## Configuring and Using mvBase Printers

mvBase can use six types of printers which can be divided into two definitive groups:

### Group 1: Windows Printers

Windows printers are available to multiple Windows applications, including mvBase. Windows printers include:

1. **Local Printers:** Printer is local to the system, even if it is subsequently shared to other users across the network.
2. **Shared Network Printers:** Printer is setup remotely and shared across the network.
3. **mvTerm Auxiliary Printer:** An mvTerm session may be defined to function as an auxiliary printer connection using a printer previously configured in Windows to that client system.

## Group 2: MultiValue Printers

1. MultiValue printers are available to MultiValue applications (mvBase) exclusively. MultiValue printers include:
2. **COM Port Printers:** Printer attaches to a COM port on the mvBase Workstation.
3. **TCP Port Printers:** The system to which the printer is attached (via any type of port) connects to the network via a Telnet (TCP/IP) port.
4. **AUX-ON Auxiliary Printers:** A printer that connects to a terminal’s AUX port may be defined for use with mvBase using the **AUX-ON** TCL command.

This section describes these printer types, and contains procedures for configuring, using and troubleshooting printers and the print Spooler. This section contains the following major topics:

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| [Setting Up mvBase Printers](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/setting_up_mvbase_printers.htm) | Contains an overview of Windows and MultiValue printers, and assists you in identifying your desired printer configuration. This section then contains procedures for configuring multiple types of mvBase printers. |
| [Installing mvBase Printer Drivers](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/installing_mvbase_printer_drivers.htm) | Describes the role of printer drivers and the function of the raw printer client (which bypasses the mvBase printer driver). |
| [Using mvBase Printers](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/using_mvbase_printers.htm) | Contains several procedures for using mvBase printers once they have been set up. |
| [Understanding the Print Spooler](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/understanding_the_print_spooler.htm) | Describes the role of the print Spooler in relation to mvBase printers. |
| [Using the Print Spooler](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/using_the_print_spooler.htm) | Describes the use of the print Spooler. |
| [Using Printer and Spooler Status Reports](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/using_printer_and_spooler_status_reports.htm) | Describes the status reports that are available to you within the MultiValue environment. |
| [Summary of Printer and Spooler Commands](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/summary_of_printer_and_spooler_commands.htm) | Summarizes those commands related to printer and Spooler operation. For complete information about these commands, see the *Guide to mvBase Files and Accounts*. |
| [Troubleshooting mvBase Printers and the Spooler](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/troubleshooting_mvbase_printers_and_the_spooler.htm) | Describes strategies to use when troubleshooting mvBase printers. |

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| **NOTE** | mvBase has added several printer-related features since its first release. Some features may not be available in your Release of mvBase. For a complete listing of printer features and their associated releases, see [Summary of Release-Specific mvBase Printer Features](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/configuring_and_using_mvbase_printers.htm#Summary_of_Release-Specific_mvBase_Printer_Features). |

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| **IMPORTANT** | The differences between printer clients pertain primarily to setup and troubleshooting. Once the printers are fully operational in the MultiValue environment, printer and Spooler behaviour in mvBase is similar across all printer clients (e.g., you use the same TCL commands to control and administrate the printers of all types). |

### Summary of Release-Specific mvBase Printer Features

Several printer-related features have been added to mvBase since its first release. The availability of these features depends upon your specific release of mvBase. This list describes the features that are not available in all releases of mvBase, and the releases with which these features were introduced. This list is organized in chronological fashion, not alphabetically.

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| **Feature** | **Description** |
| Printer Drivers | The mvBase printer drivers support more forms with larger page sizes. Enhanced printer drivers allow you to print lines with more than 132 characters from mvBase. Drivers are posted on the Rocket Web site and are added to the mvBase CD-ROM.**NOTE—** The Auxiliary Printer feature makes the mvBase printer drivers largely obsolete, and the drivers may not be contained on the CD-ROM for your later release of mvBase. |
| Serial Printer Option for COM Ports | The mvBase Workstation may configure a local COM port as a serial printer connection and make that printer available to mvBase clients. The COM port is configured via the Ports tab, accessed via the Workstation tab of the Administration Utility. |
| Serial Printer Option for TCP Ports | mvTelnet features a Serial Printer option. This option allows the associated Telnet port (TCP Port Number) to be identified as a serial printer connection. The TCP port is configured via the Telnet Servers tab, accessed via the Workstation tab of the Administration Utility. |
| Raw Printer Client | The raw printer client removes the necessity to use the generic/text-only mvBase printer driver. When the Raw mode switch is activated, output to the (Windows) printer client from an mvBase serial printer process is sent directly to the connected printer, bypassing the mvBase printer driver (if installed). The raw printer client resolves several issues reported by customers, including:* ESCAPE sequences not being recognized
* Continuous forms not being supported (printing from mvBASIC with no explicit pagination)
* ACCUPLOT output failing to print correctly
* Graphical output to printers failing to print correctly
* Oversized data being truncated

The mvTerm Auxiliary Printer is configured in the raw printer mode by default. The COM port and TCP port printers may be configured to operate in the raw mode. |
| Auxiliary Printer | The Auxiliary Printer feature of the mvTerm client allows any mvBase user to connect to any printer that is already defined in Windows. Thus, it provides the advantage of adding a printer without having to go through the mvBase Workstation. Each mvTerm instance may contain five sessions, and each session may be connected to a different printer. The Auxiliary Printer is configured to operate in the raw printer mode by default. (See above.) |
| Custom-Defined Printer Names in the Printer Tab | The printers configured for use with mvBase display in the Configured Printers field of the Printers tab (Administration Utility). Printer names in this field have followed a generic naming convention (Printer001, Printer002, and so forth). Printer names in this field may be defined with custom alphanumeric printer names that allow the administrator to be more specific (such as citing the name of the printer system and type, as with the printer name UK Server HP LaserJet III). |
| Extended Printer Name Length for Windows Printers | mvBase recognizes Windows printer names up to 50 characters long. |

## Setting Up mvBase Printers

This topic focuses upon the initial configuration of your mvBase printer(s). It contains several procedures for identifying and setting up each of the five types of mvBase printers.

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| [Identifying Your Printer Configuration](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/identifying_your_printer_configuration.htm) | Summarizes the various types of printer configurations that you may use with mvBase, and directs you to the relevant procedures within this document for printer setup. |
| [Setting Up Windows Printers for mvBase](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/setting_up_windows_printers_for_mvbase.htm) | Describes the procedure for configuring a local or network Windows printer for use with mvBase. |
| [Setting Up Auxiliary Printers for mvBase](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/setting_up_auxiliary_printers_for_mvbase.htm) | Describes the procedure for configuring a Windows printer as an auxiliary printer via an mvTerm client session or via the **AUX-ON** TCL command. |
| [Setting Up mvBase Printers on COM Ports](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/setting_up_mvbase_printers_on_com_ports.htm) | Describes the procedures for configuring a MultiValue printer that connects via a COM port for use with mvBase. |
| [Setting Up mvBase Printers on TCP Ports](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/setting_up_mvbase_printers_on_tcp_ports.htm) |  |

### Identifying Your Printer Configuration

If necessary, use the decision table below (start from the top and move downward) in order to determine which procedure(s) in this document to use for printer configuration.

