

WARRANTY CLAUSE

METROSONICS, INC. warrants each new instrument manufactured and sold to be free from defects in material, workmanship and construction, except for batteries which may be contained therein, and that when used in accordance with this owner's manual will perform to applicable specifications for a period of one year after original delivery.

If examination by METROSONICS, INC. discloses that the product has been defective, then our obligation is limited to repair or replacement, at our option, of the defective unit or its components.

METROSONICS, INC. is not responsible for products which have been subject to misuse, alteration, accident or for repairs not performed by METROSONICS, INC.

Instruments must be returned properly packed with transportation charges prepaid to METROSONICS, INC.; return transportation charges will be F.O.B. factory. No parts shall be returned unless a return authorization number is received, which will be furnished by request.

The foregoing warranty constitutes METROSONICS, INC. sole liability, and is in lieu of any other warranty, of merchantability or fitness. METROSONICS, INC. shall not be responsible for any incidental or consequential damages arising from any breach of warranty.

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Chapter 1

INTRODUCTION

This owner's manual applies to both the Metrosonics db-3100 and db-3101 Metrologgers. The db-3100 is a Type 2 sound level instrument, whereas the db-3101 is a Type 1 instrument. Throughout this manual, references to the db-3100 apply equally to the db-3101, unless stated otherwise.

The db-3100 combines a universal noise dosimeter, an integrating/averaging and true peak sound level meter and a time history monitor into one small, easy to operate instrument. Housed in a rugged, light-weight, water-tight aluminum extrusion, the db-3100 can withstand environmental and industrial usage.

Three pushbuttons control all logger functions. The db-3100 comes preprogrammed for common test conditions. Programming changes can be accomplished by using the ms-3100P (formerly called ms-935P) Programming Disk and either a simple terminal or an IBM compatible computer. In addition, complete reports can be output directly from the db-3100 to a serial printer.

ms-3100 Metrosoft is available as an option. This is an enhanced software package that allows you to program the db-3100, perform data retrieval, create graphs & reports, perform projection studies, search your data base, and more! Call Metrosonics Sales Department for more information (716) 334-7300.

IMPORTANT!

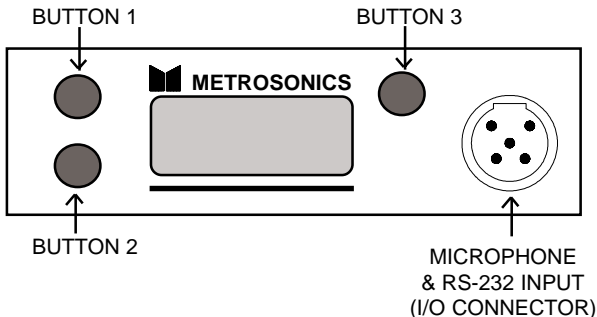
Register your db-3100/db-3101 Noise Monitor(s) and ms-3100P Programming Disk **NOW** and receive the first year of Programming Disk software upgrades **FREE**. Either fill out the enclosed card or see "Warranty Registration" in Chapter 4 for quick instructions on using the on-line warranty card to register your products.

**SEE ALL OF OUR PRODUCTS ON THE
WEB AT:
www.metrosonics.com**

Chapter 2

GETTING STARTED

Refer to the following diagram for push button control, and for connecting the microphone and RS-232 cable.



Pushbuttons

The db-3100 Noise Monitor has three pushbuttons, which are used to control all unit operations. Pressing these buttons individually or in groups allows you to perform various functions.

When pressed individually, the functions of the three pushbuttons are:

- 1 Turn the unit on and off
- 2 Start and stop logging
- 3 Start an output report

When pressed in groups, the following functions are implemented:

- 1 & 2 Enter the calibrate mode
- 1 & 3 View test statistics
- 2 & 3 Enter secure mode
- 1, 2 & 3 Clear all data

I/O Connector

One connector accommodates both the microphone input and the RS-232 output. The db-3100 senses the presence of the microphone and displays the message **Err** whenever the microphone is not connected.

NOTE: The db-3101 does NOT detect loss of microphone.

DISPLAY ABBREVIATIONS

A liquid crystal display (LCD) is used for viewing sound level, other test statistics, and operating modes.

Displayed Test Statistics

The following is a list of abbreviations used to display test statistics accessible by pressing buttons 1 & 3 (see "View Test Statistics" in Chapter 3):

<u>Display</u>	<u>Statistic</u>
SPL	Sound Pressure Level
dur	Test Duration
LA	Lav
80A	Lav with 80 dB Cutoff
90A	Lav with 90 dB Cutoff
8A	TWA (Time Weighted Average)
8A1	TWA with 80 dB Cutoff
8A2	TWA with 90 dB Cutoff
LH	Lmax
LP	Lpeak
80d	% Dose with 80 dB Cutoff
80E	Exposure in Pa ² h with 80 dB Cutoff
80P	Projected Dose with 80 dB Cutoff (in % dose or Pa ² h)
90d	% Dose with 90 dB Cutoff

<u>Display</u>	<u>Statistic</u>
90E	Exposure in Pa ² h with 90 dB Cutoff
90P	Projected Dose with 90 dB Cutoff (in % dose or Pa ² h)
HI	Dose or Projected Dose \geq 200% or 200 Pa ² h

NOTE: See Appendix A in this manual for definitions of noise terms and measurements.

Displayed Operating Messages

The following is a list of abbreviations for various messages displayed during instrument operation:

<u>Display</u>	<u>Message</u>
CAL	Calibrate Mode
-CAL	Unit is not Calibrated
Pcl	Post Calibrate Mode
bl	Baseline
dr	Doubling Rate (Exchange Rate)
A	A weighting
C	C weighting
S	Slow Detector Response
F	Fast Detector Response
clr	Data has been Cleared
Err	Error (loss of microphone)

<u>Display</u>	<u>Message</u>
→	Logging in Progress
- - -	Logger is in Secure Mode
- - -	Enter the 3-digit Secure Code
nr	No RAM (Out of Memory)
nd	No Data has been Recorded
OP	Report Output in Progress
P	Logger has been Programmed
PL	Programming Lost
Srd	Scheduled Run Disabled
flashing .	Low Battery (less than 8 hours of operation remain)
LB	Low Battery Shutdown

BATTERY

The db-3100 Noise Monitor is powered by a single 9 volt alkaline battery (NEDA 1604A). Typical battery life of the db-3100 is 30 hours (at 25°C).

See the battery replacement procedure for instructions on installing a fresh battery.

When the battery becomes low and cannot power the db-3100 for 8 hours of operation, the decimal point in the display will begin to flash. If the battery voltage drops too low, the db-3100 will display **LB** and shut-down all circuits except data memory, programming information and the time clock. All information will be maintained for approximately 30 days, but prompt replacement of the battery is recommended.

If the battery completely loses power or is removed for more than 20 seconds, the unit will shut down, all logged data will be lost, and the programming information will default to the factory settings. If this occurs, you **MUST** use either the programming disk or ms-3100 Metrosoft to reset the time clock and reprogram the noise monitor for your own settings.

NOTE: The db-3100 draws power from the battery in order to maintain the clock and store programming information in memory.

NOTE: If the unit will not be used for an extended period of time, the battery should be removed. A new battery should be installed when the unit is used again.

Battery Replacement

The procedure for replacing the battery is very simple and can easily be performed within seconds. The db-3100 will maintain its programming information and logged data during battery replacement, provided that the replacement procedure **DOES NOT** take more than 20 seconds.

The db-3100 **MUST** be turned off before removing the bottom end-cap. If the db-3100 is turned on when the battery is removed, all programming and logged data may be lost.

