



## COMMUNICATION APPLICATION TIPS

For

Modem Connection To  
750/760, PQM, 745, 489, UR, 469, 269Plus, 369

## 1. **RS232/RS485 CONVERTER SETTINGS**

When using GE's SCI or F485 RS485-to-RS232 converter, make the following dip switch settings for modem communications:

|                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <u>SCI Module Dip Switch Settings</u><br>SW1 = 1 and 3 ON (all others OFF)<br>SW2 = 2 and 4 ON (all others OFF)<br>SW3 = Baud Rate<br>3 ON – 2400<br>4 ON – 4800<br>5 ON – 9600<br>6 ON – 19200<br>(only one switch selected - all others OFF) | <u>F485 Module Dip Switch Settings</u><br>SWITCH A = Baud Rate from A1-A7<br>1 ON - 1200<br>2 ON - 2400<br>3 ON - 4800<br>4 ON – 9600<br>5 ON – 19200<br>(only one switch selected - all others OFF)<br><br>8 ON – for Modem Communications<br><br>SWITCH B<br>RS232 to RS485 = 1 and 4 ON<br>(all others off) |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Note: See section 11 for details on using self-powered RS232-to-RS485 converters.

## 2. **MODEM SETTINGS**

To properly communicate through modem to the relays, the following settings need to be made on the computer's and relay's modem:

### A. Computer's Modem

- No handshaking or flow control
- No error control
- Normal DTR (&D2)
- Carrier detection (&C1)
- Echo off (E0)
- Result codes enabled (Q0)
- No data compression

### B. Relay's Modem

- No handshaking or flow control
- No error control
- Ignore DTR (&D0)
- Carrier detection always on (&C0)
- S0=1 (number of rings before connection)
- No data compression

### 3. CABLES

See the below pin assignment table for the RS232 cable that must be used between the relay's modem and RS485/RS232 converter. A standard modem cable can be used.

| <i>9 pin Male</i> | <i>25 pin Male</i> |
|-------------------|--------------------|
| 1                 | 8                  |
| 2                 | 3                  |
| 3                 | 2                  |
| 4                 | 20                 |
| 5                 | 7                  |
| 6                 | 6                  |
| 7                 | 4                  |
| 8                 | 5                  |
| 9                 | 22                 |

### 4. BAUD RATES

The relay, PC program, and RS485/RS232 converter must be set for the same baud rate. The maximum baud rate for DOS version of 750/760PC program is 2400 baud. The maximum baud rate of all the Windows version programs (PQM, 750/760, 745, 469, 489, 269Plus, 369) is 9600 baud. Typically, a baud rate of 9600 is recommended.

### 5. EXAMPLE SETTINGS FOR RELAY'S MODEM

The following relay modem setting example pertains to the US Robotics Sportster 33.6k or 56K Faxmodem.

- A. Make the following dip switch settings to a new US Robotics or Black Box modem (model as listed above):

Dip switches that are DOWN      = 1 (DTR override)  
                                                 = 3 (Suppress result codes)  
                                                 = 6 (Carrier Detect Always ON)  
                                                 = 8 (Enable Recognition - Smart Mode)

- B. By using the AT command, make the following changes to the relay's modem:

&A0 &B0 &C0 &D0 &H0 &I0 &K0 &M0 S0=2

Use Windows 3.1 Terminal or Windows 95 HyperTerminal to make the changes. For example, to enter the setting &A0, type **AT&A0** and hit enter. The message **OK** should be displayed if you were successful. After all the settings have been changed, type **ATI4** to view the settings (some modems use **AT&V**). Set the number of rings on the modem by changing S0 register (S0=2 for 2 rings to answer). Type **ATS0=2** and hit enter setting. Type **AT&W0** to save the settings into the modem's memory. Verify that settings were changed by viewing the modem settings (use **AT&V** or **AT&W0**).

