



cincinnati time systems

# Model 2000 Ethernet w/RS-485 Multi-drop Installation Instructions

## Description

Figure 1 shows how all of the system components are connected on a typical Ethernet / RS-485 Network setup. The Network can have up to 31 additional Terminals after the Ethernet Terminal 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).

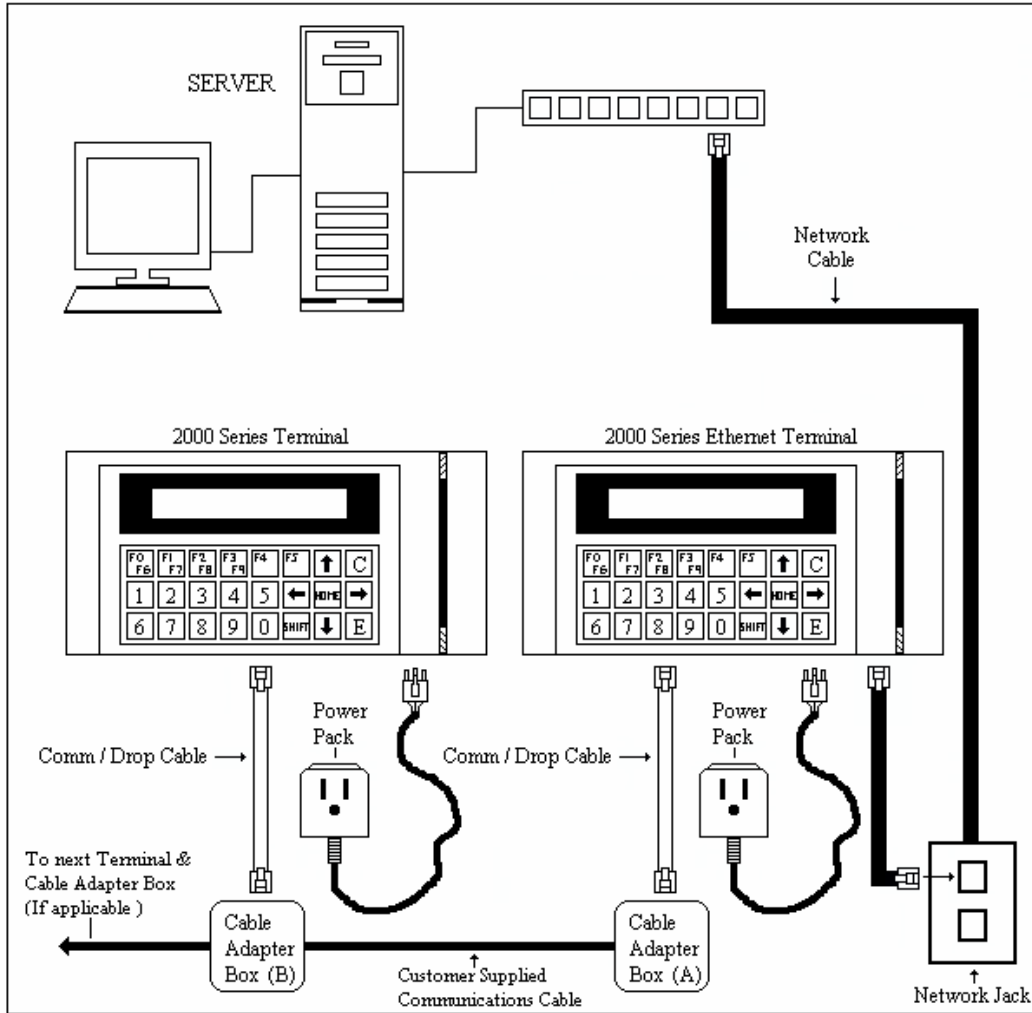


Figure 1

## 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). For the Ethernet Terminal, make sure there is a Network jack and cable installed next to where the Terminal will be mounted. For additional Terminals, run the communications cable from the Ethernet Terminal to the next Terminal's mounting site. If there is another Terminal to be installed, then run another length of communications cable from the previous Terminal's mounting site to the next 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 where each Terminal is to be mounted.

