IP-SPOOL

APPLICATION

USER'S MANUAL

FOR

DT-6XXX

EMBEDDED NETWORK PROCESSORS

RELEASE.VERSION 12.0

ISSUE 2

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Datatek
APPLICATIONS, INC

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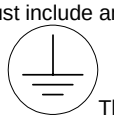
IMPORTANT SAFETY INSTRUCTIONS

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the DT-6XXX product.

When installing, operating, or maintaining this equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock, and injury to persons, including the following:

- ❑ Read and understand all instructions.
- ❑ Follow all warnings and instructions marked on this product.
- ❑ For information on proper mounting instructions, consult the User's Manual provided with this product.
- ❑ The telecommunications interface should not leave the building premises unless connected to telecommunication devices providing primary and secondary protection.
- ❑ This product should only be operated from the type of power source indicated in the User's Manual.
- ❑ This unit is intended to be powered from either –48 V DC or AC voltage sources. See User's Manual before connecting to the power source.
- ❑ The –48 V DC input terminals are only provided for installations in Restricted Access Areas locations.
- ❑ Do not use this product near water, for example, in a wet basement.
- ❑ Never touch uninsulated wiring or terminals carrying direct current or leave this wiring exposed. Protect and tape wiring and terminals to avoid risk of fire, electric shock, and injury to service personnel.
- ❑ To reduce the risk of electrical shock, do not disassemble this product. Service should be performed by trained personnel only. Opening or removing covers and/or circuit boards may expose you to dangerous voltages or other risks. Incorrect re-assembly can cause electric shock when the unit is subsequently used.
- ❑ For a unit intended to be powered from –48 V DC voltage sources, read and understand the following:
  - This equipment must be provided with a readily accessible disconnect device as part of the building installation.
  - Ensure that there is no exposed wire when the input power cables are connected to the unit.
  - Installation must include an independent frame ground drop to building ground. Refer to User's Manual.



This symbol is marked on the DT-6XXX, adjacent to the ground (earth) area for the connection of the ground (earth) conductor

- ❑ This Equipment is to be Installed Only in Restricted Access Areas on Business and Customer Premises Applications in Accordance with Articles 110-16, 110-17, and 110-18 of the National Electrical Code, ANSI/NFPA No. 70. Other Installations Exempt from the Enforcement of the National Electrical Code May Be Engineered According to the Accepted Practices of the Local Telecommunications Utility.
- ❑ For a unit used with an AC Wall Plug-In Unit, read and understand the following:
  - Contact Datatek Applications, Inc or its authorized resellers for specifications for procuring an AC power unit.
  - Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
  - Do not staple or otherwise attach the power supply cord to the building surfaces.
  - Do not overload wall outlets and extension cords as this can result in the risk of fire or electric shock.
  - The socket outlet shall be installed near the equipment and shall be readily accessible.
  - The Wall Plug-In unit may be equipped with a three-wire grounding type plug, a plug having a third (grounding) pin. This plug is intended to fit only into a grounding type power outlet. Do not defeat the safety purpose of the grounding type plug.
  - Do not allow anything to rest on the power cord. Do not locate this product where the cord may be abused by persons walking on it.
  - Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:
    a) When the powers supply cord or plug is damaged or frayed.
    b) If liquid has been spilled into the product.
    c) If the product has been exposed to rain or water.
    d) If the product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions because improper adjustment of other controls may result in damage and will often require extensive work by qualified technician to restore the product to normal operation.
    e) If the product has been dropped or the cabinet has been damaged.
    f) If the product exhibits a distinct change in performance.

Save These Instructions

1 INTRODUCTION

Many existing networking equipment consoles have the need for a dedicated print device. Similarly, legacy hosts and their applications typically assume a dedicated printer of which their use is exclusive. Many of these print devices are under-utilized, yet require considerable periodic maintenance. Finally, the physical location of these printers may not be convenient, due to requirements implied by their legacy interfaces.

Many modern host applications use RFC1179 print spooling to share a common print resource. The purpose of the IP-SPOOL application is to provide that same functionality to the dedicated printer interfaces of legacy systems.

The IP-SPOOL application has two distinct purposes.

- Allow convenience by providing the ability to route print output to a shared printer anywhere in the network infrastructure.
- Reduce the overall cost associated with legacy interfaces by eliminating dedicated equipment.

