California State University
NORTHRIDGE
Department of Police Services
University Police Division

LESSON PLAN

SUBJECT: Extech Digital Sound Level Meter

LENGTH: 20 minutes

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DATE PREPARED: August 9, 2011

APPROVED BY: [signature], Chief

DATE APPROVED: 8/9/11

I. Performance Objectives/Job-Related Objectives:

The purpose of this training is to enable the student to operate and calibrate the Extech Model 407750 Digital Sound Level Meter. At the conclusion of training, the student will demonstrate a functional level of operator competency by measuring a sound and viewing its dB level on the LCD display.

II. Type of Instruction:

The instructor will explain the subjects listed in the course outline and demonstrate the proper operation and calibration of the sound level meter.

III. Course Outline:

A. Introduction
   1. Specifications. The meter measures sound level in dB (decibel) units.
   2. Meter Description. Refer to diagram.

3. Features. The sound measurement range can be set automatically or manually and allows selectable frequency weighting and time response. The built-in RS232 PC interface allows the user to record readings into a PC in real-time.

B. Operation
   1. Quick Start.
      a. Power the meter by pressing the ON/OFF key.
      b. The meter's LCD will count down to zero and then begin measuring sound levels.
      c. If the LCD does not switch on after pressing the ON/OFF key, check the 9V battery.
   2. "A" and "C" Frequency Weighting. Select "A" or "C" weighting via the C/A key. The LCD will reflect the currently selected frequency weighting. Use "A" weighting to have the meter respond as the human ear would with regard to frequency response. "A" weighting is used for environmental measurements, OSHA regulatory testing, law enforcement, and workplace design. Select "C" weighting for flat responding measurements. "C" weighting is used in applications where hearing conservation is not an issue.
   3. FAST/SLOW Response Time. Select FAST (125ms response) or SLOW (1 second response) measurements by pressing the F/S key. The LCD will reflect the currently selected mode. Selection of FAST or SLOW is determined by the application and any directives or standards related to that application.
   4. MAX HOLD. The meter is capable of taking continuous measurements and only updating the LCD when a higher reading than the one presently on the display is detected. The bargraph display continues to change while the main LCD waits for a higher reading. Press the MAXHLD key to activate the MAX HOLD mode. The LCD will reflect the MAX HOLD function. Press the MAXHLD key again to return to the normal operation.
   5. Record (REC) Function. To record the maximum and minimum sound level measurements over a programmable period of time, press the REC key. The REC indicator will appear on the LCD. Once the REC key is pressed, the meter begins tracking the highest (MAX) and lowest (MIN) readings. Press the REC key again and the MIN indicator will appear on the LCD along with the lowest sound level reading since the REC key was pressed. Press the REC key again and the MAX indicator will appear along with the highest reading the meter has encountered since the REC key was first pressed. Press and hold the REC key until the REC indicator extinguishes to exit the RECORD mode.
   6. BA (Background Noise Absorber) Mode. The Background Noise Absorber allows the user to accurately measure equipment noise by eliminating background noise. The sound level meter first stores the background noise as a reference level. From there, when a sound is measured, the display will show the sound level measurement minus the background noise. To operate the meter in BA mode, follow these steps:
      a. Power the meter.
      b. Press the MAXHLD key (the MAX HOLD icon will appear on the LCD).
      c. Press the BA key ("F" will appear to the left of the SPL display icon).

d. Press the MAX HOLD key again (the MAX HOLD icon will reappear on the LCD).
e. The meter is now displaying the background reference noise.
f. Power the device under test and note the new sound level meter reading.
g. If the reading changes, the new reading is the sound level of the device. If the reading does not change, the noise produced from the device is either equal to or less than the background noise.

