

CALIBRATION TUTORIAL

INTRODUCTION

The monitor calibration system on the AWS 900 console enables the level of any loudspeaker connected to the AWS 900 to be trimmed by ± 10 dB. This allows for quick and easy calibration without having to physically alter settings on the individual loudspeakers. Calibration is important so that each loudspeaker will produce the same level of sound, and for setting reference monitoring levels. Note that with the monitor gain at maximum a trim level of +10dB corresponds to unity gain through the monitor section.

Note: Do not attempt to carry out loudspeaker calibration unless you have accurately calibrated test equipment.

SOUND LEVEL METER SET UP

Position your Sound Level Meter (SLM) on a microphone stand for maximum stability and for the least interference from the operator. Set the level to 80dB, C Weighting with a slow response. When calibrating, a recommended level of 85dB C is required for each loudspeaker.

Reference Level: A reference value of 85dB is the Dolby Reference level used in movie theatres and movie presentations. This level was set by the SMPTE (Society of Motion Pictures and Television) organisation to ensure and achieve repeatable results of a finished product for cinema post-production work. For more information on Dolby and for speaker setups, please visit their website at: <http://www.dolby.com>.

C Weighting: Human hearing sensitivity varies with frequency, which can be shown with loudness curves – please visit <http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html> and click on *Sound and Hearing>Sound Level Measurement>Ear's Response Curves* for graphs and detailed descriptions. Sound Pressure Level meters have different filter contours, or weightings, corresponding to the loudness curves of the ear. The different contours are intended to match the ear at different sound intensities. C-Weighted curves are used for high sound levels, and corresponds to the 100 phon loudness curve (see link above). This filter contour doesn't filter out as much of the low or high end of the spectrum when compared to the other filter contours (A and B weighting) – please visit <http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html> and click on *Sound and Hearing>Sound Level Measurement>Filter Contours A, B, C* for graphs of the filters and detailed descriptions.

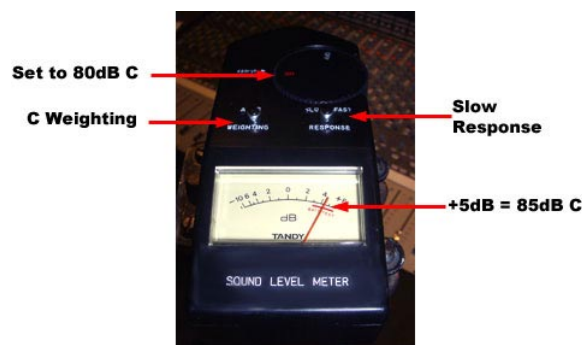


Figure 1 - Sound Level Meter

Place the SLM on its stand in the position where the sound engineer would sit at the console, at head height. Point the SLM in the direction of the loudspeaker you are calibrating. See figure 2 for position.



Figure 2 – Room Set up

ADJUSTING EACH LOUDSPEAKER WITH THE AWS 900

Turn on the console oscillator OSC ON and select the pink noise PINK ON; the default for the console's pink noise output is +4dBu RMS. Adjust using the Pink trim pot in the oscillator section if necessary (see Figure 3). To view the level of the pink noise, firstly cut the main monitor level and press the REC or MIX bus switches near the Oscillator controls, and the level will be shown on the VU meters on the console. The corresponding level for +4dBu RMS is 1.23V.

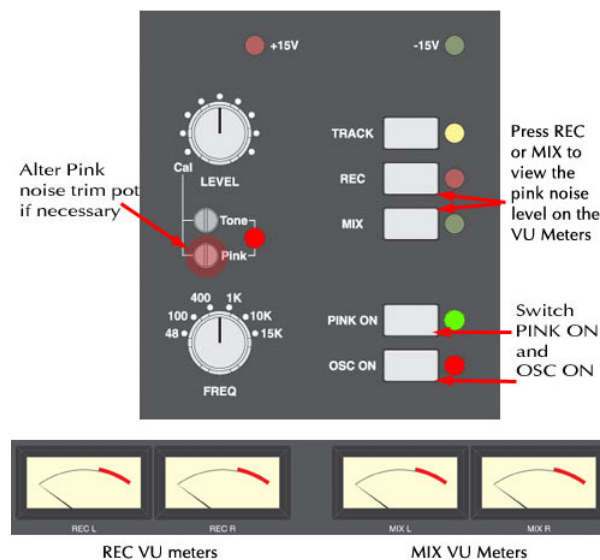


Figure 3 - Pink Noise

Set the monitor level control to the position you wish to correspond to the calibrated level. A value of 8.5 will provide 10dB of additional gain in hand.



Figure 4– Monitor Level

Now select the required monitor system – Main 5.1 (no selection), Alternate 5.1 (ALT 5.1), Mini A or Mini B.

