

Using the i-data 7913 IPDS Printer LAN Attachment

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The i-data 7913 IPDS Printer LAN Attachment is a hardware protocol converter that communicates between Infoprint and a coaxial or twinaxial IPDS printer device. You can use the i-data 7913 IPDS Printer LAN Attachment to connect this type of printer to any LAN-attached workstation. The i-data 7913 IPDS Printer LAN Attachment requires TCP/IP communications protocols and runs on either an IBM token-ring network or an Ethernet LAN. You must install one i-data 7913 IPDS Printer LAN Attachment for each coaxial or twinaxial IPDS printer device that you plan to install, and you must install and configure each unit separately.

In order to use the 7913, you must also configure and start a bootp daemon on a system somewhere in your TCP/IP network. The bootp daemon initializes the i-data 7913 IPDS Printer LAN Attachment with the TCP/IP address information that it uses to communicate over the network. bootp daemons are available for most operating systems; AIX and OS/2 provide bootp daemons in their base TCP/IP packages. If you have an AIX or OS/2 system that can run the bootp daemon on your network, you can use it. Instructions for configuring and starting the bootp daemon on both of those systems are provided in this chapter. The base Windows TCP/IP does not include a bootp daemon, but versions are available from Microsoft and other vendors as extensions to the base TCP/IP package. You can install one of those products using the documentation provided by the other vendors.

Once you have installed and tested the i-data 7913 IPDS Printer LAN Attachment and the bootp daemon, you can define it to Infoprint Manager as a PSF TCP/IP-attached printer. Create this actual destination using the Infoprint Manager Administration GUI.

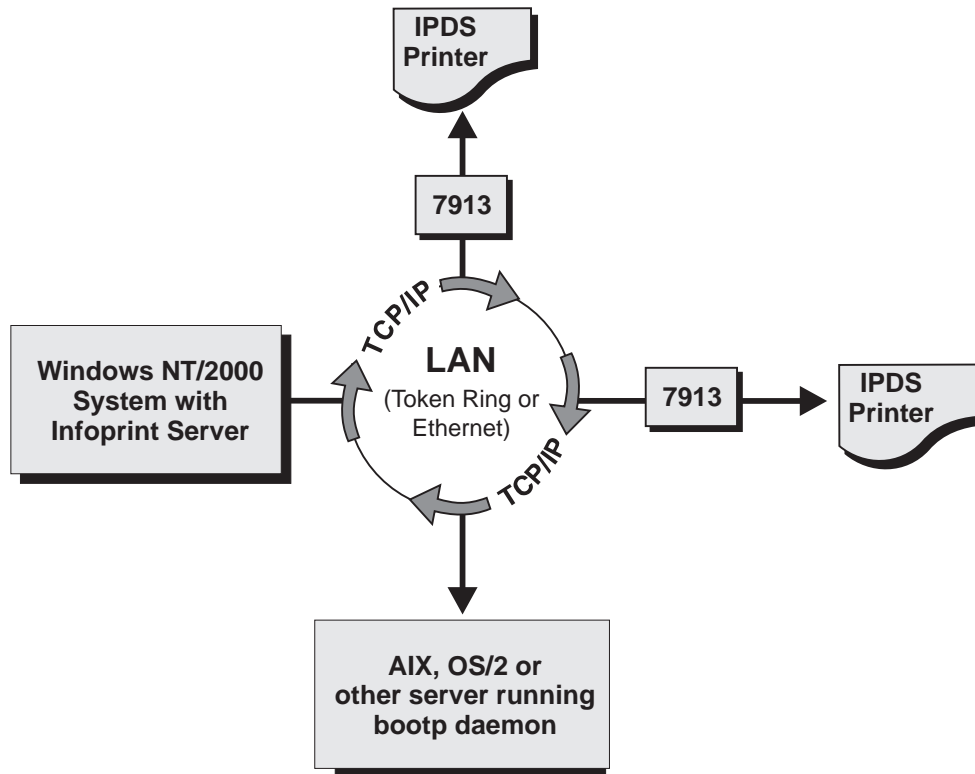


Figure 1. i-data 7913 IPDS Printer LAN Attachment in a TCP/IP LAN Environment

How the i-data 7913 IPDS Printer LAN Attachment Fits into Network Configurations

Use the configuration in Figure 2 for an TCP/IP network with the **bootp** daemon installed on another server. Normally, the server must belong to the same subnetwork as the i-data 7913 IPDS Printer LAN Attachment.