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| Is this printer intended to be available to Windows-based applications other than mvBase (either now or in the future)? |
| If Yes, then this is a... | If No, then this is a... |
| **Windows Printer** (See the columns below) | **MultiValue Printer** (See the columns below) |
| If the printer is configured on the local system, then this is a... | If the printer is configured remotely, and is able to be shared for use by this mvBase Workstation, then this is a... | If either type of Windows printer will be mapped to mvBase using an mvTerm session, then this is an... | If the printer connects to the mvBase Workstation via a COM port, then this is a... | If the Telnet printer client connects to the mvBase Workstation via a TCP port, then this is a... | If the printer connects to a terminal via its AUX port, and is defined using the **AUX-ON** TCL command, then this is an... |
| **Local Windows Printer** | **Network Windows Printer** | **mvTerm Auxiliary Printer** | **MultiValue COM Port Printer** | **MultiValue Telnet Printer Client** | **AUX Port Auxiliary Printer** |
| See [Setting Up Windows Printers for mvBase](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/setting_up_windows_printers_for_mvbase.htm). | See [Setting Up Auxiliary Printers for mvBase](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/setting_up_auxiliary_printers_for_mvbase.htm). | See [Setting Up mvBase Printers on COM Ports](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/setting_up_mvbase_printers_on_com_ports.htm). | See [Setting Up mvBase Printers on TCP Ports](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/setting_up_mvbase_printers_on_tcp_ports.htm). | See [Setting Up Auxiliary Printers for mvBase](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/setting_up_auxiliary_printers_for_mvbase.htm). |

For additional information about any of these six types of mvBase printers, proceed directly to the appropriate set on *Setting Up ...* procedures.

### Setting Up Windows Printers for mvBase

As explained in the introduction of this document, Windows printers are first configured for use in the Windows operating system. This includes installation of a printer driver. Such printers must display in the Windows Printers utility before they can be configured for mvBase. See [Installing mvBase Printer Drivers](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/installing_mvbase_printer_drivers.htm) if required prior to proceeding with this topic.

Windows printers can be local to the system, or shared with other users across the network. Once configured, you map a Windows printer to mvBase using the Printers tab of the Administration Utility, or you can use that Windows printer as an mvBase auxiliary printer that connects via an mvTerm session. To configure a Windows printer as an auxiliary printer, See [Setting up Auxiliary Printers for mvBase](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/setting_up_auxiliary_printers_for_mvbase.htm).

This set of procedures configures either type of Windows printer (local or network) for use with mvBase. Once you complete these tasks, users may print from within mvBase to this Windows printer.

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| **NOTE** | Administrator rights are required to configure Windows printers. |

Perform these tasks to set up a Windows printer for use with mvBase:

*Adding the Printer in Windows*

1. If you have not installed the printer in Windows, install the printer using the Windows Add Printer Wizard. Open the Windows Printers utility, select Add Printer, and follow the prompts of the Add Printer Wizard. Take into account these important elements when using the Add Printer Wizard:
	* Designate whether this is a local or network printer.

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| Local Printer | If the printer connects to the local system, this is a local printer, regardless of whether it will be shared across the network subsequent to setup. |
| Network Printer | If the printer is configured on a remote system, and will be shared to this system across the network, this is a network printer. |

* + Designate the kind of port to which the printer attaches.
1. Install the printer driver(s).

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| COM Ports | This type of port is a serial communications port on which transmission protocols must be defined. On Windows systems, such ports are normally designated COM*x*, where *x* is the system port number. |
| Parallel or Printer Port | This type of port is a parallel port commonly used for parallel printing devices. On Windows systems, such ports are designated LPT*x*, where *x* is the system port number. |
| TCP/IP Printing Port | This type of port uses the TCP/IP protocol. On Windows systems, such ports are designated as TCP/IP printing ports, but these are also known as LPR ports. |
| DLC Printing Port | This type of port is commonly used by Jet Direct printer servers. |

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| **NOTE** | * + The precise sequence of actions or terms used by the Windows Add Printer Wizard may differ between versions of Windows.
	+ Be aware that configuring remote printers is highly dependent upon the user accounts under which they are set up. Printers set up on one user account are not visible to a second user account until they are set up under that second account.
 |

*Configuring the Printer in the Workstation Tab*

1. Once the Windows printer is operational in the Windows environment and displays in the Windows Printers utility, launch or switch to the mvBase Administration Utility.
2. Select the Workstation tab.
3. Verify that the Workstation Application and Service progress indicators show as Stopped or Not Installed. Stop the Workstation if necessary.



1. Select Configure. The Configuring Workstation property sheet displays.
2. Select the Printers tab.



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| **NOTE** | Add and Delete buttons are shaded (disabled) when the Workstation is running. If disabled, shut down clients and stop the Workstation prior to adding or deleting printers. |

The Configured Printers field displays any Windows printers that are currently configured for use with mvBase. This tab contains three buttons for configuring printers.

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| Add | Select this button to add a new Windows printer to mvBase. This button invokes the Add/Configure Printer dialog box in which you define the printer for use by the mvBase Workstation. A disabled (shaded) button means the maximum number of allowable printers has been configured for use by the mvBase Workstation. |
| Delete | Select this button to delete the selected printer definition(s). This button removes the Windows printer definition(s) that are selected (highlighted) in the Configured Printers field. |
| Configure | Select this button to (re)configure the selected printer definition. This button invokes the Add/Configure Printer dialog box, allowing the reconfiguration of Windows printers that are already defined for use by the mvBase Workstation. |

1. To delete a printer, select the printer in the Configured Printers field, then select Delete. The printer deletion procedure is complete. Close the Administration Utility if desired.
2. To add a printer to mvBase, select Add. With selection of either Add or Configure, the Printers dialog box activates.



1. To configure an existing printer, select the specific printer from the Configured Printers field (for example, Printer001), then select Configure. With selection of either Add or Configure, the Printers dialog box activates.
2. In the mvBase Printer Name field, designate your custom name for this mvBase printer. Effective with mvBase printers can now be defined by a custom name (for example, Sales Office HP LaserJet) rather than by a numeric name (e.g. Printer001). This allows you to be much more specific about the location or function of each mvBase printer.
3. In the Windows Printer Name field, designate the name of the specific Windows printer to map to mvBase. You may select the down arrow to view the drop-down list of all printers configured in Windows and recognized by mvBase. If no printers are configured in Windows, no printers show in this field, and you must first define at least one Windows printer prior to defining it for use by mvBase. See step 2 if necessary.

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| **NOTE** | mvBase recognizes Windows printer names up to 50 characters long. If the name of your Windows printer is greater than the allowable number of characters, use the Windows Printers utility to rename the printer within these parameters. |

1. In the mvBase Server Name field, type the name of the mvBase Server to which you are connecting the mvBase Workstation.
2. In the mvBase Line field, type the line number to which you are connecting this mvBase Workstation. Map to an available line. You should not use line 0, even if that is the default line that displays.

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| **NOTE** | Rocket generally recommends that printers be allocated to the highest line numbers available. This helps avoid potential conflicts with wildcard clients, which begin line consumption with the lowest available line numbers. |

1. Select the appropriate Driver Type from the Driver Type drop-down.
	* Select Raw to treat the printer output as raw output. When selected, this option allows output from an mvBase Server process to pass through the associated Windows printer without any modification.
	* Select Windows to specify the standard Windows printer driver.
	* Select Windows-GDI to specify the Windows GDI printer driver. See the Configuring Windows Printers  topic in the mvBase System Administration Guide for more information on this driver.
2. Select the Disable option to make this client definition inactive upon startup of the mvBase Workstation. This function is particularly useful when you want to retain the current configuration's settings for future use.
3. Select OK in the Add/Configure Printer dialog box.
4. Select OK in the Configuring Workstation dialog box. The Workstation tab of the Administration Utility displays.
5. Perform one or more of these tasks in this sequence to start the mvBase Workstation:
	* Ensure that the mvBase Server is already started.
	* Configure additional client connections in the mvBase Workstation (if necessary).
	* Start the mvBase Workstation once you have configured all client connections.
6. Start an mvTerm client and connect to the mvBase Server specified above.
7. Log to the SYSPROG account.
8. Using the **LISTLINES** command, determine which process is linked to the line mapped to the printer. Usually, this process number is the same as the line number, but this may not be the case. As you execute various TCL commands on this printer or process, you will need this information.