By allowing the sharing of otherwise dedicated equipment, the IP-SPOOL application reduces ongoing costs associated with legacy applications, while providing all of the functionality expected today.

2 GLOSSARY

BHIM	Bisync Host Interface Module – a BNS SYNC* module in cluster controller emulation mode
BNS	Mnemonic which has no translation and is used to refer to the BNS-2000 family of products which include BNS-2000 and BNS-2000 VCS (a.k.a. Datakit® II VCS)
CO	Central Office
CODEC	Coder/Decoder
COLO	Central Office Co-Location
DCTU	Directly Connected Test Unit
DK	Datakit
IP	Internet Protocol
LMOS	Loop Maintenance Operations System
MLT	Mechanized Loop Test Operations System
NE	Network Element
OS	Operations System
OSS	Operations Support System
RFC	Request For Comments (Internet Specifications)
SAM	BNS Synchronous/Asynchronous Multiplexer
SNMP	Simple Network Management Protocol

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TCP	Transport Control Protocol
TCP/IP	Transport Control Protocol over the Internet Protocol
UMI	Universal Mediation Interface (Datakit/BNS interface module)
URP	Universal Receiver Protocol

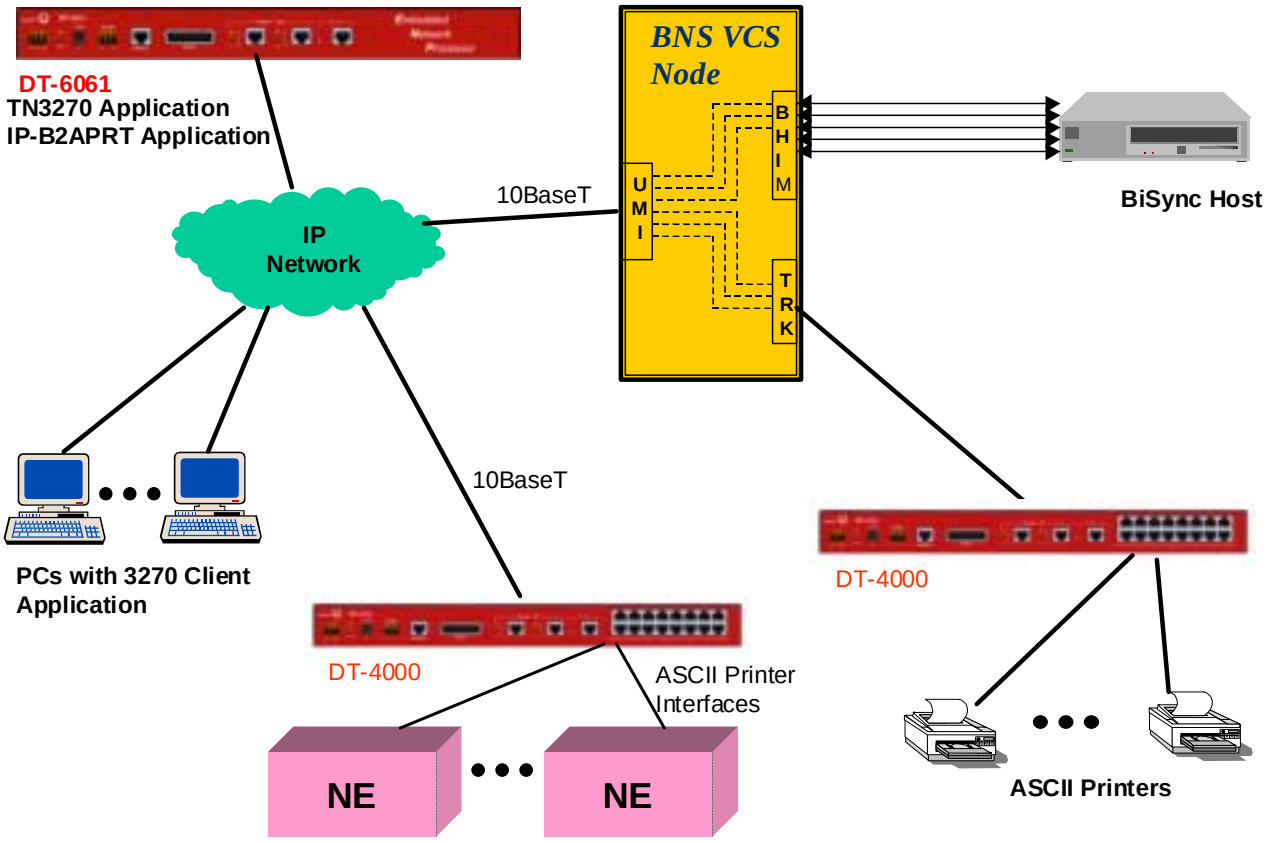
3 SUGGESTED REFERENCES

The following documents are resident at **http://www.datatekcorp.com** under the *support* button.