## STEP 2

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 2). A 120 VAC outlet should be located within 5 feet of the Terminal.

## STEP 3

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 2). Repeat this step for each Terminal to be installed.

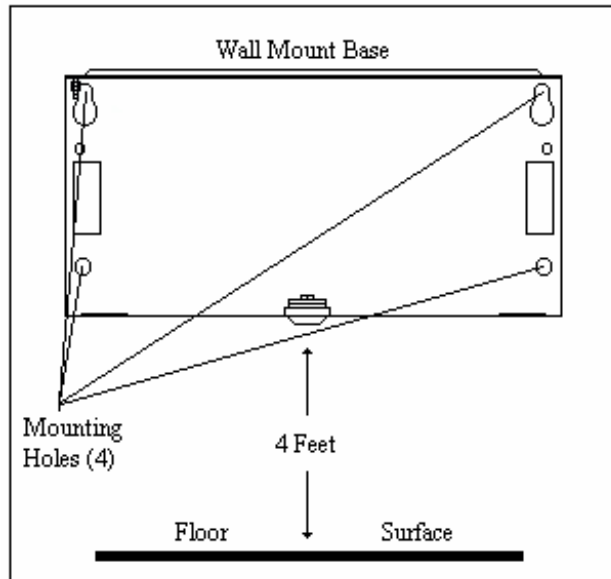


Figure 2

## STEP 4

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 5

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 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 3). 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 3). For twisted pair cable, repeat this step for each one of the remaining twisted pairs by following the Cable Installation Diagram (Figure 3). (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 3). (For example, for a third Terminal to be installed, the communication cable would be wired from the second Terminal's Cable Adapter (B) to the third Terminal's Cable Adapter (C) etc. (Figure 1)). All Drain wires should be tied

STEP 5 (cont'd)

together at each Terminal's Cable Adapter to screw terminal 1. Close the covers on all Cable Adapters when the wiring is done.

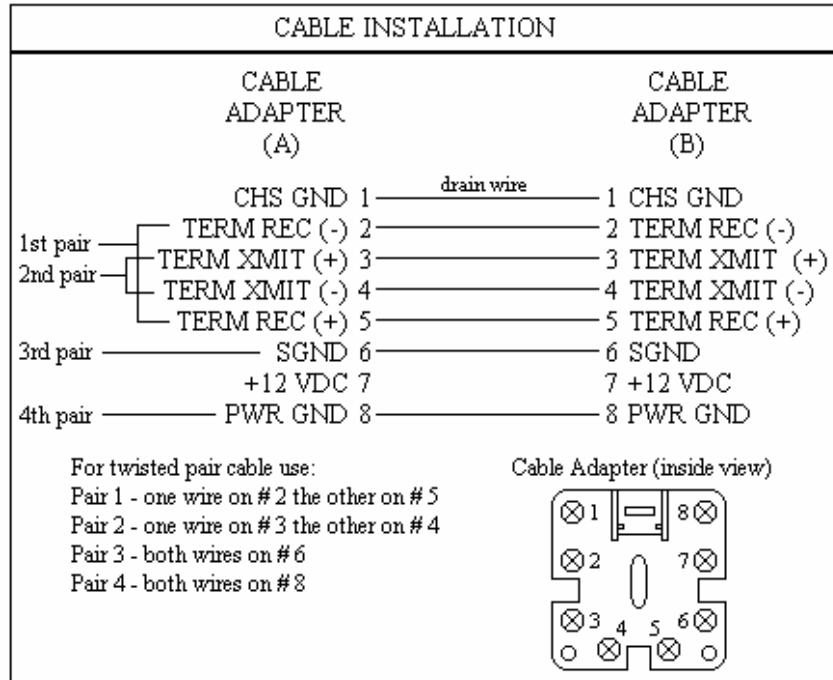


Figure 3

STEP 6

Locate a desired Cable Access knockout on the Mounting Base. Feed one end of the Comm / Drop cable, DC Plug for the power pack, one end of the Network cable (if this the Terminal with the LINC Ethernet Module in it), 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 (A) (Figure 4). Plug the other end of the Network cable into the Network jack (if applicable) (Figure 4). Repeat this step for each additional Terminal and its Cable Adapter Box.