For information about troubleshooting this particular configuration, see [Troubleshooting mvBase Printers](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/troubleshooting_mvbase_printers_and_the_spooler.htm).

### Setting Up Auxiliary Printers for mvBase

To configure an auxiliary printer for mvBase, you must have a printer (local or network) that is properly installed. Two types of printers may function as auxiliary printers within mvBase:

* Windows printers that connect to an mvBase line by using an mvTerm session. Such Windows printers must be visible within the Windows Printers utility of each system that intends to use that mvTerm auxiliary printer.
* MultiValue printers that connect to terminal devices via an AUX port. In this case, you define a specific mvBase line as a printer connection using the **AUX ON** TCL command.

Setting Up an Auxiliary Printer via mvTerm

This procedure sets up any Windows printer (serial or parallel) to function as an mvTerm auxiliary printer that operates independent of mvBase printer drivers (if installed). This procedure may be used with a printer connecting via a local or remote mvTerm session.

You may print directly to a Windows printer from an mvTerm session without having to shutdown the Workstation in order to add a printer definition. The auxiliary printer feature also permits the private use of a printer that has not been made available to all users via the Workstation.

Each mvTerm instance may contain five sessions, and each session may be connected to a different printer.

Perform these steps to set up the mvTerm Auxiliary Printer:

1. From the mvBase Terminal Emulator Menu bar select Properties from the Session pull-down menu. The Terminal Properties property sheet displays.
2. Select the Auxiliary Printer tab.



1. Select the desired Windows printer from the Printer Name drop-down list box.



1. Adjust the Printer Flush Delay value if necessary. This is the amount of time following the receipt of an **AUX OFF** character during which the Windows print job remains open. Once the printer flush delay expires without an **AUX ON** character being received, any subsequent data is printed in a new print job. The default setting is 0. This means that the print job will be closed immediately upon receipt of an **AUX OFF** character.
2. Select OK. The mvTerm session functions as the auxiliary printer. You may configure another session as an auxiliary printer. Auxiliary printers disconnect at the time the respective sessions are terminated.

Auxiliary printer output is spooled to the selected Windows printer upon the first page of output, and is released for printing when the flush delay expires.

Setting Up an Auxiliary Printer via the AUX-ON Command

mvBase supports auxiliary printers defined via the **AUX-ON** TCL command. Output that is directed to a system printer can be routed to the terminal’s AUX port. SPOOLER hold files can also be directed to the terminal’s AUX port instead of one of the system or network printers.

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| **NOTE** | The **AUX-ON** TCL command (with the intermediary hyphen) is distinct from the **AUX ON** mvBASIC statement (without the intermediary hyphen). See the *mvBASIC User Reference Guide* for additional information about the **AUX ON** mvBASIC statement. |

The terminal must have a printer connected to its AUX port in such a manner that the printer can indicate to the terminal, and from there to the system, that its print buffer is full. This can be done by using **X-ON/X-OFF** or CTS/RTS handshaking, depending on the printer, terminal and cabling involved.

For additional information about defining handshaking methods, see [Setting up mvBase Printers on COM Ports](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/setting_up_mvbase_printers_on_com_ports.htm), which contains a procedure titled Physically Connecting A Serial Printer.

For an AUX port to work correctly, a correct terminal definition in the system cursor file must be set up for the control codes that switch the terminal’s AUX port on and off. (See the *mvBase Guide to Files and Accounts* or the latest mvBase Help System for additional information about the **DEFINE-CURSOR** command.)

The **AUX-ON** TCL command selects the auxiliary printer as the output device for all printer output until you issue the **AUX-OFF** command.

Output can also be directed to the auxiliary port of your terminal as one of the options of the **SP-ASSIGN A** command. **SP-ASSIGN A** directs the output to your AUX port, and is functionally equivalent to an **AUX-ON** command. See later topics in this section and to the *mvBase Guide to Files and Accounts* for additional information about the **SP-ASSIGN** command.)

In addition, Hold files can be directed to the auxiliary printer in either of two ways:

1. Use the **A** option at the **SP-EDIT SPOOL** prompt.
2. Issue the **AUX-ON** or **SP-ASSIGN A** command before issuing the **SP-EDIT** command.

### Setting Up mvBase Printers on COM Ports

This series of procedures applies to MultiValue printers for use with mvBase exclusively within the MultiValue environment. There are four major stages to setting up this configuration:

[Preparing for Configuration](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/preparing_for_configuration.htm)

[Physically Connecting the Serial Printer](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/physically_connecting_the_serial_printer.htm)

[Defining Communications Protocols for the Serial Printer](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/defining_communications_protocols_for_the_serial_printer.htm)

[Defining the COM Port as a Serial Printer Connection](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/defining_the_com_port_as_a_serial_printer_connection.htm)

Once you complete these tasks, mvBase users (local or remote) may print from within mvBase to this serial printer.

#### Preparing for Configuration

In order to complete this configuration, you will require the following information and/or resources:

* mvBase must be properly installed and authorized on the system which will host the serial printer. Access to TCL from the SYSPROG account may be required, so you may need to start an mvTerm session.
* You require the operational printer and cable with manufacturer-supplied documentation.
* You require the printer type and model number.
* You must know the printer’s baud rate(s) and parity used.

The baud rate establishes the speed of the transmission in bits per second. Both the printer and the communications line must be set to the same baud rate.

* You must know the printer’s buffer size, if any.
* You must know the protocols supported (X-ON, DTR, etc.) by the printer.
* You should be aware of desired or required printer options that are unique to your serial printer.

#### Physically Connecting the Serial Printer

This procedure physically connects a serial printer to the local system via a COM port, and defines the printer’s method of handshaking (defined below).

1. Following the manufacturer’s instructions for system and printer power settings and connection, connect the printer to the system with proper cabling.
2. Once the printer is properly connected to the system, turn on the system and the printer according to manufacturer-supplied instructions.
3. Start Windows.
4. Start an mvTerm session within mvBase.
5. Log to the SYSPROG account.
6. Choose and implement a method for handshaking according to the three options listed below.

The computer can transmit characters faster than most printers can mechanically print them. This creates the need for handshaking signals to be sent back and forth between the computer and the printer. Handshaking allows the printer to tell the computer when to stop sending data and when to commence sending data again.

* + DTR (Data Terminal Ready)

This handshaking technique allows the printer to raise or lower a control signal, called a Data Terminal Ready signal, when its buffer is nearly full. According to RS232 convention, when DTR is high, the computer can send data; when DTR is low, the computer cannot send data until the signal goes high again. In some cases this convention is reversed; most printers, however, can be switched to work in either manner.

The DTR technique is the most common method used, since most printers have DTR control. It should not be used, however, if the printer is connected to a phone line, since the modem that controls the phone line reacts to DTR signals. Use the X-ON/X-OFF handshaking technique if your printer is connected to a modem.

* + X-ON/X-OFF

With this handshaking technique, the printer actually sends a character to the computer (X-OFF) that halts data transmission, then later sends another character (X-ON) that starts data transmission again. The X-OFF character is DC3(X’13’), the X-ON character is DC1(X’11’).

* + Padding

Buffering was the first attempt at flow control; that is, the printer itself would store a certain number of characters in a buffer until it could print them. At higher baud rates, buffering is not sufficient for this method because certain characters such as line-feed, carriage return, and form-feed take more time to process than do other characters.

Thus, in this technique, the programmer inserts null codes. On the mvBase system, this can be done by changing the line-feed and form-feed delay with the **TERM** command.

Because every printer has unique timing requirements, it is necessary to experiment in order to determine the right combination for each printer. With enough time and experimentation, this method should work for any printer.

