



cincinnati time systems

# Model 2000 RS-485 Multi-drop Installation Instructions

## Description

Figure 1 shows how all of the system components are connected on a typical RS-485 Network setup. The Network can have up to 32 Terminals with a total cable run of 5,000 feet. (5,000 ft. run is dependent upon wire specifications and Terminal power supply location). See Appendix A for recommended cable specifications. (Note: Figures are not to scale).

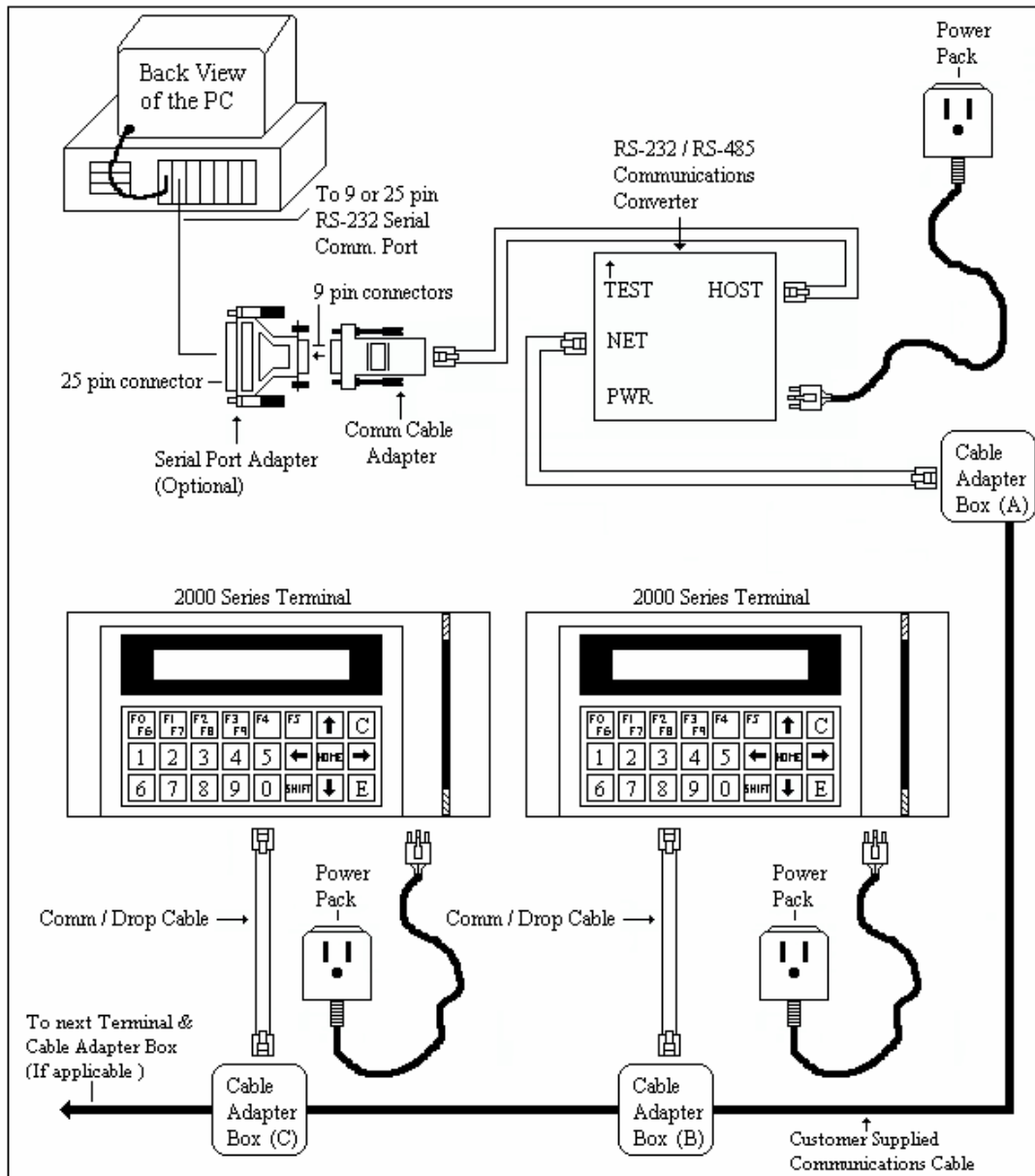


Figure 1

## Installing the Terminal(s)

- As you install the system, refer to Figure 1 in addition to the other figures mentioned below.

