Configuring and Using mvBase Tape Units

This section contains the following major divisions:

|  |  |
| --- | --- |
| [Overview of mvBase Tape Units](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/overview_of_mvbase_tape_units.htm) | Use this topic to familiarize yourself with the types of physical and virtual tape units which mvBase can use, and the mechanical properties of tape layout. |
| [Configuring mvBase Tape Units](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/configuring_mvbase_tape_units.htm) | Use the procedures in this topic to set up mvBase tape units, or to remove them from mvBase. |
| [Using mvBase Tape Units](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/using_mvbase_tape_units.htm) | Use the procedures in this topic to prepare and use mvBase tape units that are previously configured for mvBase. These procedures entail attaching, detaching, formatting, rewinding, writing to and reading from tape units. |
| [Troubleshooting Tape Unit Errors](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/troubleshooting_tape_unit_errors.htm) | Use this topic to interpret and resolve messages associated with tape units. |
| [Tape Unit Command Summary](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/tape_unit_command_summary.htm) | Use this topic to learn and review all commands, Procs and mvBASIC statements related to tape unit operation. For comprehensive information about tape device commands, see the *Guide to mvBase Files and Accounts*. |

## Overview of mvBase Tape Units

mvBase tape units are physical and virtual tape devices that are configured for use with mvBase. mvBase may also use any physical devices (previously configured in Windows) as mvBase tape units.

**Types of mvBase Tape Units**

mvBase uses both physical and virtual devices as mvBase tape units.

**Physical Devices**

Physical tape devices are removable tape drives which have been installed on the Windows host system. These devices include:

* Floppy drives
* 1/4-inch tape drives
* 1/2-inch tape drives
* 4mm DAT tape drives
* 8mm tape drives

**Virtual Tape Devices**

mvBase uses two types of virtual tape devices:

* Virtual Tape File, which is a regular file managed by the Windows host system that, once configured for mvBase, is used in the same manner a physical tape device is used. Virtual tape files can reside on any mapped drive on the network, including hard disk drives, CD-ROM and floppy disk drives.

Virtual tape files are limited to 4 terabytes.

* Virtual Tape Link (VTL), which is a unidirectional data transfer mechanism in which a read device and a write device on one or more mvBase Servers are paired into a distinct mvBase tape unit. You may select, attach and use a VTL in a fashion similar to other tape units.

**Understanding Tape Layout**

This topic describes the distinctive physical characteristics of various tape media.

**1/4-inch Tape Layout**

The layout of 1/4-inch tape is shown below. On the 1/4-inch tape, 4mm DAT, and 8mm tape, the EOD (End-Of-Data) is indicated by the beginning of a section of blank tape. This section of blank tape is created when writing to BOT (Beginning-Of-Tape). Before writing begins, the 1/4-inch tape is automatically erased and rewound during the retension cycle. (Use the **T-FORMAT** command with the N option to disable the automatic retension cycle.)



The layout of a floppy tape is shown below. On the floppy tape, the EOD (End-Of-Data) is indicated by two consecutive EOF (End-Of-File) marks.



In general, data is written to tape in fixed-length blocks or physical tape records. Files consist of variable-length items, which are logical data records. Because data records are stored as a continuous string, multiple file items can fit in a single block and individual items are allowed to span over multiple blocks. Therefore, there is no necessary correlation between block size and data record size.

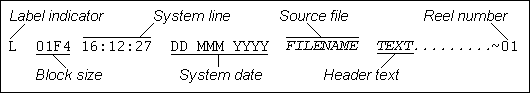
Any unused portion of a tape record is padded at the end. The pad character is an X'FB' character if **T-DUMP** and **SAVE** commands generate the tape. It is a null (X'00') character if the tape record contains a print file. The pad character is a blank when the tape is generated from mvBASIC.

**Understanding Label Format**

A tape label can be written at the beginning of each tape, and since mvBASIC tape statements do not write labels, the **T-WTLBL** command can be used to write a label to tape. This label is not written, however, until something is sent to tape. The user is also responsible for writing the EOF mark.

A tape label consists of seven elements, as shown below. There are two supported tape label sizes; short labels (80 bytes) and long labels (512 bytes). On 1/4-inch tape, long label format means that the 80 byte label is padded with null characters out to 512 bytes. It is created by the **T-DUMP** and **S-DUMP** commands.

Tapes used with releases prior to mvBase may require short label support. Specifying the **S** option when formatting a tape with **T-FORMAT** allows short labels to be written and read.



The label contains the source file name as specified in the **T-DUMP** command. It also contains any user-supplied text provided using the **HEADER** modifier. For instance, the following **T-DUMP** command uses the **HEADER** modifier to add text to the label after the file name:

|  |
| --- |
| >**T-DUMP CUSTOMERS HEADER "BEFORE REMOVING DUPLICATES"** |

The resulting tape label can be read with the **T-RDLBL** command:

|  |
| --- |
| **>T-RDLBL**  BLOCK SIZE: 2048  L 0800 11:38:36 03 APR 1994 CUSTOMERS BEFORE REMOVING DUPLICATES ~01 |

If necessary, the header string will be truncated from the right to fit into the label block. If the Spooler generates the tape output, the file name is the account name.

