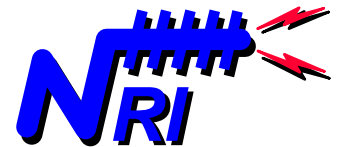


**RTU Dialup Modem
Installation And Configuration Instructions**
Telemetry And Control System Engineering Series

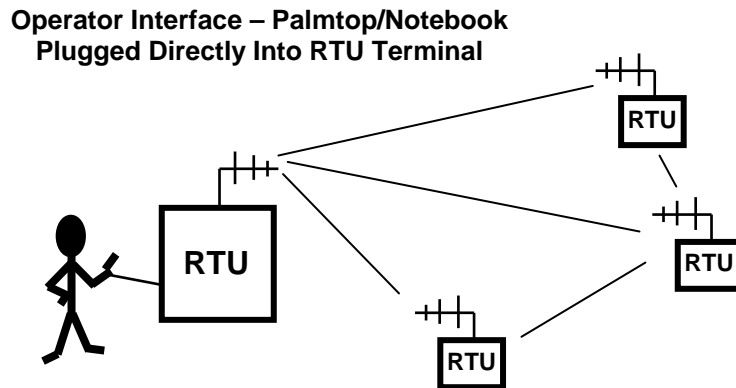
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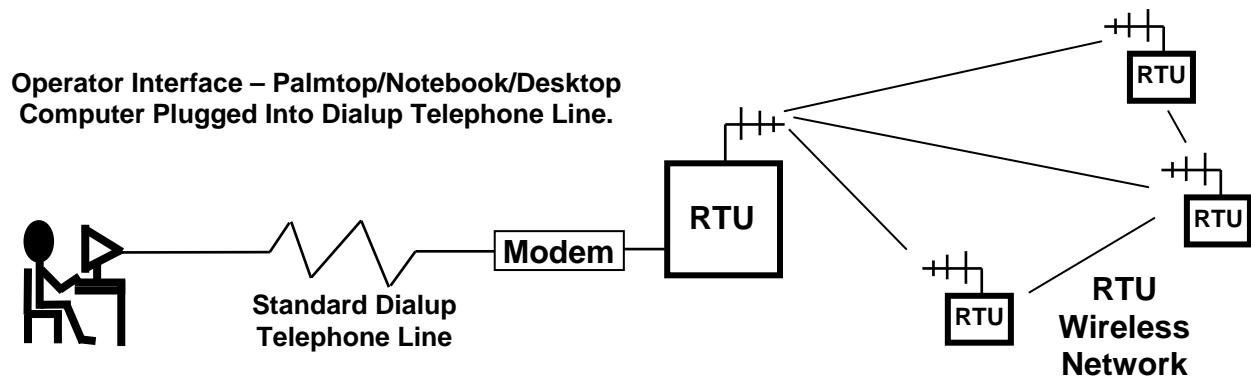


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Typically, system operators interface with an RTU Network using a palmtop computer plugged directly into the Terminal Port of an RTU. Typical palmtop computers include the HP-100LX, HP-200LX, and the HP-720.



But often, the operator would like to interface to the RTU network from home or from the office. This can be accomplished by installing a telephone line and modem at one of the RTU locations. The operator may then connect to the RTU network from a remote location using virtually any type of modem-equipped computer and a phone line.



The purpose of this document is to describe the installation and operating procedures for a remote-access RTU telephone modem. The modem described within this tutorial can be either the “US Robotics Model 5686E External Modem”, or the “US Robotics Model 839 External Modem”. Other external modems may also work correctly in this application. However, the use of modems which are not endorsed by NRI is not recommended or supported. Also, the use of non-endorsed modems may void the warranty of connected RTU.



US Robotics 5686E External Modem



US Robotics 839 External Modem

MODEM PROGRAMMING

(If the modem is already programmed, then proceed to Step 8.)

1. Ensure that the modem is not plugged into the power source; and turn the ON/OFF switch of the modem into the OFF position.
2. On the side of the modem is a bank of dip switches.