The primary drawback to this handshaking technique is the time required to experiment with the optimal settings for each printer.

1. Once the serial printer is physically connected to the system and you have successfully defined the handshaking method, perform the next procedure, [Defining Communications Protocols for the Serial Printer](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/defining_communications_protocols_for_the_serial_printer.htm).

#### Defining Communications Protocols for the Serial Printer

Once the printer is properly connected to your system via a COM port, you can define the communications protocols for that printer from TCL. If you prefer, you can skip these three steps and define the communications protocols via the Ports tab of the Administration Utility in the procedure which follows. If you prefer this second approach, proceed directly to the procedure titled [Defining the COM Port as a Serial Printer Connection](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/defining_the_com_port_as_a_serial_printer_connection.htm).

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| **NOTE** | mvBase defers to the most recent configuration of communications protocols, regardless of the manner in which they are defined. Thus, you may override communications protocols made in the Ports tab by using the PROTOCOL TCL command. Conversely, you may override protocols made with the **PROTOCOL** TCL command by using the Ports tab. |

1. See the documentation supplied with your particular printer for communication characteristics. These should always be set prior to setting up the system’s line protocols.
2. From an mvTerm session, log to the SYSPROG account at TCL (if not still logged on from step 5 above).
3. Using the **PROTOCOL** command, set the baud rate and other line protocols. If you require additional information about this command, see the *Guide to mvBase Files and Accounts*.

Format

|  |
| --- |
| PROTOCOL *line* [*baud*] [*parity*] [*bits*] [[-]D] [[-]XI] [[-] XO] [[-]W] [[-]B] [[-]C] [(C) (I) (O)] |

Parameter(s)

The hyphen [-] disables a characteristic. If no hyphen is present, the characteristic is enabled. Parameters can be entered in any sequence, separated by spaces or commas. When mvBase is initially installed, all lines are set to default settings, cited below where pertinent.

|  |  |
| --- | --- |
| ***line*** | Number of the serial printer line. |
| The **PROTOCOL** command allows you to manipulate the software flow control by setting both the inward and the outward X-ON/X-OFF protocols. |
| ***baud*** | Baud rate. (Default: 9600). You can enter any of the following baud rates:50  75  110  134  150  200  300  600  1200  1800  2400  4800  9600  9200  38400**NOTE—** Verify that the I/O boards and terminals operate at the baud rate selected. |
| ***parity*** | Parity. Set the parity by entering the letter code for any of the following types. (Default: EVEN). |
| **O** | ODD |
| **E** | EVEN |
| **M** | MARKING |
| **S** | SPACE |
| **N** | NONE |
| ***bits*** | Number of significant data bits. The data bits can be set to 5, 6, 7, or 8. (Default: 7). |
| **D or R** | Enables or disables the RTS (Ready to Send) signal. To enable RTS, use D or R. To disable RTS, use -D or -R.The RTS protocol is used to enable hardware flow control and works the same way as the **MODEM-ON/MODEM-OFF** commands. RTS signals are sent from peripheral devices to the system to start and stop transmission of data. If the RTS protocol is enabled, each time the RTS signal goes high, data is transmitted; each time the signal goes low, data transmission stops. If RTS is disable, the system ignores any RTS signal. |
| **XI** | Enables or disables inward X-ON/X-OFF codes. If enabled, the system automatically sends an X-OFF (CTRL+S) signal to the printer if the type-ahead buffer becomes more than two-thirds full. This prevents the device from transmitting any more input to the system. When the type-ahead buffer becomes less than one-third full, the system automatically sends an X-ON (CTRL+Q) signal, allowing input to resume. |
| **XO** | Enables or disables outward X-ON/X-OFF codes. The X-ON/X-OFF protocol works the same as the X-ON/X-OFF commands. If enabled, the user can stop terminal output by pressing CTRL+S, and start output again by pressing CTRL+Q. If disabled, these control key signals will not work. |
| **W** | Enables or disables automatic flow of input in the type-ahead buffer. If type-ahead wrap is enabled and the type-ahead buffer fills up, additional characters entered into the buffer will push out the first characters entered. Thus, the buffer will always hold the 127 most recently entered characters.If type-ahead wrap is disabled and the type-ahead buffer fills up, no additional characters can be entered into it. |
| **B** | Enables or disables the bell signal on input buffer full. If enabled, a bell signal is sent whenever the type-ahead buffer is full. If disabled, no signal is sent. Nothing more can be sent on the line until the information in the type-ahead buffer is processed.The bell character may be set to **B=<ii>**, where ii equals an ASCII hexadecimal character in the range of 01 through FE, which defines the character sent when the input buffer is full. The default bell signal is **B=<07>**. |
| **C** | Enables or disables CTS (Clear to Send) signal. This signal is sent from the system to the printer when the system is ready to receive data. If CTS is enabled, each time the signal goes high, the system is ready to receive data. Each time the system goes low, the system is not ready to receive data. If CTS is disabled, the system ignores any CTS signal. |
| **C={0/1}** | Forces CTS signal low (C=0) or high (C=1). |
| ***Options*** | Options can be any of the following. If an option is not appended to the **PROTOCOL** command, neither the input nor the output buffer will be affected by the command’s execution. Options can be entered in any sequence, separated by spaces or commas. |
| **C** | Clears local input and output buffers and resets any flags. |
| **I** | Clears local input buffer and resets any flags. |
| **O** | Clears local output buffer and resets any flags. |

In summary, the default settings for some parameters cited above are:

|  |  |
| --- | --- |
| baud | 9600 |
| parity | EVEN |
| bits | 7 |
| DTR | OFF |
| X-in | OFF |
| X-out | OFF |
| bell | ON |
| type-ahead | ON |

Example

For example, if setting up printer 2 as a serial printer on line 6 with a baud rate of 9600, no parity, 8 data bits, and using the DTR protocol, use this command line:

#### Defining the COM Port as a Serial Printer Connection

Once the MultiValue serial printer has been connected and communications protocols defined , you must map the COM port on the mvBase Workstation system to an mvBase line. This is the final procedure to set up such a configuration and to prepare the printer for use. Perform these steps on the mvBase Workstation system.

|  |  |
| --- | --- |
| **NOTE** | This procedure sets up the COM port printer to function in the raw mode automatically. That is, the printer bypasses the mvBase printer driver (if installed) and automatically uses the manufacturer’s default printer driver. |

1. Launch or switch to the Administration Utility.
2. Select the Workstation tab.
3. Verify that the Workstation Application and Service progress indicators show as Stopped or Not Installed. Stop the Workstation if necessary. In most cases, the Workstation progress indicator should display Stopped or Not Installed prior to configuration.

|  |  |
| --- | --- |
| **NOTE** | If you must keep the Workstation running while performing this configuration, select Apply in the Ports dialog box after defining your settings (as directed below). |

1. Select Configure. The Configuring Workstation property sheet displays.
2. Select the Ports tab if it is not displayed.



