



CL-MD9624ECT

Preliminary Product Bulletin

FEATURES

■ Data modem modes

- CCITT: V.22 bis, V.22, and V.21
- Bell®: 212A and 103
- Speeds: 2400, 1200, and 300 bps
- Industry-standard 'AT' command set

■ Fax modem send and receive modes

- CCITT: V.29, V.27 ter, and V.21 ch2
- Speeds: 9600, 7200, 4800, 2400, and 300 bps
- Supports Group 3 fax
- Data/Fax EIA/TIA-578 Class 1 'AT' command set

■ Voice mode

- Embedded voice mode 'AT' command set
- Auto-recognition (fax/voice) answer mode
- 3- and 4-bit ADPCM, and A-law compression

■ Telephone emulation

■ Microphone interface

■ V.42/MNP® protocols

- Error correction: V.42 and MNP® 2-4
- Data compression: V.42 bis and MNP® 5

■ Two built-in DTE (data terminal) interfaces

- Parallel 16C550A/16C450 register-compatible UART
 - Enhances Windows compatibility
 - Built-in COM 1-4 address decoding
 - Direct connection to PC ISA Bus
- Serial RS-232 (V.24)

■ Low power requirement

- Automatic sleep (power-down) and wake-up
- Operates from a single +5V power supply
- Typical power requirements:
 - Operating power: 330 mW
 - Sleep mode: 15 mW
 - Stop mode: < 1 mW

(cont.)

Data/Fax/Voice Modem Device Set

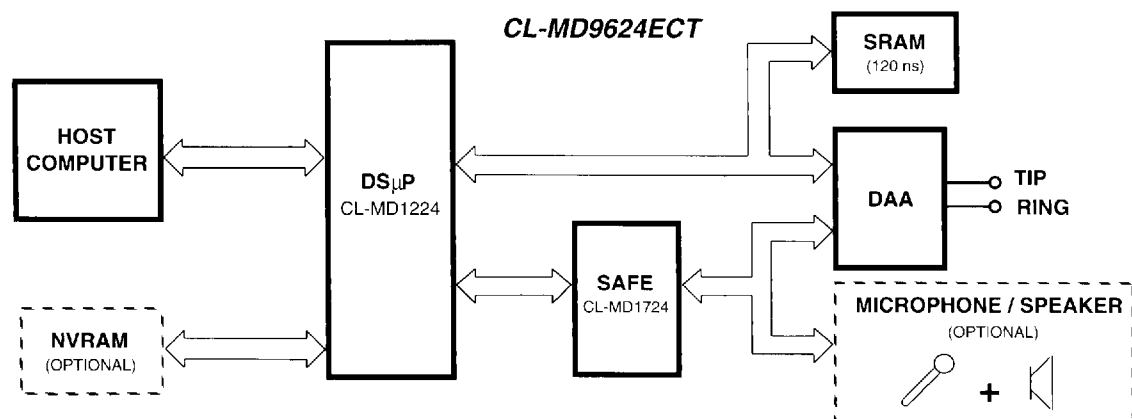
OVERVIEW

The Cirrus Logic CL-MD9624ECT is a complete, intelligent, multi-mode modem combining data, fax, and voice features in only two devices, the CL-MD1224 and CL-MD1724.

The CL-MD9624ECT operates up to 9600 bps (transmit and receive) as a fax modem, and up to 2400 bps as a data modem. The device set provides a complete solution not requiring any additional firmware development. The CL-MD9624ECT is intended for both stand-alone and integral data/fax/voice modem applications.

This device set provides all of the features of the CL-MD9624EC2, plus a microphone interface that reduces the hardware requirements for a microphone or handset. This allows the modem and microphone-speaker or handset to be used as a dictaphone or complete telephone with a minimum of additional parts. In addition, three voice-mode compression formats (A-Law, 3- and 4-bit ADPCM) provide flexibility for optimizing system quality and performance during playback and record modes.

