



8-Channel Analog Voice Compression Module



- Integral echo canceller
- Low end-to-end delay
- Soft gain control for both receive and transmit of voice and fax
- Supports applications requiring double compression (tandeming)

DESCRIPTION

- KVF.8 is a Kilomux-2100 I/O module providing high quality compression of eight analog voice channels for maximum main link bandwidth utilization. The high-density KVF.8 enables a single Kilomux-2100 chassis equipped with 12 modules to support up to 96 voice channels. The smaller Kilomux-2104 chassis can be equipped with 4 modules to support up to 32 channels.
- Voice channel compression is performed at selectable data rates of 4.8, 6.4, 9.6, 11.2, 12.8 or 16 kbps per channel. The digitizing rate is soft-selectable per quartet of channels, according to the quality desired and the available main link bandwidth. For data rates of 6.4 to 16 kbps, voice compression is based on the MPMLQ (Multipulse Maximum Likelihood Quantization) speech coding technique, as per ITU-T G.723.1. Compression at 4.8 kbps rate uses a proprietary compression technique.
- Very high voice quality (comparable to 32 kbps ADPCM) is achieved when using compression rates of 6.4 kbps and above.

- KVF.8 is available with one of the following interfaces (see *Ordering*):
 - 2-wire or 4-wire **E&M** for connection to PBX tie lines
 - 2-wire **FXS** loop-start, ground-start or wink-start with reverse polarity and metering pulse generation for direct connection to telephones
 - 2-wire **FXO** loop-start or wink-start with reverse polarity and metering pulse detection for direct connection to a PBX extension line.
- The 2-wire or 4-wire E&M module supports four strap-selectable types: EIA RS-464 Types I, II, III, and V (British Telecom SSSDC5). The E&M signaling is passed in-band within the compressed data.
- FXS interfaces require a -48 VDC source for telephone feed and ring voltages. Certain E&M applications may also require -48 VDC source. The -48 VDC can be supplied by a KM-Ringer module, or by Ringer-2000 or Ringer-2200 standalone 19" units. See separate Ringer data sheet for details and ordering information.
- The FXS and FXO interfaces enable the user to operate in environments where call charging is required. Both of these interfaces support reverse polarity (R.P.) for wink-start applications and also 12/16 kHz metering pulse (M.P.) detection and regeneration (see Figure 1).
- Automatic voice/fax detection ensures that each channel can be used for both voice and fax. Group III fax is supported. Automatic rate fallback to drop to the highest common rate supported by both faxes is featured.

FEATURES

- Digital compression of eight analog voice/fax/data modem channels
- Selectable voice compression rates:
 - G.723.1 (MPMLQ) for high-quality voice at 6.4, 9.6, 11.2, 12.8 or 16 kbps per channel
 - Proprietary technique for only 4.8 kbps per channel
- Supports up to 96 analog voice channels in a single Kilomux-2100 chassis
- Voice interfaces supported:
 - 2 or 4-wire E&M
 - 2-wire FXS
 - 2-wire FXO
- Group III Fax relay support up to 14.4 kbps, with automatic rate fallback
- V.22 bis and V.32 bis modem data relay at 2.4 to 14.4 kbps rates

KVF.8

8-Channel Analog Voice Compression Module

- Each KVF.8 channel also supports automatic detection and relay of V.22 bis and V.32 bis data modem transmissions at standard rates of 2.4, 4.8, 7.2, 9.6, 12 and 14.4 kbps.
Note: Fax/data modem transmission requires additional channel bandwidth for overhead so that, for example: 14.4 kbps fax/modem data rate requires 16 kbps channel bandwidth.
- KVF.8 is equipped with an integral echo canceller for canceling the near-end hybrid echo. The echo canceller enables acceptable voice quality on voice lines with a long delay, such as long distance calls or calls over non-terrestrial links (e.g. satellite). Delay of up to 15 msec is accommodated. The echo canceller may be enabled or disabled via the management system.
- The KVF.8 module is equipped with Hamming code forward error correction (9.6, 11.2, 12.8 and 16 kbps only) for checking the most vital speech information bits. Voice quality is maintained at a channel bit error rate of 1×10^{-3} or better.
- Diagnostics include digital loopback toward the local interface and analog loopback toward the remote site (per channel quartet). Tone injection (per channel quartet) for testing is also available. An automatic self-test is performed during power-up and under normal operation.
- Applications requiring double compression are supported, for example, voice communication between remote locations connected in a star configuration to a central PBX (see Figure 2). In such a case, the switching is performed by the PBX and requires compression and decompression to be carried out twice. KVF.8 supports this application for voice, with fax and data modem relay, due to its high-quality compression technique.