## STEP 1

Determine a mounting site for the Terminal(s). Run the communications cable from the PC to the first mounting site. If there is another Terminal to be installed, then run another length of communications cable from the first mounting site to the second mounting site, etc. (total cable length is not to exceed 5,000 feet). In all areas, make sure that the cable is within 10 feet of both the PC and where each Terminal is to be mounted.

## STEP 2

If a 9 pin serial communication port on the PC is to be used, then connect the 9 pin end of the Comm Cable Adapter into the 9 pin serial port and secure it in place (Figure 1). If a 25 pin serial port is to be used, then connect a 25 to 9 pin serial port adapter (not supplied) into the 25 pin serial port on the PC and secure it in place (Figure 1). Plug the 9 pin end of the Comm Cable Adapter into the 9 pin end of the serial port adapter and secure it in place (Figure 1).

## STEP 3

Plug one end of the 6 Conductor Comm cable into the modular jack on the Comm Cable Adapter and plug the other end into the Host modular jack on the RS-232 / RS-485 Communications Converter. Mount Cable Adapter Box (A) to the wall next to the communications cable, (which should be within 10 feet of the PC) and remove the top cover. Plug one end of the Comm / Drop cable into the Network modular jack on the Converter and plug the other end into the modular jack on Cable Adapter Box (A). Plug the DC Plug from the power pack into the Power Connector on the Converter. Plug the power pack into a 120 VAC outlet (Figure 2).

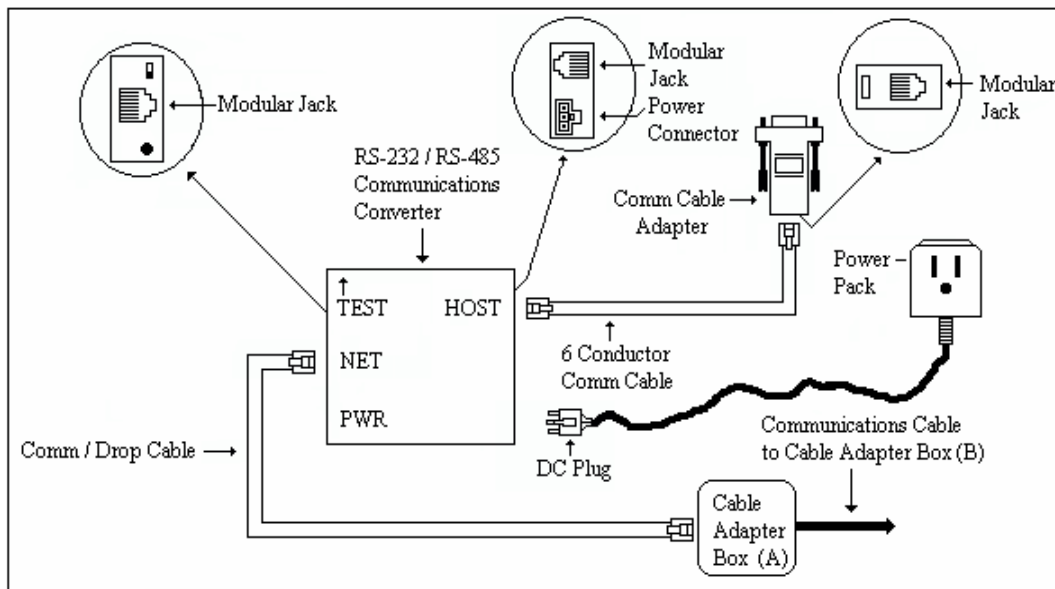


Figure 2

## STEP 4

The Terminal's Wall Mount Base can be attached to any flat surface that is in good condition. Care should be taken to place it in a location where the Terminal will not be bumped. The base of the Terminal should be about 4 feet (48 inches) from the surface of the floor in an area where lighting will not cause glare on the Terminal's display (Figure 3). A 120 VAC outlet should be located within 5 feet of the Terminal.