(cont.)



CL-MD9624ECT Functional Block Diagram



CL-MD9624ECT

Intelligent Data/Fax/Voice Modem Device Sets

FEATURES (cont.)

- No external microprocessor required
- Accommodates additional data buffering
- Data, fax, and voice application software available through third party software vendors
- DTMF and tone generation/detection
- Analog, local, and remote digital loopback tests
- Automatic adaptive and fixed compromise equalizers
- Non-volatile RAM (NVRAM) interface
- Direct connection to a speaker
- Expansion bus
- PCMCIA-compatible packages available
- Small package dimensions
 - DSμP (CL-MD1224): 100-pin PQFP or 100-pin VQFP
 - SAFE (CL-MD1724): 44-pin VQFP

APPLICATIONS

- Notebook computers
- Laptop computers
- Integral modems
- Box modems
- Pocket modems
- PCMCIA cards

ADVANTAGES

Unique Features

- *Lowest chip count to support data/fax/voice*
- *Voice mode*
- *Microphone interface*
- *Telephone-emulation mode*
- *16C550A register-compatible UART*
- *Small package sizes*
- *Sleep and stop mode*
- *Accommodates external data buffering*
- *Direct connection to PC ISA bus*
- *Requires a single +5V power supply*

OVERVIEW (cont.)

An extended data and fax 'AT' command set interpreter is embedded in the device sets, allowing system designers to develop a Hayes[®]-compatible modem with a minimum of effort. The device set provides V.42/MNP[®] 2-4 error correction and V.42 bis/MNP[®] 5 data compression to ensure fast error-free data transfer during data modem connections.

The CL-MD9624ECT implements the EIA/TIA-578 Class 1 Standard fax 'AT' command set standards that allow any DTE to communicate with Group 3 fax machines. A voice-mode 'AT' command set is also provided to allow a host computer and a CL-MD9624ECT modem to emulate a telephone answering machine.

The Sigma-Delta Analog Front End (SAFE) device — the CL-MD1724 — incorporates a unique and proprietary Sigma-Delta design.