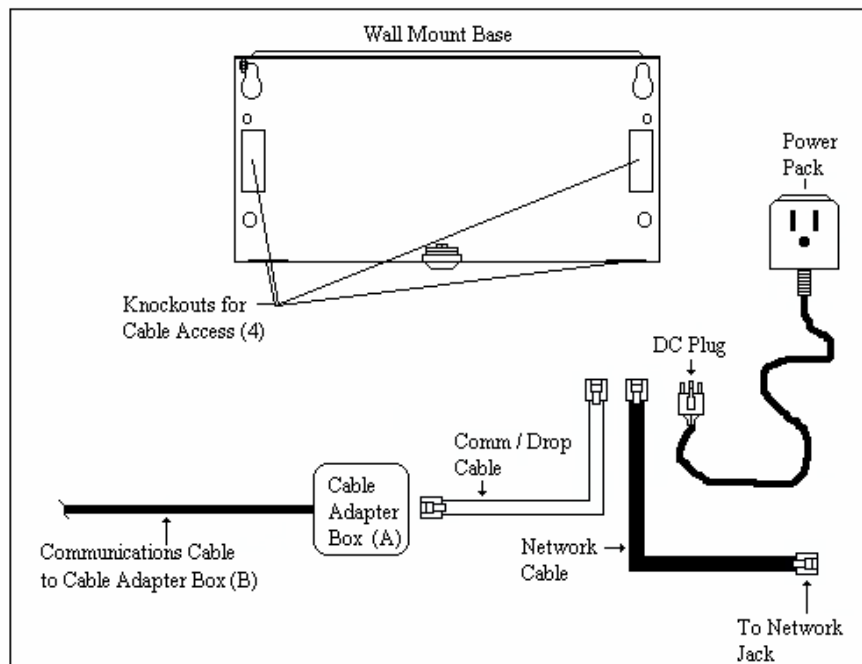


Figure 4

## STEP 7

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 LINC Ethernet or RS-485 Snap Module. If a UPS Battery Module was ordered, then insert it to the left of the LINC Ethernet or RS-485 Module (Figure 5). Repeat this step for each Terminal.

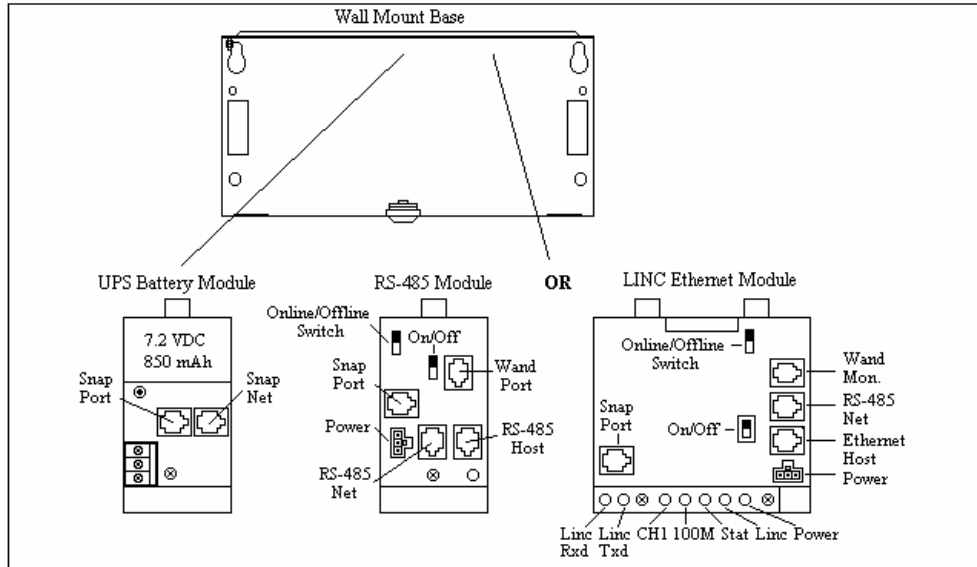


Figure 5

## STEP 8

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 LINC Ethernet Snap Module or RS-485 Snap Module and optional UPS Battery Module to the Terminal. (For example, if only a LINC Ethernet Snap Module was ordered, then plug the Comm / Drop cable end, from the Cable Adapter, to the RS-485 Net port. If only a RS-485 Snap Module was ordered, then 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 LINC Ethernet or RS-485 Module and the other end into the Snap Term port on the Series 2000 Terminal. For the Terminal with the LINC Ethernet Module in it, plug one end of the Network cable into the Network jack and the other end into the Ethernet Host port on the LINC Module (Figure 6)). Repeat this step for each Terminal.

