

VC-4/4A, VC-8/8A, VC-16

Specifications

Number of Voice Channels

VC-16: 16

VC-8, VC-8A: 8

VC-4, VC-4A: 4

Voice Encoding Technique

PCM: per ITU-T G.711 and AT&T

Pub. 43801, μ -law or A-law

ADPCM: per ITU-T G.726 and G.727,

μ -law or A-law

Bandwidth Requirement

PCM: 64 kbps (one timeslot) per enabled channel

ADPCM:

32 kbps per enabled channel (one timeslot per pair of channels) as per G.726 and G.727

24 kbps per enabled channel (one timeslot per pair of channels) as per G.727 (when using RBF or RBMF inband signaling)

Analog Interface

Line type:

E&M: 4-wire or 2-wire (soft-selectable)

FXS, FXO: 2-wire

ITU-T standard: G.712

Connectors: see *Table 3*

Analog Parameters

Nominal level: 0 dBm

Nominal impedance: 600 Ω

Return loss (ERL) at 300 to 3400 Hz:
better than 20 dB

Frequency response (Ref:1020 Hz):
 ± 0.5 dB at 300 to 3000 Hz
 ± 1.1 dB at 250 to 3400 Hz

Level adjustment (soft-selectable):
see *Table 1*.

Steps: 0.5 dB (± 0.15 dB), nominal

Signal to total distortion (G.712):

-30 to 0 dBm0: better than 33 dB

-45 to +3 dBm0: better than 22 dB

Idle channel noise: better than -65 dBm0
(+25 dBnc)

Transformer isolation: 1500 VRMS

Far-end cross-talk (2W&4W) : -65dBm0
max

Go-to-return cross-talk (4W): -60dBm0
max

Adaptive Echo Canceller

Delays of up to 4 msec per channel, as per G.168 (VC-4A, VC-8A only)

Power Consumption

See *Table 2*

E&M INTERFACE

Signaling Method (selectable)

EIA RS-464 Type I;

EIA RS-464 Types II, III, and

V (British Telecom SSDC5) using -12 VDC in place of -48 VDC

Note: For full support of Types II, III, and V (SSDC5) signaling standards, -48 VDC power supply is required.

Pulse Dial Distortion

± 2 msec max

FXS INTERFACE

Signaling Methods

PCM: EIA RS-464 loop-start or wink-start

ADPCM: EIA RS-464 loop-start

On-Hook/Off-Hook Threshold

(where V_{in} = -20 to -54 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

Table 1. Transmit and Receive Levels for Voice Interfaces

Interface	Transmit [dbm]		Receive [dbm]	
	min	max	min	max
E&M regular	-8	+5	-17	+3.5
E&M 4W enhanced	-17	+5	-17	+9
FXS	-5	+5	-17	+1
FXO	-3.5	+5	-17	+1

Loop Resistance

Min: 300Ω

Max: 1600Ω

Feed Current

23 mA (±10%) per active channel

Ringer54 VRMS, 22 Hz (±10%); Overload protected,
1 second ON, 3 seconds OFF**Metering Pulse Generation**Output frequency: 12 or 16 kHz (±2 Hz),
selectable

Output level: 1.7 VRMS

*Note: Metering pulse generation is not available in
the ADPCM mode.***Reverse Polarity Pulse Distortion**

6 msec max

-48 VDC (nominal) Current**Consumption**

30 mA (±10%) per active channel

(a full VC-16/FXS module consumes 480

mA; a full VC-8/FXS consumes 240 mA)

Number of Channels

Ringer-2100R: up to 40

Ringer-2000: up to 100

Ringer-2200N: up to 200

FXO INTERFACE**Signaling Methods**

PCM: EIA RS-464 loop-start or wink-start

ADPCM: EIA RS-464 loop-start

DC Impedance

Off-Hook:

100Ω 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

Metering Pulse Detection Frequency

12 or 16 kHz (±200 Hz), soft-selectable

*Note: Metering pulse detection is not available in
the ADPCM mode.***Reverse Polarity Pulse Distortion**

6 msec max

GENERAL**End-to-End Signaling**

T1 links:

RBMF: 667 samples per second with

D4; 333 samples per second with ESF

RBF

E1 links:

CAS per ITU-T G.704 para. 3.3.3.2

Table 2. Power Consumption for Various interfaces

Module	Power Consumption [W]		
	FXS	FXO	E&M
VC-4	2.5	1.9	2.8
VC-4A	3.3	2.7	3.6
VC-8	2.8	2.0	3.4
VC-8A	3.7	2.8	4.2
VC-16	4.7	2.5	5.2

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Diagnostics

Local digital loopback for each channel, towards the local user equipment

Note: In ADPCM mode, the local digital loopback towards the local user equipment is performed for each pair of consecutive channels (1-2, 3-4, etc.)