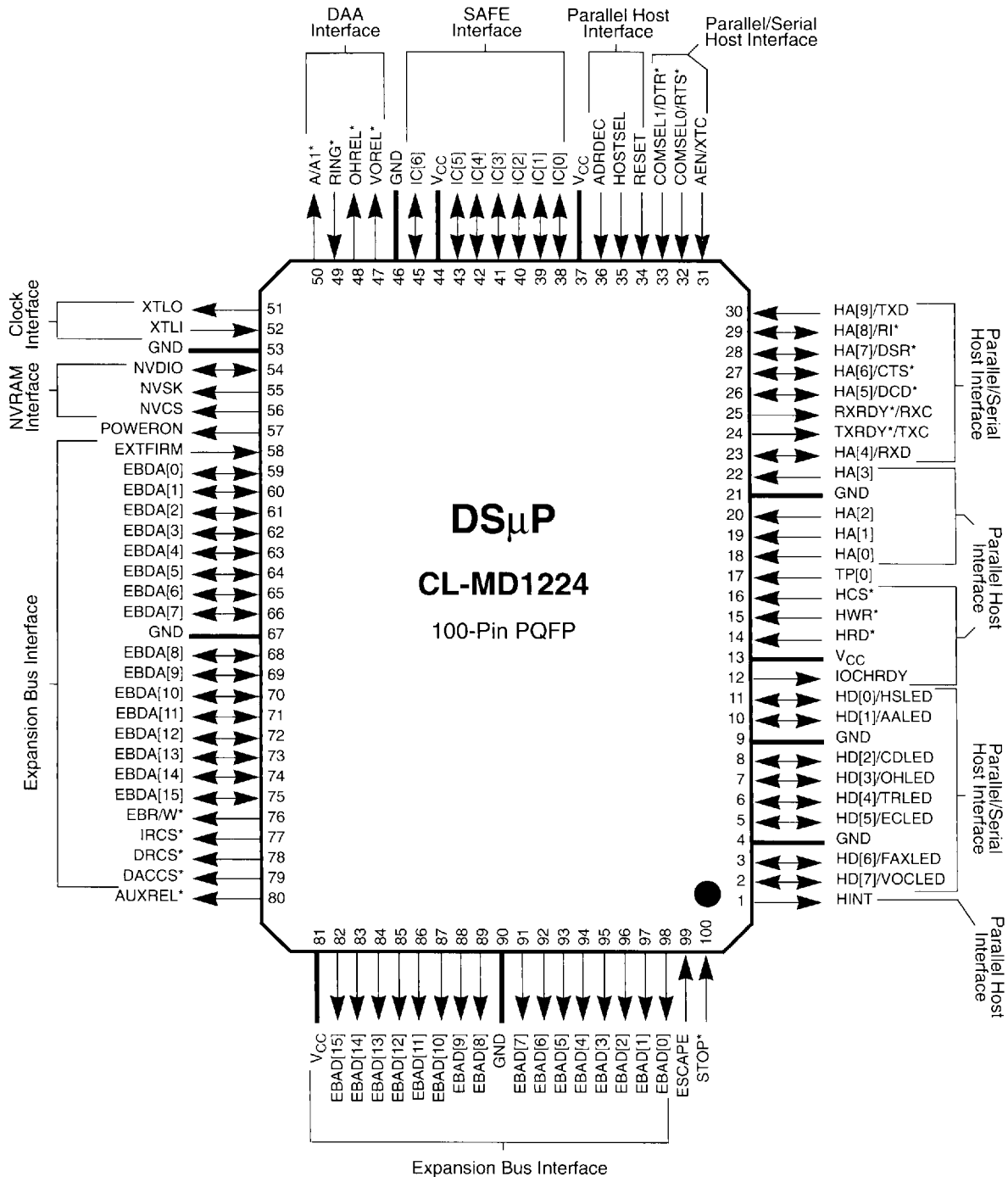
Low power requirements and small package dimensions make the CL-MD9624ECT ideal for laptop computers, notebook computers, pocket modem, and PCMCIA applications.

