Kilomux-2100/2104

KVC.1M

PCM/ADPCM Voice Module

- Two analog voice channels
- ADPCM encoding at 16, 24 or 32 kbps
- PCM encoding at 64 kbps, A-Law
- Integral echo cancellation option
- Soft gain control for both receive and transmit

KVC.1M is a voice module transmitting high quality voice over the Kilomux link.

KVC.1M digitizes the analog voice traffic using either the PCM or ADPCM technique. When using PCM, voice is digitized at 64 kbps, A-law. When using ADPCM, voice is digitized at selectable rates of 16, 24 or 32 kbps, according to the quality desired and the available main link bandwidth. The Kilomux main link bandwidth is limited to 768 kbps when operating with KVC.1M modules.

Perfect toll quality reproduction is guaranteed when using PCM or 32 kbps ADPCM, complying with ITU G.711 and G.721, respectively. High quality voice reproduction is attained at 16 and 24 kbps, ADPCM.

KVC.1M may be ordered with any of the following analog interface modules (see *Ordering*):

- 2-wire or 4-wire E&M, for connection to PBX tie lines
- 2-wire FXS loop start for direct connection to a telephone set
- 2-wire FXSP for FXS interface with phantom DC feed built-in
- 2-wire FXO loop start for direct connection to a PBX extension line.

The 2-wire or 4-wire E&M module supports five strap-selectable signaling types: EIA RS-464 Types I, II, III and V (British Telecom SSDC5).

Transmits high quality voice over the Kilomux link

RAD
data communications
The Access Company

An external Ringer-2000 or KM-Ringer unit is required to provide ring and battery voltage feed for KVC.1M/E&M/48 and KVC.1M/FXS modules (see *Ringers data sheet* for details). For an FXS interface that does not require an external ringer, the FXSP module option can be ordered (this option limits the distance to the telephone).

KVC.1M supports polarity reversal and transmission of 16 kHz metering pulses. This is available for the FXS, FXO and FXSP interfaces only. 12 kHz metering can be provided upon customer request.

KVC.1M can be ordered with an integral echo canceller for canceling the near-end hybrid echo. The echo canceller may be enabled or disabled via the management system. The module is also equipped with a Hamming code forward error correction for checking the most vital speech information bits. Voice quality is maintained, even at a channel bit error rate of 1×10^{-3}.

KVC.1M also permits fax transmission. Operating at 64 kbps PCM or 32 kbps ADPCM, a 9.6 kbps fax may be transmitted. At 24 kbps ADPCM, a 4.8 kbps fax may be transmitted, and at 16 kbps ADPCM, a 2.4 kbps fax may be transmitted.

Diagnostics include local digital loopback toward the local analog interface, and analog loopback toward the remote site. Tone injection for testing is also available. Automatic self-test is performed during power-up and during normal operation.

Each analog voice channel terminates on a separate 8-pin RJ-45 connector for the KVC.1M/E&M, or a 6-pin RJ-11 connector for the KVC.1M/FXS, FXO, and FXSP.
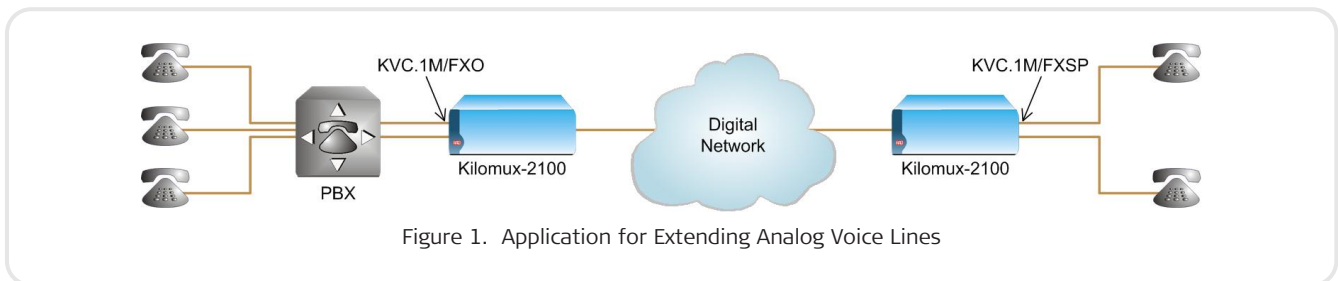
Figure 1. Application for Extending Analog Voice Lines

Specifications

Number of Channels
2

Voice Digitizing Technique
32 kbps ADPCM per ITU G.721 and ANSI T1.303
16/24 kbps ADPCM per ANSI T1.303
64 kbps PCM, A-Law per G.711

Echo Canceller (optional)
Echo path length: 32 msec
Echo return loss enhancement (ERLE): >30 dB
Convergence speed:
Better than ITU G.165

Main Link Bandwidth Allocation
Selectable, according to digitizing method:
16 to 64 kbps per channel

Note: KVC.1M can operate with main link rates of up to 768 kbps only.