Follow these instructions for battery replacement (be sure you have a fresh battery ready before beginning this procedure):

1. Turn the db-3100 off by pressing button 1.
2. With the label side of the unit facing the ceiling, loosen the bottom end-cap by turning the phillips (cross) head screw, and then turn the end-cap 90 degrees, so there is room for the battery to slide out.
3. Tilt the unit towards you and the old battery will slide out.

4. Slide the fresh battery, terminals first, into the battery compartment with the + and - terminals matching the diagram on the back label of the unit. **The battery must be installed in less than 20 seconds to prevent possible data loss.**
5. Return the end-cap to the original position and tighten the screw. If the end-cap is not seated correctly or the screw is not tightened correctly, the db-3100 will **NOT** be watertight.

CONNECTING THE MICROPHONE

Before you begin displaying and recording data, you will need to connect the microphone to the db-3100 Noise Monitor. You will also need to calibrate the microphone to assure accurate readings (see "Calibration" in next section).

One connector accommodates both the microphone input and the RS-232 output. The db-3100 automatically senses the presence of the microphone. Any time the unit is turned on and the microphone is not connected, the message **Err** will be displayed. Removing the microphone while recording is in progress will interrupt the recording session.

NOTE: The db-3101 does NOT detect loss of microphone.

Follow these instructions to connect the microphone to the db-3100:

1. Hold the db-3100 with the display facing you.
2. Line up the small black button on the microphone's 5 pin connector with the indentation in the outside ring of the I/O connector hole on the db-3100, and then press the connector into the hole so that it is secure.
3. To disconnect the microphone, press the small black button, and then pull the 5-pin connector straight out of the input hole.

Follow these instructions to connect the microphone to the db-3101:

1. Hold the db-3101 with the display facing you.
2. Line up the red dot on the microphone's connector with the red line on the outside ring of the I/O connector hole on the db-3101, and then press the connector straight into the hole so that it is secure.
3. To disconnect the microphone, grasp the microphone connector and pull firmly straight up.

CALIBRATION & POST CALIBRATION

The microphone needs to be calibrated to assure accurate readings. We recommend calibrating and post calibrating the microphone for each recording session for complete records and data integrity.

To calibrate the microphone, you will need Metrosonics cl-304 Acoustical Calibrator.

Follow these instructions to calibrate and post calibrate the microphone:

1. Connect the microphone cable to the db-3100 Noise Monitor.
2. Insert the microphone into the hole on the top of a cl-304 calibrator.

3. Turn the db-3100 Noise Monitor on by pressing button 1.
4. Turn the calibrator on by pressing and releasing the button on the bottom of the calibrator.
5. Press and release buttons 1 & 2 simultaneously on the db-3100. Either **CAL** (calibration) or **Pcl** (post calibration) will be displayed to indicate you are in calibrate mode, and then the present noise level detected (typically +102.0) will be displayed.
6. Press and release buttons 1 & 2 again to calibrate the unit. The baseline of the instrument (typically 41.2) will be displayed, the calibration will be performed, and then **SPL** followed by the current sound level (typically +102.0) will be displayed.

NOTE: A calibration is not actually performed when post calibrating. This is simply a verification step to insure data integrity.

7. Turn off the calibrator by pressing and releasing the button on the bottom of the calibrator again.
8. Remove the microphone from the calibrator by pulling it straight out of the hole.

NOTE: If you wish to exit the calibrate mode, without performing a calibration, simply press button 1 after +102 is displayed (step 5 above).

db-3100 SETUP

The db-3100 comes to you factory programmed for common test conditions, allowing immediate operation. The applicable settings (response rate, filter, exchange rate, cutoffs, ceiling, dose criterion level and dose criterion length) are set for current OSHA settings.

You can change test settings by using either the Programming Disk or ms-3100 Metrosoft (see Chapter 4 in this manual for information on how to use the programming disk, OR see the programming section in Chapter 4 of the ms-3100 Metrosoft Manual).

Default Settings

The following is a list of the db-3100 Noise Monitor default settings programmed at Metrosonics factory:

Scheduled Run Status:	Off
Program Security Code:	No
Statistics to Display:	Lav (no cutoff)
	Lav (cutoff #1)
	Lav (cutoff #2)
	TWA (no cutoff)
	TWA (cutoff #1)
	TWA (cutoff #2)
	Lmax
	Lpk

	Dose (cutoff #1)
	Proj. Dose (cutoff #1)
	Dose (cutoff #2)
	Proj. Dose (cutoff #2)
Printer Baud Rate:	1200
Report Type:	Complete (includes overall statistics, time history & amplitude distrib.)
Save Individual Test Data:	No
Response Rate:	Slow
Filter:	A weight
Exchange Rate:	5 dB
Display Dose in Pa ² h:	No
Cutoffs:	80 dB & 90 dB
Ceiling:	115 dB
Dose Criterion Level:	90 dB
Dose Criterion Length:	8 hours
Logging Mode:	Continuous
Period Length:	1 minute
Statistics Saved:	Lav (cutoff #1)
	Lmax
	Lpk
	Ln's (10.0% & 99.9%)
	Amplitude Dist. (0.0%, 10.0%, 50.0% & 99.9%)

REAL TIME CLOCK

The date and time are NOT programmed into the db-3100 at the factory. If you want to record data with real time stamp, you **MUST** use either the Programming Disk or ms-3100 Metrosoft to set the real time clock. The real time clock of the db-3100 is automatically set to the current time at your computer when the db-3100 is programmed. Since the db-3100 retains all programming information, including the real time clock setting, this step only needs to be done once. See Chapter 4 in this manual for information on programming the db-3100.

NOTE: If the battery completely loses power or is removed for more than 20 seconds, you will need to reprogram the db-3100 to reset the real time clock.

Chapter 3

db-3100 OPERATION

The instructions in this chapter assume you have reviewed Chapter 2 in this manual. If you have not reviewed Chapter 2, you should do so at this time.

These instructions also assume that you have followed the instructions in Chapter 2 and you have installed a battery, plugged in the microphone and performed the calibration procedure. If you have not done this yet, you should do so at this time.

Refer to the db-3100 diagram and display abbreviations in Chapter 2 when following the instructions in this chapter.

TURN THE db-3100 ON & OFF

1. Press and release button 1. The db-3100 will turn on & alternately display **SPL** followed by the current sound level detected.
2. Press and release button 1 again to turn off the db-3100.

NOTE: The unit may **NOT** be turned off when it is logging. This is to prevent accidentally terminating a test. See "Start & Stop Logging" later in this section.

The message **PL** followed by **-CAL** will be displayed when the unit is turned on, if any of the following conditions exist:

- The db-3100 has not yet been calibrated
- The battery has been removed for longer than the allowable replacement time
- The battery has completely lost power
- The db-3100 has been cold started

This is to tell you that programming information has been lost (the unit will be setup for the factory defaults) and the unit requires calibration for further operation. If this occurs, see Chapter 2 for calibration instructions and see Chapter 4 for reprogramming instructions.

START & STOP LOGGING

1. Turn the db-3100 on.
2. Press and release button 2 to start logging. A small arrow will appear in the upper left corner of the display to indicate that logging is in process.
3. Press and release button 2 again to terminate logging. The arrow will disappear.

Standby

The db-3100 can record more than one test. When button 2 is pressed to terminate logging, the logger is actually in a standby mode. If you wish to begin another test, simply press button 2 again and the db-3100 will begin logging the next test. You may start and stop logging tests as many times as you like.

NOTE: The db-3100 may be programmed to save all tests recorded in one datafile, or to save each test recorded in a separate datafile. See Chapter 4 for information on this programming choice.