Dip Switch (ON=DOWN, OFF=UP)	Description
1	DTR Override
2	Verbal/Numeric Result Codes
3	Result Code Display
4	Command Mode Local Echo Suppression
5	Auto Answer Suppression
6	CD Override
7	Power-on and ATZ Reset Software Defaults
8	AT Command Set Recognition

The following dip switches shall be placed in the “UP” position: 1,2,4,6

The following dip switches shall be placed in the “DOWN” position: 3,5,7,8

3. Connect the modem to a Palmtop PC or Desktop PC. This requires a “straight-thru” serial cable, 9-pin female to 25-pin male. (This cable is not included with the modem, and therefore must be obtained prior to installation.)
4. Plug the modem into the power source, and turn the modem ON.
5. Establish communication with the modem using a terminal program such as “DataCom” on the HP-200 Palmtop PC, or HyperTerminal on a Windows Desktop PC. The communication settings should be 19200 baud, No Parity, 8 Data Bits, 1 Stop Bit.
6. Type in the following commands (case-sensitive!):

AT&F0	<enter>	(Resets the modem to burned-in factory defaults)
		NOTE!!! – DO NOT USE ‘ATZ’ FOR MODEM RESET!!!
AT&B1	<enter>	(Instructs the modem to have a fixed DTE speed of 19200)
ATS0=1	<enter>	(Instructs the modem to auto-answer after one (1) ring)
AT&W0	<enter>	(Stores this configuration as the default NVRAM setting)

7. Turn the ON/OFF switch of the modem to the OFF position.

MODEM DIP-SWITCH CONFIGURATION

8. Ensure that the modem is not plugged into the power source, and turn the ON/OFF switch of the modem into the OFF position.

9. On the side of the modem is a bank of dip switches.

Preferred dip switch configuration:

For 3-wire serial cables and modems behind an AB switch.....

The following dip switches shall be placed in the "DOWN" position: 1,4

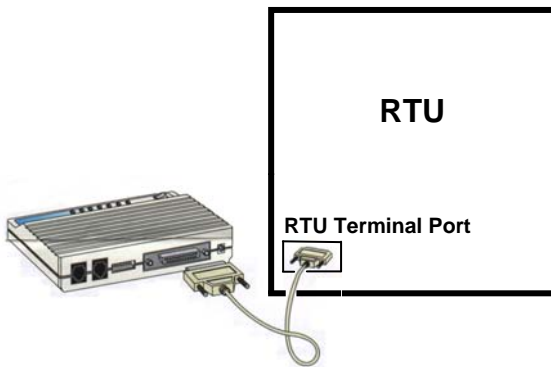
Alternate dip switch configuration:

The following dip switches shall be placed in the "UP" position: 1,2,3,5,6,7,8

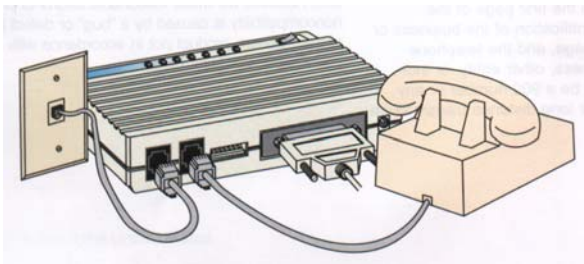
The following dip switches shall be placed in the "DOWN" position: 4

MODEM-TO-RTU CONNECTION

10. Connect the modem to the RTU Terminal Port. This requires a "straight-thru" serial cable, 9-pin female to 25-pin male. (This cable is not included with the modem, and therefore must be obtained prior to installation.)



11. Connect the modem to the telephone jack. This requires a male-to-male telephone cable. (This cable is included with the modem.) Also, it is recommended that a telephone be connected to the modem as well. This shall aid the operator for troubleshooting purposes. Note in the diagram that the telephone jack is plugged into the left receptacle, and the telephone is plugged into the right receptacle. The correct placement of these plugs is important.



12. Plug the modem into its power supply; and plug the power supply into a "battery-backed" 120 VAC power source. Turn the modem ON. The hardware installation is completed.

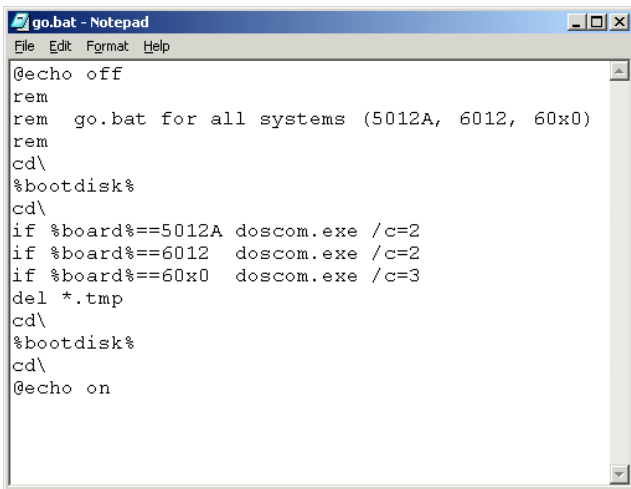
RTU SOFTWARE AND SECURITY CONFIGURATION

13. Security. Because the RTU is now connected to the PSTN (Public Switched Telephone Network), any computer user with a modem could attempt to connect to the RTU. Therefore, strong security measures have been built into the system to thwart any cyber-attacks:

- a. User-Selectable Password.
- b. Login Screen Protected From Buffer Overruns.
- c. Automatic Modem Hang Up After Five (5) Failed Login Attempts.
- d. "Control-C" RTU Interrupt Disabled.
- e. "Automatic Logout" after one (1) hour of keyboard inactivity for personnel logged in as guest or user.

14. Password Configuration. The password must be stored in the "go.bat" file. This file is located on the root drive of the RTU, "C:>". In order to edit this file, the RTU program must be halted so that control is returned to the DOS operating system. From the login prompt, log in using the "FACTORY" password (You may have to log out first to do this.). Type 'X' to exit the RTU program. You should receive a DOS prompt: C:>

The go.bat file can be edited directly using the onboard editor program "edit.exe". The unmodified go.bat file should look like this...

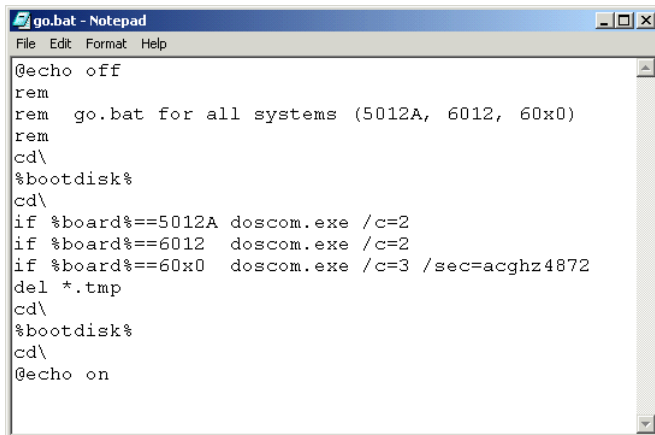


```
go.bat - Notepad
File Edit Format Help
@echo off
rem
rem go.bat for all systems (5012A, 6012, 60x0)
rem
cd\
%bootdisk%
cd\
if %board%==5012A doscom.exe /c=2
if %board%==6012 doscom.exe /c=2
if %board%==60x0 doscom.exe /c=3
del *.tmp
cd\
%bootdisk%
cd\
@echo on
```

To modify the "go.bat" file, type in the following commands to launch the onboard editor...

```
edit c:\go.bat <enter>
9 <enter>
e <enter>
if %board%==60x0 doscom.exe /c=3 /sec=acghz4872 <enter>
q <enter>
<enter>
<enter>
```

After modification, the go.bat file should contain the password ("acghz4872" in this example) as shown...



```
@echo off
rem
rem go.bat for all systems (5012A, 6012, 60x0)
rem
cd\
%bootdisk%
cd\
if %board%==5012A doscom.exe /c=2
if %board%==6012 doscom.exe /c=2
if %board%==60x0 doscom.exe /c=3 /sec=acghz4872
del *.tmp
cd\
%bootdisk%
cd\
@echo on
```

The "go.bat" file has now been correctly modified.

15. Cycle the power. The modem and RTU security have now been successfully configured for secure remote access.

16. Notes Regarding Passwords. For standard RTU connections, the following standard passwords are available:

guest	May view local and remote status and setpoints
user	Same as guest, and also able to modify local and remote setpoints
root	Same as user, except there is no "auto-logout" after inactivity.
factory	Same as root, and also certain system administrator privileges

For an RTU which has enhanced security as configured according to this document, the standard passwords will no longer be accepted for logins. The new available passwords are as follows:

password.guest	May view local and remote status and setpoints
password.user	Same as guest, and also able to modify local and remote setpoints
password.root	Same as user, except there is no "auto-logout" after inactivity.
password.factory	Same as root, and also certain system administrator privileges

It is suggested that the operator select a strong password, which contains both alphabetic characters and numbers. A wise password selection will ensure that no one will be able to guess the password.

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