**Understanding Block Size**

Blocking data normally means the process of placing a well-known number of logical records of fixed and equal length in a single physical block for the convenience of the physical device on which it is to be stored. Retrieval of the data then requires deblocking into individual logical records.

The tape-handling routines allocate two buffers equal in size to the tape record length. These buffers are then locked into memory, allowing one buffer to be filled by the output generating process while the other buffer is being written. The degree of system degradation due to large tape buffers is dependent on the activity of other users in the system.

**1/4-inch Tape Block Sizes**

On a 1/4-inch tape drive, the block size must be a multiple of 512. Block sizes that are not multiples of 512 are rounded down. Any block size specification lower than 512 bytes default to 512. The maximum block size is 32,256 bytes.

**4mm DAT Tape Block Sizes**

On the 4mm DAT tape drives, the record length can be any number up to 32,256 bytes, although the default value of 16,384 bytes is recommended. For best results, the block size should be a multiple of 1024.

**8mm Tape Block Sizes**

On the 8mm tape drives, the record length can be any number up to 32,256 bytes, although the default value of 16,384 bytes is recommended. For best results, the block size should be a multiple of 1024.

**Floppy Disk Block Sizes**

On floppy disk drives, the block size is fixed according to the mode selected. In default RAW-OFF mode, the block size is fixed at 500 bytes and can be read from and written to diskette. In RAW-ON mode, the block size is 512 bytes and the user is restricted to read-only from the diskette.

## Configuring mvBase Tape Units

Each tape drive allocated to mvBase is assigned a logical tape unit number, and may be configured in two general ways:

* Via the Tapes tab of the Administration Utility
* Through commands executed at the TCL prompt

Two mvBase tape units are configured by default during installation:

* Drive A, the Server’s floppy drive
* The virtual tape device mapped to the virtual tape file that contains the initial mvBase database

Additional tape units may be allocated to mvBase subsequent to installation and before launching the Server. These assignments are usually made when the system is coldstarted (if they are specified in the **USER-COLD-START** Proc). They can also be overridden to allow a different physical tape drive to be a particular logical tape unit.

This topic describes the customary actions associated with tape unit configuration and removal. Use this topic to create or define mvBase tape units (tape devices which mvBase can use), or to remove such a tape unit from mvBase.

Once you have configured the desired mvBase tape unit(s), proceed to [Using mvBase Tape Units](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/using_mvbase_tape_units.htm) for attaching, formatting and accessing these devices.

This section contains the following topics.

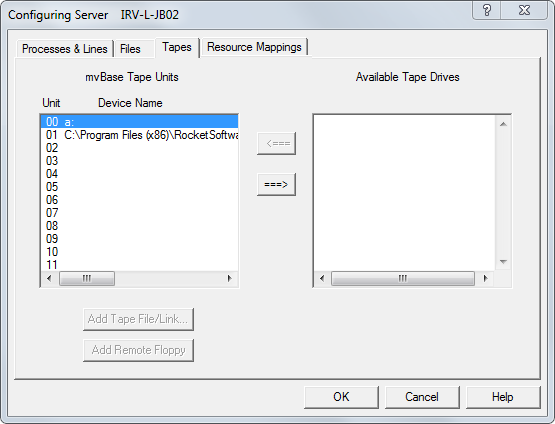
|  |  |
| --- | --- |
| [Using the Tapes Tab to Add or Remove mvBase Tape Units](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/using_the_tapes_tab_to_add_or_remove_mvbase_tape_units.htm) | Perform this procedure to add or remove mvBase tape units. Such devices include physical drives, virtual tape files, virtual tape links, and remote floppy drives. Physical devices must be previously configured in Windows. |
|  |  |
| [Remote Floppy Device Considerations](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/remote_floppy_device_considerations.htm) | Contains some additional explanation about remote floppy devices as applicable to the previous procedure. |
| [Adding Temporary Virtual Tape Units via SET-TAPEFILE](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/adding_temporary_virtual_tape_units_via_set-tapefile.htm) | Perform this procedure to create temporary virtual tape units at TCL. The Server normally removes these tape units whenever the system is rebooted. |
| [Overview of Virtual Tape Links](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/overview_of_virtual_tape_links.htm) | This topic provides additional information and considerations pertaining to virtual tape links. |
| [Adding Virtual Tape Links via TCL](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/adding_virtual_tape_links_via_tcl.htm) | Perform this procedure to define a virtual tape link independent of the Server tab (Administration Utility). |

### Using the Tapes Tab to Add or Remove mvBase Tape Units

The Tapes tab displays the current configuration of mvBase tape units and accessible physical tape devices. When the Server is stopped, the Tapes tab allows you to modify mvBase tape units (virtual and physical tape devices configured for use by mvBase).

Perform these steps to configure (add or delete) mvBase tape units (physical and virtual tape devices). Additional topics that follow this procedure provide considerations for various mvBase tape unit types, and provide steps for using tape devices once they are configured.