C. Below are the settings for the above modems after all the changes were entered.

B0 E1 F1 M1 Q0 V1 X4 Y0  
BAUD=9600 PARITY=N WORDLEN=8  
DIAL=HUNT ON HOOK

&A0 &B0 &C0 &D0 &G0 &H0 &I0 &K0 &M0 &N0  
&P0 &R2 &S0 &T5 &U0 &Y1

S00=002 S01=000 S02=043 S03=013 S04=010 S05=008 S06=002  
S07=060 S08=002 S09=006 S10=014 S11=070 S12=050 S13=000  
S15=000 S16=000 S18=000 S19=000 S21=010 S22=017 S23=019  
S25=005 S27=000 S28=008 S29=020 S30=000 S31=128 S32=002  
S33=000 S34=000 S36=014 S38=000

6. **EXAMPLE #1 FOR COMPUTER'S MODEM SETTINGS**

The following computer modem setting example pertains to the US Robotics Sportster 33.6k or 56K Faxmodem.

A. The modem dip switches that are DOWN

- = 3 (Suppress result codes)
- = 5 (Disable autoanswer)
- = 8 (Enable Recognition - Smart Mode)

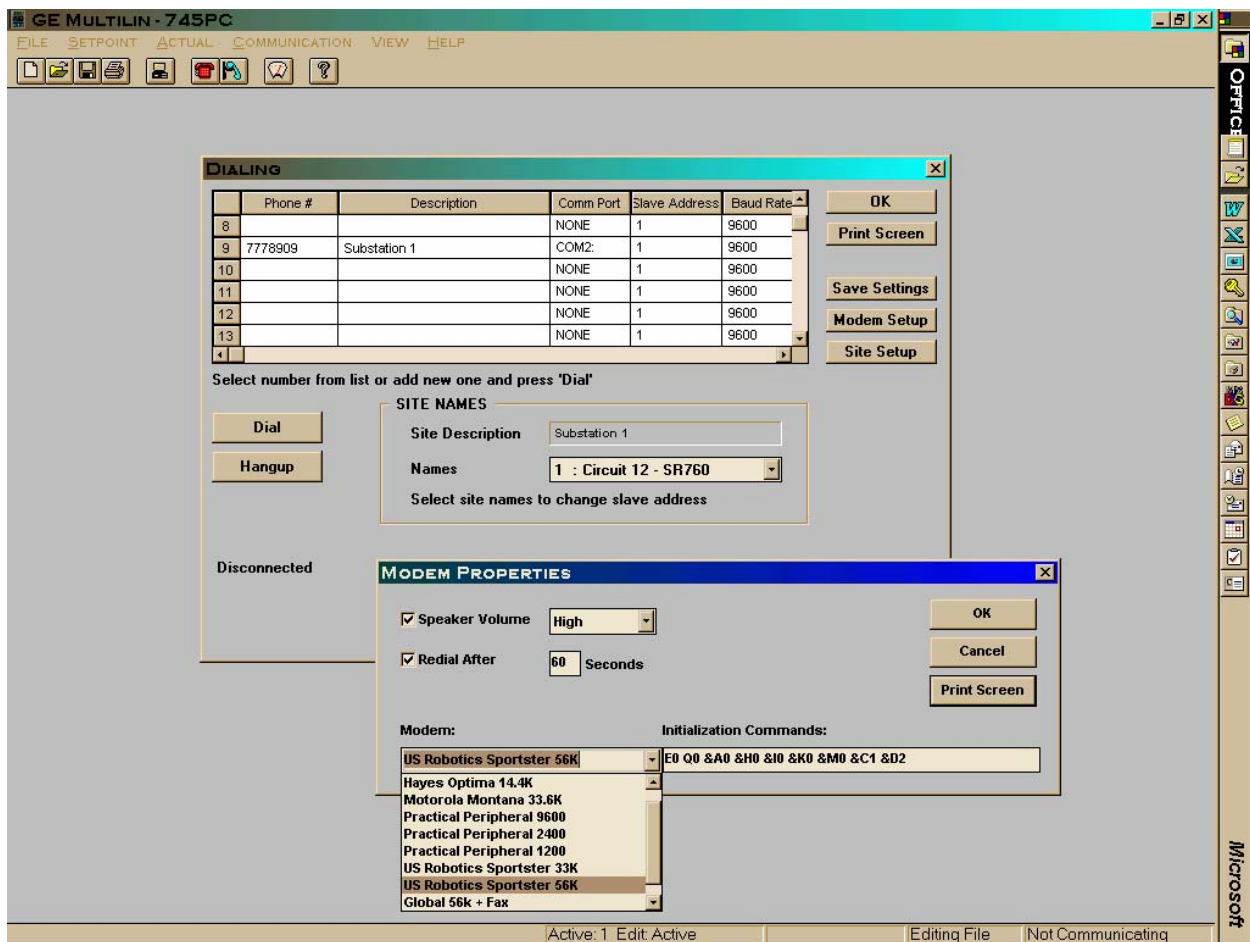
B. Computer's modem AT settings