VIEW TEST STATISTICS

1. Turn the db-3100 on and record some test data.
2. Press and release buttons 1 & 3 repeatedly to scroll through recorded overall test statistics. Follow a through n for step by step instructions for scrolling through the test statistics:
 - a. Press and release buttons 1 & 3. The db-3100 will alternately display **dur** followed by the duration of the test, in hours and minutes.
 - b. Press and release buttons 1 & 3 again. The db-3100 will alternately display **LA** followed by the value for Lav with no cutoff applied.
 - c. Press and release buttons 1 & 3 again. The db-3100 will alternately display **80A** followed by the value for Lav with an 80 dB cutoff.
 - d. Press and release buttons 1 & 3 again. The db-3100 will alternately display **90A** followed by the value for Lav with a 90 dB cutoff.
 - e. Press and release buttons 1 & 3 again. The db-3100 will alternately display **8A** followed by the value for the Time Weighted Average (TWA) with no cutoff applied.
 - f. Press and release buttons 1 & 3 again. The db-3100 will alternately display **8A1** followed by the value for the TWA with an 80 dB cutoff.

- g. Press and release buttons 1 & 3 again. The db-3100 will alternately display **8A2** followed by the value for the TWA with a 90 dB cutoff.
- h. Press and release buttons 1 & 3 again. The db-3100 will alternately display **LH** followed by the value for Lmax.
- i. Press and release buttons 1 & 3 again. The db-3100 will alternately display **LP** followed by the value for Lpeak.
- j. Press and release buttons 1 & 3 again. The db-3100 will alternately display either **80d** or **80E** followed by the sound exposure value with an 80 dB cutoff (either in % dose or Pa²h).
- k. Press and release buttons 1 & 3 again. The db-3100 will alternately display **80P** followed by the projected dose value with an 80 dB cutoff (either in % dose or Pa²h).
- l. Press and release buttons 1 & 3 again. The db-3100 will alternately display **90d** followed by the sound exposure value with a 90 dB cutoff (for % dose only).
- m. Press and release buttons 1 & 3 again. The db-3100 will alternately display **90P** followed by the projected dose value with a 90 dB cutoff (for % dose only).

- n. Press and release buttons 1 & 3 again. The db-3100 will return to alternately displaying **SPL** followed by the current sound level.
3. If you wish to return to displaying the current sound level (SPL) before you have scrolled through all of the test statistics, simply press button 1.

NOTE: If the db-3100 is programmed to display exposure in Pa²h, dose and projected dose will **ONLY** be calculated for **ONE** cutoff level.

NOTE: If you select cutoff levels other than 80 dB and 90 dB, dose and projected dose will be calculated for those cutoff levels. In addition, the display abbreviations will be adjusted to reflect the new cutoff levels.

NOTE: You can choose which test statistics you wish the db-3100 to display (see Chapter 4). If you have programmed the db-3100 **NOT** to display some of the statistics listed above they will be skipped.

NOTE: If logging is in progress, the test statistics will be updated in real time and the current readings will be displayed. If logging has been stopped, the displayed test statistics will be for the entire test.

NOTE: If the db-3100 was programmed to save each test in a separate datafile, the test statistics for the most recently recorded test will be displayed. If you have ms-3100 Metrosoft, you can view test statistics from prior tests on your computer. Call Metrosonics Sales Department for more details on ms-3100 Metrosoft at 716-334-7300.

OUTPUT REPORTS

1. After logging is complete, remove the microphone and connect the RS-232 cable to the db-3100 by plugging the 5-pin connector into the I/O connector hole.
2. Connect the other end of the RS-232 cable to the serial port of the printer you will using.
3. Turn the db-3100 and your printer on.
4. Press button 3 and a report will be output.
5. Press button 3 again if you wish to terminate the report output in progress.

The report that is output is typically a complete report, which includes the overall test statistics, time history data, and amplitude distribution information. If desired you may program the db-3100 to output only one of these reports (see Chapter 4).

IMPORTANT: Reports are typically output at 1200 baud. You may program the db-3100 to output reports at 300, 1200 or 4800 baud (see Chapter 4). If your printer does not support 1200 baud, be sure to program the db-3100 for a different baud rate **BEFORE** logging data (see Chapter 4). Once data has been logged, you will need to clear that data before you will be able to reprogram the db-3100.

NOTE: If the db-3100 was programmed to save each test in a separate datafile, the report that is output will be for the most recent test only. We recommend printing a report as recording of each test is completed.

If you have ms-3100 Metrosoft, you can view and print reports from prior tests on your computer. Call Metrosonics Sales Department for more details on ms-3100 Metrosoft at 716-334-7300.

VIEW LOGGER SETUP INFORMATION

1. Turn the db-3100 on.
2. Press and hold buttons 1 & 2 to view the current setup of the db-3100. The db-3100 will scroll through the following information:
 - a. Either the **CAL** or **Pcl** message
 - b. **bl** followed the instrument baseline
 - c. **dr** followed by the programmed doubling rate (exchange rate)
 - d. Either **A** (weighting) or **C** (weighting) with either **S** (Slow response) or **F** (Fast response)
3. Continuing to hold buttons 1 & 2 if you wish to scroll through the setup information again.
4. Release the buttons and you will be in calibrate mode.
5. Press button 1 to return to displaying the current sound level (SPL).

CLEAR TEST DATA

Clearing data erases ALL previously recorded data from the db-3100. Follow these instructions to clear the data:

1. Turn the db-3100 on.
2. Press and hold buttons 1, 2 & 3. The display will count to 9 and then the message **clr** will appear to indicate that the data has been cleared.
3. Release the buttons BEFORE the display counts to 9 and the data will NOT be erased.

SECURE MODE

There are three different ways to use the Secure Mode Feature on the db-3100:

- I) Manually, by using the buttons on the db-3100, without the use of a security code.
- II) Manually, by using the buttons on the db-3100, to program a security code and then enable/disable secure mode
- III) From your computer, using Metrosoft to program a security code and then using the button on the db-3100 to enable/disable secure mode.

NOTE: When secure mode is enabled, the display will show three dashes - - - and you CANNOT perform any functions at the db-3100, other than disabling secure mode.

Follow these instructions to use the Secure Mode feature as desired:

IMPORTANT: To use the Secure Mode feature, the db-3100 MUST either be datalogging or have a scheduled run pending.

Method I: Enabling/Disabling Secure Mode Manually, Without the Use of a Security Code

1. On the db-3100, press and release buttons 2 and 3 simultaneously. Three dashes - - - will appear on the display and the unit will enter secure mode. To disable secure mode, press and hold buttons 2 and 3 again, for about 5 seconds (until the three dashes are replaced with the SPL).

Method II: Programming a Security Code and Enabling/Disabling Secure Mode Manually, Using the Buttons on the db-3100

1. To program a security code and enable Secure Mode, on the db-3100, press and hold buttons 2 and 3 until the three dashes are replaced with 9 dashes.
2. Press any three buttons, one at a time, to enter the desired security code. This will be the code that **MUST** be used to enable/disable secure mode.

Once the third button has been pressed, the display will show the security code for a few seconds and then display three dashes. The unit is now in secure mode.

3. When you wish to disable secure mode, press and hold buttons 2 and 3 again, until the display changes from three dashes to nine dashes. Then, enter the security code by pressing the buttons in the exact sequence used to enable secure mode (step 2 above).

If the correct code was entered, the db-3100 will disable secure mode and return to displaying SPL.

If an incorrect code was entered, the db-3100 will remain in secure mode and the three dashes will be displayed.

