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dsPIC30F Soft Modem Library

Summary

The Microchip data modem library is composed of ITU-T compliant algorithms for V.21, V.22, V.22bis, V.23, V.32 and V.32bis modem recommendations. Bell standard 103 is also included in this library.

V.21, V.23 and Bell 103 are Frequency Shift Keying (FSK) modems. V.32, V.32bis and V.22bis are Quadrature Amplitude Modulated (QAM) modems. V.22 is a Quadrature Phase Shift Keyed (QPSK) modem. V.21, V.22, V.22bis, V.32 and V.32bis are all 2-wire, Full Duplex modems. V.23 is Full-Duplex when it operates with a 75 bps backwards channel.

V.22bis includes fallback to V.22, V.23 and V.21 standards. V.32bis optionally falls back to V.22bis, V.22, V.23 and V.21 standards.

Typical Applications

The dsPIC Soft Modem is well suited for small transaction orientated based applications such as, but not limited to:

- POS Terminals
- Set Top Boxes
- Drop Boxes
- Fire Panels
- Internet-enabled Home Security Systems
- Internet-connected Power, Gas and Water Meters
- Internet-connected Vending Machines
- Smart Appliances
- Industrial Monitoring

Contents

The data modem library is provided in two basic software packages:

- V.22bis/V.22, which is offered free with full source code, includes the following components:
  - V.22bis/V.22, V.23, V.21/Bell 103, V.42, DP and V.42 API, AT Command Set
- V.32bis/V.32, which is offered in object code, includes the following components:
  - V.32bis/V.32, V.22bis/V.22, V.23, V.21/Bell 103, V.42, DP and V.42 API, AT Command Set

The library currently supports single channel data-pump implementations.

Both libraries are supported with fallback data pump modulations down to V.21. Each data modem library is provided with a respective library archive containing all the data pump object code modules required to link to the user's application. Hardware component drivers, such as UART and Data Converter Interface for DAA/AFE I/O are provided in assembly source code for linking with the user's application.

ITU-T Recommendation V.42 is provided with each library. V.42 contains a High Level Data Link Control (HDLC) protocol referred to as Link Access Procedure for Modems (LAPM) and defines error-correcting protocols for modems.

All data pump modulations are developed in ASM30 assembly code yielding optimal code size and execution time. The AT, V.42 and Data Pump APIs are based on C30 C language.

Electronic documentation accompanies the modem library to help you become familiar with and implement the library functions. A comprehensive *Soft Modem User's Guide* describes the required APIs for the AT, V.42 and Data Pump layers.

Features and Performance of Data Modems

Algorithm[1]	Performance			Program Memory[2] (Kbytes)	Data Memory[2] (Kbytes)	MIPS
	Data Rate (Kbps)	Half/Full Duplex	Data Mod.			
V.21/Bell 103	0.3	Full	FSK	13	1.0	4.5
V.22/V.22bis	1.2	Full	PSK/QAM	22	1.7	7
	2.4					
V.23	1.2	Half	FSK	15	1.0	4.5
	0.6					
V.32	9.6	Full	QAM/TCM	31	3.2	12
	4.8					
V.32bis	14.4	Full	QAM/TCM	36	3.6	15
	12					
	9.6					
	7.2					
	4.8					
V.42	n/a			14	2.0	1.5
DP + V.42 API	n/a			7	1.2	-
AT Command Set	n/a			8	0.15	-

Notes:

1. Data pump modules, V.21, V.22, V.22bis, V.23, V.32, V.32bis and Bell 103 are implemented in Assembly language. V.42, Data Pump and AT Command APIs are implemented in C language.
2. The program/data memory usage for the V-series data pumps is NOT cumulative, due to the sharing of components internally.
3. Memory size does not account for application which combines data pump, V.42 and AT commands (if required).
4. V.21/Bell 103 and V.23 data pumps do not require V.42.

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Technical Notes

V.21 operates at 300 symbols per second, at mean frequencies of 1080+/-100 Hz and 1750+/-100 Hz. V.23 operates at mean frequencies of 1500+/-200 Hz for the 600bps forward channel and 1700+/-400 Hz for the 1200 bps forward channel. The V.23, 75 bps, backwards channel has a mean frequency of 420+/-30 Hz.

V.32 and V.32bis data modems operate at 2400 symbols per second on a carrier frequency of 1800 Hz, in both directions. Both V.32 and V.32bis implement trellis coding modulation (TCM) for all data rates, except 4800 bps. V.32 also includes uncoded 9600 bps.

Host System Requirements

- PC-compatible system with an Intel Pentium® class or higher processor, or equivalent
- A minimum of 16 MB RAM
- A minimum of 40 MB available hard drive space
- Microsoft Windows® 98, Windows 2000 or Windows XP

Part Numbers and Ordering Information:

dsPIC30F Soft Modem Library

Part Number	Description	Availability
SW300002	ITU-T compliant V.22bis Data-Modem Library (Free download from Microchip web site)	Now
SW300003-EVAL	ITU-T compliant V.32bis Data-Modem Library Software License (Evaluation Only)(1)	Now
SW300003	ITU-T compliant V.32bis Data-Modem Library Software License (Up to 5K units)(2)	Now
SW300004	ITU-T compliant V.32bis Data-Modem Library Software License (5K+ to 25K units)(2)	Now
SW300005	ITU-T compliant V.32bis Data-Modem Library Software License (25K+ to 100K units)(2)	Now

Note 1: The evaluation version offers the same functions and features as the other versions. The evaluation period is one year.
2: Quantities are per project, payable as a one-time license fee based on estimated lifetime volume for products resulting from the project. Please consult the factory for quantities above 100K.

dsPIC® Development Tools from Microchip

MPLAB® IDE MPLAB® Visual Device Initializer (included in MPLAB® IDE)	Free
MPLAB® C30 C Compiler	SW006012
MPLAB® ICD 2 In-Circuit Debugger/Programmer	DV164005, DV164007
MPLAB® ICE 4000	ICE4000
MPLAB® PM3 Universal Device Programmer	DV007004
dsPIC30F Math Library (included in download of MPLAB® C30 C Compiler)	Free
dsPIC30F DSP Library	Free
dsPIC30F Peripheral Library	Free
dsPICworks™ Data Analysis and DSP Software	Free
dsPIC® Digital Filter Design	SW300001
dsPIC30F Soft-Modem Library	SW300002/3/4/5
dsPIC® Speech Recognition Library	SW300010/11/12
dsPIC® Symmetric Key Embedded Encryption Library	SW300050
dsPIC® Asymmetric Key Embedded Encryption Library	SW300055
dsPIC30F Acoustic Echo Cancellation Library	SW300060
dsPIC30F Noise Suppression Library	SW300040
CMX-RTX™ for dsPIC30F	SW300031
CMX-Tiny+™ for dsPIC30F	SW300032
CMX-Scheduler™ for dsPIC® Devices	Free at www.cmx.com
dsPICDEM™ Starter Demonstration Board	DM300016
dsPICDEM™ 28-pin Starter Demonstration Board	DM300017
dsPICDEM™ 1.1 General Purpose Development Board	DM300014
dsPICDEM™ MC1 Motor Control Development System	DM300020
dsPICDEM.net™ 1 Connectivity Development Boards	DM300004-1
dsPICDEM.net™ 2 Connectivity Development Boards	DM300004-2

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