Document	Scope
DT-6061 Embedded Network Processor User's Manual (Platform)	Describes the DT-6061 Embedded Network Processor infrastructure and command set. This includes configuration information, hardware specifications, and SNMP MIB support.
DT-6X60 Embedded Network Processor Platform User's Manual	Describes the DT-6160 and DT-6260 Embedded Network Processors' infrastructure and command set. This includes configuration information, hardware specifications, and SNMP MIB support.
Universal Mediation Interface (UMI) Module User's Manual	Describes the Universal Mediation Interface Operations and Administration.
DT-4000 Multiple Protocol Inter-Networking Device User's Manual	Describes the DT-4000 multi-protocol terminal server.
DT-9480 - DT-4180 – DT-4280 – DT-4284 - DT-4281 Multiple Protocol Integrated Access Device User's Manual	Describes the DT-xx8x multi-protocol terminal servers.

4 DEDICATED PRINTER DEPLOYMENTS

There are many examples of dedicated printer deployments. Consider the following diagram:



In the preceding diagram, the PC-based 3270 clients are accessing the host via the TN-3270 application of the DT-6061[1]. To allow them to issue print requests, the cluster printer is being emulated by the IP-B2APRT application of the DT-6061 driving a dedicated ASCII printer. The printer itself is deployed as a BNS endpoint on a DT-4000. The connection between the IP-B2APRT application and the printer is permanent.

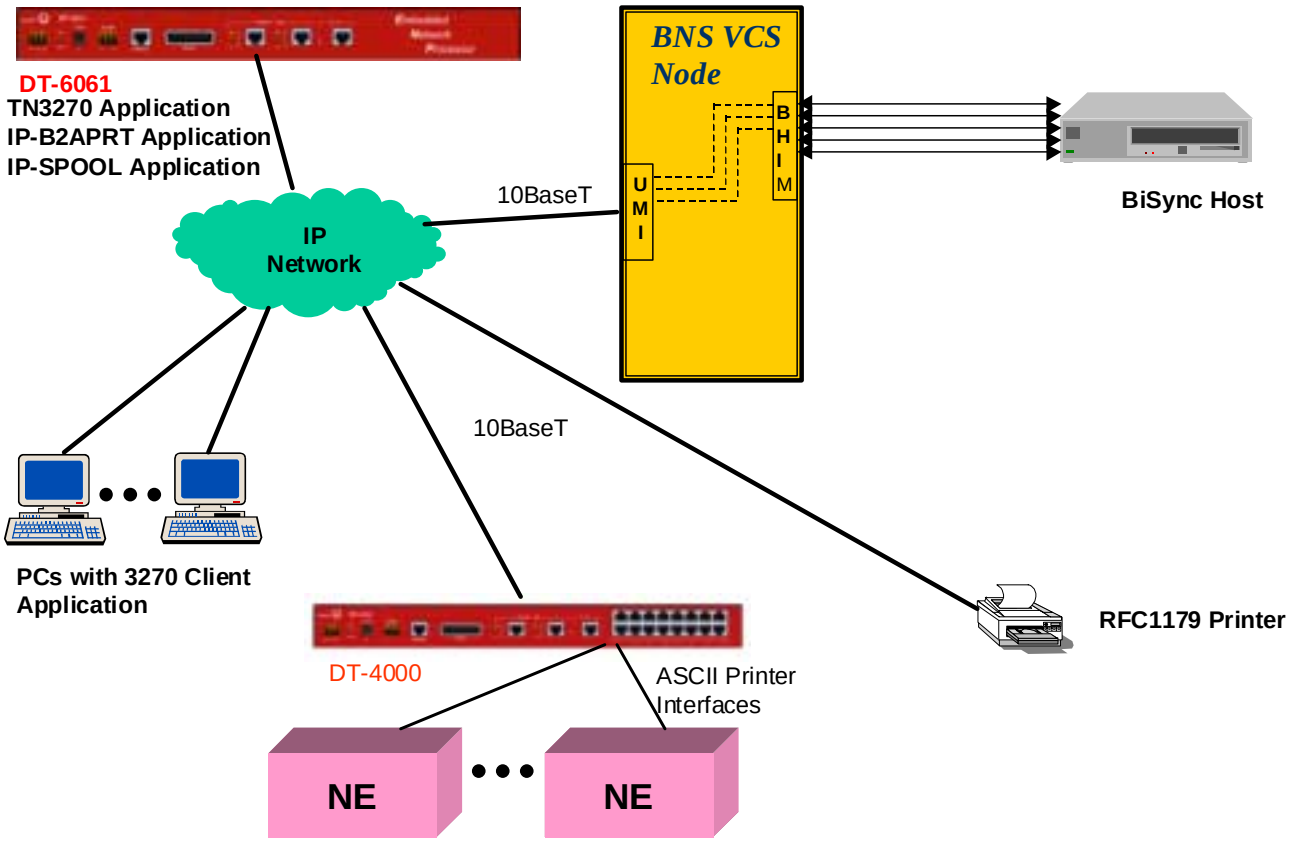
The NE devices generate output for remote ASCII printers (one dedicated to each device). A DT-4000 is used to provide IP-network access to the NE printer interfaces, while another DT-4000 connects the printers to the BNS network. The connections between the two DT-4000s traverse the UMI for mediation between the BNS and IP networks.