This tab contains three buttons for configuring COM ports:

|  |  |
| --- | --- |
| **Add** | Invokes the Ports dialog box, allowing the addition and configuration of Windows COM ports not already configured for use by the Workstation. |
| **Delete** | Removes the selected (highlighted) COM port from the mvBase Workstation. |
| **Configure** | Invokes the Ports dialog box, allowing the modification of COM ports already configured for use by the Workstation. Select the pertinent COM port prior to using this button. |

1. Perform these steps to delete an existing COM port.
	* Select the COM port from the Configured Ports field.
	* Select Delete.
	* If you now wish to configure a new or existing COM port, proceed to step 7 or 8.
	* If you are done, select OK. The Workstation tab displays. The procedure is complete.
2. To add a new COM port to mvBase, select Add. The Ports dialog box displays. Proceed to step 9.
3. To configure an existing COM port, select the COM port from the Configured Ports field, then select Configure. The Ports dialog box displays. Proceed to step 9.
4. In the Ports dialog box, define the computer name of the Server to which the Workstation will connect, and select Serial Printer. Other certain options are applicable to this serial printer connection are described below.

|  |  |
| --- | --- |
| **NOTE** | * + Items in the Ports Info group box are shaded (disabled) when the Workstation is running. If this group box is shaded, stop the Workstation prior to configuration of COM port(s). Be aware that stopping the Workstation may affect connected clients. Shut down clients if necessary prior to proceeding.
	+ mvBase defers to the most recent configuration of communications protocols, regardless of the manner in which they are defined. Thus, you may override communications protocols made in the Ports tab by using the **PROTOCOL** TCL command. Conversely, you may override communications made with the **PROTOCOL** TCL command by using the Ports tab.
 |



|  |  |
| --- | --- |
| mvBase Server | Designate the computer name of the mvBase Server system to which the COM ports are mapped. This mvBase Server can be located anywhere on the network. |
| # Ports | Designate the quantity of COM ports you wish to configure at this time. This field lists the number of consecutive ports to be mapped simultaneously. Only one port is added or configured if the quantity of available system COM ports is 1. |
| mvBase Line # | Identify the number of the first mvBase line to which the specified port(s) is/are mapped. |
| Disable | Select this box to make this client definition inactive upon startup of the mvBase Workstation. This function is particularly useful when you want to retain the current configuration's settings for future use. |
| Connect on Workstation Startup | Select this checkbox for a serial printer connection. |
| Disconnect on Logoff | Do *not* select this checkbox for a serial printer connection. Otherwise, there is no way to reconnect a disconnected printer unless you restart the Workstation. |
| Disconnect Char | Do *not* select this checkbox for a serial printer connection. The printer cannot transmit a disconnect character to the Server. |
| Serial Printer | Select this checkbox for COM ports attached to a printer. Select the Apply button to activate this setting on a running mvBase Workstation. Connections identified this way support output only with no input allowed, and do not consume an mvBase user license. |
| Suppress Connection Messages | Do not select this checkbox for a serial printer connection. |
| Communication Settings | Note that if you make changes in this field of the Ports dialog box, they override the settings you defined with the **PROTOCOL** command in steps 8-10 above. |

1. Once you have defined settings for the COM port being added or configured, select either OK or Apply. A message appears requesting confirmation.

When adding or configuring more than one port, select Apply after defining settings for each port or group of ports.

1. Select OK in the confirmation message box. mvBase returns to the Ports tab.
2. Select OK in the Ports tab. mvBase returns to the Workstation tab of the Administration Utility.
3. If you are ready to start the Workstation, perform the necessary tasks in this sequence:
	* Ensure that the mvBase Server is already started.
	* Configure additional client connections in the mvBase Workstation (if necessary).
	* Start the mvBase Workstation once you have configured all client connections.

Once the printer is configured (set up) for use with mvBase for all intended users, printer operation and behavior within the MultiValue environment is virtually identical for all printer types. See [Using mvBase Printers](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/using_mvbase_printers.htm) for additional information, or see other topics as required.

For information about troubleshooting this particular configuration, see [Troubleshooting mvBase Printers](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/troubleshooting_mvbase_printers_and_the_spooler.htm).

### Setting Up mvBase Printers on TCP Ports

This procedure configures a Telnet printer client to connect to mvBase via a Telnet connection/TCP port. The printer must already be connected to the network via a terminal server that uses the Telnet protocol.

In order to implement such a printer configuration, the setup follows this general sequence:

* You connect the printer to its host system and get it to a fully operational state with respect to that local system.
* The printer’s host system must be connected to the network using the Telnet TCP/IP protocol.
* On the mvBase Workstation system, you use the Telnet Servers tab of the Administration Utility to define the Telnet connection as a serial printer connection.
* The printer’s host system connects to the mvBase Workstation via a Telnet connection (TCP port).
* The printer is available to mvBase users in the MultiValue environment as long as the Workstation is running and the printer has established the connection.

|  |  |
| --- | --- |
| **NOTE** | This procedure sets up the TCP port printer to function in the raw mode automatically. |

Perform these steps to define the Telnet connection as a printer connection. That connection is defined via an mvTelnet Server.

1. On the host system to which the printer connects, verify that the printer is fully operational. Follow manufacturer instructions for installation or troubleshooting if required.
2. Ensure that the printer’s host system has a valid (potential) connection to the network using the Telnet TCP/IP protocol.
3. On the mvBase Workstation system (the system to which the printer’s host system will connect via a Telnet connection), launch or switch to the Administration Utility.
4. Select the Workstation tab.
5. Select Configure. The Configuring Workstation dialog box displays.
6. Select the Telnet Servers tab. If your system has previously configured mvTelnet Servers, they display in the Configured Telnet Servers field.



1. If the Telnet Server to be associated with the serial printer has been configured previously, select that Telnet Server, then select Configure. If the Telnet Server to be associated with the serial printer has not been configured previously, select Add. The Telnet Servers dialog box displays with selection of Add or Configure.



1. Type the name of this mvTelnet Server in the mvBase Telnet Server tab.
2. Type the name of the mvBase Server in the mvBase Server Name field. This designates the computer name of the mvBase Server system associated with this client.
3. Select Serial Printer in the Options field. Selection of the Serial Printer option forces the Max Connections field to 1. *Do not change this entry value*.
4. In the TCP Port Number field, enter the TCP port number. The port number may be port 23, or any port between 1024 and 5000.

|  |  |
| --- | --- |
| **NOTE** | Define TCP ports numbers from 2000 and above. This reduces the chance of TCP port conflicts from other Windows applications. |

1. In the Starting mvBase line field, type the first (or only) mvBase line number. This field must be filled with a numeric value. Rocket generally recommends that printer(s) be allocated the highest line number(s) available to reduce potential conflict with line consumption by wildcard clients.
2. Select OK. The connection defined by this mvTelnet Server now functions with a serial printer on the other end of the connection (whenever the Workstation is started). If \* or any non-numeric character was typed in the Max Connections field, a message displays advising you of required change in input for this field. This is a dedicated line pool that will only allow one connection.
3. Perform one or more of these tasks in this sequence to start the mvBase Workstation:
	* Ensure that the mvBase Server is already started.
	* Configure additional client connections in the mvBase Workstation (if necessary).
	* Start the mvBase Workstation once you have configured all client connections.
4. Log to the SYSPROG account and execute the **STARTPTR** command with desired parameters and options.

For information about troubleshooting this particular configuration, see [Troubleshooting mvBase Printers](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/troubleshooting_mvbase_printers_and_the_spooler.htm).

## Installing mvBase Printer Drivers

A printer driver is a software program or configuration file that extends the operating system so that it supports a printer. Printer manufacturers typically supply drivers for their printers for various versions of Windows or other operating systems. Several Windows applications, including mvBase, may offer additional printer drivers to support the applications’ use of printers.

All types of mvBase printers require at least one printer driver.

* Windows printers are first installed in Windows, then mapped for use by mvBase. This type of configuration requires the manufacturer’s printer driver for Windows, or the text-only mvBase printer driver.
* Raw printers are Windows printers, but bypass the Winprint preprocessor within the Windows printer driver. This allows unfiltered output of printer data to the printer device.
* MultiValue printers are serial printers that are connected on a COM port, a TCP port, or as an auxiliary printer. Serial printers configured exclusively in the MultiValue environment require the manufacturer’s printer driver, but no additional mvBase printer driver or Windows-compatible printer driver.

|  |  |
| --- | --- |
| **NOTE** | When configuring a shared network printer, it is important to configure the printer so that multiple users can print from multiple applications. This mandates use of a printer driver that is compatible with Windows. |

The printer driver(s) required for each printer configuration are described in greater detail in the pertinent procedures.