Benefits

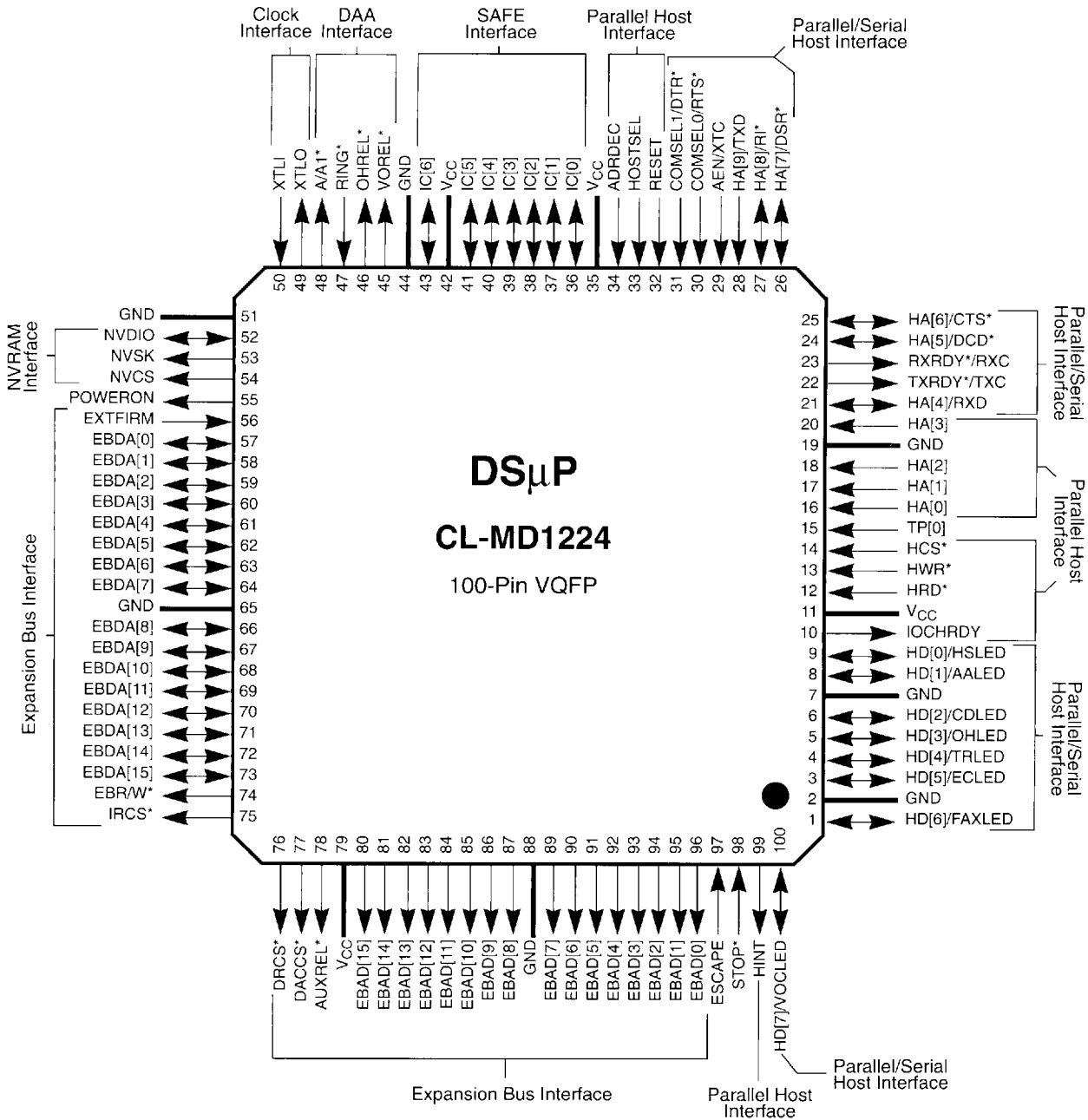
- Reduces overall system chip count.
- System can emulate an answering machine.
- Reduces hardware requirements for external microphone or handset.
- System can be used as a telephone.
- Supports enhanced communication software for improved data throughput.
- Minimizes board area (e.g., PCMCIA cards).
- Substantially reduces power consumption by over 99 percent.
- Reduces background mode data loss when host interrupts are temporarily disabled.
- Eliminates the need for bus drivers and address decoding logic.
- Simplifies board design.