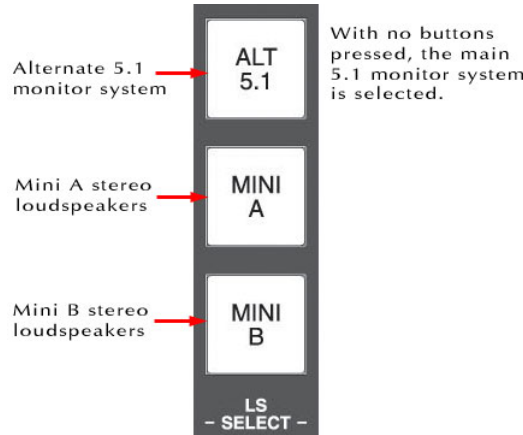


Figure 5 – Monitor System

LCR ADJUSTMENT

To enter the calibration menus, press Monitor Options button in the Monitor Control Section, and then the Cal button

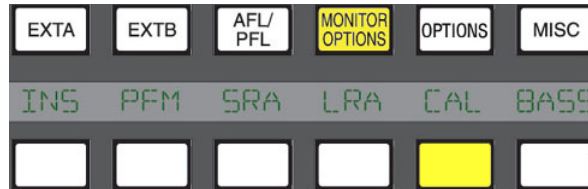


Figure 6 - Monitor Options Menu

Pressing either AL, AR or AC will send pink noise to the Left or Right or Centre loudspeakers respectively. It is recommended you wear ear protectors when carrying out calibration testing. See figure 7 for the first calibration menu.

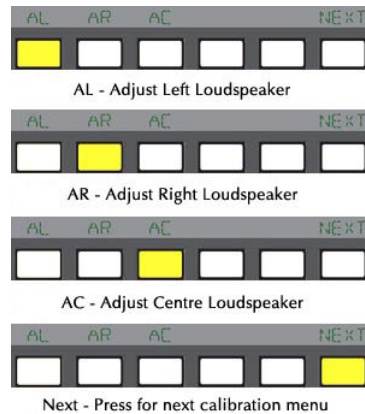


Figure 7 – First Calibration Menu

When AL, AR or AC are pressed, the main monitor pot will read 0.00. This value is -10dB, so you are able to go up to 0dB (+10dB of gain), or down to -20dB (-10dB of gain). Adjust the level for the required Sound Pressure Level, 85dB C as recommended earlier, by turning the main monitor pot left or right from its initial position, +10dB (fully clockwise), -10dB (fully anti-clockwise). Remember to point the SLM at the correct loudspeaker when testing. When you press the next adjustment button, this will be set back at 0.00 (-10dB) for that loudspeaker, and repeat the adjustments. When you press a different monitor system switch (i.e. ALT 5.1, Mini A or Mini B) all monitors will be cut and the same process is repeated. None of your previous settings for the other monitor systems will be lost.

SURROUND CHANNEL ADJUSTMENT

By pressing the NEXT button, you will enter the second calibration menu. By pressing ALS or ARS you can adjust the left surround loudspeaker or right surround loudspeaker respectively.

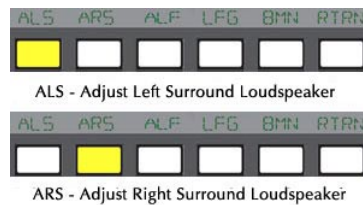


Figure 8– Second Calibration Menu

SUBWOOFER ADJUSTMENT

By pressing ALF you can adjust the Subwoofer loudspeaker. Note: check before you calibrate the LFE output whether the 0dB option is on or off. Normally the LFE bus level is increased by 10dB post the main monitor level control, as this is a requirement for DVD playback. If you are mixing for SACD, or any other format that requires unity gain on the LFE channel, select LF0 to restore the LFE bus level to unity gain.

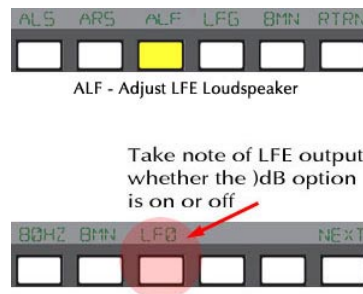


Figure 9 – LFE and LF0

Repeat the above process for all monitor systems.

LOW FREQUENCY GAIN

Low Frequency Gain, LFG is a trim which allows the gain of the contribution from the full bandwidth channels to the subwoofer output to be adjusted. Like all the speaker calibration settings it must be set for each set of speaker outputs (assuming bass management is in use). Note that when LFG is on, any discrete LFE feed is always cut. This does not mute the actual subwoofer output, only any discrete LFE signal feeding it. This ensures that you are only measuring the contribution from the bass management system.

Having lined up the six main speakers, select LFG in the second calibration menu. In LFG mode all speakers are initially muted, and the six monitor cut buttons will light; un-cut the left output and with the bass management turned on, (press BMN in the second calibration menu), adjust the LFG gain for a flat low end response. You will need a spectrum analyser to carry this out. Cut the left output, un-cut the right output and check this has a flat low end response. Repeat for all channels. Depending on how well matched the monitors are, you may have to adjust the LFG gain slightly.

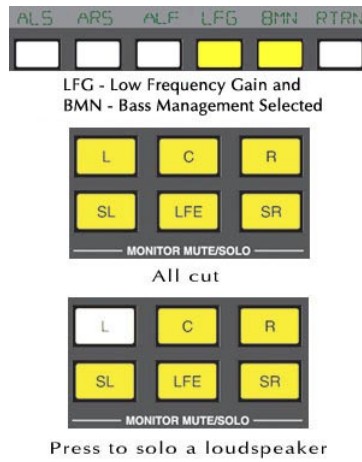


Figure 10– Low Frequency Gain