While these two printing applications are independent of each other, they have one significant characteristic in common. The connection to each print device is dedicated. This maintains the legacy interface, but precludes sharing a print device by multiple users.

[1] Throughout this document, the reference is to the DT-6160 and DT-4000. For the DT-6160, the DT-6160 and DT-6260 can be used interchangeable. The IP-SPOOL and other applications will run on all three platforms. The DT-6160 and DT-6260 are the next generation of the DT-6061. They have faster processors and more memory. The DT-6160 supports up to 30 instances of up to 5 different applications, and the DT-6260 supports 48 instances. The family of DT-6… processors will be referred to generically as DT-6XXX. With respect to the DT-4000 in this document, the DT-9480, DT-4180, DT-4280, and DT-4284 can be used in addition to the DT-4000. The whole family will be referred to as the DT-4XXX. For the purposes of this document, the differences between the various members of the DT-4XXX family are the number of ports each has.

5 A SOLUTION

The IP-SPOOL application is transparent to the legacy devices. This allows interoperability with all existing applications as well as SAM or DT-4XXX connected devices. The IP-SPOOL application spools (buffers) the print output, and initiates connections to an RFC 1179 capable printer, which can now be shared with other hosts. This is represented in the following diagram:



In the preceding diagram, each of the NE devices now has a connection to a "virtual printer", which is actually an instance of the IP-SPOOL application on the DT-6061. When

a NE sends data out over its ASCII printer interface, the data is first spooled by the IP-SPOOL application for a user-defined capture interval. The spooled data is then forwarded to the shared printer. Similarly, to allow the 3270 clients to continue to print via the IP-B2APRT application, the latter now has a connection to its own virtual printer – a different IP-SPOOL instance. This IP-SPOOL application instance forwards data to the same shared printer.

6 REDUNDANCY & RELIABILITY

The IP-SPOOL application takes advantage of the DT-6XXX redundancy infrastructure (an optional 1+1 spare arrangement) to enhance its reliability. Should a DT-6XXX fail, the spare immediately takes over automatically, and assumes the public IP address of the set. It should be noted that applications do not need to change, or even be made aware of whether the DT-6XXX is operating in duplex or simplex mode. Refer to the *DT-6061 Platform User's Manual* for more information.