1. Ensure that the Server has no connected clients.
2. Launch or switch to the Administration Utility.
3. Select the Server tab if it is not displayed in the foreground.
4. Stop the Server Application or Server Service if required. Ensure that both the Server Application and Server Service status fields display Stopped or Uninstalled.
5. Select Configure. The Configuring Server dialog box displays.
6. Select the Tapes tab.



The Tapes tab features these buttons and fields:

|  |  |
| --- | --- |
| mvBase Tape Units | This field lists all tape units currently configured for use with mvBase. System configuration should always list drive A (where drive A is the local floppy drive) and the local hard disk drive (where the virtual tape device resides). The tape01.vtf file contains the initial mvBase database. |
| Available Tape Drives | This field lists physical devices (previously configured in Windows) that are available for allocation to mvBase. A selected device listed on the right (Physical Tapes) can be added to the list of mvBase tapes on the left. |
| Add Tape File/Link | This button maps a virtual tape file for the current server or a virtual tape link between two or more servers. |
| Add Remote Floppy | This button maps a remote floppy device to the mvBase Server. |
| <===  Add Tape Unit | This button adds a physical tape device (previously configured for use in Windows) to mvBase. The device moves to the mvBase Tape Units field. |
| ===>  Remove Tape Unit | This device removes any mvBase tape unit from mvBase. If you remove a physical tape device, it moves to the Available Tape Drives field. If you remove a virtual tape file, it simply disappears from the mvBase Tape Units field. |

#### Adding a Physical Tape Device to mvBase

A physical tape device is a removable tape drive (DAT, ½-inch, QIC, etc.) which has been installed on the Windows host system. Perform these steps to add a physical tape device to the mvBase Server:

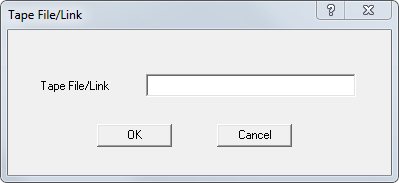
1. Select an available tape unit number in the mvBase Tape Units field. The <=== arrow becomes active (not shaded).
2. Select a corresponding physical device from the Available Tape Drives field.
3. Select <===. mvBase confirms the media type with the mvBase Tape Type dialog box.
4. Select the appropriate media type.
5. Select OK to close the Tape Type dialog box. The Tapes tab displays the new device in the mvBase Tape Units field.

|  |  |
| --- | --- |
| **NOTE** | You must issue the **T-ONLINE** command at TCL prior to attempting tape unit operation. |

#### Adding a Virtual Tape File to mvBase

A virtual tape file (VTF) is a file managed by the Windows host system and can be a networked file; once configured, it functions as a physical tape device. Perform these steps to add a virtual tape file to mvBase.

1. Select an available tape unit number in the mvBase Tape Units field.
2. Select Add Tape File/Link. The Tape File/Link dialog box displays.



1. Type the path and file of the Windows file that is to function as an mvBase tape. Syntax resembles this format:

**Format**

|  |
| --- |
| <*pathname*\*filename.vtf* |

**Parameter(s)**

|  |  |
| --- | --- |
| ***pathname*** | Represents the absolute path to an existing directory on the host operating system. |
| ***filename.vtf*** | The virtual tape file which may or may not exist at the time of command execution. The .vtf extension is used by convention to identify virtual tape files. |

For example, the command line that you use may resemble this command line:

|  |
| --- |
| c:\mvBase\tape002.vtf |

The VTF path can be local or mapped in UNC format.

* + Select OK to apply and close the Tape File/Link dialog box. The Tape File added successfully! message appears.
  + Select OK to close the message. The new virtual tape file appears in the mvBase Tapes field of the Tapes tab.

Virtual tape files that are assigned via the Administration Utility display in the **T-STATUS** display when mvBase is coldstarted.

A virtual tape file can be set up when the mvBase Server is running and started. Use **SET-TAPEFILE** to specify the file to be used.

|  |  |
| --- | --- |
| **NOTE** | A virtual tape file can also be assigned while the Server is running. See the section titled [Adding Temporary Virtual Tape Units via SET-TAPEFILE](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/adding_temporary_virtual_tape_units_via_set-tapefile.htm). |

#### Adding a Virtual Tape Link to mvBase

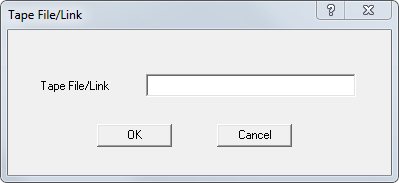
A virtual tape link (VTL) is a unidirectional data transfer mechanism between two associated logical tape units (one write and one read.) You can select, attach and use a VTL in a fashion similar to other tape units, and a VTL consumes processes and lines in a fashion similar to other tape units. For additional information about virtual tape links, see [Overview of Virtual Tape Links](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/overview_of_virtual_tape_links.htm).

