

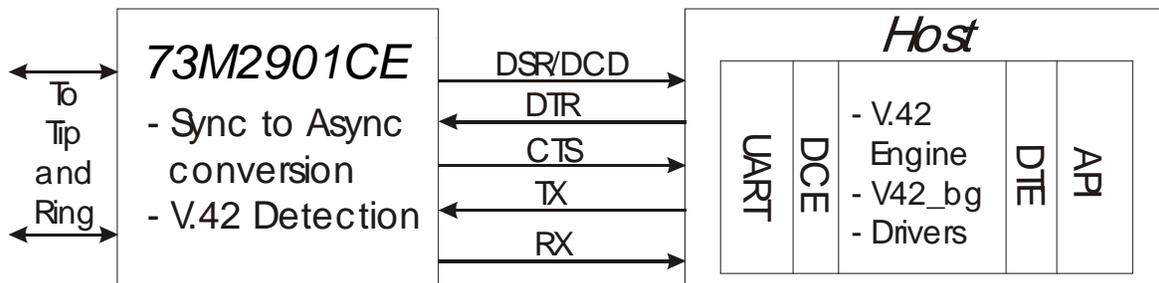
V.42-LAPM Operation

1 Introduction

The Teridian 73M2901CE integrated circuit modem provides all the microprocessor control and modulation and demodulation functions required to implement a V.22 *bis* 2400 bps modem. See the *73M2901CE Data Sheet* for details on modem operation. The V.42 error correction function is performed in software designed to run on a host processor. This software or "V.42 engine" is controlled by the host system and communicates with the 73M2901CE via a serial port.

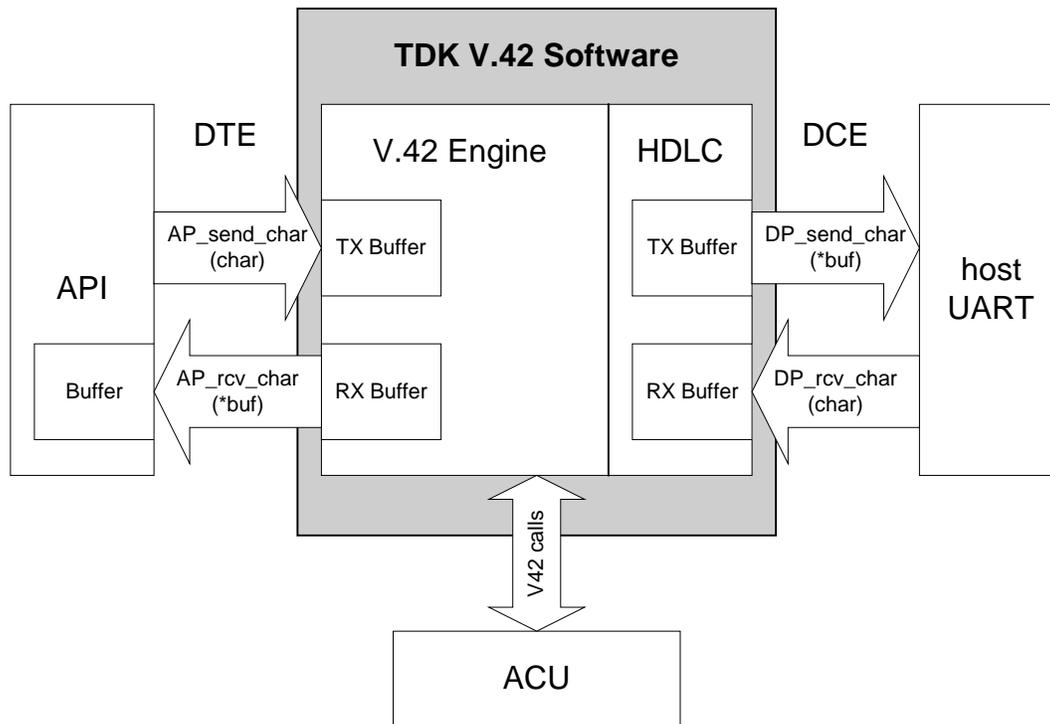
The basic interfaces to the Teridian V.42 engine are:

