

APPLICATION NOTE #5



Application Note 5: Modem Communications to PLC Controllers

Using a modem to communicate remotely to an Entertron PLC is a relatively easy task to accomplish. All that is required is to attach a modem to the PLC, attach a modem to your PC, connect some phone lines, and you are done!

When choosing a modem select one that can run at 9600 baud or better. If possible select one that also allows you to modify and save a new configuration in the modem.

Determining the communications setup:

- 1) Enter the Entertron Serial Utility Software (Monitor Mode). Be sure the modem is connected to COM1 or COM2 on your computer. Set the Serial Utility program to the correct COM port and 9600 baud.
- 2) Type **AT&V** and press **Enter(<CR>)** on the keyboard. The Modem will respond with a listing of it's active configuration (Profile).
- 3) Compare your profile with the following recommended selections.

If your modem allows you to save the profile you can modify the appropriate configurations and then save the profile at this time. If your modem does not allow you to save the profile, record the modifications required and use them to create your initialization sequence.

Recommended Configuration:

B1 - Bell protocols at 300 or 1200
E0 - No Echo
L0 - Low Speaker Volume
M1 - Speaker on until carrier received (M0 Speaker off can also be used)
N1 - Auto detect baud rate on connection
Q0 - Enable result codes
T - Tone Dialing (P required if using a non touch-tone line)
V0 - Enable numeric result codes
W0 - Disable Error correction result codes
X4 - Wait for Dial tone before dialing, Enhanced Result Codes
&C0 - DCD Signal always on
&D0 - Ignore DTR
&K0 - Disable flow control
&Q0 - Direct mode (No flow control)

S00=001 S06=002 S12=050 S37=000 S48=007
S01=000 S08=050 S18=000 S38=020 S91=009
S02=043 S08=002 S23=055 S40=104 S95=000
S03=013 S09=006 S25=005 S41=128 S109=062
S04=010 S10=014 S26=001 S44=128 S110=002
S05=008 S11=095 S36=135 S46=136

To change a configuration:

To change a configuration you just need to send the appropriate code following the attention code AT.

Example: If when you display your configuration you see X1 instead of the recommended X4 type the following:

atX4<CR>

The modem will respond with OK (Note: 0 will be the OK response once you set the Numeric code responses, V0 configuration). If you redisplay the configuration again with **at&V<CR>** you will see your changes have taken affect.

To change one of the S?? Registers type the following:

atS0=0001<CR>

This will change the S00 register to 1.

You can combine your configuration changes as well. This is what your string would look like to change a typical modem configuration to our recommended configuration for remote PLC access:

at E0 L0 V0 %C0 &C0 &D0 &K0 &Q0 S00=001 <CR>

The spaces are not required between each of the configurations, they are only used here for easy viewing. Spaces are ignored by the modem in the commands. The above string can also be used as your initialization string for a modem that can not store a particular profile.

Special Note: If your modem requires you to send an initialization string see the example program MODEM. In this program we send our the Numeric Response selection and no echo selection first. This is so that when we send the initialization string we do not get characters echoed back to us, and so that we get the numeric response we desire to determine if the unit is properly setup.

To save your configuration:

To save your configuration and make it active on each power up perform the following steps. (NOTE: Modem must have this ability for these function to work)

- 1) After you have made all the changes required to the profile save the profile by typing:

at&W1<CR>

- 2) Make the profile active.

at&Y1<CR>

- 3) Cycle the power to the modem and check the configuration to be sure the information was saved correctly. If not try again.

Using a modem from your PC to dial your remote PLC.

1) Connect the remote modem configured above to the remote PLC. Connect your modem to your PC on COM1 or COM2. Enter the Entertron Software Serial Utility (Monitor Mode). Set your baud rate and COM port appropriately.

2) To dial your remote modem type the following

atdt1-716-772-2131<CR>

This will cause the modem to connect to the phone line and dial the number you specified 1(716)772-2131. (You may wish to turn off the echo with the **ATE0<CR>** command before you begin, otherwise you will see double of everything you type.)

Once the connection is established the modem will respond with CONNECT 9600. You are now connected to the remote PLC. From here you can monitor, start and stop and download just as if the PLC was attached directly to your computer. (NOTE: Line noise may cause the monitor program to show invalid results at times or to exit the monitor with an error message, this is normal especially if you have a noisy connection, just enter the monitor program again.) You can also use all the ESC commands available within the PLC to write and change internal data.

To end the connection:

To terminate your connection with your remote PLC type the following:

Type: +++

Wait for the modem to respond with OK this will take approx. 3 seconds. This gets the modem back into command mode. Then type **atH0<CR>**. This will cause the modem to hang up the line, your remote PLC will then hang up as well.

Using the Remote PLC to CALL your PC modem.

The Entertron PLC with Enhanced software can be used to CALL any modem you desire. In the example program MODEM, the PLC directs the modem to call the pre-determined number and sends a repeating "Machine Status" message once a connection is established. The receiving machine can then suspend the message by turning on Relay 512 with the ESCB command, and can then view the monitor table. Be sure your receiving PLC is in answer mode, (S00=001 - Auto Answer on ring 1) The receiving machine must then Hang Up the phone using the above method. Any modem command that you can type on the terminal can be sent to the modem using the Entertron Enhanced software, so your possibilities are endless.

Please note Modem Configurations are changing all the time. If a configuration I recommend is not listed in your profile, ignore it. If there is one listed that I do not spell out, you must check the manual to determine what value it should be, or just use trial and error to get your system up and running.

Questions or comments regarding this or any other application are always welcome at Entertron.