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APPLICATION BULLETIN

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Point to Point

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Choosing Voice Modules for Digital Point-to-Point Applications

INTRODUCTION

Many sub-T1/E1 point-to-point systems using MDS radios also use MDS MX-2000/2100-series multiplexers. For compressed voice applications, two varieties of optional modules are available: the KVC.3 and the KVF.4. These cards both support voice at data rates¹ from 4.8 to 9.6 kbps; the KVF.4 also supports fax at fax rates up to 9.6 kbps when used at its 12.8 kbps data rate. The KVC.3 supports voice only—not fax. Both modules use the MPMLQ compression algorithm, which offers voice quality at 6.4 kbps that's equivalent to the KVC.1 ADPCM module operating at 32 kbps.

When choosing PCM/ADPCM modules for toll-grade voice applications, be aware that the KVC.1 supports mainlink data rates only up to 384 kbps. For links at 512 or 768 kbps, you must use the KVC.1M instead for these applications. Also, an integral hardware echo canceler is available for the KVC.1M, whereas the KVC.1 does not offer this option. This has value in 2-wire circuits, such as FXO/FXS extensions, but not in 4-wire E&M applications.

So, which card is most appropriate for your compressed-voice application?

Both modules offer excellent voice quality using the same compression algorithm. The end-to-end delay on both modules is approximately 108 ms. Either may be used for voice-only applications. However, the KVF.4 adds fax capability, which imposes a limitation. In any application where tones, such as EIA standard control tones, are to be passed through the channel either exclusively or along with other audio, it's important to choose the KVC.3. The KVF.4 interprets tones as facsimile transmissions and switches to fax mode, ceasing to pass audio in the normal fashion.

MDS does not recommend passing analog modem data across either of these modules, although the KVF.4 will support dial-up modems at up to 2.4 kbps. For higher data rates over analog channels, select the KVC.1 or KVC.1M PCM/ADPCM voice card. The KVC.1 family can also pass fax, and audio with tones, with an end-to-end delay of approximately 5 ms. However, it uses more of the mainlink bandwidth per channel (16, 24, 32 or 64 kbps, depending on the required audio quality).

Further, in applications involving voting receivers, delay is critical to proper voting operation. Therefore, compressed (KVC.3, KVF.4) and non-compressed (KVC.1, KVC.1M) modules cannot be mixed because the delay in the compressed modules is much longer. Minimizing delay and maintaining constant delay is best done using KVC.1 or KVC.1M modules for this application. Also keep in mind that the delays specified for these modules apply to a single link. Multiple links increase end-to-end system delays; the actual increase is system-specific. Contact MDS Systems/Applications Engineering for more information on latency for your specific configuration.

In summary, compressed voice is an excellent choice for carrying multiple high-quality voice circuits across a sub-T1/E1 link using MX-2000 multiplexers, but you need to be aware of the issues discussed above to choose the right module for your application.

Other MDS Application Bulletins regarding voice modules for the MX-2000: 95006-1, 96002-1.

¹For example, a sub channel programmed for 9.6 kbps uses 9.6 kbps of the mainlink data rate. If the link rate is 384 kbps, this leaves 374.4 kbps for other sub channels and the required overhead used for multiplexer signaling and synchronization.

For more information, contact MDS Technical Services at techsupport@microwavedata.com, or by phone at +1-585-241-5510.