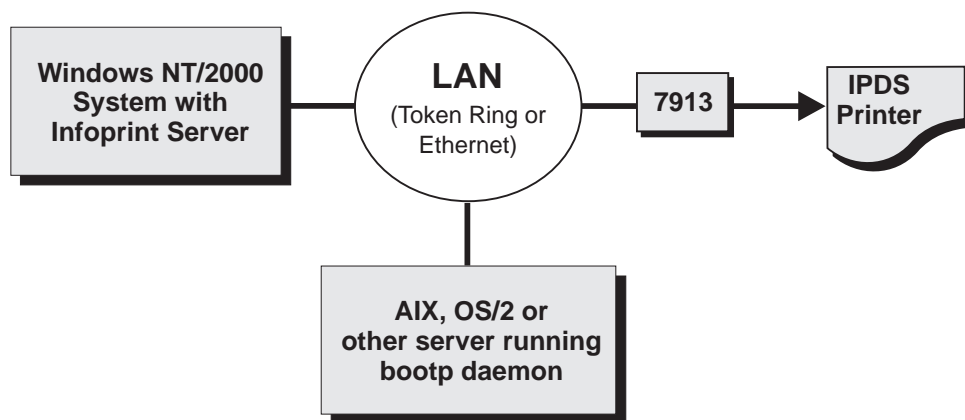


Figure 2. Network Configuration for Separate Internet Protocol Hosts

Prerequisite Tasks

Before you begin to install the i-data 7913 IPDS Printer LAN Attachment, you must satisfy the following conditions:

1. You have one i-data 7913 IPDS Printer LAN Attachment for each IBM coaxial or twinaxial printer that you plan to install. You can order the 7913 unit as a printer feature.

The following printers require the i-data 7913 IPDS Printer LAN Attachment:

- IBM 3112 Page Printer Model 001
- IBM 3116 Page Printer Models 001, 002, and 003
- IBM 3112 Page Printer Model 001
- IBM 3812 Page Printer Model 2 with feature 3190 or 3192
- IBM 3816 Page Printer Models 01D and 01S with feature 7653 or 7654
- IBM 3912 Page Printer Models AS1 and NS1
- IBM 3916 Page Printer Models AS1 and NS1
- IBM 3930 Page Printer Models 02D and 02S
- IBM Laser Printer 4028 Models AS1 and NS1, including support for the 4028 with magnetic ink character recognition (MICR), Request for Price Quotation (RPQ) S02177
- IBM 6400 Line Matrix Printer (all models)
- IBM 6408 Line Matrix Printer Model CTA

Note: Infoprint Manager does not support twinaxial connections for this printer device.

- IBM 6412 Line Matrix Printer Model CTA

Note: Infoprint Manager does not support twinaxial connections for this printer device.

2. You have installed IBM Infoprint Manager for Windows NT and Windows 2000, Version 1, Release 1 or higher.
3. You have either an IBM token-ring network or an Ethernet LAN installed and operating.
4. For each i-data 7913 IPDS Printer LAN Attachment that you plan to install, you have obtained the following information from your network administrator:
 - Internet Protocol (IP) address
 - Subnet mask
 - Gateway address

The bootp Daemon

You must configure and start the **bootp** daemon on a Windows system in your TCP/IP network. The **bootp** daemon initializes the i-data 7913 IPDS Printer LAN Attachment.