## STEP 5

Using the keys provided, unlock the Terminal and separate it from the Wall Mount Base. Remove any Snap Modules that are installed in the Base and put them aside for now. Locate the 4 mounting holes on the inside of the Base to mark the wall for the locations of the screws. Make sure the Wall Mount Base is level. Remove the Base from the wall and prepare the wall (if necessary); for example, drill pilot holes or tap holes. Place the Base on the wall and mount it using appropriate screws and anchors to secure it to the wall (Figure 3). Repeat this step for each Terminal to be installed.

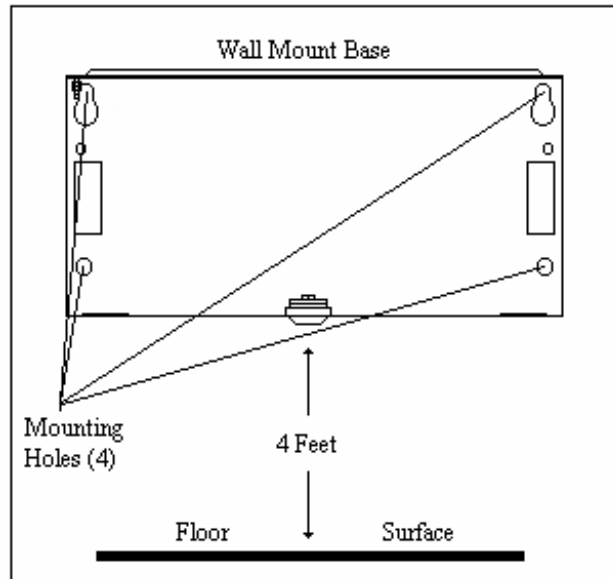


Figure 3

## STEP 6

For each Terminal to be installed, mount a Cable Adapter Box next to the communication cable at the Terminal's mounting site and remove the top cover. Cable Adapter Box should be within 10 feet of the Terminal. (The Cable Adapter Box can be mounted inside the Wall Mount Base to the far left of the Base ensuring enough room for the Snap Modules to be re-installed later).

## STEP 7

Strip back the outer covering on the communication cables about 2 inches. For twisted pair cable, select 1 twisted pair from however many there are and strip them back about ½ inch. For non-twisted pair cable, select 5 color wires from however many there are (Note: The same color wires must be used at every Terminal location and at the Converter) and strip them back about ½ inch. For either type of cable, connect and screw the wires down into to both Cable Adapter Box (A) and Cable Adapter Box (B) using the Cable Installation diagram (Figure 4). It does not matter what color wire is selected to screw down into the Cable Adapter's screw terminals, as long as the same color wire is connected to same number screw terminal at each Adapter (Figure 4). For twisted pair cable, repeat this step for each one of the remaining twisted pairs by following the Cable Installation Diagram (Figure 4). (Note: If there are only 3 twisted pairs in the cable, then the 3<sup>rd</sup> pair would be connected to the #6 screw terminal). Connect the Drain wire from the communication cable at all Cable Adapters to screw terminal 1. (Depending on the environment, the drain wire at Cable Adapter (A) may need to be tied to an Earth Ground). For each additional Terminal to be installed, connect and screw the wires down from the communication cable from the previous Cable Adapter to the next Cable Adapter by using the Cable Installation diagram (Figure 4). (For example, for a second Terminal to be installed, the communication cable would be wired from the first Terminal's Cable Adapter (B) to the second Terminal's Cable Adapter (C) etc. (Figure 1)).

STEP 7 (cont'd)

All Drain wires should be tied together at each Terminal's Cable Adapter to screw terminal 1. Close the covers on all Cable Adapters when the wiring is done.