This procedure is required at both ends of the link (on one Server system, you define the transmitting VTL device as a write device, and on the other system, you define the receiving VTL as a read device). In the case that remote systems comprise the ends of the VTL, one user at each system may be required.

|  |  |
| --- | --- |
| **NOTE** | * mvBase must be installed on all systems associated with the VTL. * The file names for the VTL are created with this procedure, not attached or selected. |

**Perform these steps to add a virtual tape file to mvBase:**

1. Select an available tape unit number in the mvBase Tape Units field.
2. Select Add Tape File/Link. The Tape File/Link dialog box displays.



1. On the writing side of the VTL, define the writing side of the VTL in the Tape File/Link field with this syntax:

|  |
| --- |
| \\*system*\*pipe*\*pipename* |

**Parameter(s)**

|  |  |
| --- | --- |
| ***system*** | Computer name of the destination system on the reading (receiving) end of the VTL. This must be a valid Windows computer name. If configuring the local system, you may type a period (**.**) instead of the system name to designate the local system. |
| ***pipe*** | Required literal element which applies this command line to the VTL defined as ***pipename***. |
| ***pipename*** | Name of the virtual tape link. Use alphanumeric characters with no spaces. |

For example, a local Server system in the US that is writing to a remote Server system in the UK might type:

|  |
| --- |
| \\.\pipe\uklink |

1. On the reading side of the VTL, define the reading side of the VTL in the Tape File/Link field with this syntax:

|  |
| --- |
| \\*system*\*pipe*\*pipename* |

**Parameter(s)**

|  |  |
| --- | --- |
| ***system*** | Computer name of the destination system on the reading (receiving) end of the VTL. This must be a valid Windows computer name. If configuring the local system, you may type a period (**.**) instead of the system name to designate the local system. |
| ***pipe*** | Required element which applies this command line to the VTL defined as ***pipename***. |
| ***pipename*** | Pipename that identifies this virtual tape link. This must be the same pipename as that which is defined on the writing (sending) side of this VTL. |

To follow the example immediately above, the remote system which is receiving (reading) the VTL would type this path:

|  |
| --- |
| \\system\pipe\pipename |

#### Adding a Remote Floppy Drive

A disk drive is a removable disk drive (floppy and possibly CD-ROM), and includes remote floppy devices. A remote floppy device enables a client that is running on a remote system to use the floppy device(s) that are local to that remote Workstation system, and for the (remote) Server system to use those drives with mvBase. The Available Tape Drives field displays the tape drives that can be configured for use with mvBase Server. Perform these steps to add a remote floppy device.

1. Select an available tape unit number in the mvBase Tape Units field.
2. Select Add Remote Floppy.
3. Select Yes in the confirmation dialog box. The new floppy drive appears in the mvBase Tape Units field.

When mvBase is next started, the **T-STATUS** display identifies the remote floppy using the F# in the **DRIVE** column and the A: in the **PATH** column.

|  |  |
| --- | --- |
| **NOTE** | A remote floppy device is not supported with a terminal or Telnet client connection. |

The remote floppy feature can create multiple aliases for a single floppy tape device. Consequently, even after one user has performed a **T-ATT** to the floppy device, another user can perform a **T-ATT** to the same device using a different alias. However, the second user receives the **DEVICE NOT READY** message when attempting to access the floppy tape device. This same message displays if the device is in use by another program running on the host operating system.

**See Also**

#### Removing mvBase Tape Units

mvBase tape units are removed in the same manner, regardless of their type (tape drive, virtual tape file, remote floppy device, or virtual tape link). Perform these steps to remove an mvBase tape unit from within the Administration Utility:

1. In the mvBase Tape Units field, select the mvBase tape unit you wish to delete. Do not delete either of the two default tape units.
2. Select the right arrow ===> button. The mvBase tape unit is removed, and the corresponding tape unit number is now available for another device. If this was a physical tape device that was removed, it now displays in the Available Tape Drives field.

#### Completing Tape Device Configuration

1. Once you have added and/or removed your desired mvBase tape units, select OK in the Tapes tab. The Server tab of the Administration Utility displays.
2. Perform additional configuration in the Administration Utility as required, or (re)start the mvBase Server.

The topics that follow provide additional considerations when configuring one or more specific mvBase tape units types, such as remote floppy devices and virtual tape links.

|  |  |
| --- | --- |
| **NOTE** | An mvBase tape unit must be attached prior to data transfer. Once you define an mvBase tape unit of any type, mvBase considers that unit to be a tape device, hence you must use **T-SELECT**, **T-ONLINE**, **T-REW** and other tape-related commands in the customary sequence in order to perform normal tape device functions.  USB tape devices are supported via the tapes registry value named forced. Setting the forced registry value to 1 allows a user to force the availability of a USB tape device. |

If you configured a virtual tape link with the procedure above, use the **T-STATUS** command to verify that the link name (pipename), which is a file associated with the LTU, is correct.

### Remote Floppy Device Considerations

A remote floppy device enables a client running on a remote PC (not running on the Server) to use a local floppy device as a drive on the mvBase system.