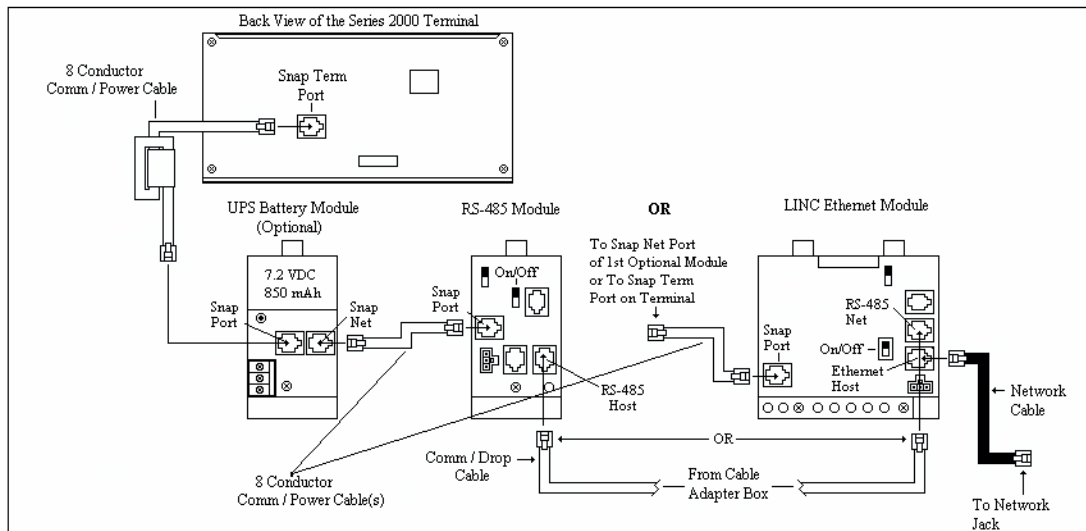


Figure 6

## STEP 9

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 7 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.