The following settings should be entered into the relay's PC program for use with a new US Robotics modem (model as listed in #5). You do not have to make modem setting changes via the AT command as in #5. Under the MODEM SETUP, select the proper modem from the pull-down menu and verify the below initialization commands:

E0 Q0 &A0 &H0 &I0 &K0 &M0 &C1 &D2

(See Section 6.C for default modem settings)

Note: URPC software automatically reads the modem setup configuration from the Windows configuration, so no modem string has to be entered.



- C. For your reference, below are the default modem settings for example in Section 6.  
Changes to modem settings are performed via the relay's PC program.

B0 E1 F1 M1 Q0 V1 X4 Y0  
BAUD=9600 PARITY=N WORDLEN=8  
DIAL=HUNT ON HOOK

&A3 &B1 &C1 &D2 &G0 &H1 &I0 &K1 &M4 &N0  
&P0 &R2 &S0 &T5 &U0 &Y1

S00=000 S01=000 S02=043 S03=013 S04=010 S05=008 S06=002  
S07=060 S08=002 S09=006 S10=014 S11=070 S12=050 S13=000  
S15=000 S16=000 S18=000 S19=000 S21=010 S22=017 S23=019  
S25=005 S27=000 S28=008 S29=020 S30=000 S31=128 S32=002  
S33=000 S34=000 S36=014 S38=000