Diagnostics
Digital loopback (toward local)

Analog loopback (toward remote)

1 kHz tone injection

Indicators (per channel)
E&M: E-lead, M-lead
FXS, FXSP: REM call, LOC O.H.
FXO: RING, REM O.H.

Connectors (per channel)
KVC.1M/E&M: 8-pin RJ-45
KVC.1M/FXS, FXO: 6-pin RJ-11

Management
Programmable via RADview or via Telnet,
PC/ASCII terminal

ANALOG PARAMETERS

Interface
KVC.1M/E&M: 2-wire or 4-wire
KVC.1M/FXS, FXO, FXSP: 2-wire

ITU Standard (32, 64 kbps)
4-wire: G.712, G.714
2-wire: G.713

Nominal Level
0 dBm

Nominal Impedance
600Ω

Return Loss (at 300 to 3400 Hz)
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
Steps: 1 dB (±0.15 dB)

E&M: Tx: +7 to -17 dBm, Rx: +1 to -17 dBm
FXS, FXSP: Tx: +8 to -13 dBm Rx: +2 to -17 dBm
FXO: Tx: +5 to -16 dBm Rx: -1 to -17 dBm

Signal to Total Distortion
(G.712, G.713 method 2)

At 32, 64 kbps:

- 0 to -30 dBm0: better than 33 dB

- +3 to -45 dBm0: better than 22 dB

At 16, 24 kbps:

- 0 to -30 dBm0: better than 25 dB

- +3 to -45 dBm0: better than 14 dB

Idle Channel Noise
At 32, 64 kbps: better than -70 dBm0
At 16, 24 kbps: better than -58 dBm0

Transformer Isolation
1500 VRMS

SIGNALING

KVC.1M/E&M
EIA RS-464 Type I; Modified EIA RS-464 Types II, III, and V (BT SSDC5) with -12V or -48V
Dial pulse distortion: ±2.5 msec max

KVC.1M/FXS or FXSP
EIA RS-464 Loop start
On-hook/Off-hook threshold between TIP and RING:

- Off-hook: 3V to 38V

- On-hook: 40V to 48V

- Feed Current: (with KM-Ringer) 23 mA (±10%) for current feed

- Ringer: (with KM-Ringer) 54 VRMS (FXS)/ 23(FXSP) VRMS (±10%), overload protected, 22 Hz (±10%), 1 sec. ON/ 3 sec. OFF

KVC.1M/FXO
EIA RS-464 Loop start
DC Impedance:

- Off-hook: 100 Ω at 100 mA feed, 230Ω at 25 mA feed

- On-hook: above 1 MΩ

Ring Detector: 20 kΩ @ 20 Hz, 70 VRMS

- Detection: >20 VRMS, 17–25 Hz

- No detection: < 5 VRMS

KVC.1M

PCM/ADPCM Voice Module

Ordering

KM-2000M-KVC.1M/#/*

Legend

Echo Cancellation: (Default=no EC):

EC	with Echo Cancellation

* Analog interface:

E&M	2/4-wire E&M, -12V
E&M48	2/4-wire E&M, -48V
E&M/POS	2/4-wire E&M, -12V positive E&M signaling
E&M/PML	2/4-wire E&M, -12V positive M-lead signaling
FXS	2-wire FXS
FXSP	FXS with Internal Ringer
FXO	2-wire FXO

Note: *KM-Ringer or Ringer-2000 is required to support the FXS and the E&M/48 interfaces.*

Table 3. Kilomux-2100/2104 Voice Modules Comparison Table

	KVC.1M	KVF.4	KVF.6	KVF.8
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)
Voice Codecs	ADPCM/PCM G.721/G.711	MPMLQ G.723.1	MPMLQ G.723.1	MPMLQ G.723.1