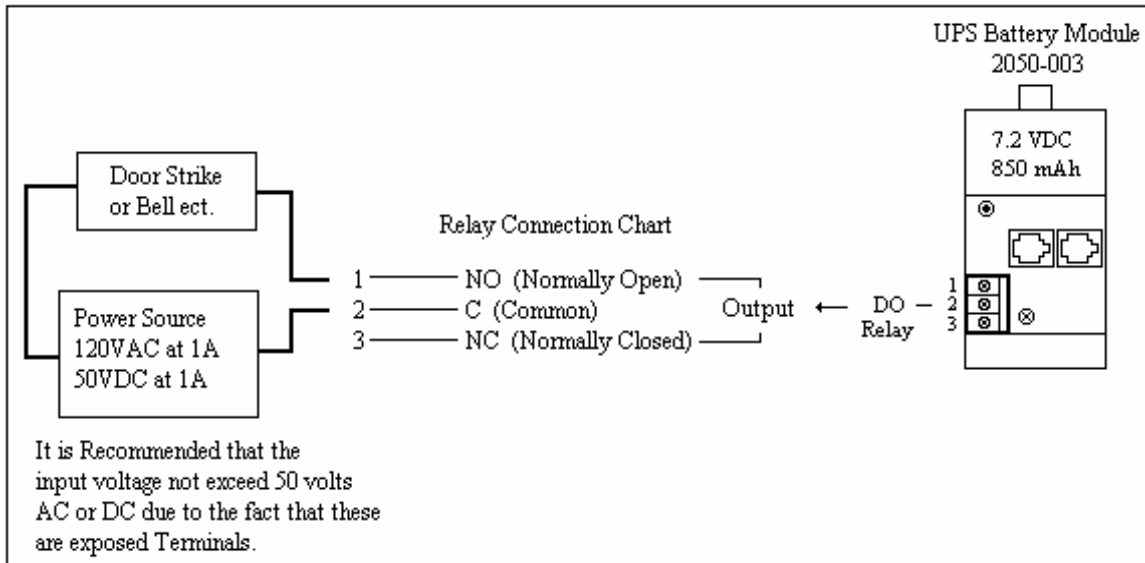


Figure 7

\* NOTE: Repeat Steps 10-30 (where applicable) for each additional Terminal.

## STEP 10

On the LINC Ethernet or 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 8). Plug the DC Plug from the power pack into the Power connector on the LINC Ethernet or RS-485 Module (Figure 8).

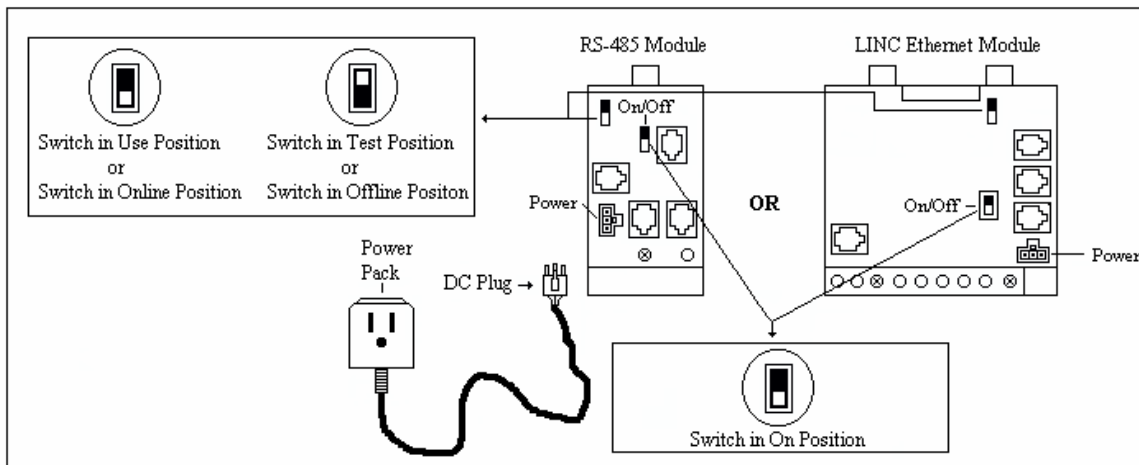


Figure 8

## STEP 11

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

## STEP 12

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 9).

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

Figure 9

## STEP 13

Press the "E" key once on the Terminal and the prompt "BAUD RATE" appears on the top line of the display (Figure 10). The bottom line of the display will have an underline under the current setting. The default Baud Rate setting is 19200. If it is not at 19200, press either the up or down arrow keys on the Terminal until it reads "19" then press the right arrow key on the Terminal.

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

Figure 10

## STEP 14

The prompt on the top line of the display should now read "PARITY" (Figure 11). 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  
19,O,HDD,A00,NO,BC
```

Figure 11

## STEP 15

The prompt on the top line of the display should now read "HOST DELAY" (Figure 12). 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  
19,O,HDD,A00,NO,BC
```

Figure 12

## STEP 16

The prompt on the top line of the display should now read "ADDRESS" (Figure 13). 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  
19,O,HDD,A00,NO,BC
```

Figure 13

## STEP 17

The prompt on the top line of the display should now read “PROTOCOL OPTION” (Figure 14). 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
19,O,HD0,A01,NO,BC
```

Figure 14

## STEP 18

The prompt on the top line of the display should now read “READER” (Figure 15). 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 15 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 for “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
19,O,HD0,A01,NO,BC
```

Figure 15

\* NOTE: For those Terminals with RS-485 Modules, proceed to Step 30. If this is the Terminal with the LINC Ethernet Module, continue to Step 19.

## STEP 19

Press the down arrow key until the prompt on the top line of the display reads “Utilities?”. Press the “E” key once. Then continue to press the down arrow key on the Terminal until the prompt on the top line of the display reads “UTILITIES” and “Ethernet Utilities?” on the bottom line (Figure 16).