Understanding Raw Printer Operation

The raw printer mode configures Windows printers to allow unfiltered output of printer data which bypasses the Winprint preprocessor of the printer driver.

The raw printer mode resolves several issues, which include:

* ESCAPE sequences not being recognized
* Continuous forms not being supported (printing from mvBASIC with no explicit pagination)
* ACCUPLOT output failing to print correctly
* Graphical output to printers failing to print correctly
* Oversized data being truncated

When the raw mode switch is activated for serial printers, output to the printer client from an mvBase printer process is sent directly to the connected printer, bypassing the Windows printer driver.The raw printer client allows embedded x'FF characters (255 ASCII) in print jobs, and allows ACCUPLOT to print correctly. Additionally, if you create a print job from mvBASIC with a **PRINT CHAR(255)** statement, the embedded **CHAR(255)** should pass through to the printer and not create an end-of-document condition.

Another factor in deciding whether to use the raw printer mode is whether a printer will be shared across the network. Shared printers are most likely to print from multiple Windows-based applications, and the raw printer mode is most suited for this user of printers.

The following mvBase serial printers are or can be configured as raw printers:

* Windows printer clients configured in the Printers dialog box: the Raw option must be selected for the printer to operate in the raw mode. (The Printers dialog box is accessed via the Workstation tab of the Administration Utility.)

In this case, the raw mode passes embedded x'FF characters to the printer. An end-of-document x'FF character (only) terminates the document and nothing more passes through to the Windows Spooler. With the Raw mode cleared (off), any x'FF character terminates the document and nothing more passes through to that print job.

See [Setting Up Windows Printers for mvBase](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/setting_up_windows_printers_for_mvbase.htm) for additional information.

* MultiValue serial printer clients configured in the Ports dialog box (Serial Printer option selected) operate automatically in the raw mode. (The Ports dialog box is accessed via the Workstation tab of the Administration Utility.)

In this case, the COM port client passes embedded x'FF characters through to the COM port. An end-of-document x'FF character is deleted from the out-put stream. With the option cleared (off), all x'FF characters are passed through to the COM port.

See [Setting Up Printers on COM Ports](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/setting_up_mvbase_printers_on_com_ports.htm) for additional information.

* Telnet printer clients configured in the Telnet Servers dialog box (Serial Printer option selected) operate in the raw mode automatically. (The Telnet Servers dialog box is accessed via the Workstation tab of the Administration Utility.)

In this case, the Telnet client passes embedded x'FF characters through to the Telnet client (to which a printer on a Network Terminal is ultimately connected). An end-of-document x'FF character is deleted from the output stream. With the Raw option cleared (off), all x'FF characters are passed through to the Telnet client.

See [Setting Up Serial Printers on TCP Ports](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/setting_up_serial_printers_on_tcp_ports.htm) for additional information.

## Using mvBase Printers

This section contains the following tasks or procedures related to operating printers that are defined for mvBase. These topics are applicable once a printer has been connected to a system on the network and properly set up and configured for use by mvBase.

|  |  |
| --- | --- |
| **NOTE** | Once printer configuration is complete, printers of all types (Windows and MultiValue) behave within mvBase in virtually identical fashion (that is, printer and Spooler TCL commands are nearly always applicable to all mvBase printers within the MultiValue environment). One notable exception is the **AUX ON/AUX OFF** TCL command, which connects or disconnects MultiValue AUX port auxiliary printers to mvBase lines, and is not applicable to other printer types. |

|  |  |
| --- | --- |
| [Overview of Printer Operation](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/overview_of_printer_operation.htm) | Briefly describes the relationship between printers, and their assigned lines, processes and statuses. |
| [Starting a Printer with the STARTPTR Command](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/starting_a_printer_with_the_startptr_command.htm) | Describes the procedure to commence printer operation in mvBase once the printer has been properly set up. Applies to both Windows and MultiValue printers. |
| [Restarting a Printer with the STARTPTR Command](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/restarting_a_printer_with_the_startptr_command.htm) | Describes use of the **STARTPTR** command to restart a stopped printer. Because the printer definitions are stored in the printer control block, all you have to specify is the printer number in order to restart it. |
| [Checking the Status of Printers with the LISTPTR Command](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/checking_the_status_of_printers_with_the_listptr_command.htm) | Describes use of the **LISTPTR** command to obtain information about printers. |
| [Stopping a Printer with the STOPPTR Command](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/stopping_a_printer_with_the_stopptr_command.htm) | Describes the process of stopping an operational printer. The method of stopping a printer is an execution of the **STOPPTR** command issued at TCL. The function of this command is determined by the current operational state of the printer. |
| [Removing a Printer from the System with the SP-KILL Command](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/removing_a_printer_from_the_system_with_the_sp-kill_command.htm) | Describes how to use the **SP-KILL** command to remove (delete) a printer from the system. |

### Overview of Printer Operation

Each printer defined for use with mvBase has its own process and port and is independently displayed by using the WHERE command as soon as it is initialized. Printers typically sleep until they are assigned something to do. Once they have a print job to process, printers scan the assigned form queue(s), print any jobs, then return to the non-active mode awaiting further tasks.

At a given time, a printer may be in any one of the following four states:

|  |  |
| --- | --- |
| **UNDEFINED** | Device is not currently defined as a printer. |
| **READY** | Printer is ready to receive and print jobs from its queue(s). |
| **WORKING** | Printer is printing a print job. |
| **STOPPED** | Printer is waiting for instructions. |

When the printer scans the form queues, it looks for an available job to print. (An available job is one whose print mode matches a print mode supported by that printer). If the print modes do not match, the job will not be selected for print output. This permits specific output to select the printer it needs, but still allows one printer to handle several queues.

### Starting a Printer with the STARTPTR Command

This topic describes the general syntax and processes associated with the **STARTPTR** command. The **STARTPTR** command, found in the SYSPROG account, is used to start a system printer once it has been properly set up and defined for use with mvBase. The **STARTPTR** command allows you to:

* Add new printer(s) to the system
* Initialize the printer(s)
* Assign the printer number
* Assign the form queues handled by the printer
* Define which line to which it is attached

Initialization Overview

Printer initialization entails these actions, which are manually defined with the **STARTPTR** command:

* Assigns a printer number.
* Assigns one, two or three form queues to a printer.
* Defines the printer as a serial or parallel printer.
* Assigns a communications line to the printer.
* Sets the number of blank pages to eject between print jobs.
* Sets the alignment of forms.

Startup (Initialization) Procedure

Any printer to be added or initialized must be physically connected to the system and set up for use with mvBase. See [Setting Up mvBase Printers](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/setting_up_mvbase_printers.htm) if required prior to completing this procedure.

Perform this procedure to add or initialize a printer:

1. From SYSPROG, issue the **STARTPTR** command.

Format

|  |
| --- |
| STARTPTR *printer*,*form* [,*skip*], S*line*, [*options*] |

Parameter(s)



|  |  |
| --- | --- |
| **A** | Begins the alignment process. There must be a print job waiting in the queue in order for the alignment process to work. |
| **N*n*** | Used with the **X** option to specify the number of lines per page (where ***n*** specifies number of lines per page). If the **N** option is not used, the default page length is 66 lines. |
| **S** | Specifies that the form-feed command at the beginning of a print file is to be ignored by a serial printer. This option is used when skip is set to a number other than zero. |
| **X** | Used to count page lines and output the correct number of blank lines when a serial printer does not recognize an X'0C' as a page-eject command. The **X** option can be used in conjunction with the **N** option. |

Parameters must be entered in the exact order shown, separated by commas where indicated.