Method III: Using Metrosoft to Program a Security Code and then Using the Buttons on the db-3100 to Enable/Disable Secure Mode

1. Start ms-3100 Metrosoft on your computer.
2. Press F5 (Create New Logger Programming File) in the Main Menu and the Logger Setup Form will appear on your screen.
3. Move to the Program Security Code field and select yes.
4. Move to the Security Code field and enter your 3-digit security code. This can be the numbers 1, 2 and/or 3, in any sequence.
5. Reprogram the db-3100.

6. To enable Secure Mode, while datalogging is in progress or a scheduled run is pending, press buttons 2 and 3 on the db-3100. Three dashes will be displayed and Secure Mode will be enabled.
7. When you wish to disable secure mode, press and hold buttons 2 and 3 again, until the display changes from three dashes to nine dashes. Then, enter the security code that was programmed from Metrosoft, by pressing the buttons on the db-3100.

If the correct code was entered, the db-3100 will disable secure mode and return to displaying SPL.

If an incorrect code was entered, the db-3100 will remain in secure mode and the three dashes will be displayed.

Chapter 4

PROGRAMMING DISK (ms-3100P)

The ms-3100P Programming Disk allows you to program the db-3100 with your own test settings. As an option ms-3100 Metrosoft is available. In addition to programming the db-3100, this enhanced software program allows you to perform data retrieval, create graphs & reports, perform projection studies, search your data base, and more! Call Metrosonics Sales Department for more information (716) 334-7300.

The Programming Disk contains a sample datafile, which allows you to see the database, report generation and graphing capabilities offered in ms-3100 Metrosoft. See "ms-3100 Metrosoft Features" later in this chapter for more information.

NOTE: ms-3100P was formerly called ms-935P

IMPORTANT: Register your Noise Monitor(s) and Programming Disk NOW and receive the first year of Programming Disk upgrades FREE. Either fill out the enclosed card or see "Warranty Registration" later in this chapter for quick instruction on using the on-line warranty card to register your products.

STARTING THE PROGRAMMING DISK

1. Boot MS-DOS Version 3.0 or higher.
2. Insert the Programming Disk into the floppy drive.
3. Type the following command:

M<Enter>

The Metrosonics Logo will appear followed by the Main Menu. If you press any key while the logo is on the screen the Main Menu will appear faster.

NOTE: If desired, you may copy the Programming Disk into a directory on your hard drive. Then, to start the Programming Disk, simply change to the directory and then type M<Enter>.

SETTING UP THE PROGRAMMING DISK FOR YOUR COMPUTER

Press F2 (Configure Metrosoft) in the Main Menu, and the Configure Metrosoft Form will appear.

This form allows you to set up the Programming Disk for the type of computer system you have. This step **MUST** be performed the first time you use the Programming Disk to make sure that the software knows what kind of hardware setup you have.

Since the software saves the setup until you change it, you do not have to repeat this step unless a change is desired or if you are using a different COM port, disk drive, or directory name.

Use the following instructions to fill in the Configure Metrosoft Form:

- Press ↓ or <Enter> to move to the next field
- Press ↑ to move to the previous field
- Press → or ← to scroll through choices for a field
- Type information for fields that do not offer choices when → or ← are pressed
- Press F2 to save the setup
- Press F3 for Warranty Registration
- Press F10 to return to the Main Menu

NOTE: If you press F10 without saving the setup, the software will remember your changes until you exit the program. Once you exit the software program, the Configure Metrosoft Form will automatically revert to the last saved setup.

The following list provides information on each selection in the Configure Metrosoft Form:

Logger Communications Port

This is the serial port that will be used when sending information and commands from the computer to the db-3100 Noise Monitor. You may select either COM1 or COM2.

Baud Rate

This is the baud rate that will be used when communicating with the db-3100. This setting should be left on 4800 baud, as this is the rate always used by the db-3100.

Disk Drive For Recorded Data

This tells the software which disk drive you will be using to store Logger Setup Files. You may enter any letter from A to Z. Generally A and B are floppy drives, and C is the hard disk.

Directory

This tells the software which subdirectory you will be using to store Logger Setup Files.

When typing the directory name DO NOT type in the disk drive. Metrosoft will bracket (\...\) the name if necessary. Invalid subdirectory name characters (spaces, periods, and some special symbols) are beeped.

If you do not have a subdirectory, leave this field blank.

NOTE: Metrosoft does NOT create the subdirectory for you. You must do so from the operating system. If you are using a hard drive, we recommend that you create a subdirectory for Logger Setup Files (see your DOS manual for details on creating subdirectories).

Monitor Type

This field is used to select the type of monitor (video display terminal) used on your computer. You may select either monochrome or color.

Fields for Datafiles Only

Several fields in the Configure Metrosoft Form are only needed for retrieving and viewing datafiles. These fields must be properly selected for viewing the sample datafile included on the Programming Disk.

The following lists the field names that are only necessary for reviewing the sample datafile:

- Plotter Type (serial)
- Plotter Port
- Plotter/Serial Printer Baud
- Printer Type
- Printer Port
- Displayed File Listing Format
- Dose in Pa²h (w/Leq only)
- All Graphing Options fields (Resolution, Line Types, Draw Grid Lines, Limit Line, Scaling, Manual Range and Parameters to Graph)
- All Search Criteria fields

WARRANTY REGISTRATION

Register your Noise Monitor and Programming Disk and receive the first year of Programming Disk software upgrades FREE. Simply follow this set of quick instructions to use our on-line warranty card:

1. Press F2 (Configure Metrosoft) in the Main Menu and the Configure Metrosoft Form will appear.
2. Press F3 (Register Warranty) and the Warranty Registration Form will appear on your screen.
3. Press ↑, ↓ or <Enter> to move from field to field and type the appropriate information into the form.
4. When the form is complete, press F2 to print the form, and then mail it to: Metrosonics, Inc., P.O. Box 23075, Rochester, NY 14692.
5. Press F10 to exit the Warranty Registration Form and return to the Configure Metrosoft Form.
6. Press F10 again to return to the Main Menu.

VERIFY COMMUNICATION

Before programming the db-3100 Noise Monitor, we recommend that you verify that the computer is properly hooked up and communicating with the db-3100.

Follow these steps to verify communication with the db-3100:

1. Check the Configure Metrosoft Form to make sure that the Programming Disk is configured for the correct serial port (COM1 or COM2) and baud rate (4800).
2. Press F6 (Verify Logger Communication) in the Main Menu. Instructions will appear on your screen:
 - a. Turn the db-3100 on by pressing button 1.
 - b. Connect the RS-232 cable from the db-3100 to the computer's serial port.
 - c. Press <Enter>.

If the computer is properly communicating with the db-3100, the message "Communication Established" will appear.

If communication fails, a message will appear on the screen, with a list of instructions. If you get this message, check each of the items on the list and try communicating again.

NOTE: The RS-232 cable may have a two-position slide switch at the 25-pin serial connector. If so, the switch must be correctly positioned to communicate with the db-3100 Noise Monitor. If unable to communicate, move the switch to the other position.

PROGRAMMING THE db-3100

The db-3100 Noise Monitor comes to you factory programmed for our default settings. If you wish to create your own settings for collecting data, you will need to create Logger Setup Files.

Logger Setup Files can be created within seconds. Metrosonics software uses fill-in-the-form programming. This means all you have to do is "fill in a form" by choosing the settings you want for a given test. This information is then sent to the db-3100 and the test is run. It's that easy!