```
UTILITIES?
Ethernet Utilities?
```

Figure 16

## STEP 20

Press the “E” key once on the Terminal. The Terminal will go out and read the LINC Module and prompt “Terminal IP” on the top line of the display and the default IP Address on the bottom line (Figure 17). Using the numbers on the keypad, type in the correct Terminal IP Address, then press the “E” key on the Terminal. (If the Terminal IP Address is unknown, check with the Customer’s MIS Dept. for the correct Terminal IP Address).

```
Terminal IP
xxx.xxx.xxx.xxx
```

Figure 17

## STEP 21

The prompt on the top line of the display should now read “Terminal Port” and the default values on the bottom line (Figure 18). Using the numbers on the keypad, type in “03001” then press the “E” key on the Terminal.

```
Terminal Port
XXXXXX
```

Figure 18

## STEP 22

The prompt on the top line of the display should now read “Subnet Mask” and the default values on the bottom line (Figure 19). If the default values are to be changed, then use the up and down arrow keys on the keypad to put in the correct values for the Subnet Mask. (If the values are unknown, check with the Customer’s MIS Dept. for the correct Subnet Mask. Press the “E” key on the Terminal.

```
Subnet Mask
XXX.XXX.XXX.XXX
```

Figure 19

## STEP 23

The prompt on the top line of the display should now read “Gateway IP” and the default values on the bottom line (Figure 20). If a Gateway IP Address is to be used, then using the numbers on the keypad type in the correct values for the Gateway IP Address. If a Gateway is not being used, then the values should be all zeros. If they are not all zeros, then use the numbers on the keypad and type in all zeros, then press the “E” key on the Terminal.

```
Gateway IP
XXX.XXX.XXX.XXX
```

Figure 20

## STEP 24

The prompt on the top line of the display should now read “Host IP” and the default values on the bottom line (Figure 21). If the values are not all zeros, then use the numbers on the keypad and type in all zeros, then press the “E” key on the Terminal.

```
Host IP
XXX.XXX.XXX.XXX
```

Figure 21

## STEP 25

The prompt on the top line of the display should now read “Host Port” and the default values on the bottom line (Figure 22). If the values are not all zero’s, then use the number keys on the keypad and type in all zero’s, then press the “E” key on the Terminal.

```
Host Port
XXXXXX
```

Figure 22

## STEP 26

The prompt on the top line of the display should now read “TCP/UDP Mode” and “TCP” on the bottom line (Figure 23). If it is not set to “TCP”, then press either the up or down arrow keys on the keypad until it reads “TCP” then press the “E” key on the Terminal.

```
TCP/UDP Mode
TCP
```

Figure 23

## STEP 27

The prompt on the top line of the display should now read “Flush Mode” and “Standard” on the bottom line (Figure 24). If the bottom line is not set to “Standard”, then press either the up or down arrow keys on the keypad until it reads “Standard” then press the “E” key on the Terminal.

```
Flush Mode
Standard
```

Figure 24

## STEP 28

The prompt on the top line of the display should now read “Maximum Speed” and “100Mb” on the bottom line (Figure 25). If the Network connection to this Terminal is 100Mb then press the “E” key on the Terminal. If the Network connection to this Terminal is 10MB then press either the up or down arrow keys on the keypad to change it, then press the “E” key on the Terminal.

```
Maximum Speed
100Mb
```

Figure 25

## STEP 29

The prompt on the top line of the display should now read “Update Linc?” (Figure 26). Press the “E” key on the Terminal and the message “Linc Updated” will be on the display for about 3 seconds, then the top line of the display will again read “Setup Mode” with the correct settings on the bottom line.

```
Update Linc?
```

Figure 26

## STEP 30

Use the key to open up the Terminal from the Wall Mount Base. On the LINC Ethernet or 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 8). 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 27). Place the Terminal back over the Wall Mount Base and use the key to lock it in place.

```
LOCKED, NO DOWNLOAD!
```

Figure 27

\* This completes the Ethernet 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.