* Once a remote floppy device is configured to be an mvBase tape unit, tape commands operate in customary fashion for the local floppy drive. For example, when executing the **T-STATUS** command, a remote floppy is identified by the F# in the **DRIVE** column.
* Any client that is running Windows can use a remote floppy device that is configured to be an mvBase tape unit. Drives resident on the system (e.g., A:, B:, etc.) may be added as remote floppy devices.
* The Remote Floppy feature of the Tapes tab allows a client running on a remote PC to enable its own floppy drive to function as an mvBase tape unit.

|  |  |
| --- | --- |
| **NOTE** | In the case of a Telnet client connected via mvTelnet, the floppy that is considered remote is the floppy where the mvBase Workstation is running. |

When you use **T-SELECT** to select a remote floppy device, the client’s or Workstation’s PC floppy drive replaces drive A in the mvBase Server’s tape device table. The client may now use this floppy drive, rather than using the floppy drive located on the Server. Tape commands on the remote floppy function normally. When the user detaches from the remote floppy, the path to drive A is restored.

The remote floppy feature can create multiple aliases for a single floppy tape device. Consequently, while one user is **T-ATT**ached to the floppy device, another user can **T-ATT**ach to the same device using a different alias. However, the second user receives the **DEVICE NOT READY** message if attempting to access the floppy tape device. This same message displays if the device is in use by another program running on the host operating system.

|  |  |
| --- | --- |
| **NOTE** | Once you define an mvBase tape unit of any type, mvBase considers that unit to be a tape device, hence you must use **T-SELECT**, **T-ONLINE**, **T-REW** and other tape-related commands in the customary sequence in order to perform normal tape device functions. |

### Adding Temporary Virtual Tape Units via SET-TAPEFILE

Perform these steps to add a temporary mvBase tape unit using the TCL command **SET-TAPEFILE**.

1. Log to the SYSPROG account.
2. Execute **T-SELECT** ***n*** to select an available virtual tape device, identified by the V in the drive column of the **T-STATUS** display.
3. Execute this command:

**Format**

|  |
| --- |
| SET-TAPEFILE *<path>* *command* |

**Parameter(s)**

|  |  |
| --- | --- |
| ***<path>*** | Represents the absolute path to an existing directory on the host operating system and file name may or may not exist. The extension ".vtf" is used by convention to identify virtual tape files. |

For example, the following sequence of commands is a valid implementation of **SET-TAPEFILE**:

|  |
| --- |
| LOGTO SYSPROG  T-SELECT 5  SET-TAPEFILE C:\MVBASE\FSAVE.VTF  T-ONLINE  FILE-SAVE |

**Parameter(s)**

|  |  |
| --- | --- |
| **FSAVE.VTF** | The virtual tape file that does not currently exist in the directory represented by the path C:\MVBASE. |

1. Execute the TCL command **T-ONLINE**.

The tape file is now ready for use as an mvBase tape unit.

As this assignment of an mvBase tape device is temporary, it can be overwritten by performing another **SET-TAPEFILE** to the same virtual tape device. Moreover, all temporarily assigned mvBase tape units will disappear if the Server is shutdown and re-started.

|  |  |
| --- | --- |
| **NOTE** | Once you define an mvBase tape unit of any type, mvBase considers that unit to be a tape device, hence you must use **T-SELECT**, **T-ONLINE**, **T-REW** and other tape-related commands in the customary sequence in order to perform normal tape device functions. |

### Overview of Virtual Tape Links

A virtual tape link (VTL) is a virtual tape file which works as a unidirectional data transfer conduit rather than as a physical file. A VTL establishes this conduit (or pipe) between two logical tape units (LTUs) located on one or more mvBase Servers. One LTU functions as a write (send) device, and the other LTU functions as a read (receive) device.

VTLs can be predefined in the Administration Utility or dynamically defined using the **SET-TAPEFILE** TCL command. This allows VTLs to be used as an ad hoc data transfer and backup mechanism between various mvBase Servers. It is not necessary to take these servers out of service for reconfiguration when transferring data. Thus, the system administrator has the ability to create and delete VTLs while a system is running and gains considerable flexibility in backup processes.

VTLs have specific file names which can be accessed by processes on different systems on the network. VTLs can be opened, read, written to, saved and closed using file names and standard file system commands.

Once the VTL is configured, it can be selected, attached and used with paired and compatible tape commands or functions. The [Transferring Data via a Virtual Tape Link](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/transferring_data_via_virtual_tape_links.htm) procedure contains more information about suitable command pairs.

The process of implementing VTLs can be broken into three specific stages which, combined with certain restrictions and considerations, comprise other related topics. See [Using mvBase Tape Units](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/using_mvbase_tape_units.htm) for additional information.