How the bootp Daemon Works

The TCP/IP **bootp** daemon supports one or more i-data 7913 IPDS Printer LAN Attachments. When you start an i-data 7913 IPDS Printer LAN Attachment, it broadcasts an initialization request to all systems on the LAN. The **bootp** daemon searches the **/etc/bootptab** file and returns information that defines the i-data 7913 IPDS Printer LAN Attachment within the network.

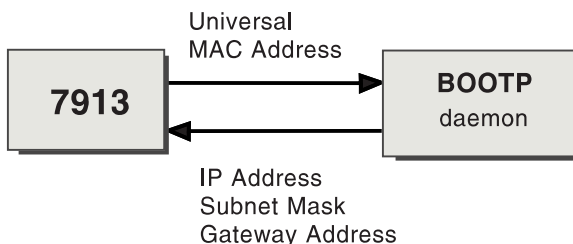


Figure 3. Data Flow between the i-data 7913 IPDS Printer LAN Attachment and the bootp Daemon

Figure 3 shows the exchange of the following data:

Universal medium access control (MAC) address

The universal MAC address is unique for each i-data 7913 IPDS Printer LAN Attachment. It is printed on the side panel of the i-data 7913 IPDS Printer LAN Attachment and defined in the hardware. The i-data 7913 IPDS Printer LAN Attachment broadcasts its universal MAC address when it starts. The **bootp** daemon uses the universal MAC address to find the i-data 7913 IPDS Printer LAN Attachment in the **bootptab** file.

IP address

The IP address is the full address of the i-data 7913 IPDS Printer LAN Attachment as defined to the network. This address must be unique for each i-data 7913 IPDS Printer LAN Attachment.

Subnet mask

The subnet mask is a bit template that indicates which part of the IP address represents the network. A 1 in the subnet mask indicates that the corresponding bit in the IP address is part of the network address; a 0 indicates that it is not. For example, if the IP address is 9.99.12.137 and the subnet mask is 255.255.255.0, the network address is 9.99.12.0.

Gateway address

The gateway address is the address of the system that routes data to other networks.

Filling out the bootp Configuration Worksheet

Before you begin to modify the **/etc/bootptab** file, fill out a **bootp** configuration worksheet for each i-data 7913 IPDS Printer LAN Attachment.

Table 1. bootp Configuration Worksheet

Parameter	Where to Find the Value	Value
Name	Any name that identifies the i-data 7913 IPDS Printer LAN Attachment	
Network type (token ring or Ethernet)	System administrator	
Ring speed (token-ring only)	System administrator	
Universal MAC address	Side panel of the i-data 7913 IPDS Printer LAN Attachment	
IP address	System administrator	
Subnet mask	System administrator	
Gateway address	System administrator	

Table 1. bootp Configuration Worksheet (continued)

Parameter	Where to Find the Value	Value
Printer type (twinaxial or coaxial)	Printer documentation	

Editing the bootp Configuration File

bootp daemons use a text configuration file, usually named bootptab. On AIX, this file resides in the /etc filesystem. On OS/2, the file is placed in the /etc subdirectory under the install path for the TCP/IP product (usually in /tcpip/etc). Existence and location of the configuration file on Windows system depend upon the TCP/IP extension that you selected.

The **bootp configuration** file contains a separate entry with configuration information for each i-data 7913 IPDS Printer LAN Attachment. To configure this file, edit it and add the values from Table 1 on page 4. You must have **Administrator** authority to edit the **bootp configuration** file.

Figure 4 shows an example of a simple **bootp configuration** file. There are entries for two i-data 7913 IPDS Printer LAN Attachments with the same subnet mask and gateway address.

```
P4028: ht=6: ha=00036EFFFFFF: ip=9.9.12.137:-
      sm=255.255.255.0: gw=9.99.12.254:
P3812: ht=6: ha=00036E00049F: ip=9.9.12.138:-
      sm=255.255.255.0: gw=9.99.12.254:
```

Figure 4. A Simple bootptab File

The keywords and fields in Figure 4 are as follows:

EntryName

A name of your choice that identifies the entry. This name has no meaning to the system.

ht=HostHardwareType

Enter **6** for a token ring network or **ethernet** for an Ethernet LAN. This keyword must precede the **ha** keyword.

ha=HostHardwareAddress

The universal MAC address of the i-data 7913 IPDS Printer LAN Attachment.

ip=IPAddress

The IP address of the i-data 7913 IPDS Printer LAN Attachment.

sm=SubnetMask

The subnet mask for the IP address.

gw=GatewayAddress

The gateway address for the network.