1. DTE buffer interface
2. DCE buffer interface
3. ACU Control interface



Teridian V.42 / Teridian 73M2901CE PC System Block Diagram

2 V.42 API Specification



V.42 Software Interface Block Diagram

2.1 DTE Interface

These software functions can only be called after a successful V.42 connection has been established. They control transmitting and receiving characters between the API and the V.42 Engine. The V.42 Engine controls and handles all flow control functions. The API has no flow control responsibilities.

stat=TERIDIAN_AP_send_char(char)

The application calls this function, passing a character from the application to the V.42 TX buffer. The V.42 engine returns a status. Stat = 0 means a character has been put in V.42 TX buffer. Any non-zero condition means a character was not passed into the V.42 TX buffer. The non-zero characters will be defined later. The prototype is: unsigned char TERIDIAN_AP_send_char (unsigned char ch)

stat=TERIDIAN_AP_rcv_char(*buf)

The application calls this function, passing a pointer (that points to the API RX buffer). The V.42 engine returns a status. Stat = 0 means that a character was passed from the V.42 RX buffer to the API. Non-zero conditions mean that no character was passed. The non-zero characters will be defined later. The prototype is: unsigned char TERIDIAN_AP_rcv_char (unsigned char *buf)

2.2 DCE Interface

Controls receiving and transmitting characters between the V.42 Engine and the host UART.

stat=TERIDIAN_DP_send_char(*buf)

The serial driver calls this function, passing a pointer that points to the UART TX buffer. Stat = 0 means that a character was sent from the HDLC TX buffer to the UART. Stat = 1 means that this is the last character of the frame (this last byte is a part of the ending flag and some stubbing bits if necessary). A value of 02 means that no character was available from the HDLC TX buffer. When a 02 character is returned, the UART sends 7Eh to the modem. Other non-zero characters will be defined later.

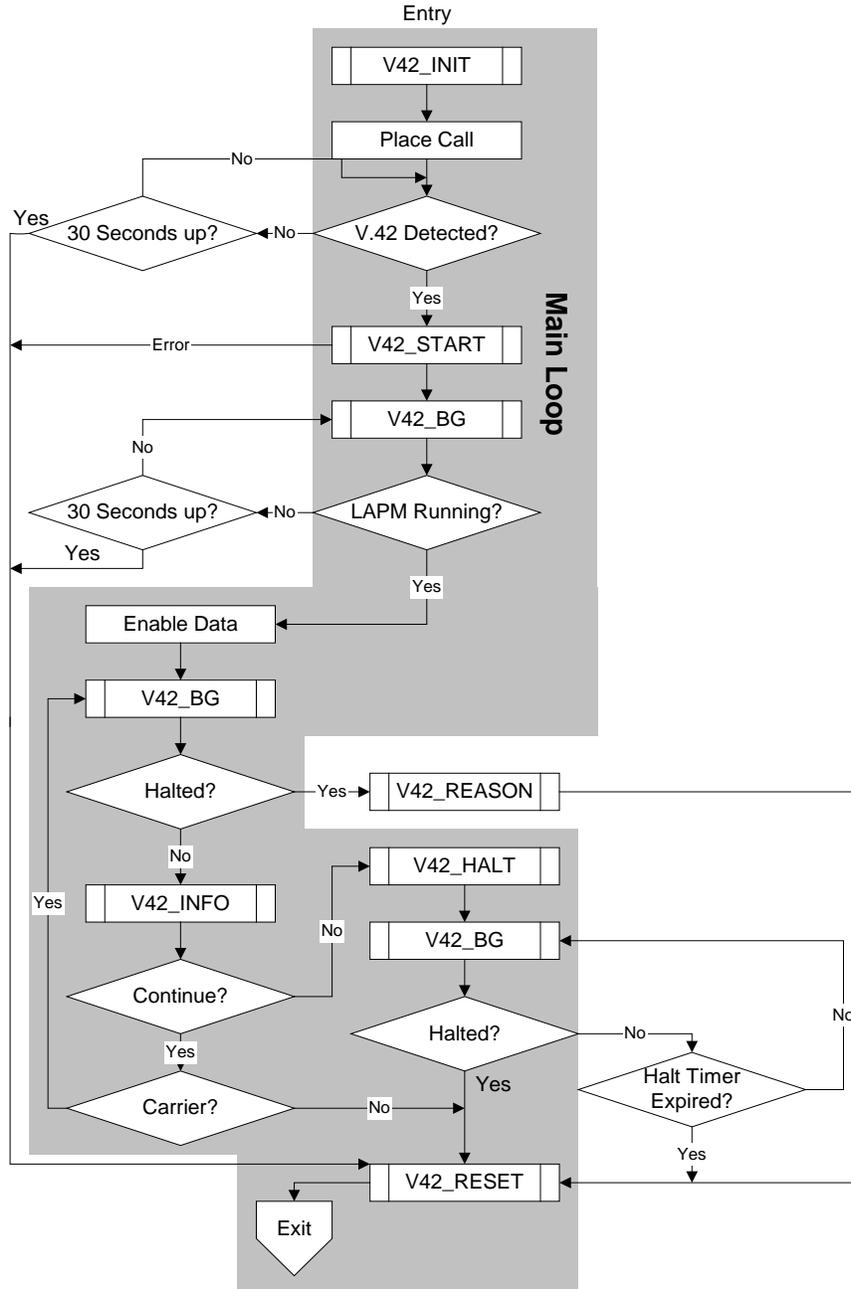
The prototype is: unsigned char TERIDIAN_DP_send_char (unsigned char *buf)

