-1 Warnings

1. **NEVER** connect or disconnect any component of the sound system with power applied to the system.

2. **NEVER** connect test leads of the IM-1 to any system that has power applied to the system.

IM-1 Low Battery Indication and Battery Replacement

When the battery voltage drops too low for proper operation, the IM-1 will read "0.0" at all times in the impedance mode. The open circuit reading of the IM-1 indicates the condition of the battery during operation. The open circuit reading decreases as the battery voltage falls. When the open circuit reading decreases to about "120.0", the battery voltage becomes too low and the display reading changes to "0.0". An IM-1 with a low battery will read "0.0" in the impedance mode at all times no matter what the actual circuit impedance is. For maximum battery life, use an alkaline battery to power the IM-1.

When replacing the battery in the IM-1, use the following precautions:

1. Remove the IM-1 test leads from the circuit under test.

2. Turn off power switch on the IM-1.

3. Install battery correctly into battery connector. An incorrectly installed battery will become hot and will not allow the IM-1 to operate.

FAILURE TO FOLLOW THE BATTERY REPLACEMENT PRECAUTIONS ON PAGE 6 MAY RESULT IN DAMAGE TO THE BATTERY OR TESTER.

IM-1 TESTING PROCEDURES

To use the IM-1, the following procedural steps are necessary to ensure accurate measurements.

1. Move the **FUNCTION** switch to the **IMPEDANCE** position.
2. Use the **FREQUENCY RANGE** switch to select the desired range for testing. Options are; 20Hz - 200Hz, 200Hz - 2kHz, 2kHz - 20kHz.
3. Turn the IM-1 to the ON position by rotating the **FREQUENCY ADJUSTMENT** knob clockwise until you feel a slight "click".
4. Plug the test leads into the IM-1. Be sure to observe polarity (red is +, black is –).

With the test leads open circuited (not connected to anything) the LCD display on the IM-1 will read between "120.0" and "135.0" depending on the state of charge of the internal battery.

If the display reads "0.0" check the internal battery for proper connection and state of charge. If the battery is bad replace it with a new one.

WARNING: Batteries that are in a discharged state can leak acid which can damage the IM-1. Discharged batteries should be removed immediately. If the IM-1 is to be stored for a period of more than 30 days, the battery should be removed.

To test a speaker system/circuit use the following procedures;

1. With the IM-1 set up as described by the above procedures attach the test leads to the speaker wire that "feeds" the speaker system. The wire must be disconnected from the amplifier. It is best to check one channel at a time. i.e. Test left front then right front and so forth. Be sure to observe polarity.

2. Observe the LCD readout. A nominal impedance will be shown.

   EXAMPLE: If the speaker wire to which the IM-1 is attached feeds a speaker system/circuit that includes a 4 Ohm woofer, a 4 Ohm midrange and a 4 Ohm tweeter all wired in parallel with assorted passive crossover components, then the IM-1 readout should be approximately "3.5". This is with the **FREQUENCY RANGE** switch set in the 20Hz - 200Hz position and the **FREQUENCY ADJUSTMENT** fully counterclockwise.

3. To observe the frequency at which the impedance reading is being taken set the function switch to the **FREQUENCY** position.

In the previous example, the readout should read approximately "20" when the function switch is moved to the **FREQUENCY** position.

4. By rotating the **FREQUENCY ADJUSTMENT** switch clockwise it is possible to vary the frequency within a selected range. Moving clockwise increases the frequency and counterclockwise decreases the frequency.

This allows for impedance measurements to be taken across the entire audio spectrum. With the function switch in the **IMPEDANCE** position, slowly rotate the **FREQUENCY ADJUSTMENT** knob clockwise while observing the display readout. If the impedance measurement drops below the amplifiers' "safe operating range", switch the function switch to the **FREQUENCY** position to isolate where the problem exists. i.e.: A low impedance measurement at 300Hz could indicate a poor crossover design, a shorted capacitor or induct coil, overlapping crossover frequencies, etc.

IM-1 SPECIFICATIONS

Maximum Impedance Measurement:	100 Ohms
Impedance Measurement Accuracy:	0 Ohms-50 Ohms: 5% 50 Ohms-100 Ohms: 10%
Frequency Range:	20Hz-20kHz in 3 ranges.
Frequency Measurement Accuracy:	1%
Typical Open Circuit Voltage At Probe Tips:	1.5 Vrms
Display:	LCD Digital Readout
Battery Type:	9V Alkaline
Dimensions:	5.75"H x 3.5"W x 1.29"D
Weight:	1 lb.

LIMITED WARRANTY INFORMATION

Rockford Corporation offers a limited warranty on Rockford Fosgate products on the following terms:

- **Length of Warranty**
  1 year on test equipment (receipt required)
  90 days on test equipment B-stock (receipt required)

- **What is Covered**
  This warranty applies only to Rockford Fosgate test equipment sold to Authorized Rockford Fosgate Dealers, or to consumers by an authorized Rockford Fosgate Dealer in the United States of America or its possessions. Test equipment purchased by Dealers, or consumers from an Authorized Rockford Fosgate Dealer in another country are covered only by that country's Distributor and not by Rockford Corporation.

- **Who is Covered**
  This warranty covers only the original purchaser of Rockford product purchased from an Authorized Rockford Fosgate Dealer in the United States. In order to receive service, the Dealer/Consumer must provide Rockford with a copy of the receipt stating the customer name, dealer name, product purchased and date of purchase.

- **Products found to be defective** during the warranty period will be repaired or replaced (with a product deemed to be equivalent) at Rockford's discretion.

- **What is Not Covered**
  1. Damage caused by accident, abuse, improper operations, water, theft
  2. Any cost or expense related to the removal or reinstallation of product
  3. Service performed by anyone other than Rockford or an Authorized Rockford Fosgate Service Center

4. Any product which has had the serial number defaced, altered, or removed
5. Subsequent damage to other components
6. Any product purchased outside the U.S.
7. For consumer, any product not purchased from an Authorized Rockford Fosgate Dealer

- **Limit on Implied Warranties**
  Any implied warranties including warranties of fitness for use and merchantability are limited in duration to the period of the express warranty set forth above. Some states do not allow limitations on the length of an implied warranty, so this limitation may not apply. No person is authorized to assume for Rockford Fosgate any other liability in connection with the sale of the product.

- **How to Obtain Service**
  Please call 1-800-669-9899 for Rockford Customer Service. You must obtain an RA# (Return Authorization number) to return any product to Rockford Fosgate. You are responsible for shipment of product to Rockford.

  Ship to: **Electronics**
  Rockford Corporation
  Warranty Repair Department
  2055 E. 5th Street
  Tempe, AZ 85281
  RA#:_____