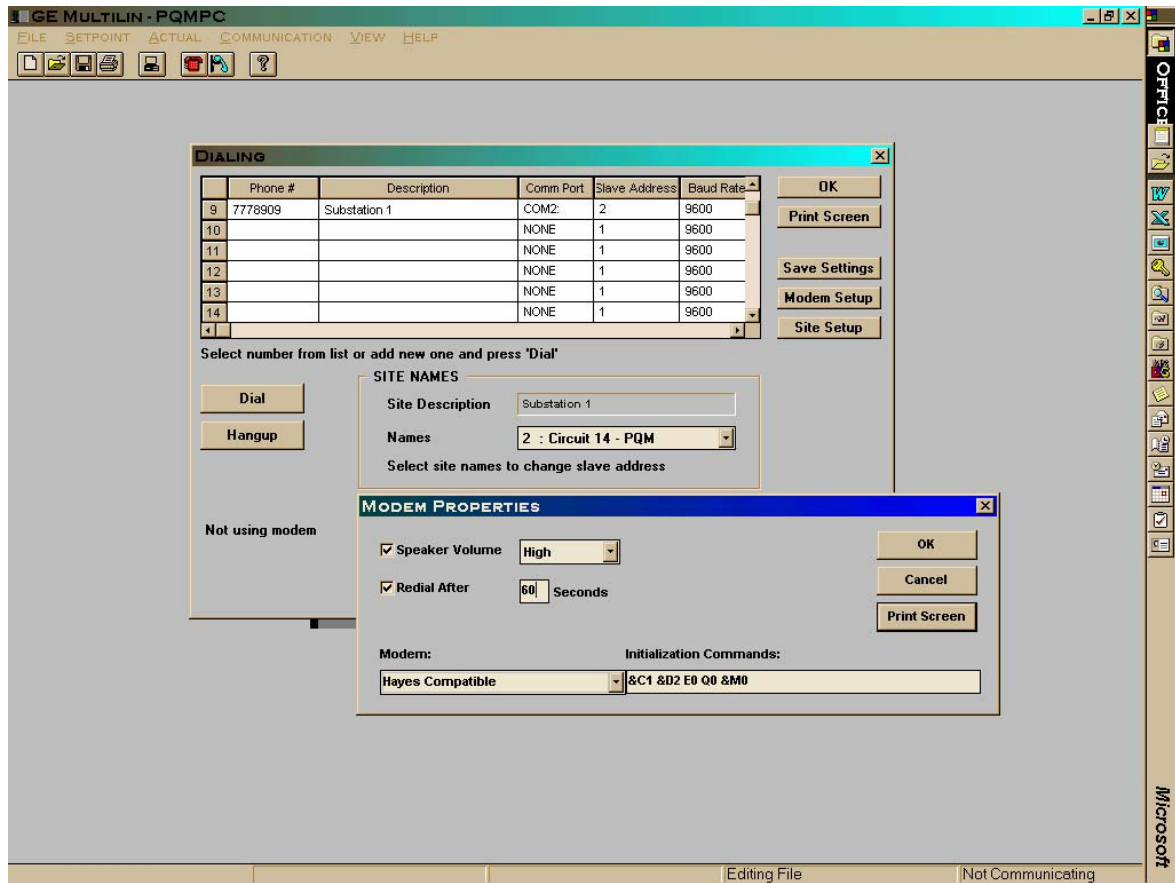
## 7. EXAMPLE #2 FOR COMPUTER'S MODEM SETTINGS

Many modems can have different AT commands, check your specific model and enter the proper AT commands for the Computer's Modem as outlined in Section 2. If the error message, "No Modem Response" occurs for Example #1, then your modem may not support the those AT commands and you may want to try the below settings.

- A. Computer's modem AT settings

The following settings should be entered into the relay's PC program for use with a new Hayes modem:

E0 Q0 &K0 &C1 &D2 (See Section 7.B for default modem settings)



- B. For your reference, below are the default modem settings for example in Section 7.  
Changes to modem settings are performed via the relay's PC program.

**ACTIVE PROFILE:**

B1 E1 L2 M1 N1 Q0 T V1 W0 X4 Y0 &C1 &D2 &G0 &J0 &K3 &Q5 &R1 &S1 &T5 &X0 &Y0 ~Z0  
S00:000 S01:000 S02:043 S03:013 S04:010 S05:008 S06:004 S07:045 S08:002 S09:006  
S10:050 S11:095 S12:050 S18:000 S25:005 S26:001 S36:007 S37:000 S38:020 S44:020  
S46:138 S48:007 S51:012 S52:012 S53:010 S54:010 S95:000

**STORED PROFILE 0:**

B1 E1 L2 M1 N1 Q0 T V1 W0 X4 Y0 &C1 &D2 &G0 &J0 &K3 &Q5 &R1 &S1 &T5 &X0  
S00:000 S02:043 S06:004 S07:045 S08:002 S09:006 S10:050 S11:095 S12:050 S18:000  
S36:007 S37:000 S40:168 S41:195 S46:138 S51:012 S52:012 S53:010 S54:010 S95:000

**STORED PROFILE 1:**

B1 E0 L2 M1 N1 Q0 T V0 W0 X4 Y0 &C1 &D2 &G0 &J0 &K3 &Q5 &R1 &S1 &T5 &X0  
S00:000 S02:043 S06:004 S07:050 S08:002 S09:006 S10:014 S11:095 S12:050 S18:000  
S36:007 S37:000 S40:168 S41:195 S46:138 S51:012 S52:012 S53:010 S54:010 S95:000

8. **VARIOUS COMPUTER MODEM INITIALIZATION STRINGS**

For your reference, below are the modem settings required for various modems used for the computer's modem. These modem strings can be entered into the relay's PC software, see MODEM SETUP.

