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Service Note

98-033 Rev B
2 May, 2007

GENERAL REQUIREMENTS FOR MODEM COMMUNICATION WITH API ANALYZERS

BACKGROUND:

API analyzers do not use hardware or software data flow control (also known as "handshaking"). This means that if the device that is connected to the API requires a hardware signal to control it, the device will not communicate. With most devices, such as a computer, this is not a problem as the API holds the CTS (clear to send) line true always. Most devices, if they use hardware handshaking, only require the presence of CTS. Modems, however, are different. When using hardware flow control most modems also require the presence of DTR (data terminal ready) or DSR (data set ready). This allows them to be backward compatible with older devices such as teletypes. If this signal is not present, the modem will not send data to the device.

In order to make the API analyzer work with a modem, it is necessary to program the modem to ignore hardware and software flow control and might require that you build a special cable. A definitive service note, covering all types and brands of modems, is beyond the scope of this document. Therefore, this document is limited to the general programming of modems. As we have used and can support the US Robotics Sportster modems, we recommend that you use this modem with a baud rate of 14,400 BPS or higher.

If you choose to use a modem other than the USR, please follow the instructions below. If you cannot get your modem to work after following these instructions, please contact the modem manufacturer's customer service for assistance. API regrets that we cannot assist you beyond the scope of this document.

***NOTE*:** You must use a modem that is faster than the baud rate you will be using. You can use just about any communications program, but for the sake of uniformity, we recommend that you use the HyperTerminal program that comes with windows or any of the versions of Procomm available.

SCOPE:

This service note will instruct the user in the basic information on how to make a modem communicate with an API analyzer.

TOOLS:

Modem 14,400 or faster
Computer with communications program (preferably HyperTerminal)
9 pin female to 25 pin male cable

PROCEDURE:

NOTE: **We would suggest that you test the modems in-house before you take them to the site to install the system. If you have a phone system in-house that uses an exchange system, you will want to make sure that you use a dedicated line for the analyzer. If you don't have any dedicated lines in-house, you can use a telephone simulator. We have used the Teltone TLS-3A (see attached information) in-house to do our testing.**

There are two different ways to make the modem work with the API analyzers.

1. Programming the modem to ignore the hardware and software flow control. Using the modem with the standard type of 9 pin to 25 pin cable.
2. Using the "special" cable that needs to have the 25 pin connector jumpers. We will discuss this cable later in this document.

The determining factor, which will dictate the setup you will need, is the modem you have. Depending on the modem that you have, you might need to use both of these methods. The best method is probably to program the modem.

1. Connect the computer to the modem using the standard 9 – 25 pin cable.
2. Start the computer and load a communications program. When you are setting up the communications program set the following items.

Flow control	Xon/Xoff
Comm port	what ever comm. port you are using
Baud rate	the baud rate that the analyzer is going to use
Data bits	8
Stop bits	1
Parity	none

3. If your modem doesn't have switches, skip this step. The following switches are for the US Robotics Sportster modem. Most modems with switches have similar switches. Use this table as a guide for your modem or consult your modem manual. Locate the dip switches on the modem, set the switches to the positions that are highlighted:

U.S. Robotics Modem dip switches:

switch 1 *on modem ignores DTR (DTR override)*
off normal DTR operations: computer must provide DTR signal.
switch 2 on numeric results
off verbal (word) result codes
switch 3 *on enables result codes*
off suppresses result codes
switch 4 on suppresses echo
off displays keyboard commands
switch 5 on disables auto answer
off auto answer on first ring (or higher if specified in NVRAM)
switch 6 *on carrier detect always on (override)*
off modem sends CD signal when it connects, drops on disconnect

switch 7 *on loads &f0 from ROM*
off loads Y or Y1 config. from NVRAM
switch 8 *on smart mode (enables AT command set recognition)*
off dumb mode (disables AT command set recognition)

4. Turn the modem on.
5. All of the following commands are for the USR Sportster and are for your reference; the actual commands for your modem might be different.
6. Depending on the modem that you have, you might not need all of the commands that are listed here to make the modem work with the analyzer. However, you might need to use more commands to make the modem work.
7. Verify that you have communication with the modem by pressing the Enter key on the computer 2 times, then type the command to reset the modem (ATZ) and pressing the Enter key. The modem should respond with "OK" after a second or two.
8. After each command the computer should respond with an "OK". If it does not then you will have to try the command again. If it still does not reply with OK, check the manual for your modem and figure out why the command did not work.

modem displays keyboard commands (echo on)	(ate1	enter)
Displays result codes	(atq0	enter)

Verbal codes	(atv1	enter)
default is profile 0 setting in NVRAM	(aty0	enter)
DTR override	(at&d0	enter)
flow control disabled	(at&h0	enter)
software flow control disabled	(at&i0	enter)
sets auto answer to 2 rings	(ats0=2	enter)
sets serial port rate to follow the connection rate of the modem.	(at&b0	enter)
sets connect speed of the modem to 19,200	(at&n10	enter)
If you are using an analyzer that can't go to 19,200, set this to (at&n6 for 9600) or (at&n4) for 2400		
normal mode, sets error control to off	(at&m0	enter)

YOU WILL NOT GET ANY EHCOING OF CHARICTERS AFTER TYPING THIS COMMAND

echo off	(ate0	enter)