Follow these steps to program the db-3100:

1. Press F5 (Create A New Logger Setup File) in the Main Menu and the Logger Setup Form will appear on your screen. The applicable settings (response rate, filter, exchange rate, cutoffs, ceiling, dose criterion level and dose criterion length) in this screen are set for current OSHA requirements. You can make selections for each field on this form to create whatever test settings you need.
2. Make selections for each field on this form to create whatever settings you need.
3. Press F3 (Program Logger)
4. Connect the db-3100 to the computer's serial port.

5. Turn the db-3100 on by pressing Button 1.
6. Press <Enter>. When logger programming is complete, the message "The Logger Has Been Programmed" will appear on your screen.

NOTE: Since the db-3100 Noise Monitor remembers the last test setup sent to it, you do not need to reprogram the db-3100 unless a change is required or if the battery loses power or is removed.

Use the following commands to make selections in the Logger Setup Form:

- Press ↓ or <Enter> to move to the next field
- Press ↑ to move to the previous field
- Press → or ← to scroll through choices for a field
- Type information in fields that do not offer choices when → and ← are pressed
- Press F2 to save the Logger Setup File for future use
- Press F3 to program the db-3100 with the current setup
- Press F10 to return to the Main Menu (you will be asked if you are sure you want to exit logger programming - answer "Y" for yes)

The following list provides information on each selection in the Logger Setup Form:

Scheduled Run

You can program the db-3100 to automatically turn on and begin recording at a specific date and time, and then stop recording after a certain length of time. This is called a scheduled run. This allows you to program the db-3100 in advance and then run a test without actually being there.

Follow these steps to set up a scheduled run:

1. Select on for the scheduled run status field. Notice that the fields below light up when the scheduled run is activated.
2. Enter the date you want the test to begin in the scheduled run date field.
3. Enter the time you want the test to begin in the scheduled run time field.
4. Enter the amount of time you want the test to run for in the scheduled run length field.

Program Security Code

The db-3100 allows you to turn on a secure mode by pressing and holding down buttons 2 and 3 simultaneously.

While in secure mode, the noise monitor will continue to record; however, it will not permit anyone to stop logging, view statistics, clear data or print reports unless the secure mode is turned off.

For an extra degree of security, you may enter a 3 digit code into this field in the software. To do this, you must first select yes for the program security code field. Then you may enter the numbers 1, 2 and/or 3 in any sequence into the security code field.

When a code is programmed into the db-3100, the person operating the db-3100 must know this code in order to use secure mode. The code is entered into the db-3100 by pressing buttons 1, 2 and/or 3 in the exact sequence the code was been entered in the software.

NOTE: See the Secure Mode Section in Chapter 3 of this manual for more details.

Statistics to Display

The db-3100 always COMPUTES the Time Weighted Average (TWA), average sound level (Lav), maximum sound level (Lmax), peak sound level (Lpk), and noise dose for the entire test. You may choose whether or not you wish to VIEW any of these test statistics on the db-3100 display.

To select the statistics to display, simply move to each statistic field, and select either yes or no.

Printer Baud Rate

This selection allows you to determine the baud rate at which reports will be printed when outputting from the db-3100 to a serial printer.

You may select 300, 1200 or 4800 baud.

Report Type

This selection allows you to determine which type of report will be printed. You may select a complete report, amplitude distribution report or time history report.

Generally a complete report is selected, which includes both the amplitude distribution and the time history of all data recorded. If desired, only the amplitude distribution or the time history may be output.

NOTE: If you are saving individual test data, and you are NOT saving amplitude distribution data this field is not accessible. In this case, the overall statistics and time history reports will be output to your printer.

Save Individual Test Data

During a recording session, each time logging is manually started and stopped a new test is started. You can choose to save all tests from the recording session in one datafile, OR you can save each test from the recording session as an individual datafile.

If you choose to save all tests in one datafile, the db-3100 will combine the data of all tests from a given recording session when storing the overall statistics and amplitude distribution data, and all time history data will be stored in one report.

If you choose to save each test as an individual datafile, the following information will be stored separately for each test:

- Overall Statistics (Lav, TWA, Lmax, Lpk, & noise dose)
- Time History
- Amplitude Distribution (if applicable)

Notice that if you choose to save individual test data, the choice to save amplitude distribution data is automatically set to no. This is to conserve memory (storing amplitude distribution data for each test can use a large amount of the db-3100's memory). If you wish to save amplitude distribution data for each test, you MUST move to that field and select yes (see "Save Amplitude Distribution (A/D)" later in this section).

Response Rate

The response rate determines how often the db-3100 takes samples of data. Test statistics (Lav, Lmax, etc.) are updated every time a sample is taken.

You may select either a Slow or a Fast response rate. Typical occupational and environmental noise regulations require a Slow response rate.

Filter

This field allows you to choose the type of filter required for your testing needs. You may select either A weight or C weight. Typical occupational noise regulations require an A-weighted filter.

Exchange Rate

This field allows you to choose the exchange rate required for your testing needs. You may select 3, 4, 5 or 6 dB . OSHA requires an exchange rate of 5 dB; saving data in Pa²h requires an exchange rate of 3 dB.

Display Dose in Pascal Squared Hours

You can select to have noise exposure computed either in % dose OR in Pa²h (Pascal Squared Hours). Noise exposure is automatically computed in % dose unless you program the db-3100 to compute noise exposure in Pa²h.

When Pa²h is selected, Metrosoft uses the following equation to convert from % dose to Pa²h:

$$\text{Pa}^2\text{h} = [p_0^2 (\text{Tc}/100) 10^{\text{Lc}/10}] \times \% \text{ dose}$$

where:

$$p_0 = 0.00002$$

Tc = dose criterion time (typically 8 hours)

Lc = dose criterion level (typically 90 dB)

% dose = percent dose or projected dose
(from 0% to 10000%)

NOTE: Unlike % dose, Pa²h is computed using ONLY the first cutoff level.

Cutoffs

This field allows you to select the cutoffs required for your testing needs. You may enter two individual cutoff levels, and they may be any value between 40 and 140 dB (OSHA requires cutoff levels of 80 and 90 dB).

NOTE: When computing noise exposure is Pa²h, only the first cutoff is used.

Ceiling

This selection allows you to enter a noise level, and the db-3100 will record the total amount of time the noise exposure was above this level. This makes it possible to quickly determine if a possible violation existed. You may enter any value from 40 to 140 dB.

Dose Criterion Level

The dose criterion level (permissible exposure level) is the average sound level at which the dose criterion length (in hours) represents 100% noise dose for a given regulation. The db-3100 will calculate the % dose based on the actual exposure, the criterion level and the criterion length selected.

You may enter any value from 60 to 100 dB for the dose criterion level.

Dose Criterion Length

The dose criterion length allows you to set up the db-3100 to calculate dose based on a permissible exposure duration (length) set by a regulatory agency. You may select either 4, 6, 8, 10, 12, 16 or 18 hours for this field. For ANY workshift length, OSHA requires a criterion length of 8 hours.

Time History Logging Mode

The db-3100 may be programmed to record one interval of time history data and then stop recording (single mode), OR to continuously log sequential time history intervals (as is the usual mode of operation).

Single mode is generally used for point to point survey applications, while continuous mode allows you to record numerous intervals of time history data for greater detail.

Time History Period Length

The time history period length determines how often the db-3100 will store data values in memory. If, for example, you chose a time history period length of one minute, the noise monitor would store the average, maximum, peak and/or Ln values for each minute.

A shorter time history period length will provide more detailed time history data, which will appear in your reports. A longer time history period length requires less memory, thereby offering longer logging sessions.

You may enter any length from 0:00:01 to 23:59:59. **If all zeroes (0:00:00) are entered, the db-3100 will not maintain time history.**

Time History Statistics to Save

You may choose whether you wish to store average, maximum, peak and/or Ln values. These values are called time history statistics. The statistics you choose are stored in the db-3100's memory for each time history period. This allows you to save memory for longer recording sessions.