7 IP-SPOOL INTERFACES

The TCP port numbers associated with a DT-6XXX application are generally determined by the ***instance*** of the application. There are three distinct interfaces to the IP-SPOOL application. The TCP port numbers associated with these interfaces are as follows:

Set	**#Channels**	**TCP Port#**	**Usage**
OA&M	1	10000 + **instance#**	Configuration and administration of the IP-SPOOL application. Connections to this TCP port are made via a Telnet client.
Virtual Printer	1	30000 + (**instance#** - 1) * 200	"Virtual Printer" connection is made to this TCP port.
RFC 1179 Shared Printer	1	Allocated Dynamically	The IP-SPOOL application will initiate a connection to the shared printer when it has data to print. The TCP port used for this connection is allocated dynamically by the DT-6XXX.

7.1 CONFIGURING THE IP-SPOOL APPLICATION

The IP-SPOOL application is first assigned to an ***instance*** using the ***app*** command on the DT-6XXX system console. The DT-6XXX infrastructure then starts the IP-SPOOL

application on the specified **instance#,** which may be in the range of 1 through 30[2], inclusive.

After the IP-SPOOL application is operating, the administrator configures the IP-SPOOL application by connecting to the administrative interface for this particular IP-SPOOL ***instance***. The TCP port number would be at 10,000 + the **instance#**. Configuration of the IP-SPOOL application involves entering the shared RFC1179 printer's IP address and the capture timeout period.

7.2 OPERATION

The IP-SPOOL application listens for a call to its "virtual printer" TCP port. A device that previously had a connection to a dedicated printer may then make a connection to that TCP port. This connection is permanent.[3]

When data arrives on the "virtual printer" connection, it will be forwarded to the shared printer via the RFC1179 protocol (assuming the shared printer IP address is defined). This is done after the configured capture timeout period has elapsed, or when a high-water mark in the spooling buffer has been reached.

After the shared printer acknowledges receiving all data sent to it, or a user-configurable timeout window has elapsed, the connection to the shared printer is disconnected. The timeout prevents a "hung" connection in the case where the acknowledgement from the printer was not received, thus allowing other IP-SPOOL instances, as well as any other host, to attach to the shared printer.

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[2] For the DT-6260, the range is 1 to 48.

[3] Referring back to the example network shown earlier in this document, each DT-4XXX port to which an NE printer interface is connected would have its PDD redirected to an instance of the IP-SPOOL application (DT-6XXX IP address + "virtual printer" TCP port). Similarly, the IP-B2APRT application would be re-configured to redirect its output to a "virtual printer" instead of a physical printer.

8 IP-SPOOL APPLICATION COMMAND SET

The following conventions are used for commands:

- All parameters may be given on the command line. Parameters of the form **name=<value>** may be given in any order.
- Commands may be entered in upper or lower case.
- Parameters of the form **name=value** may use upper or lower case for **name**.
- Default values, if any, are shown in parenthesis as part of the prompt.
- Case is not preserved for values.
- Backspace erases one character.

8.1 LOGIN

Syntax: login passwd=<password>
or

Prompted Mode:

Syntax: login

Passwd:

The **login** command is used to allow access to the other commands. The legal characters for passwords are the upper and lower case letters, numbers, and the following special characters:

~ ! @ # $ % ^ & * ( ) _ + { } | : < > ? `- = [ ] \ ; ' , . /

Note that when inputting a password, all of these special characters are allowed. Double quote is not allowed, nor is equal sign '="allowed as the first character of a password in prompted mode. Passwords are case sensitive.

The **passwd** parameter is not echo suppressed. However, if the **passwd** parameter is not provided in the command line, the console prompts for a password (i.e. *prompted mode*); the response *is* echo-suppressed in this case.

If the password is valid, the user is placed in the *logged in* mode. Once the console user is logged *in*, the rest of the commands are accessible. The **login** command is not accessible if the user is already logged in.

8.2 LOGOUT

Syntax: logout

The **logout** command is only allowed if the console user is logged *in*. It uses no arguments. It will set the console to the logged *out* mode.

8.3 CHANGE PASSWORD - CHGPASS

Syntax: chgpass PASSWD=<old> NEWPASS=<new> CONFIRM=<new>

The **chgpass** command is used to change a user password on the system console. The command is only allowed if the user is logged *in*.

All three parameters must be given on the same command line. None of those entries are echo-suppressed.

If the current password is valid and the two entries for the new password match, the password is changed to the new value.

8.4 HELP

Syntax: help | ? [Command]

The **help** command is always visible. The help command displays the currently allowed commands for the mode that the unit is currently entered. An alternative to the **help** command is a question mark.