The printer is ready to receive print jobs once:

* + It has been connected physically to a system.
	+ Handshaking parameters have been defined (if it is a serial printer).
	+ It has been defined for use by mvBase.
	+ It has been started (initialized) with the **STARTPTR** command.

Printer operation continues to follow the normal use of the **STARTPTR** command. Review the above procedure as required, or review other procedures related to using the print Spooler or stopping printers.

Example(s)

This example shows how to add one serial printer to the system.

|  |
| --- |
| STARTPTR 2,2,0,S6 |

This above command line assigns the number 2 to the new printer, assigns form queue 2 to it, specifies that no pages should be ejected between print jobs, and defines the printer as a serial printer connected to line 6.

The next example shows how to add the same printer as with the first example, but with three form queues assigned to it (form queues 2,3, and 4). Type:

|  |
| --- |
| STARTPTR 2,(2,3,4),0,S6 |

### Restarting a Printer with the STARTPTR Command

Parameters set by the **STARTPTR** command when you initialize a printer remain in effect even if you stop the printer with the **STOPPTR** command. **STARTPTR** is used to restart a stopped printer, but since the printer definitions are stored in the printer control block, all you have to specify is the printer number in order to restart it.

This procedure assumes that a printer has already been started (and stopped) at least once with the **STARTPTR** command, and that proper setup and configuration has not changed.

Perform this step to restart a stopped printer:

1. Type this command line at TCL from SYSPROG:

|  |
| --- |
| STARTPTR *printer* |

Parameter(s)

|  |  |
| --- | --- |
| ***printer*** | Identifying number you assign to the printer. |

If you try to start a printer that has not been stopped or that is set to stop but is still printing a job, this message displays:

|  |
| --- |
| PRINTER MUST BE STOPPED |

### Checking the Status of Printers with the LISTPTR

###  Command

Use the **LISTPTR** command to get information about printers. For each printer the report lists:

* Printer type
* Form queues assigned
* Number of blank pages ejected between print jobs
* The process number of the line to which the printer is attached
* The current status of the printer: **ACTIVE**, **INACTIVE**, or **STOPPED**

The **LISTPTR** command produces a report such as the following:

|  |  |  |
| --- | --- | --- |
| PRINTER ASSIGNMENTS |   | 16:41:16 |
| PRINTER | OUTPUT QUEUES | PAGE | DEV OR | STATUS |
| TYPE | NUMBER |   | SKIP | PROCESS # |   |
| SERIAL | 0 | 0 | 0 | 6 | INACTIVE |

This report lists the currently defined printer on the system. Serial printer 1 has form queue 0 assigned to it and is running on process 6. It is currently inactive. The printer does not skip any pages between print jobs.

The **LISTPTR** command also places information in the secondary input buffer for access by a Proc. Proc control of the Spooler is covered later on in this section. Another topic in this section discusses the **LISTPEQS** command, which describes the status of the printer entry queues. There are also two other commands typically used by the system administrator: **SP-STATUS**, to monitor the activity of the Spooler, and **LISTABS**, to check on the printer assignments for all users.

Perform this step to check the status of printers:

1. Type this command line at TCL:

|  |
| --- |
| LISTPTR [*n* [-*m*]] [*options*] |

Parameter(s)

|  |  |
| --- | --- |
| ***n*** | Number of the printer. |
| ***n-m*** | Specifies a range of printer numbers. |
| ***options*** | Parentheses are not required: |
| **B** | Lists information about all printer control blocks, whether allocated or not. |
| **N** | Suppresses automatic paging. |
| **P** | Sends the output to the printer. |

### Stopping a Printer with the STOPPTR Command

This topic describes the process of stopping an operational printer. The method of stopping a printer is to execute the **STOPPTR** command at TCL. The function of this command is determined by the current operational state of the printer. A printer has four states:

|  |  |
| --- | --- |
| **UNDEFINED** | Device is not currently defined as a printer. |
| **READY** | Printer is ready to receive and print jobs from its queue(s). |
| **WORKING** | Printer is printing a print job. |
| **STOPPED** | Printer is waiting for instructions. |

Use the **STOPPTR** command when you need to stop a printer when it has no current print jobs. If a print job is currently on the printer when you issue the command, the printer will not be stopped until the job has finished printing.

This command requires SYS2 privileges as it affects a system resource that is available to all users. Stopping a printer is usually done prior to removing the printer from the system, since **STOPPTR** allows the current print job to finish first.

Stopping a printer, in effect, tells the Spooler that the printer is offline. If the printer is inactive at the time the **STOPPTR** command is issued, no additional jobs will be sent to it. If the printer is active, the current print job will finish.

Format

|  |
| --- |
| STOPPTR [*n* [-*m*]] [B] [W] |

Parameter(s)

|  |  |
| --- | --- |
| ***n*** | Number of the printer you want to stop. If no printer is specified, printer number 0 is stopped. |
| ***n-m*** | Specifies a range of printers. |
| **B** | Stops all printers. |
| **W** | Causes the process to wait until the printer is inactive before it returns the terminal to the TCL prompt. |

Use the **STARTPTR** command (from the SYSPROG account) to restart the printer, or to remove the printer using the **SP-KILL** Command.

Once the printer is inactive, it is safe to remove it from the system using the **SP-KILL** command with the **D** option. (SYS2 privileges are required to use this option.)

Example

This command line provides one example for using the **STOPPTR** command:

|  |
| --- |
| >**STOPPTR 5**PRINTER #5 SET TO STOP BUT IS STILL ACTIVE. |

Because Printer 5 is active, **STOPPTR** allows the current job to continue printing. When that job is completed, the status of the printer is **STOPPED AND INACTIVE**.

### Removing a Printer from the System with the SP-KILL Command

Use this procedure to remove (delete) a printer from the system. This procedure uses the **SP-KILL** command, which cancels any active print jobs in addition to removing the printer. Note that if a print job is being printed, you must use the **SP-KILL** command twice: first to cancel the print job, then to remove the printer.

|  |  |
| --- | --- |
| **NOTE** | When it is necessary to cancel a print job from within Windows while it is being queued in the print Spooler, Rocket highly recommends first cancelling the print job from TCL (**SP-KILL** command), and only then cancelling the print job from the Windows Printers utility. This cancels the print job with respect to its original source (the MultiValue environment). Note that all mvBase print jobs originate within the MultiValue environment. This includes mvBase print jobs queued on Windows printers and for which Windows printer drivers are required. If you do not use this sequence, you run the risk of having to restart the Windows print Spooler. |

See the [Stopping A Printer with the STOPPTR Command](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/stopping_a_printer_with_the_stopptr_command.htm) procedure for information on stopping print jobs without deleting printers.

Perform these steps to remove a printer from the system configuration and to cancel a print job (when required).

1. First, to cancel an active print job, type this command at TCL from SYSPROG:

|  |
| --- |
| SP-KILL *printer* |

Parameter(s)

|  |  |
| --- | --- |
| ***printer*** | Printer on which the print job is queued. |

1. Remove the printer by typing this command at TCL from SYSPROG:

|  |
| --- |
| SP-KILL D *printer* |

|  |  |
| --- | --- |
| ***printer*** | Printer you want to remove. |

**SP-KILL** can be used to remove a printer regardless of its state. Removal is recommended, however, only when the printer is inactive. The **SP-KILL** command has the following format:

Format

|  |
| --- |
| SP-KILL [*options*] |

Parameter(s)

|  |  |
| --- | --- |
| ***options*** | Can be any of the following: |
| **A** | Cancels only those print files that were created on the account you are logged on to. |
| **B** | Cancels all print files on the Spooler. You must have SYS2 privileges to cancel print files created on other accounts. |
| **D*n*** | Removes printer ***n*** from the system. |
| **F*n* [-*m*]** | Removes the specified print files from the queue and makes them into hold files. Files that are currently being printed are not removed from the queue. |
| **N** | Suppresses the **ABORT!** message on cancelled print jobs currently being printed. |
| ***n*** | Specifies a printer number. |
| ***n-m*** | Specifies a range of printers. |
| **O** | Removes the file that is currently being printed from the queue and makes it a hold file. |

Example

The following sequence of actions removes system Printer 1 from the system.