CL-MD9624ECT

Intelligent Data/Fax/Voice Modem Device Sets



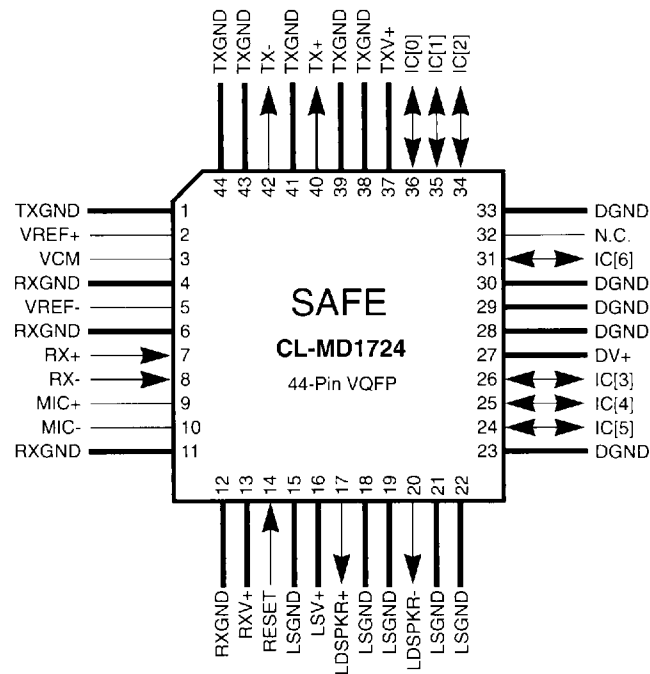
The CL-MD1224 100-Pin PQFP Pinout



The CL-MD1224 100-Pin VQFP Pinout

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Intelligent Data/Fax/Voice Modem Device Sets



The CL-MD1724 44-Pin VQFP Pinout

Table 1. Cirrus Logic Modem Products

Device Set	Features
CL-MD9624AT	Basic modem that provides a 2400-bps data mode, and 9600-bps fax and voice modes (with two built-in DTE interfaces — serial RS232 and parallel 16C450A/16C550-compatible interface registers that can be connected directly to an ISA bus).
CL-MD9624EC2	Same features as the CL-MD9624AT, plus error correction (V.42 and MNP 2-4) and data compression (V.42 bis and MNP 5).
CL-MD9624ECT	Same features as the CL-MD9624EC2, plus a microphone interface and phone-emulation mode.
CL-MD9624ECP	Same features as the CL-MD9624ECT, except built-in PCMCIA interface with 16C450-/16C550-compatible registers, (i.e., does not support parallel ISA bus and serial RS232 host interfaces).

Table 2. Basic Data Modem 'AT' Commands

Command	Default	Function
A/	**	none
A	none	Repeat last command
Bn	*	1
Cn	1	Select CCITT or Bell
D	none	Carrier control option
En	*	1
Fn	1	Dial command
Hn	0	Command mode echo
In	0	On-line echo
Kn	0	Switch hook control
Ln	0	Identification/checksum
Mn	none	Buffer control
Nn	*	2
On	*	1
P	*	1
Qn	*	0
Sn	none	Speaker volume control
Sn=x	none	Speaker control
Sn?	none	Select data rate handshake
?	none	Go on line
T	*	0
Vn	*	none
Xn	*	1
Yn	*	4
Zn	*	0
&Cn	*	0
&Dn	*	1
&F	none	DCD option
&Gn	*	2
&Jn	*	0
&Mn	*	0
&Pn	*	0
&Qn	*	0
&Sn	*	0
&Tn	0	Load factory defaults
&Vn	0	Guard tone option
&Wn	0	Auxiliary relay control
&Yn	*	0
&Zn=x	none	Communication mode option
%En	*	0
		Dial pulse ratio
		Communication mode option
		DSR option
		Self-test commands
		View active configuration and stored profiles
		Store active profile
		Select stored profile on power up
		Store telephone number
		Auto-retrain control

Table 3. Fax Identity and Test 'AT' Commands

Command	Function
+FMFR?	none
+FMDL?	none
+FREX?	none
+FTTn	none
+FRTn	none

Table 4. Data/Fax Class 1 'AT' Commands

Command	Function
+FCLASS?	Mode query
+FCLASS=n	Fax mode selection
+FCLASS=?	Supported modes
+FRH=<mod>	Receive HDLC data
+FRM=<mod>	Receive data
+FRS=<time>	Wait for silence
+FTH=<mod>	Transmit HDLC data
+FTM=<mod>	Transmit data
+FTS=<time>	Stop transmission and pause

Table 5. Voice Mode 'AT' Commands

Command	Default	Function
#VBP	none	Generate beep tone
#VCL=n	0	Voice mode selection
#VIP=n	0	Initialize parameter
#VLN=n	0	Relay/speaker control
#VPH	none	Phone-emulation mode
#VPL=n	127	Play level
#VPY	none	Play mode
#VRD	none	Record mode
#VRL=n	127	Recording level
#VSM=n	CL1	Sampling mode
#VSR=n	9600	Sampling rate