Save Amplitude Distribution (A/D)

The db-3100 automatically saves amplitude distribution data unless you are saving individual test data (see Save Individual Test Data earlier in this section). When saving individual test data, you may choose whether or not you wish to save amplitude distribution data. You will NOT be able to access this field if you are not saving individual test data.

NOTE: Choosing to save amplitude distribution data for individual tests uses up a large amount of memory, thereby limiting the recording capacity of the db-3100.

A/D Ln's (Amplitude Distribution Ln's)

These fields allow you to enter values which will be used to calculate Ln's from the amplitude distribution data for a test.

For example if 10% is selected as one of the Ln values, the sound level during 10% of the test will be calculated for you.

You may enter any 4 values from 0 to 99.9%.

Saving Setup Files

After filling in the Logger Setup Form, you may save the setup on disk for future use. The files created are called Logger Setup Files. This allows you to recall a specific test setup and quickly program additional db-3100 Noise Monitors in precisely the same way. Valuable time is saved because you don't have to remember the settings or recreate them every time you need to program a noise monitor. You can create as many Logger Setup Files as you require and recall them as needed.

Follow these instructions to save a Logger Setup File:

1. Fill in the Logger Setup Form as needed.
2. Press F2 (Save Setup).
3. You will be prompted to enter a filename without an extension (the software automatically gives the file the extension .CFG). Enter up to 8 characters and press <Enter>.

The Logger Setup File is saved on the data drive and directory that you specified when you filled in the Configure Metrosoft Form.

NOTE: If you enter a filename that already exists, you may either overwrite it or enter a different filename.

Sending Test Setup Information To The db-3100

There are two ways to program the db-3100. You can either create a new Logger Setup File and immediately send it to the db-3100, or you can retrieve a saved Logger Setup File and send it to the db-3100.

NOTE: You must clear all data from the db-3100's memory before you can program it for a new test.

NOTE: The following features are not available in db-3100 Noise Monitors which are version 1.4 and lower:

- Save Individual Test Data
- Display Dose in Pa²h

If you try to program a db-3100 that is not version 1.5 or higher with either of these features, the software will automatically disable the feature(s), program the db-3100, and then display a message telling you that this has been done.

Real Time Clock

Whenever the db-3100 is programmed, Metrosoft automatically sets the real time clock (RTC) of the db-3100 to the current time at your computer. Make sure that your computer's clock has been set to the correct time before programming the db-3100.

Create & Send A New Logger Setup File

Follow these instructions to create a new Logger Setup File and immediately send it to the db-3100:

1. Fill in the Logger Setup Form.
2. Press F3 (Program Logger). Instructions will appear on your screen:
 - a. Connect the RS-232 cable from the db-3100 to the computer's serial port.
 - b. Turn the db-3100 on by pressing button 1.
 - c. Press <Enter>.

When logger programming is complete the message "The Logger Has Been Programmed" will appear on your screen.

Retrieve & Send A Saved Logger Setup File

Follow these instructions to retrieve a saved Logger Setup File and send it to the db-3100:

1. Press F4 (View Stored Logger Setup Files) in the Main Menu. A screen will appear listing your saved setup files.
2. Press ↑, ↓, → or ← to select the file you want to retrieve.
3. Press F2 to view the file. The completed Logger Setup Form for this file will appear on the screen so you can review the settings.

4. If you wish to see another file, press F10 to return to the listing of your saved Logger Setup Files, select the desired file and press F2 to view it.
5. Press F3 (Program Logger). Instructions will appear on your screen:
 - a. Connect the RS-232 cable from the db-3100 to the computer's serial port.
 - b. Turn the db-3100 on by pressing button 1.
 - c. Press <Enter>.

When logger programming is complete the message "The Logger Has Been Programmed" will appear on your screen.

Clear Logged Data

If there is recorded data in the db-3100's memory, the message "Data Has Been Logged! Clear Logged Data (Y/N)?" will appear on your screen when attempting to program the db-3100. Type Y (yes) to clear the data. You will be asked if you are sure. Type Y (yes) again and the data will be cleared and the db-3100 will be programmed. You will then see the message "The Logger Has Been Programmed".

Deleting A Saved Logger Setup File

You may remove Logger Setup Files that you no longer need.

Follow these instructions to delete Logger Setup Files:

1. Press F4 (View Stored Logger Setup Files) in the Main Menu. A listing of your saved setup files will be displayed.
2. Press \uparrow , \downarrow , \rightarrow or \leftarrow to select the file you want to delete.
3. Press F3 to delete the file. You will be asked to verify that you want to delete this file. You must type in Y (yes) to delete the file.

EXIT PROGRAMMING DISK

Exiting from the Programming Disk is very easy. Simply use these commands to exit a function, return to the Main Menu or exit the Programming Disk and return to DOS:

- 1 Press F10 to exit from a menu or screen and return to the previous screen and then continue to press F10 until you reach the desired Metrosoft screen OR hold down the <Ctrl> key and press F10 to go directly to the Main Menu.
2. Press F10 while at the Main Menu to exit the Programming Disk and return to DOS. You will be asked to verify that you wish to exit. Press Y (yes) to exit or press N (no) to redisplay the Main Menu.

ms-3100 METROSOFT FEATURES

The Programming Disk comes with a sample datafile, which allows you to try some of the powerful features that are available ONLY with ms-3100 Metrosoft. This includes database searching and creating graphs and reports. These functions can be accessed by pressing F3 (View Stored Test Results) in the Main Menu of the Programming Disk and then following the instructions on the screen. Please take a moment to try these features and see how much time you can save by letting us do your analysis for you.

ms-3100 Metrosoft also allows you to retrieve data from the db-3100 and store it in a database. This function is labeled F7 (Get/View Test Results From Logger) in the Main Menu. The Programming Disk does NOT have the capability to perform data retrieval, and will give a message indicating this, if you press F7.

For more information on ms-3100 Metrosoft, please call Metrosonics Sales Department at (716) 334-7300.

Chapter 5

REMOTE COMMANDS

You can send remote commands to the db-3100 from a terminal or computer. This provides another way for you to clear data, output a formatted report, and program the db-3100 for a test.

To send remote commands, the db-3100 must be turned on and the RS-232 cable must be connected from the terminal's serial port to the db-3100.

In addition, the computer or terminal **MUST** be set to the **SAME** baud rate as the db-3100 (300, 1200 or 4800). When at the correct baud rate, press the **Esc** key a few times from the terminal or computer until the db-3100 responds with an **!**.

The db-3100 responds to the following commands:

ESC	C	Outputs the current setup and prompts the user through a limited programming sequence
ESC	E	Erases all data
ESC	O	Outputs a formatted report

NOTE: Hold down the **Ctrl** key and press **C** to terminate printing a formatted report.

Chapter 6

SPECIFICATIONS

INPUT

db-3100 Microphone: Metrosonics 1/4" pendant microphone, rugged, miniature ceramic type, with 1-meter captive cable

db-3101 Microphone: B&K 2642 preamplifier with 4176 microphone

db-3100 Oper. Range: 40 to 140 dB

db-3101 Oper. Range: 25 to 120 dBA; 28 to 120 dBC

db-3100 Dynamic Range: 100.0 dB

db-3101 Dynamic Range: 95 dBA,; 92 dBC

db-3100 Amplitude Linearity: ± 0.7 dB

db-3101 Amplitude Linearity: ± 0.5 dB

Amplitude Resolution: 0.1 dB

Detector: True RMS

Sample Rate: Slow: 16 samples/sec.; Fast: 64 samples/sec.