**Considerations**

* Currently, VTLs can be configured via the Administration Utility or at the TCL prompt via **SET-TAPEFILE**. There are three options:
  1. If you define the VTL in the Server tab of the Administration Utility, the VTL is preserved when you shut down and restart the Server system.
  2. If you define the VTL at the TCL prompt and do not include this as part of the **USER-COLD-START** Proc, the VTL is lost every time you shut down the Server system.
  3. If you define the VTL at the TCL prompt and do include this as part of the **USER-COLD-START** Proc, the VTL is retained when you shut down and restart the Server system.
* Backspace and rewind tape operations have no meaning for VTL devices and do nothing.
* mvBase Servers may be configured with as many VTLs as there are available virtual tape device LTUs. VTLs may be reconfigured as virtual tape files and vice versa.
* Multiple LTUs may be configured as read devices corresponding to a single VTL write device, although only one of these read devices may be actively attached at a time.
* When bidirectional tape transfer is desired, set up two separate VTLs using two pairs of LTUs with different pipenames and with each LTU write device on a different system.

### Adding Virtual Tape Links via TCL

Perform this procedure to define a virtual tape link independent of the Server tab (Administration Utility). Actions are required at both ends of the link. In the case that remote systems comprise both ends of the link, one user at each system may be required. Note that the file name for the VTL is created with this procedure, not selected.

|  |  |
| --- | --- |
| **NOTE** | * If you define a VTL at TCL rather than with the Server tab of the Administration Utility, the Server will not retain the configuration of the VTL upon shutdown unless you include that VTL in the **USER-COLD-START** Proc. * mvBase must be installed on all systems associated with the VTL. |

1. Determine the status of virtual tape devices on each mvBase Server system associated with the link. Issue the **T-STATUS** command at TCL. This command lists all LTUs and identifies those previously configured as virtual (V) tape devices.
2. Determine the role for each of the two associated LTUs. One LTU must function as the write (send) device, and the other LTU must function as the read (receive) device.
3. On each end of the link, issue **T-SELECT** for an available LTU of type V (virtual).
4. For the LTU write device selected in Step 3, define this side of the link using this command syntax:

**Format**

|  |
| --- |
| SET-TAPEFILE \\.\*pipe*\*pipename* |

**Parameter(s)**

|  |  |
| --- | --- |
| **.**(dot) | The period denotes the local system as being the system on which this write device is to be established. |
| ***pipe*** | Required element which applies this command line to the VTL defined as ***pipename***. |
| ***pipename*** | Name of the virtual tape link. Use alphanumeric characters with no spaces. |

1. For the LTU read device selected in Step 3, define this side of the link using this command syntax:

**Format**

|  |
| --- |
| SET-TAPEFILE \\*system*\*pipe*\*pipename* |

**Parameter(s)**

|  |  |
| --- | --- |
| ***system*** | Computer name of the destination system on the reading (receiving) end of the VTL. This must be a valid Windows computer name. |
| ***pipe*** | Required element which applies this command line to the VTL defined as ***pipename***. |
| ***pipename*** | Pipename that identifies this virtual tape link. This must be the same pipename as that which is defined on the writing (sending) side of this VTL. |

1. Use the **T-STATUS** command to verify that the link name (pipename), which is a file associated with the LTU, is correct.

The VTL is now configured on both sides of the link and is ready for attaching. The VTL must be attached prior to data transfer.

|  |  |
| --- | --- |
| **NOTE** | Once you define an mvBase tape unit of any type, mvBase considers that unit to be a tape device, hence you must use **T-SELECT**, **T-ONLINE**, **T-REW** and other tape-related commands in the customary sequence in order to perform normal tape device functions. |

## Using mvBase Tape Units

This section focuses upon using mvBase tape units (physical and virtual) that have been configured previously for use with mvBase. Most of these tasks are performed at the TCL prompt. Most of these topics assume that you are already logged onto mvBase. Note that several of these topics are written as examples (with associated explanation), while others topics are procedures with numerated steps.

This section contains the following procedures and task-related topics.