stat=TERIDIAN_DP_rcv_char(char)

The serial driver calls this function, passing a character from the UART to the HDLC RX buffer. Stat = 0 means a character has been sent from the UART to the HDLC RX buffer. Non-zero conditions mean that a character was not passed into the HDLC RX buffer. The non-zero characters will be defined later.

The prototype is: unsigned char TERIDIAN_DP_rcv_char (unsigned char ch)

3 Automatic Calling Unit (ACU)



The ACU function controls (calls) the operation of the V.42 engine. This Function is defined in the flowchart.

TERIDIAN_v42_init

Called by the ACU to initialize V.42. V42_INIT configures internal V.42 operating parameters. This is done prior to making a call. See the RSA Modem Component Software documentation for greater detail.

TERIDIAN_v42_start

Starts the V.42 negotiation phase. Done after a physical layer connection has been established. This negotiation phase should not take longer than 30 seconds. See the RSA Modem Component Software documentation for more detail.

TERIDIAN_v42_bg

This is the heart of the V.42 Engine. It must be called at least once every 10ms. It returns the state of the V.42 Engine. See the RSA Modem Component Software documentation for greater detail.

TERIDIAN_v42_info

void v42_info (unsigned char *)

Returns the following status information from V.42.

ASYNCSYNC (byte)

0	=	ASYNCSYNC
1	=	SYNC

Data compression negotiated (byte)

0	=	None
1	=	MNP Class 5 (MNP protocol only)
129	=	V.42bis, transmit direction only
130	=	V.42bis, receive direction only
131	=	V.42bis, both directions

Current transmit data block size (word)

The current size of the data blocks

Retry count (byte)

0	=	No retries done since last call to v42_info
non-0	=	Number of retries done since last call to v42_info

Line receive rate (byte)

Number of receive frames since last call to v42_info

Line receive error rate (byte)

Number of receive error frames since last call to v42_info

MNP data optimization

For MNP protocol:

0	=	Class 4 optimization not negotiated
1	=	Class 4 optimization negotiated

MNP 10 status (byte)

0	=	MNP 10 not running
1	=	MNP 10 running

Current MNP 10 baud rate (byte)

3	=	1200	bps
4	=	2400	bps
5	=	4800	bps
6	=	7200	bps
7	=	9600	bps
8	=	12.0K	bps
9	=	14.4K	bps

Data in buffers (byte)

0	=	No data left to be transmitted or received
1	=	Data left to be transmitted
2	=	Data left to be received
3	=	Data left to be transmitted and received

Current V42 mode (byte)

0	=	V42 running no mode
1	=	V42 running MNP
2	=	V42 running SPEED MATCHING
3	=	V42 running LAPM
100	=	V42 running DETECTION PHASE

Frame Retransmit count (byte)

A running counter, which is incremented (without rollover test) every time a frame is retransmitted.

TERIDIAN_v42_reason

Returns the reason for unexpected disconnection. See the RSA Modem Component Software documentation for greater detail.

TERIDIAN_v42_halt

Sends a request to the far end to terminate the connection. The V.42 Engine finishes sending its buffer data before disconnection. See the RSA Modem Component Software documentation for greater detail.