Table 6. V.42, MNP 'AT' Commands

Command	Default	Function
%An *	13	Set auto-reliable fallback character
%Cn *	1	MNP 5 data compression control
\An *	3	MNP block size
\Bn	none	Transmit break
\Cn *	0	Set auto-reliable buffer
\Gn *	0	Set modem port flow control
\Jn *	0	Bps rate adjust control
\Ln	0	Select MNP block/stream link
\Kn *	5	Set break control
\Nn *	3	Set operating mode
\O	none	Originate reliable link
\Qn *	3	Set serial port flow control
\Tn *	0	Set inactivity timer
\U	none	Accept reliable link
\Vn *	2	Modify result code form
\Xn *	0	Set XON/XOFF passthrough
\Y	none	Switch to reliable mode
\Z	none	Switch to normal mode
-Jn *	1	Set V.42 detect phase
"Hn *	3	V.42 bis compression control
"On	16	V.42 bis string length

* Value Saved in NVRAM

** Command not preceded by an 'AT'.

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Intelligent Data/Fax/Voice Modem Device Sets



Table 7. Dial Modifiers

Command	Function
0 to 9	Dialing digits
A,B,C, D, *, #	Tone dial characters
P	Pulse dial
R	Reverse originate mode
S=n	Dial NVRAM telephone number
T	Tone dial
W	Wait for dial tone
,	Pause
!	Flash hook
@	Wait for quiet answer
;	Return to idle state
- ()	Ignored by modem

Table 8. S-Registers Summary

Register		Default	Function
S0	*	0	No. of rings to auto-answer on
S1		0	Ring count
S2	*	43	Escape character
S3		13	Carriage return character
S4		10	Line feed character
S5		8	Backspace character
S6	*	2	Wait before blind dialing
S7	*	30	Wait for carrier/dial tone
S8	*	2	Pause time for dial modifier
S9	*	6	Carrier detect recovery time
S10	*	14	Lost carrier hang up delay
S11	*	70	DTMF dialing speed
S12	*	50	Guard time
S13		none	Reserved
S14	*	none	Bit-mapped options
S15		none	Reserved
S16	*	none	Modem test options
S17		none	Reserved
S18	*	0	Modem test timer
S19		none	Reserved
S20		none	Reserved
S21	*	none	Bit-mapped options
S22	*	none	Bit-mapped options
S23	*	none	Bit-mapped options
S24		none	Reserved
S25	*	5	Detect DTR change
S26	*	1	RTS to CTS delay interval
S27	*	none	Bit-mapped options
S28	*	none	Reserved
S29	*	none	Reserved
S30	*	10	Sleep mode timer

* Value Saved in NVRAM

Table 9. Basic Response Codes (IV0)

Numeric Code	Verbose Code
0	OK
1	CONNECT
2	RING
3	NO CARRIER
4	ERROR
5	CONNECT 1200
6	NO DIAL TONE
7	BUSY
8	NO ANSWER
10	CONNECT 2400
+F4	+FCERROR

Table 10. Modified Response Codes (IV1)

Numeric Code	Verbose Code
22	CONNECT 300/REL
24	CONNECT 1200/REL
25	CONNECT 2400/REL

Table 11. V.42 Extended Response Codes (IV2)

Numeric Code	Verbose Code
32	CONNECT 300/REL-MNP
34	CONNECT 1200/REL-MNP
35	CONNECT 2400/REL-MNP
42	CONNECT 300/REL-MNP 5
44	CONNECT 1200/REL-MNP 5
45	CONNECT 2400/REL-MNP 5
52	CONNECT 300/REL-LAPM
54	CONNECT 1200/REL-LAPM
55	CONNECT 2400/REL-LAPM
62	CONNECT 300/REL-LAPM V.42 BIS
64	CONNECT 1200/REL-LAPM V.42 BIS
65	CONNECT 2400/REL-LAPM V.42 BIS