



- Provided With Modem Integrator, Bundling V.42, V.42bis, V.14 and Rate Control Logic Together to Facilitate Integration
- Tuned to Operate on the Worst Case of Bell3002 Channel and on CONUS Poor Voice Channel With Low SNR and Other Channel Distortions
- Echo Canceller Suppresses Both Near and Far Echoes With Far Echo Frequency Shift up to 14 HZ
- Includes Retrain, Rate Renegotiation Request and Automodem Options
- Input Signal is Filtered via a Band Pass Filter With Hibert Transformer Eliminating the Need for a Separate DC Offset Filter
- Direct Interface With PCM 8-kHz Sampled Data. Both Sample-By-Sample and Block-Based Processing Supported
- Easily Interfaces With HDLC Protocols
- eXpressDSP-Compliant Algorithm. Code is Reentrant, Supports Multithreading and Dynamic Memory Allocation. At the Same Time Allows Direct (Non- eXpressDSP) Interface to Enable Static Memory Allocation
- 8-kHz Sampling Rate
- Can be Easily Ported to any Platform

**description**

The SPIRIT Data Modem algorithm includes ITU–T V.22, V.22bis, V.32, and V32bis modes and is used to transmit data at rates up to 14.4 kbps.

**resource requirements (see Notes 1 and 2)**

PEAK MIPS	PROGRAM MEMORY (KWORDS)	CONST MEMORY (KWORDS)	DYNAMIC MEMORY (WORDS)
14	14.1	2.835	(2244 + Far Echo Delay x 2.4) x Number of channels

- NOTES: 1. Far Echo Delay parameter means the maximum delay (in milliseconds) of for each signal that could be suppressed by the modem. The modem reserves the buffer and saves the transmitted signal to cancel it later. To save one second of the signal, the buffer size needs to be 2400 words.
2. MIPS requirements are given for 14400 bps rate.

**availability**

The Data Modem is available in five forms:

- eXpressDSP-compliant object code for TMS320C54x
- Fully functional eXpressDSP evaluation object at extremely low price
- Portable C code
- Assembly code

The algorithm is supplied with test environment and integration example code.

Detailed product annotation and user guide documents describing testing procedures, interface and integration of this product, as well as PC-based and DSP-based (TI TMS320VC5406 EVM and TMS320VC5402 DSK) demos are available for evaluation upon request. To get additional information on CST software, go to [www.spiritdsp.com/CST](http://www.spiritdsp.com/CST).



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# TMS320C54CST DATA MODEM ALGORITHM

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## performance

Dynamic range	55 dB
Distortion compensation	S3002 Line worst case, CONUS Poor Voice etc.
Phase Jitter	40 deg at 50 to 120 Hz
Frequency offset	± 10 Hz
Baud frequency offset	± 0.01 %
Far Echo Frequency offset (V.32/32bis)	± 14 Hz
Far Echo Delay (V.32/32bis)	Up to 2 sec
Echo suppression	60 dB

BER =  $10^{-5}$  at Flat Channel

PROTOCOL	SNR
V.32bis 14400	24 dB
V.32bis 12000	21 dB
V.32bis 9600	17 dB
V.32bis 7200	14 dB
V.32 9600	19 dB
V.32 4800	12 dB
V.22bis 2400	14 dB
V.22 1200	7 dB

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