TERIDIAN_v42_reset

Forces an unconditional termination of the connection and ceases all V.42 functions. See the RSA Modem Component Software documentation for greater detail.

TERIDIAN_v42_timer

Must be called at a 100ms rate from V42_INIT until V42_RESET. See the RSA Modem Component Software documentation for greater detail.

4 Using the 73M2901 V.42 Demonstration Program

The following section describes the operation of the Teridian V.42 demonstration code on a PC. The PC should be in DOS mode for this demonstration. The operation of this code is the same as when it is used in an embedded host application, but with a simple user interface for ease of use. This program is available through your authorized TERIDIAN Semiconductor representative.

4.1 Making a V.42 Call Using the V.42 Demonstration Application

To start the application type: TERIDIANV42 <ENTER>

Once the application is started, the Help Menu screen is displayed (figure 1):

```

Commands:
H – Display this Help screen.
C – Configure communications port.
I – Init Modem (Init String).
V – Direct V42 Connect.
    <CTRL> e – exit terminal emulator.
    <CTRL> r – receive ascii capture.
    <CTRL> t – send ascii file.

T – Terminal emulator.
    <CTRL> e, r, and t work here also.
Q – Quit.

Press return to exit help.

```

Figure 1 – Menu Screen

To exit the Help Menu Screen, press <ENTER>.

H – Display Help Menu

To display the Help screen at a later time, just press H <ENTER> at the Command Prompt.

C – Configure Communications port

To configure the communications port (Recommended every time the application is started), press C <ENTER> from the Command Prompt, and the following menu will appear on the screen (figure 2):

```

Enter com port (1 or 2):

Enter baud rate:

Hand shake – 0:none 1: XON/XOFF 2:Hardware
            3:Hardware – send before receive

```

Figure 2 – Configuration Menu Screen

In this menu, the choices appear as settings are entered.

The first choice “Enter com port:” pertains to what com port in the computer is linked to the 73M2901.

The second choice “Enter baud rate:” pertains to what baud rate is desired. 4800bps is the desired rate.

The third choice “Hand shake” pertains to what type of flow control is desired between the PC and the 73M2901 (2 is preferred – Hardware).

Upon entering the last setting the message “Com port initialized.” will appear.

I – Init Modem

When I <Enter> is pressed the following menu will appear on the screen (figure 3):

Enter com port (1 or 2):
Enter baud rate:
Hand shake – 0:none 1: XON/XOFF 2:Hardware 3:Hardware – send before receive

Figure 3 – Init Modem Menu Screen

If '0' is pressed, a simplified editor is displayed, and the init strings can be modified simply by typing.

Note: The init strings can also be modified outside the TERIDIANV42 program, if the user desires, by the use of any text editor to change the file INIT.TXT, which is supplied in this software package.

If '1' or '2' is pressed, one of the init strings will be sent to the modem.

Note: The maximum number of characters in an Init String acceptable by the 73M2901 modem is limited to 40 characters. If the user has the need for a longer Init String, the Init String 2 provided in the INIT.TXT file can be used.

V- Direct V42 Connect

When 'V' is pressed from the Command prompt, it causes the modem to be initialized with the proper init string for V.42, and to dial using the dial string provided in the INIT.TXT file.

<CTRL>t is pressed if a message is to be transmitted from a file.

<CTRL>r is pressed if the user intends on receiving and storing data in a file.

<CTRL>e is pressed in order to terminate the call.

T – Terminal Emulator

The PC works as a dumb terminal while in this mode. The Terminal Emulator Mode is useful to exercise the 73M2901 in non-V.42 modes.

<CTRL>t is pressed if a message is to be transmitted from a file.

<CTRL>r is pressed if the user intends on receiving and storing data in a file.

<CTRL>e is pressed in order to exit terminal mode (it takes the user back to the Command Prompt).

Q - Quit

The 'Q' Command is used to exit the Teridian V4.2 application.

The following shows the default initialization string for the demonstration code. This can easily be modified as described above. The default AT String is:

ATFC1R2K3S30=4S25=2Y4W1X4.

F	Restore Factory Defaults
C1	Select Carrier Detect Option
R2	Modem goes on hook, disables the Auto-Answer and assumes Command State when DTR is toggled
S30=4	2400 bits/s
Y4	Quasi-Synchronous Mode
K3	RTS/CTS
W1	Enable the Extended Result Codes
S25=2	LAP-M Protocol

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