: Delimiter indicating the end of a value.

- Continuation character indicating that the entry continues on the next line.

Figure 5 on page 6 shows a more complex way to describe the same **bootp** configuration as in Figure 4. The file begins with a global entry for the subnet mask used by all i-data 7913 IPDS Printer LAN Attachments. An entry for the

gateway address points to the subnet mask entry. In turn, each entry for an i-data 7913 IPDS Printer LAN Attachment points to the gateway address entry. This style is convenient to use when many i-data 7913 IPDS Printer LAN Attachments share the same subnet mask and gateway address. If the gateway address changes, you need to update only one entry.

```
# Global entry with information that every host uses
global.lan:-
    sm=255.255.255.0:

# Subnet entry with gateway address
subnetida.trlan:-
    tc=global.lan: gw=9.99.12.254:

# Entries for 7913 units
P4028: tc=subnetida.trlan: ht=6: ha=00036EFFFFFF:-
    ip=9.9.12.137:

P3812: tc=subnetida.trlan: ht=6: ha=00036E00049F:-
    ip=9.9.12.138:
```

Figure 5. A More Complex bootptab File

In addition to the keywords you saw in Figure 4 on page 5, Figure 5 contains the following keywords:

tc=template

A pointer to another entry that contains addressing information.

Comment character

Running the bootp Daemon

Once the bootptab configuration file has been edited to include the TCP/IP network information for each of your i-data 7913 IPDS Printer LAN Attachment, follow instructions specific to your operating system to start the bootp daemon. The daemon can be configured to be controlled by the inet superdaemon by adding the bootp daemon to the list of services that the inet daemon controls. The bootp daemon may also be started manually from a command line at boot time if you want to maintain control over the daemon.

If you do not want to maintain an active bootp daemon on your network, the i-data 7913 IPDS Printer LAN Attachment allows you to load default network information into the device; the 7913 automatically uses this information if no bootp daemon responds to the address request within the timeout period (usually about two minutes). Follow the detailed instructions provided with your 7913 to modify your bootptab configuration file to force the network information into the device. You will still have to temporarily start a bootp daemon to initially load the network information into each 7913, but once the information is loaded, the bootp daemon will only be required if you want to change network information for a specific i-data 7913 IPDS Printer LAN Attachment, if you wanted to add an additional 7913 to your network, or if you needed to load updated microcode into existing i-data 7913 IPDS Printer LAN Attachments.

Instructions for setting up the bootp daemon on AIX and OS/2 systems follow.

Setting Up the bootp Daemon on AIX

After you have configured the **bootp configuration** file, you must set up and start the **bootp** daemon on AIX. Follow these steps:

1. Log on as **root**.
2. Add the following lines to the **/etc/services** file if they are not already present:

```
bootps 67/udp # bootp server port
bootpc 68/udp # bootp client port
```
3. Use *one* of the following methods to start the **bootp** daemon:
 - To have the **inetd** super-daemon start the **bootp** daemon, follow these steps:
 - a. Add the following line to the **/etc/inetd.conf** file if it is not already present:

```
bootps dgram udp wait root /etc/bootpd bootpd
```
 - b. On the AIX command line, enter the following commands so that the **inetd** super-daemon can recognize the update:

```
inetimp
refresh -s inetd
```
 - To start the **bootpd** daemon manually, follow these steps:
 - a. Verify that the **/etc/inetd.conf** file does not include a line that controls the **bootpd** daemon. If necessary, comment out or delete the line and refresh the **/etc/inetd.conf** file.
 - b. On the AIX command line, enter one of the following commands:

```
bootpd -s
```

or

```
bootpd -s -d -d -d -d -d
```

The **-s** flag indicates that the **inetd** super-daemon does not control the **bootpd** daemon. Each **-d** flag displays an additional amount of debugging information. You can specify the **-d** flag up to five times.