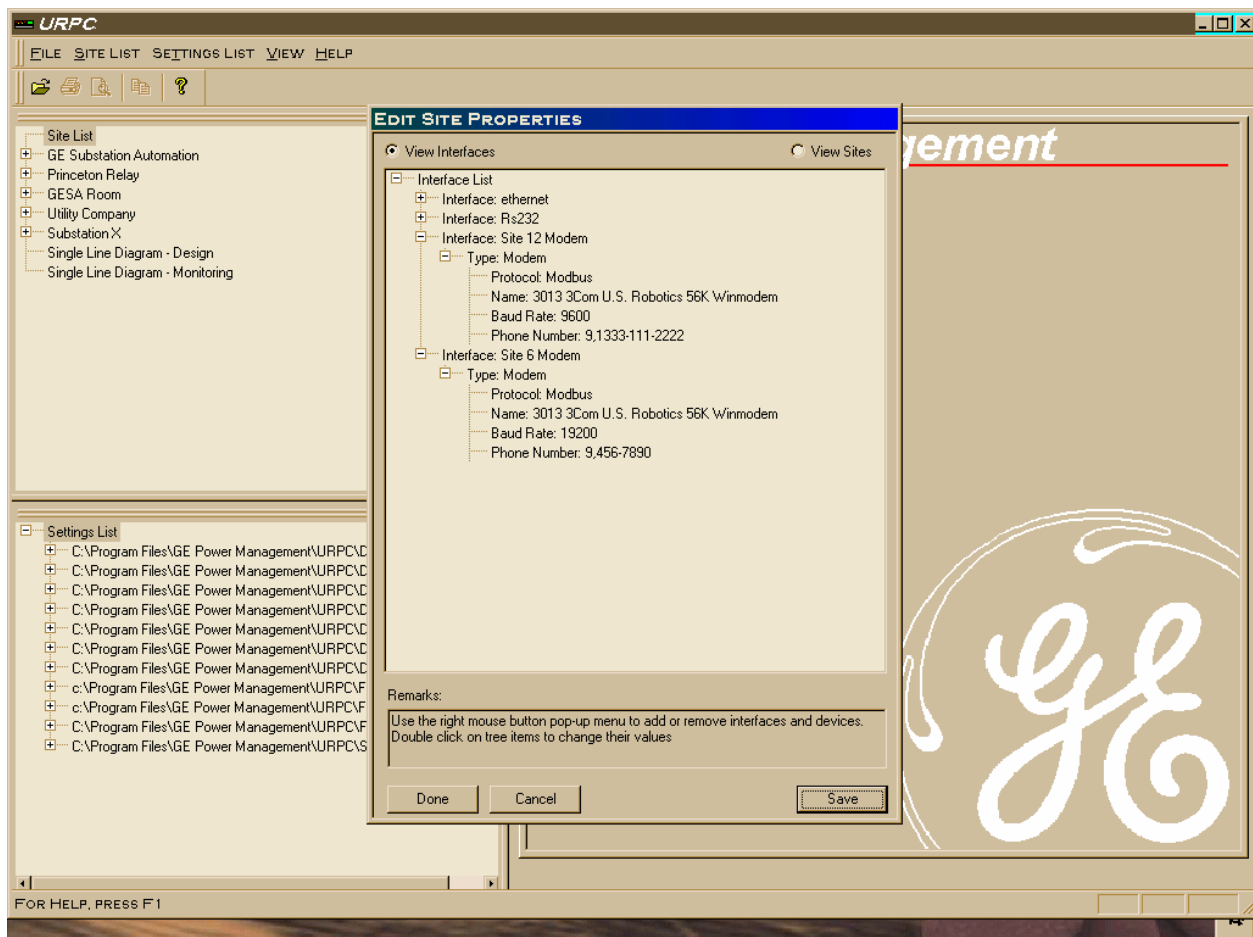
|                                                             |                                                       |
|-------------------------------------------------------------|-------------------------------------------------------|
| Practical Peripheral 9600 Modem:                            | AT&F&C1&D0&K0&Q6N0S37=9S0=2                           |
| Practical Peripheral 2400 Modem:                            | AT&F&C1&D0&K0&Q6N0S37=6S0=2                           |
| Practical Peripheral 1200 Modem:                            | AT&F&C1&D0&K0&Q6N0S37=5S0=2                           |
| Hayes Optima 14.4K Modem:                                   | L1 &C1 &D2 &K0 E0 V1 Q0 M1                            |
| US Robotics Sportster 33.6K Modem:                          | E0 Q0 &A0 &H0 &I0 &K0 &M0 &C1 &D2                     |
| US Robotics Sportster 56K Modem:                            | E0 Q0 &A0 &H0 &I0 &K0 &M0 &C1 &D2                     |
| Black Box Speedster 33.6K Modem:                            | E0 Q0 &A0 &H0 &I0 &K0 &M0 &C1 &D2                     |
| Motorola Montana 33.6K Modem:                               | E0 F0 M1 Q0 &C1 &D2 &K0 &M0 %C0 \G0 \N1 \Q0 \V1 S37=9 |
| Dell Latitude LS Internal Modem<br>(operating at 9600 baud) | E0Q0&C1&D2&K0%C0\N1S37=9                              |