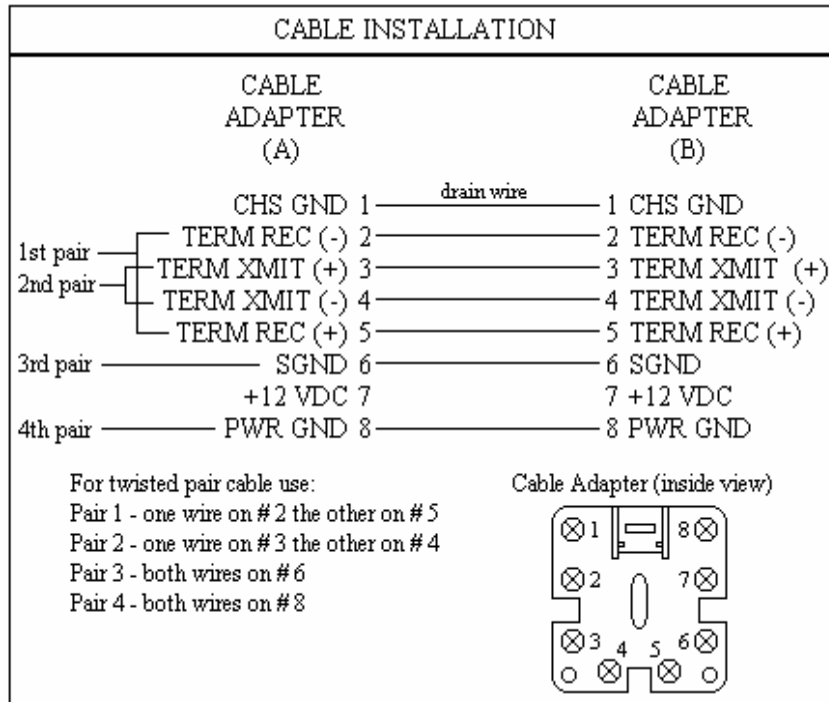


Figure 4

STEP 8

Locate a desired Cable Access knockout on the Mounting Base. Feed one end of the other Comm / Drop cable, DC Plug for the power pack, and any wires for the Relay (if applicable) through a knockout. Do not make any connections inside the Terminal yet. Plug the other end of the Comm / Drop cable into the modular jack on Cable Adapter Box (B) (Figure 5). Repeat this step for each additional Terminal and its Cable Adapter Box.