8.5 BANNER MESSAGE - BANNER

Syntax: banner [L<#>="System Banner Line <#>" | default]

The **banner** command is only visible when the application is *logged in*. The command is used to configure a system message banner that is displayed to the administrators upon connection to the ip-spool application. The banner can consist of a maximum of eight (8) lines of 60 characters each of text including spaces. Each line may be configured independently of each other with its own tag (i.e. L1, L2, …, L8). The banner lines are visible on a **verify / vfy** command or by invoking the **banner** command with no

parameters. The use of this command is not required if no banner is desired. The banner may be cleared by using the **banner** command using the parameter named **default.** This will delete all banner lines.

8.6 APPLICATION COMMENTS - COMMENT

Syntax: comment [L1="comment"]
[L2="comment"]
[L3="comment"]

The **comment** command allows a user to add user information to the application instance. The information is displayed during a **verify** command. Up to three lines of information may be provided. Each line may be up to 64 characters in length, may include spaces, and is double quoted. Each line may be changed individually. Comments may be cleared by setting the line value to a null comment (i.e. "").

8.7 LABEL

Syntax: label [<"label string"> | none]

If the command is issued without arguments, the current configuration is displayed. When issued with an argument of **none**, the label becomes a NULL label. Otherwise, a label up to 32 characters is allowed when enclosed in double quotes. (The double quotes are not counted as part of the 32 characters). The label may be a mixture of alpha characters and digits.

8.8 OA&M SESSION TIMER CONFIGURATION - TIMEOUT

Syntax: timeout [OFF | <Number of Seconds>]

The **timeout** command configures the session timer. Its range is 15 to 254 seconds. When configured, the session timer will disconnect a user from the OA&M telnet port for this IP-SPOOL instance. No other instances on the DT-6XXX are affected since each has its own OA&M connection.

8.9 VERSION – VER | VERSION

Syntax: ver | version

The **version** command is only visible when the application is *logged in*. The command has no arguments. It displays the current software and database revisions of the application.

8.10 DEFINING THE SHARED PRINTER - PRT

Syntax: prt [dest=<IP-Addr>] [timeout=<#secs>] [retry=<#secs>]
[tcpport=<source TCP port >] [queue=<queue name >]
[class=<string >] [host=<string >] [user=<string >]
[capture=<#secs>] [errors=<#errors | off>]

The **prt** command is only visible when the application is *logged in*. The command is used to define parameters associated with the shared printer.

The **dest** parameter defines the IP address of the printer in the format d.d.d.d where d = 0 to 255 decimal. There is no need to specify a TCP port number, since that is specified in RFC 1179.

The **timeout** parameter allows the configuration of a hold period of the shared printer after all buffered data has been sent, as discussed in sec. 7.2.

The **retry** parameter is the number of seconds to wait before attempting a new connection to the shared printer when an attempt fails. The range for both **timeout** and **retry** is 15-255 seconds.

The **tcpport** parameter is the originating TCP port to be used for the connection to the shared printer. RFC 1179 requires the TCP port to be between 721 and 731, inclusive. However, many printers do not require this. If the port is defined as zero (the default value) the next available port will be used.

The **queue** parameter is the name of the printer. The value **<queue name>** is a single word with a maximum of 32 characters.

The **class**, **host** and **user** strings correspond to the 'C', 'H' and 'P' commands used in the control file as defined in RFC 1179. This allows customization the fields that will be used

on the control page for the individual device. Each string is a single word with no quotes and can be up to 30 characters long.

The **capture** parameter is used to define the time period between the initial arrival of data on the virtual printer interface and the time a connection is made to the shared printer. Use of the capture period minimizes "thrashing" for devices that have irregular printing patterns. This allows customization for the individual device. The range for the capture timeout is 15 to 255 seconds.

The **errors** parameter is the number of consecutive errors required before the application will remove the printer from service. The "off" option will disable the auto remove printer function. The range of **errors** is 1 to 10.

8.11 VERIFY CONFIGURED OPTIONS – VERIFY | VFY

Syntax: verify | vfy

The **verify (vfy)** command is only visible when the application is logged in. The command is used to display the configured options.

8.12 RESTORING THE PRINTER CONNECTION – RS | RESTORE

Syntax: rs | restore prt

The **rs prt** command is only visible when the application is logged in. It puts the printer connection "in service". The printer connection must be "in service" before a connection to a RFC1179 printer will be attempted.

