

Unity Gain

Unity Gain: When a signal passes through a system or a device without changing level (amplify or attenuate) it is said to be at "Unity Gain".

Unity Gain is fundamental in setting up any audio chain or signal path. With most professional equipment and in most quality recording studios, care has been taken to insure that unity gain has been established between the outboard equipment and the console. However, there is one area where the mixing engineer should always check for unity gain before recording... between the mix bus of the console and the input of the stereo recording device(s) used to mix down to. It is common for seasoned engineers and producers to bring their own "master" recorder to capture a finished mix and these devices often have a different input level from that of the studio's two track machines. Establishing unity gain between the console and these "master" recorders is essential to capturing the highest quality recording possible. But, even when you are mixing down to the equipment provided by the studio there can be discrepancies due to a wide variety of recording media and specifications in use today. This is why it is essential that you understand how to check for and create unity gain.

The concept is straight forward... create, calibrate and monitor your "record chain" (the signal path from the console THROUGH the master recorder back to the console) adjusting for unity gain at each step in the chain.



The specifics of exactly how to establish unity gain vary depending on the console and master recorder(s) being used. Start by sending a signal from the console to the recorder. While program material (the music you are mixing from your multitrack) is an easy source for this signal, it's erratic, transient nature make it ineffective for calibrating unity gain, better to use a simple sign wave at 1kHz. Most professional consoles will have a built-in oscillator (Osc.) for this very purpose and specific details for how to use it can be found in the console's manual. Once you establish how to feed signal from the oscillator to the mix bus of the console you need to calibrate the output level of the signal. Use the console's mix bus meters and the oscillator trim to adjust the level of the oscillator so the meters read 0dB. Next, feed the signal from the mix bus to the master recorder. With the master recorder in "input" or "monitor" mode, feed the signal back to the console. Adjust the various input and output stages in the chain until you have established unity gain through the entire system.

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In MP241 you are using the API Legacy console and the HHB CDR830 "BurnIT" CD recorder. Manuals for these and other equipment can be found at...

http://classes.berklee.edu/mpe/studios/studio_f.php

http://classes.berklee.edu/mpe/studios/studio_d.php

The studio has been hard wired such that the mix bus from the API feeds the input to the CD recorder, as well as all the other two track recorders in the studio. The output of the CD Recorder has been hard wired to a "Tape Return" selector switch in the "CR Play" module of the API console.

Setting Unity Gain:

With the console set to "CR PGM", the GM Fader set to "0", the Group A fader at 0, the "Monitor Select" set to "GM", and St A assigned in the GM assign section

- 1 Turn the CONTROL ROOM LEVEL down and adjust the Dim to very quiet
- 2 Turn the Osc. OUTPUT LEVEL all the way down (counterclockwise).
- 3 Turn the Osc. on and set the frequency to approximately 1kHz.
- 4 Assign the Osc. to the Mix Bus with the "OSC BUS" switch
- 5 Turn the Osc. OUTPUT LEVEL up so the Mix Bus Meters read exactly 0VU
- 6 Select the appropriate TAPE RETURN switch in the C/R Play module to monitor the return from the CD Recorder (2 TRK 2)
- 7 Make sure the CD Recorder is set to "Analog" input with the INPUT SELECTOR switch.
- 8 Set the CD Recorder to "Input" mode by pushing the MONITOR switch until the red LED illuminates.
- 9 Adjust the ANALOG REC LEVEL until the Mix Bus Meters on the console read exactly 0VU.

REMEMBER... You are adjusting the input level to the CD Recorder while looking at the MIX BUS METERS ON THE CONSOLE!