APPLICATIONS



Figure 1. Direct Inward Dialing (DID) including Wink-Start with Reverse Polarity

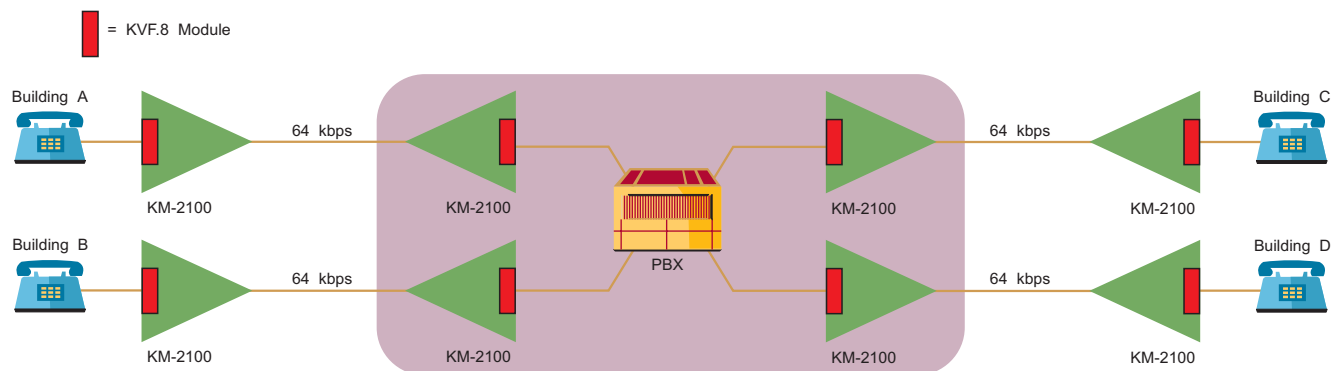


Figure 2. Double Compression/Tandeming Application

8-Channel Analog Voice Compression Module

SPECIFICATIONS

- **Number of Voice Channels**
8
- **Digitizing Techniques and Supported Compressed Voice Channel Data Rates**
G.723.1 MPMLQ:
6.4, 9.6, 11.2, 12.8 or 16 kbps
Proprietary technique: 4.8 kbps
- **Bandwidth Allocation on Main Link (per voice channel quartet)**
4 x 4.8 kbps: 19.2 kbps
4 x 6.4 kbps: 25.6 kbps
4 x 9.6 kbps: 38.4 kbps
4 x 11.2 kbps: 44.8 kbps
4 x 12.8 kbps: 51.2 kbps
4 x 16 kbps: 64 kbps
- **Fax Compatibility**
Group III according to ITU-T
Rec. T.4, T.30, V.29, V.27, V.27ter
- **Data Modem Compatibility**
V.22 bis, V.32 bis
- **Supported Fax/Modem Data Rates at Selected Channel Rate (in kbps)**
Ch. Rate: Fax/Modem Rates:
4.8 2.4
6.4 2.4, 4.8
9.6 2.4, 4.8, 7.2
11.2, 12.8 2.4, 4.8, 7.2, 9.6
16 2.4, 4.8, 7.2, 9.6, 14.4
(All with automatic rate fallback)
- **End-to-End Processing Delay**
Less than 100 msec
- **Acceptable Channel Bit Error Rate**
 1×10^{-3} or better
- **Analog Interface**
 - KVF.8/E&M:
2-wire or 4-wire, soft-selectable
 - KVF.8/FXS:
2-wire
 - KVF.8/FXO:
2-wire
- **Adaptive Echo Canceller**
Echo path length: 15 msec
Echo return loss compliments (ERLE):
>30 dB
Convergence speed:
Better than ITU G.165
- **Analog Parameters (at 6.4 kbps and above)**
Nominal level: 0 dBm
Nominal impedance: 600 Ω
Return loss (300 to 3400 Hz):
Better than 20 dB
Frequency response
(Ref 1020 Hz):
0 dB \pm 0.5 dB, 300-3000 Hz
0 dB \pm 1.1 dB, 250-3400 Hz
Level adjustment soft-controlled:
E&M:
Transmit: +5 to -10 dBm
Receive: +3 to -17 dBm
FXS:
Transmit: +5 to -10 dBm
Receive: +2 to -17 dBm
FXO:
Transmit: +5 to -10 dBm
Receive: +2 to -17 dBm
Steps: 1 dB \pm 0.5 dB
Signal to total distortion (G.712, G.713 method 2):
0 to -30 dBm0:
Better than 33 dB
+3 to -45 dBm0:
Better than 22 dB
Idle channel noise:
Better than -70 dBm0
Transformer isolation:
1500 VRMS
- **E&M Interface Characteristics**
Signaling methods:
(user-selectable):
EIA RS-464 Type I;
EIA RS-464 Types II, III, and V
(British Telecom SSDC5)
Note: For full support of Types II, III, and V (SSDC5) signaling standards, a -48 VDC power supply is required.
Pulse dial distortion:
 \pm 2 msec max
- **FXS Interface Characteristics**
Signaling methods
EIA RS-464 loop-start and wink-start
On-hook/off-hook threshold:
($V_{in} = -20$ VDC to -56 VDC)
3V to 80% V_{in} between Tip and Ring at Off-Hook state
Higher than 83% V_{in} between Tip and Ring at On-Hook state
Feed current
(with Ringer):
22 mA (\pm 10%) for current feed
Ringer:
86 VRMS (when providing 4 REN or less) to 45 VRMS (when providing 12 REN max),
1 sec ON, 3 sec OFF
Ringing frequency: 16.7, 20, 25, 50 Hz (\pm 10%) user-selectable
Metering pulse:
Output frequency:
16 kHz, 12 kHz (\pm 2 Hz)
Output level:
1.7 VRMS
Reversal polarity pulse distortion:
6 msec max
- **FXO Interface Characteristics**
Signaling methods:
EIA RS-464 loop-start and wink-start
DC impedance:
Off-hook:
100 Ω at 100 mA feed,
230 Ω at 25 mA feed
On-hook: above 1 M Ω
Ring detector:
20 k Ω @ 20 Hz, 70 VRMS
Detection:
>20 VRMS, 17-25 Hz
No detection:
<5 VRMS
Metering pulse:
Detection frequencies bandwidth:
16 kHz: 15.76 to 16.24 kHz
12 kHz: 11.82 to 12.18 kHz
Reversal polarity pulse distortion:
6 msec max