Setting up the BOOTP Daemon under OS/2

To use the BOOTP daemon under OS/2, the SERVICES file in the ETC directory (**/tcpip/etc/services**) must contain the following entries:

```
sbootp 67/udp # bootp server
cbootp 68/udp # bootp client
```

To test the BOOTPD command, enter the following from an OS/2 command line:

```
bootpd -d -d -d -d -d
```

where:

- **-d** displays debugging information, such as hardware address. Each additional **-d** increases the amount of debugging information displayed. You can specify **-d** up to five times.

When you are satisfied that the BOOTPD command is working correctly, you can add the command to your startup procedure.

Add the BOOTPD command to the **/tcpip/bin/tcpstart.cmd** file (assuming that TCP/IP was installed in the **tcpip** subdirectory). If the BOOTPD and the 7913 are on the same LAN segment (no bridges), enter the following:

```
start BOOTPD
```

If the BOOTP daemon and the 7913 are on different LAN segments (bridges required), enter the following:

```
start BOOTPD -b
```

Configuring a Twinaxial Printer

If you are using the i-data 7913 IPDS Printer LAN Attachment to connect a twinaxial printer, set the **Station address** to **0** at the printer device.

Note: You cannot use the **CANCEL** button on a twinaxial printer to cancel print jobs.

Setting the Controls for the i-data 7913 IPDS Printer LAN Attachment

There are two models of the i-data 7913 IPDS Printer LAN Attachment, each with different controls:

- Model 03 for IBM token-ring networks
- Model 04 for Ethernet LANs

You must set the controls before you attach the i-data 7913 IPDS Printer LAN Attachment to the printer or to the network.

DANGER

Disconnect the i-data 7913 IPDS Printer LAN Attachment from the electrical outlet before setting the controls.

Model 03 for IBM Token-Ring Networks

Figure 6 shows the i-data 7913 IPDS Printer LAN Attachment Model 03 for IBM token-ring networks.

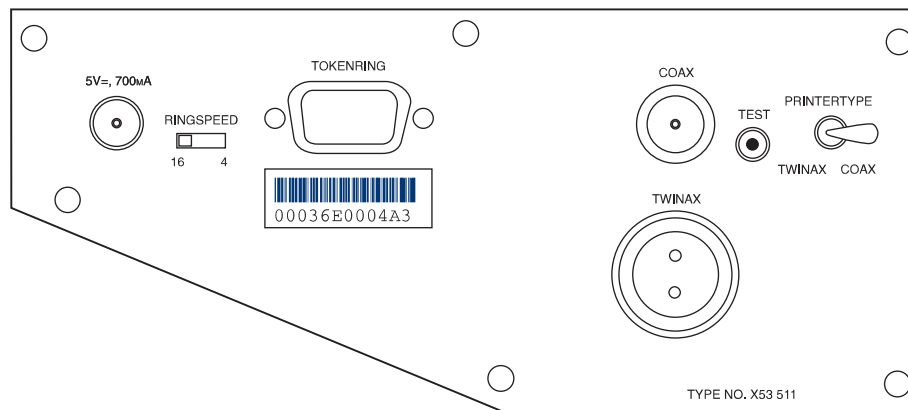


Figure 6. i-data 7913 IPDS Printer LAN Attachment Model 03 for IBM Token-Ring Networks

To set the controls on this model, follow these steps:

1. Disconnect the i-data 7913 IPDS Printer LAN Attachment from the electrical outlet.
2. Set the **RINGSPEED** switch to the speed of the token ring: **4** or **16** megabits per second. You can find out the speed from your system administrator.
Attention: If the **RINGSPEED** switch is not set correctly, the LAN may malfunction.
3. Set the **PRINTERTYPE** switch to **COAX** for an IBM coaxial printer or **TWINAX** for an IBM twinaxial printer.

