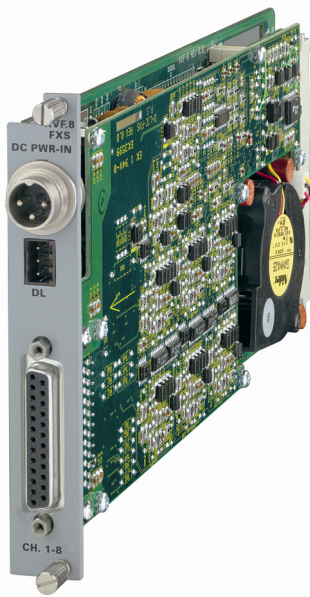


Kilomux-2100/2104

# KVF.8

## 8-Channel Analog Voice Compression Module



- Up to 96 analog voice channels in a single Kilomux-2100/2104 chassis
- Group III Fax relay at up to 14.4 kbps, with automatic rate fallback
- V.22 bis and V.32 bis modem data relay at 2.4 kbps to 14.4 kbps rates
- Selectable voice compression rates
- Low end-to-end delay

KVF.8 is a Kilomux-2100/2104 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 compress up to 96 voice channels. The smaller Kilomux-2104 chassis can be equipped with four modules to compress 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 required and the available main link bandwidth. For data rates of 6.4 kbps 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.

Digital compression of  
eight analog  
voice/fax/data modem  
channels



**data communications**

The Access Company

## KVF.8

### 8-Channel Analog Voice Compression Module

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 signaling supports four soft-selectable methods: EIA RS-464 Types I, II, III, and V (British Telecom SSDC5). The E&M signaling is passed inband within the compressed data. The E&M interface requires signaling voltage from an external -48 VDC source.

FXS interfaces require a -48 VDC source for telephone feed and ring voltages. The -48 VDC can be supplied by a KM-Ringer module, or Ringer-2000, or Ringer-2200N standalone 19-inch units. See separate *Ringer data sheet* for details and ordering information.

FXS and FXO interfaces enable operation in environments where call charge is required. Both of these interfaces feature reverse polarity for wink-start applications and also 12/16 kHz metering pulse detection and regeneration (see *Figure 1*).

Automatic voice/fax detection ensures that each channel can be used for both voice and fax. KVF.8 also features Group III fax support and automatic rate fallback to drop to the highest common rate supported by both faxes.

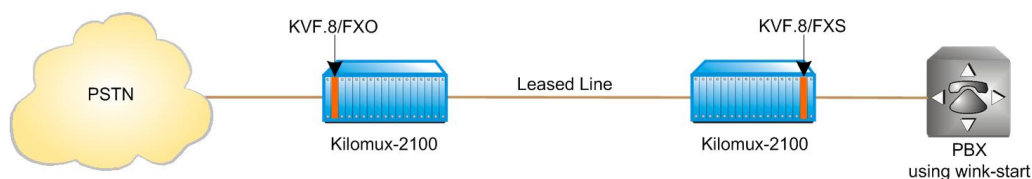


Figure 1. Direct Inward Dialing (DID) including Wink-Start with Reverse Polarity

Each KVF.8 channel also performs 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; for example, 14.4 kbps fax/modem data rate requires 16 kbps channel bandwidth.

KVF.8 is equipped with an integral echo canceller for cancelling the near-end hybrid echo. The echo canceller enables acceptable voice quality on voice lines with 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 can be enabled or disabled via the management system.

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  $1 \times 10^{-3}$  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. Automatic self-test is performed during power-up and 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 case, switching is performed by the PBX and requires compression and decompression to be carried out twice. KVF.8 with fax and data modem relay supports this application for voice, due to its high-quality compression technique.

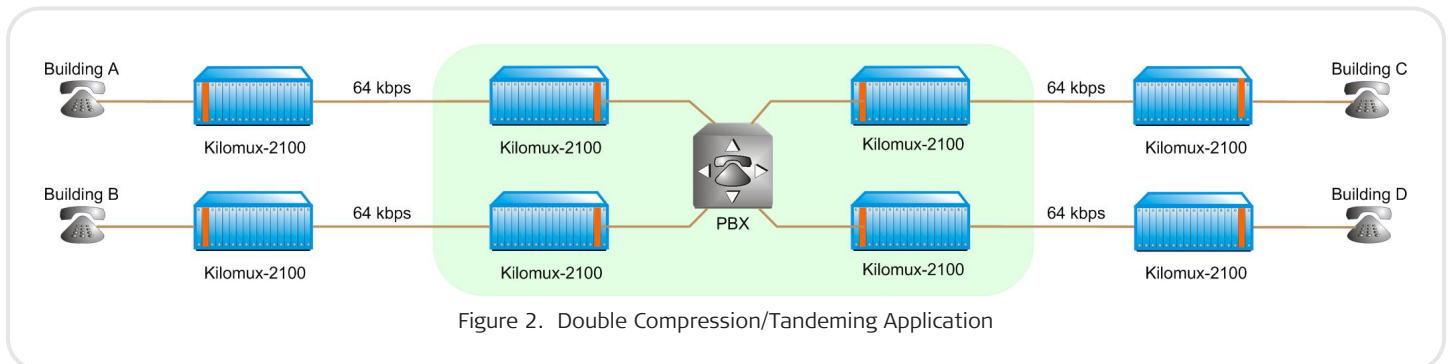


Figure 2. Double Compression/Tandeming Application

## 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)

See *Table 1*.