7. Auto and Manual Ranging. The meter powers up in the Automatic Range mode. In automatic mode the meter automatically finds the correct range in order to produce the best accuracy. However, if it is desired to set the range manually, follow these steps:
   a. Power the meter.
   b. Notice the two digit number to the immediate left of the analog bargraph. This number is the low end of the presently selected range.
   c. To change the range, press the UP key to raise the range or press the DOWN key to lower the range. The two digit number on the left of the bargraph will change with each key-press.
   d. An advantage of Manual mode is that it takes less time for the meter to take a reading. In Auto Range mode the meter must first locate the correct range before displaying a measurement.
8. LCD Backlighting. Press the BACKLIT key to illuminate the LCD. The backlight will remain on for 5 seconds and then automatically switch off to preserve battery life.
9. Auto Power Off. To preserve battery life, this meter has an automatic power off feature. If the unit is not used for approximately 20 minutes, the meter shuts off. To override this function, follow these steps:
   a. From a power OFF condition, press and hold the ON/OFF and MIN/MAX keys simultaneously.
   b. When "n" appears on the display, release the MIN/MAX and then the ON/OFF keys.
   c. The Auto Power Off feature is now disabled. Note that the Auto Power Off feature is reactivated the next time the meter is powered down.
10. Analog Outputs. The meter includes an AC and a DC analog output. These outputs are proportional to the displayed sound level and are ideal for use with chart recorders and dataloggers. The AC output is 0.707V rms full scale and the DC output is 10mV per dB. The labeled 3.5mm output mini-plugs are located on the bottom of the instrument.
11. RS-232 Output. The meter includes an RS-232 PC interface jack. This PC interface allows the meter to store and display readings on a PC as they are recorded. The interface cable and software for data acquisition are sold separately.

C. Practical Exercises
   1. Turn on the meter by pressing the ON/OFF key.
   2. Point the microphone toward the source of a sound to be measured and view the reading on the meter's LCD.

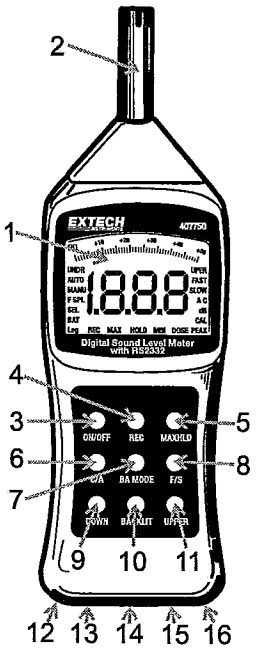
D. Maintenance. When the low battery message appears on the LCD, the 9V battery has fallen to a critically low voltage and should be replaced as soon as possible.
    1. Locate the battery compartment cover on the rear of the sound meter.
    2. Remove the battery compartment screw and remove the battery compartment cover.
    3. Change the battery.
    4. Replace the battery compartment cover and screw.

E. Calibration of Sound Level Meter (to be performed by supervisors only). The sound level meter should be periodically calibrated using the Extech Model 40744 Sound Level Calibrator.
    1. Insert the microphone into the calibrator's microphone cavity.
    2. Slide the function switch on the calibration unit to the "I" (power on) position. As soon as the unit is powered, the calibration tone is generated.
    3. Read the sound level meter's display. The sound level meter should read 94dB or 114dB depending on the calibrator's setting. If the sound level meter does not match the calibrator's signal (within specification), adjust the reading by turning the calibration adjustment screw located on the bottom of the sound level meter.
    4. Slide the function switch to the OFF position and remove the microphone.

F. Questions and Comments

Meter Description

1. LCD Display
2. Microphone
3. ON/OFF key
4. REC (Record) key
5. MAXHLD (Max Hold) key
6. C/A Weighting Select key
7. BA (Background Absorber) key
8. F/S Fast / Slow Response select key
9. DOWN
10. Backlit (LCD backlighting) key
11. UPPER
12. AC adaptor jack
13. Calibration screw adjust
14. AC analog output jack
15. DC analog output jack
16. RS-232 output jack



Note: The Battery Compartment and the Threaded Tripod mount access are located on the back of the instrument (not pictured)