Peak Range: 28 dB

db-3100 Applicable Standards: Type 2: ANSI S1.4-1983, ANSI S1.25-1978; IEC 651, IEC 804

db-3101 Applicable Standards: Type 1: ANSI S1.4-1983, S1.25-1978, IEC 651, IEC 804

USER-PROGRAMMABLE PARAMETERS

Frequency Response: A or C weighted

Averaging Response: Slow or Fast

Exchange (Doubling) Rate: 3, 4, 5, 6 dB

Criterion Level: 60 to 100 dB

Dose Period: 4, 6, 8, 10, 12, 16, 18 hours

Exposure Level: % dose or Pa²h

Cutoff (Threshold) Levels: Two, 40 to 140 dBA

Ceiling Level: 40 to 140 dB

Real Time Clock: Date and Time at Computer

Schedule Run: Date, Time, Length

Time History Interval: Hours, Minutes, Seconds

Time History Data Saved: Lavg, Lmax, Lpk, 2 Ln values (either combined for all tests or separate for each individual test)

Security Code: 3-digit

DATA STORAGE

Capacity: 725 intervals if all time history statistics are saved

OPERATING CONTROLS

Push Buttons: 3 sealed

DATA DISPLAY

Display Type: Large 3½ digit LCD display

Display Resolution: 0.1 dB

Display Update: Current sound level updated 4 times per second

DIGITAL COMMUNICATIONS

Interface: 3-wire RS-232C; uses X-on/X-off

Baud Rate: 300, 1200, 4800 formatted; 4800 memory dump

Report Width: 80-column

Format: ASCII, 1 start bit, 8 data bits, 1 stop bit

OUTPUT MODES

Printer: Preformatted data for RS-232C printer or terminal

Memory Dump: Unformatted data to computer

Header: Precedes each formatted report - Identifies logger model, serial number and software version, date and time of report, calibrator information, time and date of last calibration, display range, weighting, exchange rate and averaging response

ENVIRONMENTAL

Operating Temp.: -4 to +140°F (-20 to +60°C)

LCD Working Temp.: +14 to +122°F (-10 to +50°C)

Humidity: To 90% non-condensing. Short term complete water immersion, except microphone

POWER

Battery Type: 9V alkaline, 1604A, primary

Battery Operating Life: At least 25 hours @ 25°C

Data Retention: 30 days

PHYSICAL

Case: Anodized aluminum extrusion

Size: 3.0 x 4.8 x 0.9 inch (7.6 x 12.2 x 2.3 cm)

Weight: 12 oz. (0.3 kg)

Specifications subject to change without notice.

Chapter 7

ACCESSORIES

ba-004	replacement batteries
ca-3025	microphone extension cable, 25 ft.
ca-3095	microphone extension cable, 95 ft.
ca-3100	printer/comp. interface cable (db-3100)
ca-3101	printer/comp. interface cable (db-3101)
cc-303	briefcase (for ek-3100 kit)
cc-304	carrying case (for db-3100)
cc-304H	heavy duty carrying case (db-3100)
cc-306	briefcase (fk-3100A kit)
cc-3100	briefcase (fk-3100B kit)
cl-304	acoustical calibrator, 102 dB
dp-428	battery operated 24-column printer
ma-250	calibrator adaptor for ¼" microphone
ma-500BK	calibrator adaptor for ½" microphone
mk-311	B&K microphone preamp assembly
mk-3100R	pendant microphone
ms-206	clothing clip
ms-3100	Metrosoft software package
mt-3100	tripod w/mounting adapter & boom
sc-3100	storage case (db-3100WA & db-3100MK kits)
tc-3100-5	transit case (fk-3100D & E kits)
ws-307	foam microphone shield

Chapter 8

TROUBLE SHOOTING

In the event that the db-3100 does not appear to operate properly, follow these instructions:

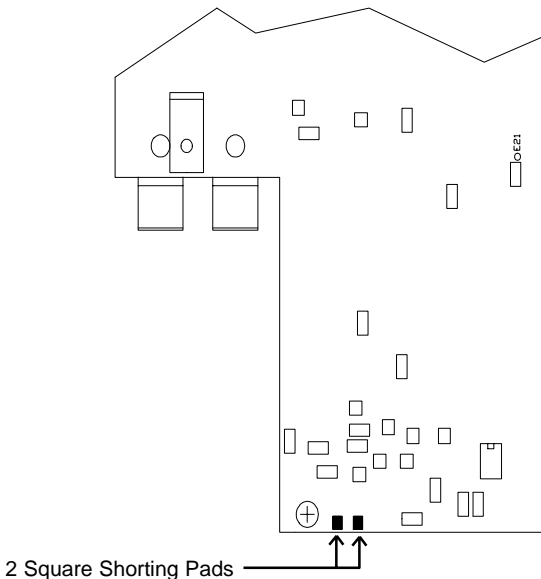
1. Try exiting the secure mode (see Secure Mode in Chapter 3). If this does not correct the problem, proceed to step 2.
2. Replace the battery with a known good battery (see Battery in Chapter 2). If this does not correct the problem, proceed to step 3.
3. Try to request a formatted report from a terminal (see Remote Commands in Chapter 3). If this does not correct the problem, a cold start may be attempted.

COLD START

The cold start should **ONLY** be used as a last resort as all stored data and programming information will be lost.

NOTE: Model # db-3100E units (INIEX approved) do NOT have the cold start feature. This was a requirement of INIEX for the unit to be approved.

Refer to the following diagram of the db-3100 circuit board for cold starting a db-3100:



Follow these instructions to cold start the db-3100:

1. Turn the unit off by pressing button 1.
2. Remove the bottom endcap and the battery (see Battery in Chapter 2).
3. Carefully remove the unit from the case. This is accomplished by holding onto the top endcap and gently sliding the unit straight out of the case.
4. Locate the two small metal square pads (refer to the diagram on the previous page) - they are on the bottom side of the lower printed circuit board just below the round blue component.
5. With a screw driver or other suitable metal object, short these 2 pads together for 10 seconds.
6. Carefully slide the printed circuit boards back into the case.
7. Insert a new battery and replace the bottom end cap.
8. Turn the unit on. It will display **PL** followed by -**CAL**. This indicates the cold start was performed properly. Otherwise repeat this procedure.

Chapter 9

STORAGE

If the db-3100 will not be used for an extended period of time, it is recommended that the battery be removed and a new battery be installed when the unit is to be used again.

Chapter 10

SERVICE INFORMATION

In the event the db-3100 needs repair service, call the Metrosonics Service Department at:

(716) 334-7300

The Service Department will try to determine the cause of the apparent malfunction and provide necessary support to correct the problem.

In some cases, apparent problems (or misunderstandings) can be corrected over the phone. Therefore, before returning the db-3100 to the factory for service, discuss all problems with the Service Department.

Chapter 11

COMPUTER/PRINTER REQUIREMENTS

There are only six communication requirements for any computer or printer to work with the db-3100 Noise Monitor:

1. Serial RS-232 communications using at least the transmit (TX, pin 2), receive (RX, pin 3), and common ground (GND, pin 7) lines.
2. Accept X-on/X-off software handshaking to control the flow of characters. X-on/X-off is also known as DC1/DC3 or control-S/control-Q.
3. Accept a baud rate of either 300, 1200 or 4800 baud.
4. Data format: 10 bit characters (1 start bit, 8 data bits, 1 stop bit, with no parity).
5. Accept the standard ASCII character set.
6. Support 24 column or 80 column printouts.

If all six of these requirements are met, a computer or printer will function properly with the db-3100.