9. **DIAGNOSTIC TIPS IF MODEM DOES NOT RESPOND OR DIAL (NOT APPLICABLE TO URPC PROGRAM)**

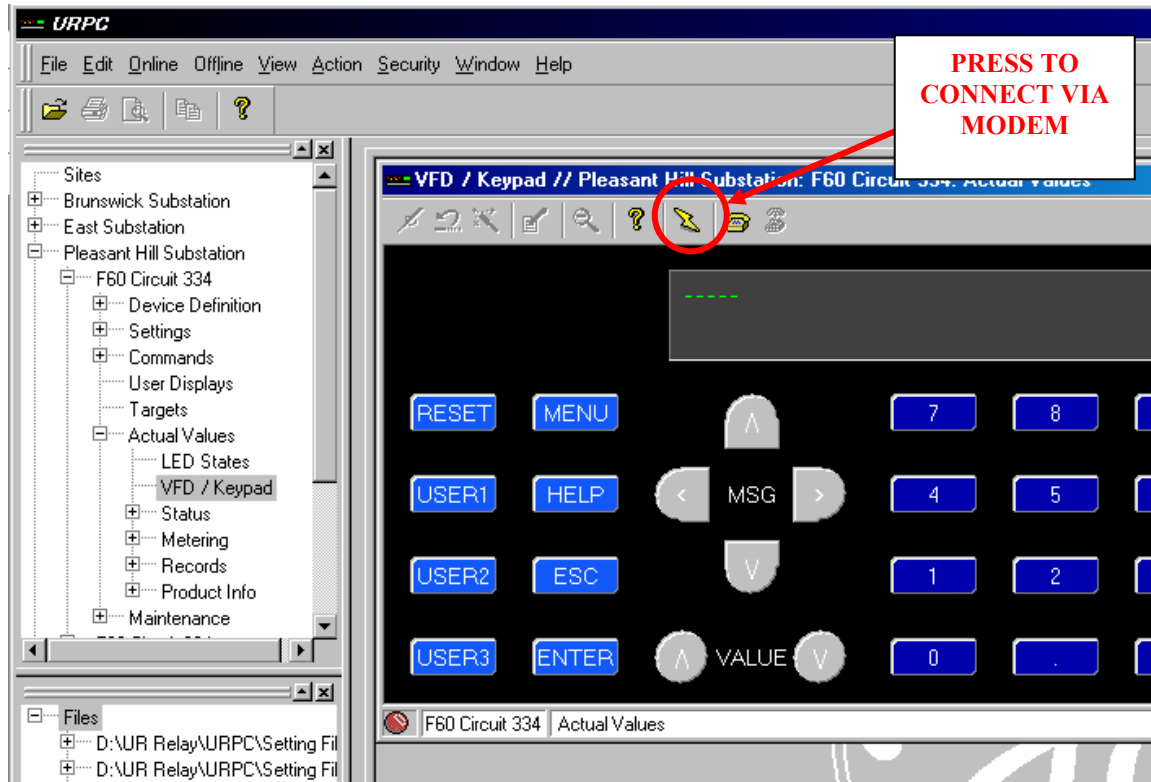
- A. Make sure that modem dials number and you hear a connection. If **NO RESPONSE** message appears, then check to see if all commands in modem initialization sting (AT commands) are recognized by the modem (see manual for modem – section AT commands).
- B. If modem connects, verify that the message **CONNECT 9600** appears and baud rate matches the baud rate used. If not, you may have to alter the modem initialization string to force the modem to connect at the desired baud rate. If 9600 baud rate is desired, then add **S37=9** to the initialization string to force modem to connect at 9600 baud.
- C. Make sure relay's modem is set to the desired number of rings to answer by setting S0 register. To set for 2 rings to answer, type **ATS0=2** and hit enter. Type **AT&W0** to save the settings into the modem's memory.