|  |  |
| --- | --- |
| [Advancing to End of Data](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/advancing_to_end_of_data.htm) | Provides explanation for using the **T-EOD** command to move a tape forward to the end of the recorded data. |
| [Appending Data to Tape](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/appending_data_to_tape.htm) | Provides explanation for using the **T-EOD** command to append data to a tape. |
| [Attaching a Cartridge Tape Unit](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/attaching_a_cartridge_tape_unit.htm) | Provides explanation for using the **T-ONLINE** command to reset the cartridge tape drive, to check that the tape cartridge has been inserted, and to rewind the tape. |
| [Attaching a Tape Unit to a Process](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/attaching_a_tape_unit_to_a_process.htm) | Provides explanation for using the **T-ATT**, **T-SELECT** and/or **T-ONLINE** commands to attach tape units. |
| [Attaching Virtual Tape Links via TCL](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/attaching_virtual_tape_links_via_tcl.htm) | Describes the procedure for attaching a previously configured virtual tape link. This must be done at TCL. |
| [Chaining Drives](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/chaining_drives.htm) | Provides explanation for chaining a series of 1/4-inch, 4 mm DAT, or floppy tape drives together and selecting them for the same process. |
| [Changing Assignments](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/changing_assignments.htm) | Briefly identifies those commands by which to assign a logical tape unit number to each tape drive on the system (**SET-TAPE** and **RESET-TAPE**). |
| [Changing Tape Block Size](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/changing_tape_block_size.htm) | Provides explanation for the ways in which you can change tape block size, and the associated commands (**T-ATT**, **T-RDLBL** and **T-READ**). |
| [Copying Data Between Two Tape Drives](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/copying_data_between_two_tape_drives.htm) | Provides explanation for using the **T-COPY** command to copy all or part of a tape to another tape if you have multiple tape drives. See several alternate topics for additional methods of data transfer. |
| [Detaching a Tape or Floppy Disk Unit](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/detaching_a_tape_or_floppy_disk_unit.htm) | Provides explanation for using the **T-DET** command to detach the currently attached tape unit from your process. |
| [Dumping a File to Tape or Floppy Disk](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/dumping_a_file_to_tape_or_floppy_disk.htm) | Provides explanation for using the **T-DUMP** command to transfer a copy of all or selected file items in random order to tape. |
| [Examining the Contents of a Tape or Floppy Disk](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/examining_the_contents_of_a_tape_or_floppy_disk.htm) | Provides explanation for using the **T-READ** command to read a tape record and display its contents on the screen or send it to the printer. |
| [Formatting Tape Devices](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/formatting_tape_devices.htm) | Provides steps and considerations for formatting various tape devices. |
| [Forwarding the Tape or Floppy Disk](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/forwarding_the_tape_or_floppy_disk.htm) | Provides explanation for using the **T-FWD** command to advance a specified number of tape records or to the End-Of-File mark. |
| [Including Data from Tape or Floppy Disk in Reports](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/including_data_from_tape_or_floppy_disk_in_reports.htm) | Provides explanation for using the **TAPE** modifier with any INFO/ACCESS modifier to retrieve data from tape and display it in reports. |
| [Listing Current Device Assignments](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/listing_current_device_assignments.htm) | Provides explanation for determining the current tape assignments by using the **T-WHAT** and **T-STATUS** commands and the associated report. |
| [Moving a Tape or Floppy Disk Backward](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/moving_a_tape_or_floppy_disk_backward.htm) | Provides explanation for using the **T-BCK** command to move the tape or floppy disk backward for a specified number of records or to a previous End-Of-File mark. |
| [Moving to a Specified File](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/moving_to_a_specified_file.htm) | Provides explanation for using the **T-SPACE** Proc to space a tape forward over a specified number of files. |
| [Operating Physical Tape Devices Using T-ONLINE](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/operating_physical_tape_devices_using_t-online.htm) | Describes the procedure for operating physical tape devices previously configured as mvBase tape units. |
| [Positioning the Tape or Floppy Disk](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/positioning_the_tape_or_floppy_disk.htm) | Provides explanation of the commands used to position, rewind and advance the backup medium (physical tape or sectored floppy disk) to specific data blocks or to an End-of-Data or End-Of-File mark. |
| [Reading Tape or Floppy Disk Labels](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/reading_tape_or_floppy_disk_labels.htm) | Provides explanation for using the **T-RDLBL** command to read a tape label, whether it is at the beginning of a tape, or at the beginning of a file (i.e., after an End-Of-File mark). |
| [Restoring Items from Tape or Floppy Disk](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/restoring_items_from_tape_or_floppy_disk.htm) | Provides explanation for using the **T-LOAD** command to restore file items that were previously copied to tape with either the **T-DUMP** or **S-DUMP** commands. |
| [Rewinding the Tape or Floppy Disk](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/rewinding_the_tape_or_floppy_disk.htm) | Provides explanation for using the **T-REW** command to rewind a tape to the load point (BOT). |
| [Selecting a Tape Unit](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/selecting_a_tape_unit.htm) | Provides instruction for using the **T-SELECT** command with various tape units. |
| [Specifying Tape Drive or Floppy Disk Drive Format](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/specifying_tape_drive_or_floppy_disk_drive_format.htm) | Provides explanation for using the **T-FORMAT** command to rewind the tape unit and to set the tape format. |
| [Transferring Data to and from Other Systems](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/transferring_data_to_and_from_other_systems.htm) | Examines specific issues that are involved when using tape media to transfer data between computer systems. |
| [Transferring Data via Virtual Tape Links](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/transferring_data_via_virtual_tape_links.htm) | Describes the procedure for using virtual tape links to transfer data. |
| [Verifying a Tape Unit](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/verifying_a_tape_unit.htm) | Provides instructions for using the **T-CHK** command to check the file currently located on a tape for parity errors. |
| [Writing an End-Of-File Mark](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/writing_an_end-of-file_mark.htm) | Provides instruction for using the **T-WEOF** command to write an End-Of-File mark on the tape at the current position. |

### Advancing to End of Data

The **T-EOD** command moves a tape forward to the end of the recorded data. At the EOD mark, you can append new data to the tape. End-Of-Data is indicated differently on tape and floppy disk drive. For 1/4-inch tape, 8mm tape, and DAT, End-Of-Data is indicated by a blank section of the tape. For 1/2-inch tape and floppy disk drive, a pair of End-Of-File marks is used; the floppy disk drive will be positioned after the first of these EOF marks.