Remote digital loopback for each channel, towards the remote user equipment

1 kHz, 0 dBm0 test tone injection for each channel, towards the remote user equipment

1 kHz, 0 dBm0 backward test tone injection for each channel, towards the local user equipment

Environment

Operating temperature: -10°C to +55°C
(-14°F to 131°F)

Storage temperature: -20°C to +70°C
(-4°F to +160°F)

Humidity: up to 95%, non-condensing

Table 3. VC Module Connectors

Module	E&M Interface	FXO/FXS Interface
VC-4, VC-4A	RJ-45 connector per channel	RJ-12 connector per channel
VC-8, VC-8A	68-pin female SCSI connector for all channels	1 x 50-pin female TELCO connector for all channels
VC-8/DS	2 x 68-pin female SCSI connectors, - one per group of 4 channels	-
VC-8/RJ/POS/24	RJ-45 connector per channel	RJ-12 connector per channel
VC-16	2 x 68-pin female SCSI connectors, one per group of 8 channels	1 x 50-pin female TELCO connector for all channels

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Ordering

RECOMMENDED CONFIGURATIONS

MP-2100M-VC-4/E&M

4-Channel PCM voice module with E&M interface

MP-2100M-VC-4/FXO

4-Channel PCM voice module with FXO interface

MP-2100M-VC-4/FXS

4-Channel PCM voice module with FXS interface

MP-2100M-VC-8/E&M

8-Channel PCM voice module with E&M interface

MP-2100M-VC-8/FXO

8-Channel PCM voice module with FXO interface

MP-2100M-VC-8/FXS

8-Channel PCM voice module with FXS interface

MP-2100M-VC-16/E&M

16-Channel PCM voice module with E&M interface

MP-2100M-VC-16/E&M/4WIRE

16-Channel PCM voice module with E&M interface and enhanced gain levels

MP-2100M-VC-16/FXO

16-Channel PCM voice module with FXO interface

MP-2100M-VC-16/FXS

16-Channel PCM voice module with FXS interface

SPECIAL CONFIGURATIONS

Please contact your local RAD partner for additional configuration options.

OPTIONAL ACCESSORIES

Octopus cables for splitting the high-density module (VC-8 and VC-16) connector(s) into separate channels with RJ-12/RJ-45 connectors, for direct connection to user equipment. Default cable length is 2m (6 ft).

CBL-VC16/FXS0

Cable with 16 x RJ-12 connectors, for splitting the VC-16/FXS or VC-16/FXO single 50-pin Telco connector

CBL-VC8/FXS0

Cable with 8 x RJ-12 connectors, for splitting the VC-8/FXS or VC-8/FXO single 50-pin Telco connector

CBL-KVF8/E&M

Cable with 8 x RJ-45 connectors, for splitting a single VC-8/E&M or VC-16/E&M 68-pin SCSI connector, 2m long

CBL-KVF8/E&M/4METER

Cable with 8 x RJ-45 connectors, for splitting a single VC-8/E&M or VC-16/E&M 68-pin SCSI connector, 4m long

CBL-KVF8/E&M/10METER

Cable with 8 x RJ-45 connectors, for splitting a single VC-8/E&M or VC-16/E&M 68-pin SCSI connector, 10m long

CBL-KVF8/E&M/12METER

Cable with 8 x RJ-45 connectors, for splitting a single VC-8/E&M or VC-16/E&M 68-pin SCSI connector, 12m long

CBL-KVF8/E&M/25METER

Cable with 8 x RJ-45 connectors, for splitting a single VC-8/E&M or VC-16/E&M

68-pin SCSI connector, 25m long

CBL-KVF8/E&M/OPEN

Open-end cable with stranded core, for splitting a single VC-8/E&M or VC-16/E&M 68-pin SCSI connector, 2m long

CBL-KVF8/E&M/OPEN/4METER

Open-end cable with stranded core, for splitting a single VC-8/E&M or VC-16/E&M 68-pin SCSI connector, 4m long

CBL-KVF8/E&M/OPEN/10METER

Open-end cable with stranded core, for splitting a single VC-8/E&M or VC-16/E&M 68-pin SCSI connector, 10m long

CBL-KVF8/E&M/OPEN/12METER

Open-end cable with stranded core, for splitting a single VC-8/E&M or VC-16/E&M 68-pin SCSI connector, 12m long

CBL-KVF8/E&M/OPEN/25METER

Open-end cable with stranded core, for splitting a single VC-8/E&M or VC-16/E&M 68-pin SCSI connector, 25m long

CBL-KVF8/E&M/OPEN/SOLID/12METER

Open-end cable with solid core, for splitting a single VC-8/E&M or VC-16/E&M 68-pin SCSI connector, 12m long

Note: Order these cables only for applications that do not need "Signaling Battery" and "Signaling Ground" functionality.

When ordering FXS or E&M modules, a **RINGER** may be required (see *Ringer data sheet* for ordering)

Note: FXS modules require a -48 VDC (nominal) source for feed and ring voltages. This power can be provided by a Ringer-2000/2200N unit or Ringer-2100R module. E&M applications may also require -48 VDC. -48 VDC-powered chassis, or AC-powered MP-2104 chassis with built-in ringer option, do not require an additional Ringer.

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