8.13 REMOVING THE PRINTER CONNECTION – RM | REMOVE

Syntax: rm | remove prt

The **rm prt** command is only visible when the application is logged in. It takes the printer connection "out of service". Any existing connections will be taken down and no new connections will be established even if there is data to print.

8.14 DISPLAYING CURRENT CONNECTIONS – DC | DCONN

Syntax: dc | dconn

The **dconn (dc)** command is used to display all of the current connections into the IP-SPOOL application. The command does not require any arguments. The report shows the connection peer for each active connection.

8.15 DISPLAY JOBS IN QUEUE – DQ | DQUEUE

Syntax: dq | dqueue

The **dq** command displays all jobs in the queue assigned to the application instance.

8.16 PURGE JOBS IN QUEUE - PURGE

Syntax: purge [queue=<queue name>] [confirm=yes]

The **purge** command deletes all jobs currently in the queue, where **<queue name>** is the configured queue name for this instance of the application. The **queue** and **confirm** arguments are both required as shown, since the command is destructive and irreversible.

8.17 DISPLAY LOG - DLOG

Syntax: dlog | dlog clr

The **dlog** command is only visible when the application is logged in. This command is used to display the entries in the error log. An exclamation point (!) that precedes a log entry denotes new entries. A double asterisk (**) that precedes a log entry denotes folding of multiple similar entries into a single line. The log file can be cleared with the command: **dlog clr**

8.18 DISPLAY OF MEASUREMENTS - DMEAS

Syntax: dmeas

The **dmeas** command is only visible when the application is logged in. The command is used to display the current measurements on all of the interfaces.

8.19 CLEAR MEASUREMENTS – CLR | CLEAR

Syntax: clr | clear

The measurements displayed with the **dmeas** command are aggregated until cleared. The **clr** command will set all measurements to zero. The command has no arguments.

9 IP-SPOOL MEASUREMENTS

This section itemizes the measurements available using the *display measurements* (**dmeas**) command.

The base measurements are always displayed, and the error and exception counters are only displayed if nonzero.

The measurements available are as follows:

Measurement Description	**Type**
Number of characters Received on the virtual printer interface	Base
Number of characters Sent on the virtual printer interface	Base
Number of characters Received on the Shared Printer interface	Base
Number of characters Sent on the Shared Printer interface	Base
Number of successful connections to the Shared Printer.	Base
Number of connection attempts to the Shared Printer	Exception

10 APPENDIX A:IP-SPOOL INSTANCE NUMBER TO TCP PORT CONVERSION TABLE

Instance Number of DT-6XXX running IP-SPOOL	Default IP-SPOOL Virtual Printer TCP Port Connect.
1	30,000
2	30,200
3	30,400
4	30,600
5	30,800
6	31,000
7	31,200
8	31,400
9	31,600
10	31,800
11	32,000
12	32,200
13	32,400
14	32,600
15	32,800
16	33,000
17	33,200
18	33,400
19	33,600
20	33,800
21	34,000
22	34,200
23	34,400
24	34,600
25	34,800
26	35,000

Instance Number of DT-6XXX running IP-SPOOL	Default IP-SPOOL Virtual Printer TCP Port Connect.
27	35,200
28	35,400
29	35,600
30	35,800
31	36,000
32	36,200
33	36,400
34	36,600
35	36,800
36	37,000
37	37,200
38	37,400
39	37,600
40	37,800
41	38,000
42	38,200
43	38,400
44	38,600
45	38,800
46	39,000
47	39,200
48	39,400

*Note instances 31 through 48 are valid only when using a DT-6260.

The IP-SPOOL application is used in conjunction with the IP-B2APRT application. The IP-B2APRT sets up a TCP call to the IP-SPOOL instance to a virtual printer. Each instance corresponds to one virtual printer. The IP-B2APRT application uses the TCP port numbers shown above to access a virtual printer in IP-SPOOL.

11 HARDWARE WARRANTY

The warranty period for the DT-6XXX hardware on which this application runs shall be ninety (90) days from the date of shipment of the hardware from Datatek Applications, Inc. Replacements and repairs are guaranteed for the longer of the remaining original warranty period or thirty (30) days whichever is longer.

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