### Fax Compatibility

Group III according to ITU-T

Rec. T.4, T.30, V.29, V.27, V.27ter, V.17

### Data Modem Compatibility

V.22 bis, V.32 bis

### Supported Fax/Modem Data Rates at Selected Channel Rate

See *Table 2*.

(All with automatic rate fallback)

### End-to-End Processing Delay

Less than 100 msec

### Acceptable Channel Bit Error Rate

$1 \times 10^{-3}$  or better

### Analog Interface

KVF.8/E&M: 2-wire or 4-wire, soft-selectable

KVF.8/FXS, 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: 600Ω

Return loss: better than 20 dB

Frequency response (Ref 1020 Hz):

0 dB ±0.5 dB, 300-3000 Hz

0 dB ±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 ±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

(soft-selectable):

EIA RS 464 Type I;

EIA RS 464 Types II, III, and V (British Telecom SSDC5)

*Note: To support Types II, III, and V (SSDC5) signaling standards, a 48 VDC power supply is required.*

### Dial Pulse Distortion

±2 msec max

Table 1. Main Link Bandwidth Allocation

Ch Data Rate [kbps]	1-4 Channels [kbps]	5-8 Channels [kbps]
4.8	19.2	38.4
6.4	25.6	51.2
9.6	38.4	76.8
11.2	44.8	89.6
12.8	51.2	102.4
16	64	128

Table 2. Supported Data Rates

Ch. Rate: [kbps]	Fax/Modem Rates: [kbps]
4.8	2.4
6.4	2.4, 4.8
9.6	2.4, 4.8, 7.2
11.2	2.4, 4.8, 7.2, 9.6
12.8	2.4, 4.8, 7.2, 9.6, 12
16	2.4, 4.8, 7.2, 9.6, 12, 14.4

# KVF.8

## 8-Channel Analog Voice Compression Module

### 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 (10%) user selectable

#### Metering Pulse

Output frequency: 16 kHz, 12 kHz (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 $\Omega$  at 100 mA feed,

230 $\Omega$  at 25 mA feed

On-hook: above 1 M $\Omega$

#### Ring Detector

(20 k $\Omega$  @ 20 Hz, 70 VRMS)

Detection: >20 VRMS, 17-25 Hz

No detection: <5 VRMS

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

#### Power Consumption

See Table 3.

#### 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

KVF.8/FXO, KVF.8/FXS: DB-25, female.

#### DC PWR-IN Connector

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

#### DL Connector

3-pin terminal block connector for downloading software upgrades

#### Management

Programmable by the Supervision Terminal interface, or the RADview Network Management System

Table 3. Power Consumption

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

## KVF.8

## 8-Channel Analog Voice Compression Module

## Ordering

KM-2100M-KVF.8/\*

## Legend

\* Voice interface:

**E&M** single 100 to 240 VAC**FXS** single -48 VDC**FXO** dual 100 to 240 VAC

## SUPPLIED ACCESSORIES

**CBL-KVF8/E&M**

Octopus cable for splitting the E&M module 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/FXO module DB-25 connector into 8 x RJ-11 connectors, for direct connection to user equipment. Cable length is 2m (6 ft).

**CBL-Ringer-1**

Cable with a Ringer 3-pin DC output connector applying power to KVF.8 DC PWR-IN connector

**CBL-KVF6/8-DL**

Cable with an RS-232 DB-9 connector for downloading software upgrades from a PC to KVF.8 using the 3-pin DL connector.

## OPTIONAL ACCESSORIES

**KM-Ringer**, or **Ringer-2000**, or **Ringer-2200N** used as source for feed and ring voltages to FXS modules and certain E&M applications. See separate *Ringer data sheet* for details and ordering information.

Table 1. Kilomux-2100 Voice Modules Comparison Table

	<b>KVC.1M</b>	<b>KVF.4</b>	<b>KVF.6</b>	<b>KVF.8</b>
No. of Voice Channels	2	2	E1: 16 or 31 or, T1:12 or 24 (Ordering option)	8 (4+4)
Interfaces	E&M, FXS, FXSP, FXO	E&M, E&M/E, S0, S0/P, FXO, FXSP	E1 PBX or T1 PBX	E&M, FXS, FXO
Connectors	E&M: 8-pin RJ-45 FXS, FXO: 6-pin RJ-11	E&M, E&M/E, S0, S0/P: RJ-45, 8-pin, FXS, FXO, FXSP: RJ-11, 6-pin	8-pin RJ-45	E&M: SCSI 68-pin female FXO, FXS: DB-25, female (adapter cable required)
Channel Rates	16, 24, 32, 64 kbps	4.8, 6.4, 7.2, 9.6 or 12.8 kbps	4.8, 6.4, 9.6, 11.2, 12.8 or 16 kbps (configured in groups of 4 channels)	4.8, 6.4, 9.6, 11.2, 12.8, 16 kbps (configured in groups of 4 channels)

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