1. Type this command at TCL:

|  |
| --- |
| STOPPTR 1 |

The system displays this message:

|  |
| --- |
| PRINTER #1 SET TO STOP AND IS INACTIVE. |

1. Type this command at TCL:

|  |
| --- |
| LISTPTR 1 |

The following message displays on the screen:

|  |
| --- |
| PRINTER ASSIGNMENTS                                                        13:28:55 |
| TYPE | PRINTER NUMBER | OUTPUT QUEUES | PAGE SKIP | DEV OR PROCESS # | STATUS |
| SERIAL | 1 | 1, 6 | 0 | 7 | STOPPED |

1. Type this command at TCL:

|  |
| --- |
| SP-KILL D1 |

The system displays:

|  |
| --- |
| SERIAL PRINTER # 1 HAS BEEN DELETED, AND ITS PROCESS SENT TO LOGON. |

The message indicates that a serial printer has been removed and its process is now available for use as a logon line.

## Troubleshooting mvBase Printers and the Spooler

If you find you are having problems with a printer or with the Spooler, this section summarizes several hints for resolving the issue(s). This section also contains a summary of error messages that pertain to specific TCL commands.

This troubleshooting section contains the following topics:

|  |  |
| --- | --- |
| [General Printer Troubleshooting](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/general_printer_troubleshooting.htm) | This topic summarizes a few initial methods to troubleshoot both Windows and MultiValue printers. |
| [Troubleshooting Windows Printers](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/troubleshooting_windows_printers.htm) | If the general methods do not resolve your problem and you are working with a Windows printer, read these hints to troubleshoot your printer. |
| [Troubleshooting MultiValue Printers](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/troubleshooting_multivalue_printers.htm) | If the general methods do not resolve your problem and you are working with a MultiValue printer, read these hints to troubleshoot your printer. |
| [Resolving Spooler and Error Messages](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/resolving_spooler_and_error_messages.htm) | If the system gives you an error in response to your use of the **SP-STATUS**, **STARTPTR**, or **STOPPTR** command, see this topic for information about what to do next. |

### General Printer Troubleshooting

The following general hints may be helpful. These apply to both Windows and MultiValue printers. For specific information about troubleshooting these two types of printers, see the additional information later in this section.

1. Turn the printer off, then turn it on again. See if the problems persist.
2. If it is a serial printer, ensure the cable pin-outs are correct.
3. Execute the **LISTLINES** command from the SYSPROG account at TCL. Designate the port number to which the printer is assigned. If this command returns the line number for the COM port or TCP port, this verifies that there is actually a printer client connection on the intended line between the Server and the Workstation.

You can issue **LISTLINES** for a line that is not logged on.

Format

|  |
| --- |
| LISTLINES [*linenum-linenum*] [,*linenum*] [(A N)] |

Parameter(s)

|  |  |
| --- | --- |
| ***linenum-linenum*** | Specifies a range of line numbers to display. |
| ***Linenum*** | Specifies a specific line to display. |
| **A** | (Optional) Displays (in the report) all lines with client type Unknown. |
| **N** | (Optional) Do not pause display at end of page. |

There may be many sets of line number ranges, and specific line lines separated by commas on the command line.

This command returns the following information:

|  |  |
| --- | --- |
| **LINE** | Number of the line connecting the mvBase client to the mvBase Server process. |
| **STATION** | Name of the system on which the mvBase client resides. |
| **CLIENT** | Name of the mvBase client. |
| **HOST LOGIN** | User's Windows account name. |
| **PROCESS** | Number of the process running on the mvBase Server. |
| **ACCOUNT** | mvBase account to which the user has logged on. |

If there is no apparent connection after issuing the **LISTLINES** command at TCL, then the connection needs to be made. Ensure that the Workstation has been started, and that the Workstation is connected to the correct mvBase Server.

1. If there are characters missing and it looks as if the printer is out of alignment, there is probably a handshaking problem. Make sure your printer’s communications protocols are set correctly, then use the **LIST-LINE-CHARS** command (or its synonym, **LLC**) to make sure the line characteristics as set on mvBase match the printer characteristics.
2. Perform the specific steps for troubleshooting Windows and MultiValue printers (the following topics), then return to the steps below.
3. Execute the **LISTPTR** command from the SYSPROG account at TCL. This verifies that the printer is configured for the specific line number, and that a spooler is defined (the printer despooling process starts).
4. Execute the **BLOCK-PRINT** user command to verify that the printer itself is operational.

Format

|  |
| --- |
| BLOCK-PRINT *text* [(P)] |

Parameter(s)

|  |  |
| --- | --- |
| ***text*** | Character string to be printed in block format. text may not exceed the current line length, as set by the **TERM** command. text can include any of the ASCII characters. If text contains any single quotes, enclose the entire string in double quotes; if it contains any double quotes, enclose the entire string in single quotes. The enclosing quotes are not printed. To include leading spaces, enclose text in double quotes. |
| **P** | Sends output to the printer. |

### Troubleshooting Windows Printers

If you have implemented the general troubleshooting procedures, and the printer is still not operating correctly, attempt these steps from within Windows (if this is a Windows printer).

1. Print a test page from within the Windows Printers utility.
	* Launch or switch to the Printers utility.
	* Select the printer about which you are inquiring with the right mouse button (in most instances). A popup menu displays.
	* Select Properties.
	* Switch to the General tab.
	* Select Print Test Page.
	* Follow the Windows prompts if they communicate any problems with the printer.
2. Check the Windows Event Application Log for any Workstation errors encountered during Workstation startup.
3. Verify that the user account under which the Workstation has been started can connect to the printer.
4. See additional Windows documentation as required.

### Troubleshooting MultiValue Printers

Troubleshooting MultiValue printers generally starts at the printer and the system to which the printer is connected, then the mvBase Workstation configuration and status (started), then verifies within mvBase that the printer is started on the intended line.

Use the following methods to troubleshoot a MultiValue printer. These steps are intended for both COM and TCP port printers unless specifically noted otherwise.

1. Perform the general tasks listed in the [General Printer Troubleshooting](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/general_printer_troubleshooting.htm) topic of this section.
2. Verify that the printer and the system to which the printer connects are operating correctly in local fashion. Troubleshoot according to manufacturer documentation, particularly for terminal server or UNIX systems.
3. If this is a TCP port printer, verify that the Telnet connection between the mvBase Workstation system and the terminal server (or UNIX system) has not been disrupted for any reason. Also verify that it is connecting via the intended line, and that the TCP port is available and not in conflict with other TCP port consumption. Finally, verify that you have correctly typed the name of the mvBase system to which you are connecting.
4. If this is a COM port printer, then within Windows, verify that the COM port is not configured for use by other Windows applications.
5. If this is a COM port printer, ensure that the COM port has not been configured in multiple places with conflicting mvBase line numbers.
6. Verify that the intended line for this printer is not being consumed by another mvBase Workstation component. (The **LISTLINES** command will have told you this when you performed the general troubleshooting procedures.)
7. Ensure that the Workstation is running and connected to the intended mvBase Server on an available (and connected) mvBase line. If the line has become disconnected for any reason, you may need to stop the Workstation, restart and reconnect the mvBase Workstation.
8. Connect a terminal to the printer port, then send some printer output to the printer and see how it appears on the screen. If the output appears to be satisfactory, connect the printer to the printer port and repeat this step.