KVF.8

8-Channel Analog Voice Compression Module

- Power Consumption**

Voltage	Current	Power	
E&M	+5V	1.12A	5.6W
	+12V	0.004A	0.05W
	-12V	0.037A	0.4W
	Total	1.161A	6.05W
External	-48V	0.174A	8.4W
		(max)	
FXS	+5V	1.0A	5.0W
	+12V	0.144A	1.7W
	-12V	0.037A	0.4W
	Total	1.181A	7.1W
External	-48V	0.355A	17.0W
FXO	+5V	1.2A	6.0W
	+12V	0.004A	0.05W
	-12V	0.037A	0.4W
	Total	1.241A	6.45W

- Diagnostics**

Activated from local or remote site (per channel quartet):

- Digital loopback toward local channels
 - Analog loopback toward remote channels
 - 1 kHz tone injection
- Auto self-test activated upon power-up and during normal operation

- Channel Connectors (one for all channels)**

- KVF.8/E&M: SCSI 68-pin female connector. Splitter cable supplied for 8 x RJ-45 connectors (CBL-KVF8/E&M)
- KVF.8/FXO, KVF.8/FXS: DB-25 female connector. Splitter cable supplied for 8 x RJ-11 connectors (CBL-KVF8/FXOS)

- DC PWR-IN Connector**

3-pin circular connector for input of required DC power source for feed and ring voltages

Note: a matching 3-pin plug for the user's DC power cable is provided.

- DL Connector**

3-pin terminal block connector for downloading software upgrades

Note: a matching CBL-KVF6/8-DL cable, with an RS-232 DB-9 connector for downloading software upgrades from a PC into the KVF.8's 3-pin terminal block DL connector, is provided with every module.

- Configuration**

Programmable via front panel and terminal interface, as well as via the RADview network management system

ORDERING

KM-2100M-KVF.8/*

8-Channel Analog Voice Compression Module for KM-2100/2104

* Specify voice interface:

E&M for 2-wire or 4-wire E&M

FXS for 2-wire FXS

FXO for 2-wire FXO

Note:

FXS modules require a -48 (-20 to -56) VDC source for feed and ring voltages. Certain E&M applications may also require -48 VDC.

The -48 VDC can be supplied by a KM-Ringer, Ringer-2000 or Ringer-2200. See separate Ringer data sheet for details and ordering information.

CBL-KVF8/E&M

Octopus cable for splitting the E&M module's SCSI 68-pin connector into 8 x RJ-45 connectors, for direct connection to user equipment. Cable length is 2m (6 ft).

CBL-KVF8/FXOS

Octopus cable for splitting the FXS and FXO modules' DB-25 connector into 8 x RJ-11 connectors, for direct connection to user equipment. Cable length is 2m (6 ft).



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