NOTE: The db-3100 will automatically detect and adjust formatting for 24 column output when connected to the Metrosonics dp-428 printer.

NOTE: The RS-232 cable provided by Metrosonics must be used.

Appendix A

DEFINITIONS OF NOISE TERMS

Response Rate

Instruments used to measure sound level have selectable response time constants, which were originally established to describe the dynamic response characteristics of analog sound level meters. Two most commonly used time constants which are in common use are: Slow (1 second) and Fast (.125 second). Typical occupational and environmental noise regulations require a Slow response rate.

Filter (A-Weighted and C-Weighted)

The db-3100 Noise Monitor has two types of selectable filters (i.e. tone controls): an A-weighted filter that simulated how the ear perceives noise at low levels, and a C-weighted filter that simulates how the ear perceives noise at high levels. Typical occupational noise regulations require an A-weighted filter.

Dose Criterion Level (Permissible Exposure Level)

The dose criterion level is the average sound level at which the dose criterion length (in hours) represents 100% of an allowable exposure for a given regulation. OSHA requires a dose criterion level of 90 dB.

The db-3100 Noise Monitor will calculate the % Dose based on the actual exposure, the criterion level and the criterion length selected.

Dose Criterion Length

The dose criterion length is the permissible exposure duration (in hours) for a given regulation. Regulations currently in practice require a dose criterion length of 8 hours.

NOTE: The dose criterion level and length simply establish what constitutes 100% dose. Actual work shift duration DOES NOT influence these parameters. A dosimeter set up for compliance measurements should have EXACTLY the same settings regardless of the expected shift length.

Exchange Rate (Doubling Rate)

Regulatory limits on unprotected exposure are commonly stated in terms of the maximum permissible exposure time (criterion length) at a specified sound level (criterion level). For example, OSHA specifies 8 hours at 90 dBA.

The exchange rate is the increase in sound level for which the permissible exposure time is halved, OR the decrease in sound level for which the permissible exposure time is doubled.

For example, OSHA regulations stipulate that an unprotected worker may be exposed to noise levels of 90 dB for 8 hours. Since OSHA's exchange rate is 5 dB, for every 5 dB the noise exposure increases the permissible exposure time is cut in half, and for every 5 dB the noise exposure decreases the permissible exposure time is doubled. Thus, a worker could be exposed to a noise level of 95 dB for only 4 hours.

Other exchange rates in use include 3 (ISO), 4 (DOD) and 6 dB.

Cutoff Level (Threshold Level)

All sound levels at or above the cutoff level are averaged into the calculations relating to noise exposure. All sound levels below the cutoff level are not included. For example, if an 80 dB cutoff is selected, all samples of sound levels equal to or greater than 80 dB will be included in the calculations for noise exposure. This is an arbitrary procedure used by OSHA and other regulations. OSHA requires dual cutoff levels of both 80 and 90 dB.

Ceiling

The maximum allowable sound level a unprotected worker may be exposed to. For example, OSHA does not permit unprotected workers to be exposed to sound levels, measured with a Slow response, above 115 dB.

The db-3100 Noise Monitor will record the total amount of time the noise exposure was above the ceiling level you select. This makes it easy to determine if a possible violation existed.

Lav (Average Level)

Lav is the average sound level (in dB) computed for a chosen averaging time duration. Lav with a 3 dB exchange rate is referred to as Leq (equivalent sound level).

Lav (80)

Lav (80) is the average sound level (in dB) computed for a chosen time duration, using an 80 dB cutoff level. The particular cutoff of 80 dB is used by OSHA for hearing conservation compliance measurements.

Lav (90)

Lav (90) is the average sound level (in dB) computed for a chosen time duration, using an 90 dB cutoff level. The particular cutoff of 90 dB is used by OSHA for engineering controls compliance measurements.

TWA (Time Weighted Average)

The TWA is the level (in dB) at which exposure for the criterion length (typically 8 hours) would produce a noise dose equal to that obtained for a shift length of arbitrary duration. In other words, it is a conversion of the actual noise dose to an equivalent exposure sound level for 8 hours.

For example, if a worker accumulated 100% noise dose in 16 hours with a continuous exposure of 85 dBA, the corresponding TWA for 8 hours of exposure would be 90 dBA.

TWA (80)

TWA (80) is the time weighted average level corresponding to noise dose computed with an 80 dB cutoff level.

TWA (90)

TWA (90) is the time weighted average level corresponding to noise dose computed with an 90 dB cutoff level.

Lmax (Maximum Level)

Lmax is the maximum sound level observed during a measurement interval with a particular response setting (Slow or Fast). OSHA specifies that an Lmax measured with a Slow setting must not exceed 115 dBA.

Lpk (Peak Level)

Lpk is the highest instantaneous sound pressure level observed during a measurement interval. Under OSHA regulations, unprotected workers may not be exposed to peak sound levels greater than 140 dB.

8 Hour Dose

This is the actual dose (as a percentage) accumulated for the actual work shift length based on a regulation's defined criterion level and criterion length.

8 Hour Dose (80 dB Cutoff)

This is the actual dose (as a percentage) accumulated for the actual work shift length based on a regulation's defined criterion level and criterion length, using an 80 dB cutoff level.

8 Hour Dose (90 dB Cutoff)

This is the actual dose (as a percentage) accumulated for the actual work shift length based on a regulation's defined criterion level and criterion length, using an 90 dB cutoff level.

8 Hour Projected Dose

This is a computed estimation (as a percentage) of what the projected dose would be for an 8 hour work shift. Such estimations are useful in preliminary work place surveys. For example: a worker's exposure may be monitored for 1 hour and a dose of 40% is obtained. If the assumption is made that for the remaining 7 hours of the shift the work will continue to experience the same noise exposure, the instrument will compute an estimated 8 hour projected dose of 320%.

8 Hour Projected Dose (80 dB Cutoff)

This is a computed estimation of what the projected dose would be for an 8 hour work shift, using an 80 dB cutoff level.

8 Hour Projected Dose (90 dB Cutoff)

This is a computed estimation of what the projected dose would be for an 8 hour work shift, using an 90 dB cutoff level.

Pascal Squared Hours (Pa²h)

This is a measure of sound exposure accumulated during the measurement period, given in Pa²h rather than % dose. Pa²h is defined as the time integral of squared instantaneous A-frequency weighted sound pressure over a specified duration, for example the duration of a working day.

8 Hour Pa²h

This is an estimated measure of sound exposure that would be accumulated over an 8 hour work shift, if the pattern of exposure to noise remains unchanged. This measure is useful for estimating the potential full shift sound exposure of workers based on a short duration measurement.

**Examples of Exposure Evaluations
With a Dose Criterion Level of 90 dBA
and a Dose Criterion Length of 8 Hours**

5 dB Exchange Rate

	Constant Sound Level of 90 dBA		Constant Sound Level of 95 dBA	
	4 Hrs.	8 Hrs.	4 Hrs.	8 Hrs.
Exposure	4 Hrs.	8 Hrs.	4 Hrs.	8 Hrs.
TWA	85 dBA	90 dBA	90 dBA	95 dBA
8 Hr Dose	50%	100%	100%	200%
8 Hr Proj. Dose	100%	100%	200%	200%

3 dB (Leq) Exchange Rate

	Constant Sound Level of 90 dBA		Constant Sound Level of 93 dBA	
Exposure	4 Hrs.	8 Hrs.	4 Hrs.	8 Hrs.
TWA	87 dBA	90 dBA	90 dBA	93 dBA
8 Hr Dose	50%	100%	100%	200%
8 Hr Proj. Dose	100%	100%	200%	200%