YOU WILL NOT GET ANY OK'S AFTER TYPING THIS COMMAND

does not display result codes (quiet mode)	(atq1	enter)
writes current configuration to NVRAM 0 template	(at&w0	enter)

9. Power off the modem and disconnect it from the computer. Connect the modem to the analyzer.
10. 10. If your modem doesn't have switches, skip this step. The following switches are for the US Robotics Sportster modem. Most modems with switches have similar switches. Use this table as a guide for your modem. Locate the dip switches on the modem, set the switches to the positions that are highlighted:

U.S. Robotics Modem dip switches:

switch 1 *on* *modem ignores DTR (DTR override)*
off normal DTR operations: computer must provide DTR signal.
switch 2 on numeric results
off *verbal (word) result codes*
switch 3 *on* *enables result codes*
off suppresses result codes
switch 4 *on* *suppresses echo*
off *displays keyboard commands*
switch 5 on disables auto answer
off *auto answer on first ring (or higher if specified in NVRAM)*
switch 6 *on* *carrier detect always on (override)*
off modem sends CD signal when it connects, drops on disconnect
switch 7 *on* *loads &f0 from ROM*
off loads Y or Y1 config. from NVRAM
switch 8 *on* *smart mode (enables AT command set recognition)*
off dumb mode (disables AT command set recognition)

11. Turn on the modem and then turn on the analyzer.

12. DCE to DTE or vice versa. To do this there will be a switch on the rear panel (on the outside of the analyzer) or there will be jumpers (on the inside of the analyzer). Change the position of the switch on the analyzer and the green LED should come on. If you have jumpers you will want to change them from both vertical to both horizontal or vice versa.
13. With the modem connected to the analyzer, press the following buttons on the front of the analyzer "SETUP_MORE_VARS_NEXT to RS232 MODE_EDIT". Write down the number that is being displayed, then change the number to 8 if it is not already 8.
14. Next change the baud rate in the communications menu to the highest baud rate of the slowest analyzer that will be on this phone line. Press "SETUP_MORE_COMM_BAUD_ENTER".
15. Change the RS232 mode back to what you had it set to if it was not 8 to begin with.
16. Now that you have the modem connected to the analyzer you should be able to hook it to the phone system and call it. With your computer hooked to the phone system, call the analyzer. The modem will ring and answer on the second ring. Once the modem has established communication with your computer push the following buttons on the computer:

    Enter
    Ctrl "t"
    "?" enter

17. You should get a menu of the commands for the API. If you do not then you will want to check the setup again and make sure that everything is correct. If you can't make the computer talk to the analyzer, try to go into the DIAG menu on the analyzer and push NEXT to get to the RS232 output and push ENTR. You should see a long string of "W's". If you have a bunch of garbage on the computer screen then you probably have a baud rate problem.
18. If you do not get anything on either the computer or the analyzer then you might have to build a custom cable that will essentially make the modem think that it is getting the hardware handshaking that it expects. Follow the instructions below and then go to step 12 with this cable and follow the directions.
19. To construct a custom cable, you will need a 5 conductor, shielded coax cable of the appropriate length. You will also need 2 solder cup style connectors: a 9 pin Female, "D" type connector and a 25 pin male, "D" type connector.
20. Make the following connections between the 9 pin and 25 pin connectors:

9 Pin Connector	25 Pin Connector
Pin 2	Pin 3
Pin 3	Pin 2
Pin 5	Pin 7

21. On the 25 pin connector, you must connect pins 4, 5 and 20 together. This completes the connections for the custom cable. Go to step 12 of this procedure.

If you are having problems making your modem "talk" to the API analyzer, API's recommendation is to get a U.S. Robotics Sportster modem and to use it with the procedure that we have written specifically for that modem. We have tested the USR Sportster and can support it, where we probably do not have any experience with the modem that you are trying to use. If you have any questions about the USR Sportster, please feel free to contact us at the factory.

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TELTONE®

User Manual

40-400-00010, Rev. A

Covers Model TLS-3A-01

TLS-3A

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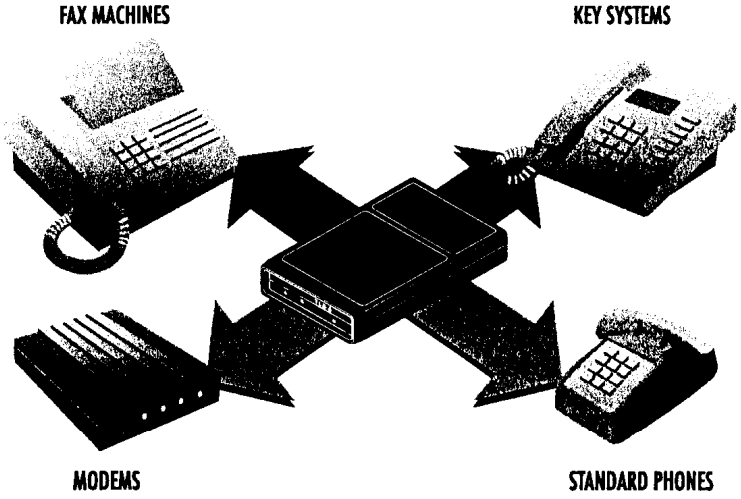

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