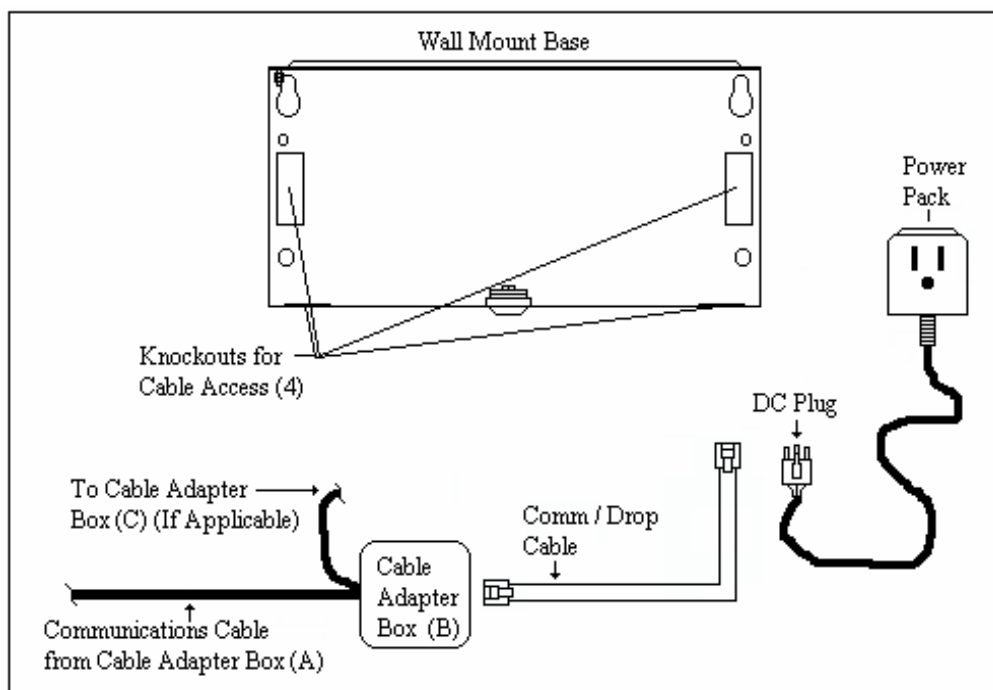


Figure 5

STEP 9

Depending on the configuration of the Terminal that was ordered, there are 1 or 2 Snap Modules to be re-installed into the Wall Mount Base. Starting from the right side of the Base, insert the RS-485 Snap Module. If a UPS Battery Module was ordered, then insert it to the left of the RS-485 Module (Figure 6). Repeat this step for each Terminal.

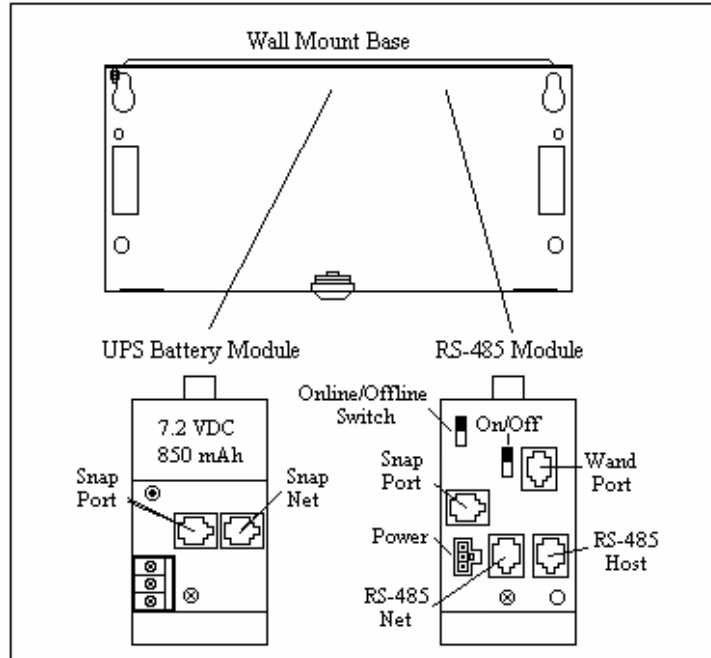


Figure 6

STEP 10

The diagram below shows how all of the Snap Modules connect to each other and to the Terminal. Depending on the configuration of the Terminal that was ordered, follow the diagram below on connecting the RS-485 Snap Module and optional UPS Battery Module to the Terminal. (For example, if only a RS-485 Snap Module was ordered, plug the Comm / Drop cable end, from the Cable Adapter, to the RS-485 Host port. Then connect one end of the 8 conductor Comm / Power cable to the Snap Port on the RS-485 Module and the other end into the Snap Term port on the Series 2000 Terminal (Figure 7). Repeat this step for each Terminal.