## 10. URPC PROGRAM SETUP FOR MODEM COMMUNINCATIONS

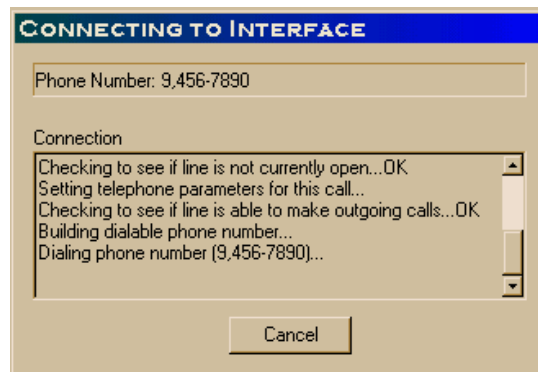
URPC software automatically reads the modem properties & settings from the Windows configuration, so no modem string has to be entered. Just select the proper baud rate and enter telephone number in the INTERFACE LIST.



To connect to a device, select a DEVICE from the SITE LIST and desired branch item (for example FRONT PANEL). To connect to the device, click on the red button to connect via modem.



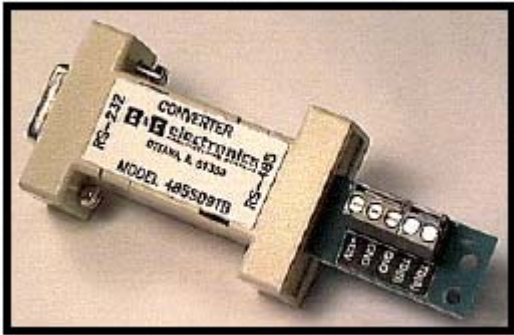
A CONNECTING TO INTERFACE dialog box will appear displaying commands and status messages of the connection.



## 11. USING SELF-POWERED RS232-TO-RS485 CONVERTER AT RELAY'S MODEM

It is recommended to use model 485SD9TB from B&B Electronics ([www.bb-elec.com](http://www.bb-elec.com)). When using this converter, place a null modem adapter between the modem and the converter. Multiple devices can be connected to one converter by daisy chaining 2 wire shielded twisted pair wire between RS485 devices to TDB(+) and TDA(-) terminals of converter. Make sure to configure relay's modem as specified in section 5.

When using this converter for direct connection to relay (no modem), a null modem adapter is not necessary.



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