TELEDYNE
INSTRUMENTS
Advanced Pollution Instrumentation

A Teledyne Technologies Company

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Service Note

USING US ROBOTICS SPORTSTER MODEMS WITH TELEDYNE API ANALYZERS

I.   PURPOSE:
BACKGROUND:
Teledyne 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 Teledyne 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 Teledyne 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 Teledyne API analyzer work with a modem, it is necessary to program the modem to ignore hardware and software flow control. A definitive service note, covering all types and brands of modems, is beyond the scope of this document. Therefore, this document is limited to programming US Robotics Sportster modems. Teledyne API recommends that you use the US Robotics 14,400 BPS modem or higher.

***NOTE*: You must use a modem that has a faster baud rate than the baud rate you will be using. If you have a different brand of modem, you can try these instructions, however, it is advisable to consult your modem manual for the exact commands to enter into your modem for each step below. 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**.

II.   TOOLS:
US Robotics Sportster or US Robotics V.92 Modem
Computer with communications program (preferably HyperTerminal)
9 pin female to 25 pin male cable

III.   PARTS:
N/A

III.   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.

NOTE: **If you are using an analyzer that has the "Modem Aware" software, then skip to step 14 and begin there. The following table has the versions of the software that has the new modem aware software. This software is not mandatory for setting up the Teledyne API analyzer to communicate with a modem.**

M100A	>B.5	AMX
M200A	>D.9	AMX
M300	>A.7	AMX
M400	>C.2	AMX
M700	>C.7	AMX

1. Connect the computer to the modem using the 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. Locate the dip switches on the modem, set the switches to the following positions:
   Set switch #'s 2, 4, and 5   "OFF" (switches in up position).
   Set switch #'s 1, 3, 6, 7, and 8   "ON" (switches in the down position).

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)

       down = on
       up = off

4. Turn the modem on.
5. Verify that you have communication with the modem by pressing the Enter key on the computer 2 times, then typing "ATZ" and pressing the Enter key. The modem should respond with "OK" after a second or two.
6. Type in the following commands exactly as they appear here. 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 find he command that equals the function that you are trying to set.

ate1q0v1	enter	modem displays keyboard commands (echo on)
		Displays result codes
		Verbal codes
aty0	enter	default is profile 0 setting in NVRAM
at&d0	enter	DTR override
at&h0	enter	flow control disabled
at&i0	enter	software flow control disabled
ats0=2	enter	sets auto answer to 2 rings
at&b0	enter	sets serial port rate to follow the connection rate of the mode.
at&n10	enter	sets connect speed of the modem to 19,200. If you are using an analyzer that cant goto 19,200 set this to at&n6 for 9600 or at&n3 for 2400
at&m0	enter	normal mode, sets error control to off
ate0q1&w0	enter	echo off
		Does not display result codes (quiet mode)
		writes current configuration to NVRAM 0 template

YOU WILL NOT GET AN OK AFTER TYPING THIS COMMAND

7. Power off the modem and disconnect it from the computer. Connect the modem to the analyzer.
8. If your modem does not have dip switches, skip this step. Change the dip switches to the following positions

> Set switch #'s 2, 3, 5, and 7 "OFF", (switches in up position).
> Set switch #'s 1, 4, 6, and 8 "ON" (switches in the down position).

9. Turn on the modem and then turn on the analyzer.
10. With the modem connected to the analyzer, check to make sure that both the green and red LEDs on the rear panel are on. If they are not on then you will have to change the analyzer from 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.
11. 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.
12. 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".
13. Change the RS232 mode back to what you had it set to if it was not 8 to begin with.
14. If you are using the new "modem aware" software you will want to do the following steps, if not then skip to step 21.
15. If your modem does not have switches, skip this step. Locate the dip switches on the modem, set the switches to the following positions:
> Set switch #'s 2, 4, and 5   "OFF" (switches in up position).
> Set switch #'s 1, 3, 6, 7, and 8   "ON" (switches in the down position).
16. Hook the modem to the analyzer and turn the modem on.
17. Turn on the analyzer and allow the analyzer to get to the sample menu.
18. Turn off the modem.

19. Change the dip switches to the following positions
        Set switch #'s 2, 3, 5, and 7   "OFF" (switches in up position).
        Set switch #'s 1, 4, 6, and 8   "ON" (switches in the down position).
20. Turn on the modem, and proceed the next step.
21. Now that you have the modem connected to the analyzer and programmed 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

22. You should get a menu of the commands for the Teledyne 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 RS 232 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.

If you have questions about this or any Teledyne API equipment, please contact a Teledyne API Customer Service Representative. If you are having problems with this setup procedure and are going to contact Teledyne API, please have the manual for the modem, the software rev of the analyzer, and the name of the communications program you are using on the computer.