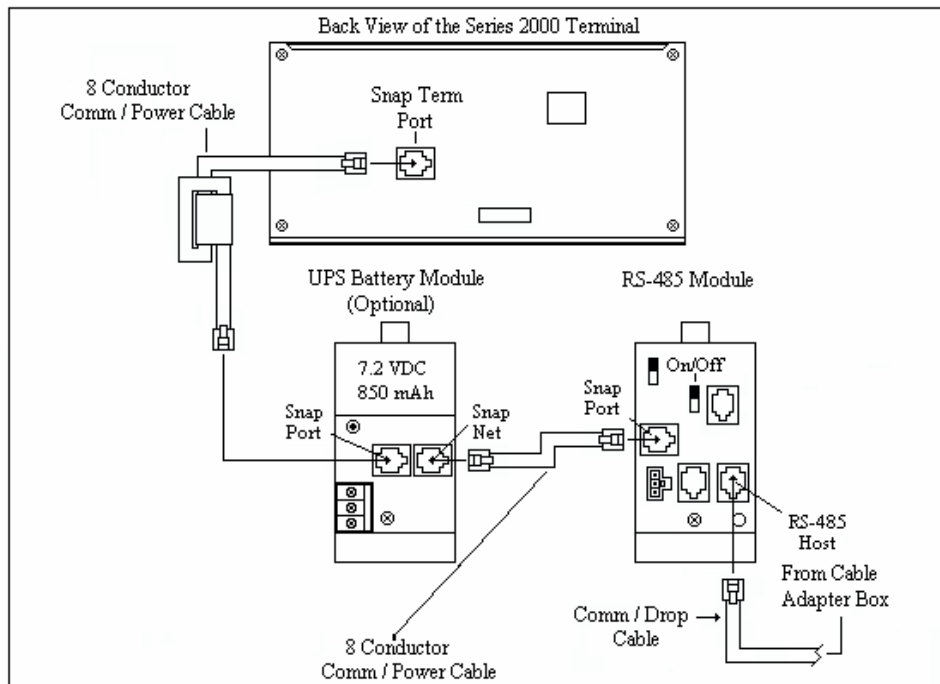


Figure 7

STEP 11

If the configuration of the Terminal includes a UPS Battery Module and the Relay is to be used, follow the Relay Connection Chart on Figure 8 on how to connect the wires to either ring bells or for door access. If the bells or door access strike needs more amperage than the Relay can handle, then call ADI Support Dept. for additional options. Repeat this step for any other Terminals that need to have connections made to the UPS Battery Module's Relay.

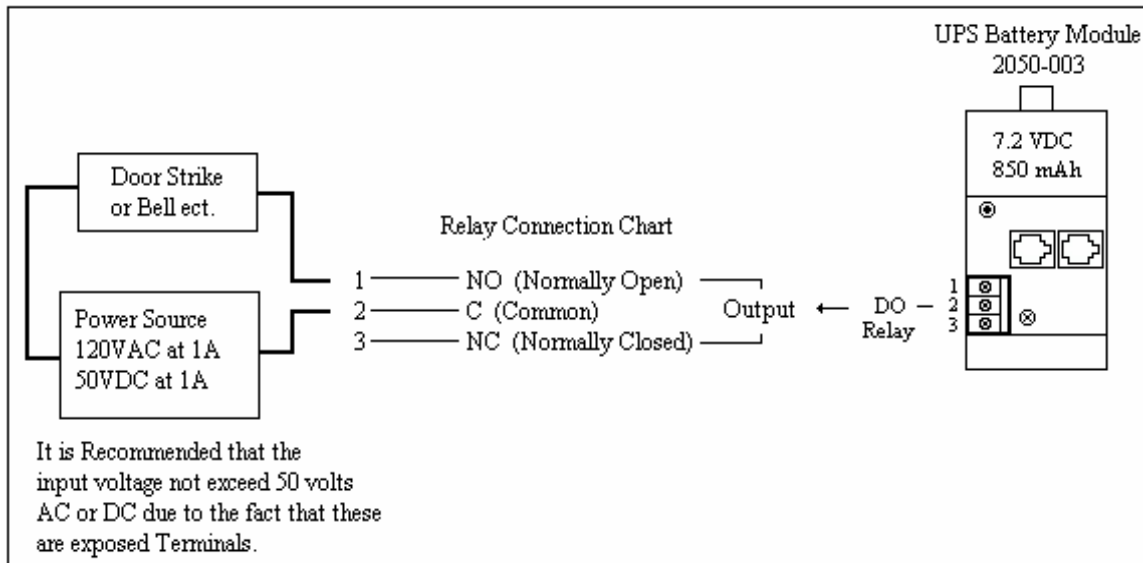


Figure 8

\* NOTE: Repeat Steps 12-21 (where applicable) for each additional Terminal.

STEP 12

On the RS-485 Module, move either the Online / Offline switch to the "Offline" position or the Use / Test switch to the "Test" position and move the On / Off switch to the "ON" position (Figure 9). Plug the DC Plug from the power pack into the Power connector on the RS-485 Module (Figure 9).