Model 04 for Ethernet LANs

Figure 7 shows the i-data 7913 IPDS Printer LAN Attachment Model 04 for Ethernet LANs.

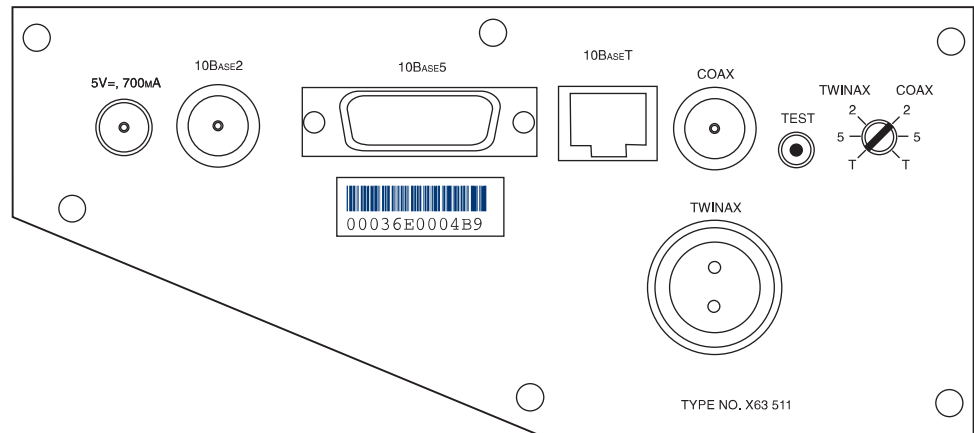


Figure 7. i-data 7913 IPDS Printer LAN Attachment Model 04 for Ethernet LANs

To set the controls on this model, follow these steps:

1. Disconnect the i-data 7913 IPDS Printer LAN Attachment from the electrical outlet.
2. Set the **TWINAX/COAX** rotary switch to one of the following positions:
 - COAX 2**
10base2 to coax
 - COAX 5**
10base5 to coax
 - COAX T**
10baseT to coax
 - TWINAX 2**
10base2 to twinax
 - TWINAX 5**
10base5 to twinax
 - TWINAX T**
10baseT to twinax

Attaching the i-data 7913 IPDS Printer LAN Attachment

Attach the i-data 7913 IPDS Printer LAN Attachment by cabling it to the token ring or LAN and to the printer. For coaxial printers, you must also install the ferrite cable block shipped with the i-data 7913 IPDS Printer LAN Attachment. The ferrite cable block reduces electrical interference.

Note: Cables are not provided with the i-data 7913 IPDS Printer LAN Attachment or with Infoprint Manager.

1. Unplug the i-data 7913 IPDS Printer LAN Attachment.
2. Use a LAN connection cable to attach the i-data 7913 IPDS Printer LAN Attachment to the token ring or LAN.
3. Use a coaxial or twinaxial connection cable to attach the i-data 7913 IPDS Printer LAN Attachment to the printer.

4. For coaxial printers, clamp the ferrite cable block to the coaxial cable. Position the ferrite cable block about 10 centimeters (4 inches) from the i-data 7913 IPDS Printer LAN Attachment.

Starting the i-data 7913 IPDS Printer LAN Attachment

To start the i-data 7913 IPDS Printer LAN Attachment, follow these steps:

1. Turn on the printer device.
2. Plug the i-data 7913 IPDS Printer LAN Attachment power cable into an electrical outlet.

The **POWER** light goes on. Several seconds later, the **LAN** light blinks. When the **bootp** daemon initializes the i-data 7913 IPDS Printer LAN Attachment, the **LAN** light changes from blinking to steady.

