Gain Structure Procedure

This exercise will properly adjust the gain settings of professional amplifiers used in a home theater to ensure simultaneous clipping with the AVR or pre amp. No adjustment is needed for any professional EQs or processors that may be in the signal chain; however if they have a master gain control it should be set for flat (unity).

The required tools are:

* Test disc or other source with reference pink noise signal.

1. Unplug all speakers from the amplifiers.
2. Assuming all other proper connections have been made, turn on all components in the signal chain.
3. Make sure the speaker-size settings in the AVR's menu are correctly set. For the subwoofer channel, set the crossover for the frequency normally used.
4. Run your receiver's auto EQ function.
5. Afterwards, in the AVR's menu adjust the levels for all channels that will utilize outboard amplifiers to their maximum setting.
6. Make sure any auto-EQ functions and/or tone controls normally used in the AVR are enabled (not bypassed) Likewise for the equalization from any outboard processors.
7. Set the AVR to Bypass or Stereo mode (if this bypasses internal EQ it can skew the gain structure - addressed in #15).
8. Set all outboard amplifier gain controls to a low setting.
9. Start the pink noise test signal and turn the AVR's volume control up to the setting that was previously determined for maximum usable (clean) output. (If that volume setting is unknown, first complete the process outlined in the *Measuring AVR Output Voltage* paper.)
10. Increase the gain settings of the amplifier to the point where the clipping indicators light steady. This is the proper amplifier gain setting for your AVR or pre amp.
11. For subwoofer amplifiers, repeat steps #6 - #8.
12. For any outboard amplifiers used for the rear surround channels:
    a. Turn off all equipment and redirect the amplifier connections to the AVR's main channel outputs.
    b. Turn the equipment on again and repeat steps #6 - #8.
    c. Turn off all equipment and move the rear-channel amplifier connections back to the designated AVR outputs.
13. For a center channel amplifier, change the AVR to Dolby Pro Logic mode. Repeat steps #6 - #8.
14. After all amplifiers have completed the gain structure procedure, perform a manual surround sound speaker-level-setting exercise, or run your AVR or pre-pro's auto set-up function again.
15. If you end up with audible distortion it will most likely mean the AVR or pre amp is reaching its limits before the amplifier (i.e. you'll hear distortion before the amplifier's clip lights activate). This could be the case if internal equalization is bypassed when in "Direct" or "Stereo" mode. All that needs to be done in this case is re-calibrate the gain structure with a lower AVR volume-setting to get the desired results.