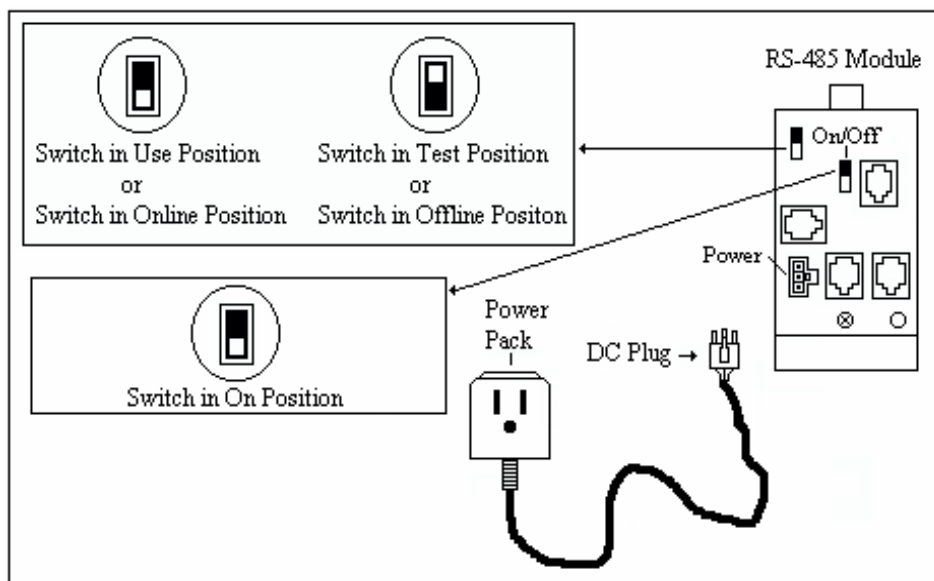


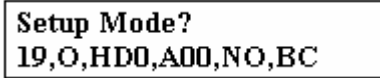
Figure 9

### STEP 13

Place the Terminal over the Wall Mount Base and use the key to lock it in place.

### STEP 14

Plug the Terminal's power pack into a 120 VAC outlet (Figure 1). The Terminal will run a series of self-tests and prompt "Setup Mode?" on the top line of the display. The bottom line of the display shows the Baud Rate, Parity, Host Delay, Terminal Address, Protocol Option, and the type of Reader (Figure 10).

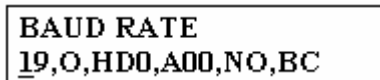


```
Setup Mode?  
19,O,HDD,A00,NO,BC
```

Figure 10

### STEP 15

Press the "E" key once on the Terminal and the prompt "BAUD RATE" appears on the top line of the display (Figure 11). The bottom line of the display will have an underline under the current setting. The default Baud Rate setting is 19200. Set the Baud Rate to 9600. Press either the up or down arrow keys on the Terminal until it reads "96" then press the right arrow key on the Terminal.

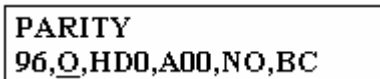


```
BAUD RATE  
19,O,HDD,A00,NO,BC
```

Figure 11

### STEP 16

The prompt on the top line of the display should now read "PARITY" (Figure 12). The bottom line of the display will have an underline under the current setting. The default Parity setting is "ODD". If it is not "ODD", press either the up or down arrow keys on the Terminal until it reads "O" then press the right arrow key on the Terminal.

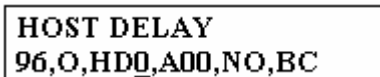


```
PARITY  
96,O,HDD,A00,NO,BC
```

Figure 12

### STEP 17

The prompt on the top line of the display should now read "HOST DELAY" (Figure 13). The bottom line of the display will have an underline under the current setting. The default Host Delay is "0". If it is not "0", press either the up or down arrow keys on the Terminal until it reads "0" then press the right arrow key on the Terminal.

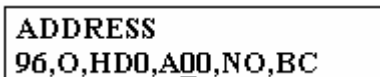


```
HOST DELAY  
96,O,HDD,0,NO,BC
```

Figure 13

### STEP 18

The prompt on the top line of the display should now read "ADDRESS" (Figure 14). The bottom line of the display will have an underline under the current setting. The default Address is "00". Press the up arrow key on the Terminal until it reads "01". (For additional Terminals, set the next one to an Address of "02", third Terminal to "03" etc.). Press the right arrow key on the Terminal.