Note: If no bootp daemon responds within the timeout limit, the i-data 7913 IPDS Printer LAN Attachment uses default network information that it has stored internally, if it is available. If no default information has been stored, the 7913 device will remain unavailable to your network.

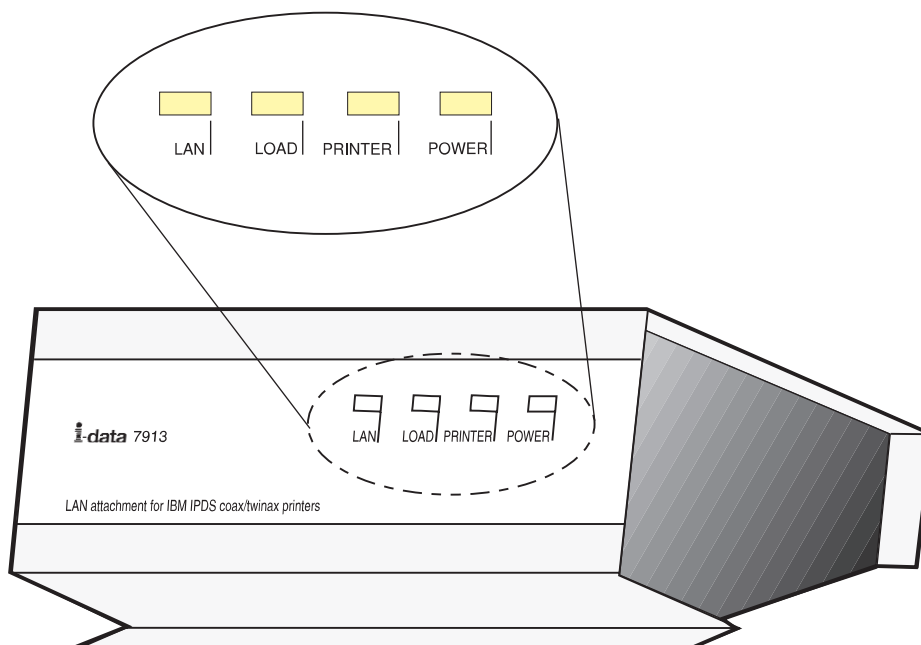


Figure 8. Status Indicators on the i-data 7913 IPDS Printer LAN Attachment

Testing the i-data 7913 IPDS Printer LAN Attachment

After you have started the i-data 7913 IPDS Printer LAN Attachment, follow these steps to test it:

1. Press the **TEST** button on the side panel of the i-data 7913 IPDS Printer LAN Attachment. This breaks the connection between Infoprint Manager and the i-data 7913 IPDS Printer LAN Attachment and causes the printer to print a test page.
2. From any system on your LAN, ping the i-data 7913 IPDS Printer LAN Attachment to test both the physical LAN connection and the IP network connection.

- a. Open a DOS window. On Windows NT systems, click the Windows Start button and select **Program** → **Command Prompt**. On Windows 2000 systems, click the Windows Start button and select **Program** → **Accessories** → **Command Prompt**.
- b. Type **ping** and the IP address or host name of the i-data 7913 IPDS Printer LAN Attachment, for example:
ping 9.99.12.73

If the **ping** command is successful, the response looks like this:

```
ping 9.99.12.73 with 32 bytes of data
Reply from 9.99.12.73: bytes = 32 time<10ms ttl=128
Reply from 9.99.12.73: bytes = 32 time<10ms ttl=128
Reply from 9.99.12.73: bytes = 32 time<10ms ttl=128
Reply from 9.99.12.73: bytes = 32 time<10ms ttl=128
```

Shutting Down the i-data 7913 IPDS Printer LAN Attachment

To end the connection between Infoprint and the i-data 7913 IPDS Printer LAN Attachment, you should treat it as you would any other physical destination. Issue a shutdown command to break the connection to Infoprint Manager, then unplug the device to ensure that the connection will not be inadvertently restored.

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