Automation tones on DXR.1 codec

Broadcast networks sometimes use sub-audible tones in the range of 20 to 50 Hz to allow affiliates to automate their network cutaways and rejoins. 25 Hz is a popular frequency, and the combination of low-frequency roll-off in the DXR.1 and our customers' equipment may provide an output too low for a tone decoder expecting full line level. Since the G.722 processing in the DXR.1 "favors" the lower audio frequency band by allocating more bits in the coding process, the automation tones are handled very well in the digital processing. There are two points in the DXR.1 analog section, however, that will restrict the low-frequency performance.

Referring to the DXR.1 board schematic included in the manual, capacitor C4 couples the output of U19D to resistor R12, which sets the input impedance to U19C. The factory-supplied value of C4 is 470nF (0.47mF). Increasing this value to 2.2mF, a commonly available value for non-polarized capacitors, will improve the low frequency response of the encoder section. Larger values are fine, but we recommend a non-polarized unit. In the decoder, the only change necessary would be if the DXR.1 audio output has been terminated in a true 600 ohm load. If so, the 22mF output coupling capacitors, C32 and C33, which are connected to U24, can be eliminated by adding a jumper across each of them. Just be aware that you may present a small dc offset voltage to your equipment. The alternative would be larger non-polarized electrolytic capacitors designed for audio use. If the DXR.1 is feeding a bridging load (>5K ohms, typical of most console inputs), the 22mF capacitors may be left in place.

If you make these changes and are still having problems, you should check that the automation tone level at the DXR.1 input is actually up to the program line level. Small audio transformers in any equipment you may have between the tone generator and the DXR.1 may either reduce the level of the tones, or add distortion products. Many transformers will not handle 25 Hz tones at line level, despite the manufacturer's claims. The same reasoning applies at the receiving end, in any equipment between the ISDN codec and the automation tone decoder.

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