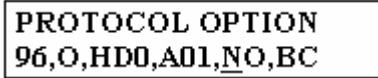


```
ADDRESS  
96,O,HDD,A00,01,NO,BC
```

Figure 14

## STEP 19

The prompt on the top line of the display should now read “PROTOCOL OPTION” (Figure 15). The bottom line of the display will have an underline under the current setting. The default Protocol Option is “NO”. If it is not “NO”, press either the up or down arrow keys on the Terminal until it reads “NO” then press the right arrow key on the Terminal.

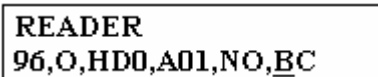


```
PROTOCOL OPTION
96,O,H00,A01,NO,BC
```

Figure 15

## STEP 20

The prompt on the top line of the display should now read “READER” (Figure 16). The bottom line of the display will have an underline under the current setting. If the Reader type is not correct, press the up or down arrow keys on the Terminal until it reads the correct type of Reader. (For example, Figure 16 below shows that the Reader is set to “BC” which is for a Barcode Reader. If the Terminal has a Magnetic Stripe Track II Reader, then the setting on the Terminal would be set for “M2”, for a Biometric Reader, the setting on the Terminal would be set for “BIO”, for a Proximity Reader, the setting on the Terminal would be set to “PROX”). Press the “HOME” key on the Terminal and the top line of the display will again read “Setup Mode” with the correct settings on the bottom line.

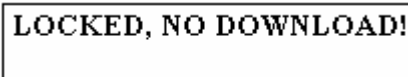


```
READER
96,O,H00,A01,BC
```

Figure 16

## STEP 21

Use the key to open up the Terminal from the Wall Mount Base. On the RS-485 Module, move either the Online / Offline switch back to the “Online” position or move the Use / Test switch back to the “Use” position (Figure 9). The Terminal will go through another series of self-tests and the prompt “LOCKED, NO DOWNLOAD!” will be displayed on the top line of the display (Figure 17). Place the Terminal back over the Wall Mount Base and use the key to lock it in place.



```
LOCKED, NO DOWNLOAD!
```

Figure 17

\* This completes the Multi-drop Installation of the Model 2000 Terminal. The rest of the Terminal programming will be done on the PC in the Time & Attendance software.

# APPENDIX A

## CABLE SPECIFICATIONS

**Note:** Described below is one of the Manufacturers recommended specifications for RS-485 communication cable. Please check local building electrical codes before selecting a cable.

**Description:** The cable selected must contain a minimum of 3 twisted pairs (6 conductors) of 24 gauge solid or stranded (7/32) wire, surrounded with an outer foil shield, drain wire and PVC jacket.

### ADI's Recommended Cable Specifications:

The following is a description of communications cable that ADI carries in inventory. For ordering and pricing information contact ADI at (401) 438-5500.

Category 5 cable with 4 twisted pairs (8 conductors), 24 gauge stranded (7/32) wire, with shield, drain wire and PCV jacket.

### Electrical and Electromagnetic Noise:

Caution must be exercised in locating cables near electrical power equipment and lighting fixtures that might cause electrical interference. Examples of electrical and electromagnetic noise sources are:

- Fluorescent, neon and incandescent lighting fixtures.
- Power distribution members, including wiring, transformers, generators, etc.
- Motors that drive machinery such as air conditioners, elevators, escalators, large blowers and machine tools.
- Radio and television transmitters.
- Signal generators, intercommunication systems and security signal systems.
- Arc welders, electrical discharge machines and related equipment.

### Preventing Electrical and Electromagnetic Noise:

Interference between cable and typical sources of electrical interference apply generally to long parallel runs. Good rules to follow for noise prevention are:

- Do not install the cable in conduit with A/C power lines.
- Do not install the cable near (within 3 feet) high inductance devices such as motors, generators, etc.
- Do not install the cable within 3 feet of A/C power lines or fluorescent light fixtures.