The following example advances the attached tape to the end of recorded data:

|  |
| --- |
| >**T-EOD**  BLOCK SIZE:  16896  [92] END OF RECORDED DATA - 3 FILE(S) |

### Appending Data to Tape

At the end of the last file on tape, an End-Of-Data (EOD) is written. On the 1/4-inch tape, 8mm tape, and DAT, the EOD is indicated by the beginning of blank tape. To append data to a tape, position the tape to the End-Of-Data. The T-EOD command moves the tape to the EOD mark.

### Attaching a Cartridge Tape Unit

The **T-ONLINE** command resets the cartridge tape drive, checks that the tape cartridge has been inserted, and rewinds the tape.

Since **T-ONLINE** can attach the tape drive, the **T-ATT** command need not be used to attach the tape separately. However, standard practice is to use **T-ATT** first. A program can test that **T-ATT** fails and take alternative action. If it fails to attach using **T-ONLINE**, the user is prompted to continue or quit.

1. Before using **T-ONLINE**, insert a tape cartridge into the tape drive and wait a few seconds for the drive to become ready.
2. Select the tape unit.
3. **T-ONLINE** checks for attachment, resets the tape drive, checks that a tape has been inserted, and rewinds the tape.

### Attaching a Tape Unit to a Process

A tape device must be attached to a user process before it can be used. Use **T-ATT** to change the block size. The **T-SELECT** command attaches a device to a process, as well as specifying the logical tape unit. The **T-ONLINE** command makes the currently selected tape drive available to mvBase and attaches it to the process. If the tape drive is already attached to another process, the **T-ONLINE** command will fail.

The tape drive remains attached to the process until the user logs off, detaches the unit using the **T-DET** command, or attaches to a different tape drive. Once the tape drive is attached, the**T-DUMP** and **T-LOAD** commands can be used to write to tape and to read files from tape. Both are INFO/ACCESS commands.

Several commands serve the purpose of attaching the selected tape unit to your process., in addition to one or more other functions. The table below compares the application of these commands:

|  |  |  |
| --- | --- | --- |
| **Command** | **Description** | **Application** |
| **T-ATT** | Attaches the currently selected tape unit to your process. | Use **T-ATT** to attach the tape drive if you want to change the block size. |
| **T-SELECT** | Changes the tape unit(s) from the default unit or the one(s) last selected, and attaches it to the current process. | Use **T-SELECT** when you want to select another LTU than either the default unit or the last one selected, as well as attach the unit to the process. (See [Selecting a Tape Drive for An Account](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/selecting_a_tape_unit.htm#Selecting_a_Tape_Drive_for_an_Account) for more information. |
| **T-ONLINE** | Resets the physical tape drive, checks that the tape has been inserted (or in the case of a VTF, that the destination directory/file already exists), attaches the tape drive, and rewinds the tape. | Use **T-ONLINE** when you want to not only attach the unit to the process, but reset and rewind a physical tape, as well as checking to make sure the attaching procedure has been completed successfully. |

### Attaching Virtual Tape Links via TCL

Subsequent to defining a virtual tape link, perform each step of this procedure on both ends of the link in order to attach the associated logical tape unit (LTU) devices together. In the case that remote systems comprise both ends of the link, one user at each system may be required.

1. At each end of the link, select the associated LTU by executing this command line:

|  |
| --- |
| T-SELECT *LTU#* |

|  |  |
| --- | --- |
| **T-SELECT** | Applies to the writing tape unit on one side of the VTL and to the reading tape unit on the other. |
| ***LTU#*** | Number of the appropriate virtual tape device configured for use with the VTL. This was established when you configured the VTL previously. |

1. At each end of the link, open and verify the link by executing this command line:

|  |
| --- |
| T-ONLINE LTU |

|  |  |
| --- | --- |
| **T-ONLINE** | Applies to the writing tape unit on one side of the VTL and to the reading tape unit on the other. |
| ***LTU#*** | Number of the appropriate virtual tape device configured for use with the VTL. This was established during the *Defining a VTL...* procedure. |

**T-ONLINE** opens the link and verifies that the user at the other end of the VTL has also done so. Either end of the link can issue this command first.

If the other end of the link is not yet open, this prompt displays:

|  |
| --- |
| DEVICE NOT READY  CONTINUE/QUIT (C/Q)? |

As one end of the VTL likely precedes the other in this step, a user at one end is likely to receive this prompt. If and when this prompt appears, type **C** for **CONTINUE**.

The command executes, concluding the attachment process. Once you have attached the VTL successfully at both ends of the link, the VTL is ready for data transfer operations.

### Chaining Drives

A series of 4 mm DAT or floppy tape drives can be chained together and selected for the same process. The chain may include only devices of the same type (i.e., all 4mm DAT drives) which allows continuous multi-reel tape operations using all the selected drives in sequence.

Once the first tape drive in the series has reached the end of tape, the process begins writing to the second selected tape drive while the first tape rewinds. The operator is instructed to mount a new tape only when the end of tape has been reached on the last tape drive in the series.

### Changing Assignments

Each tape drive on the system is assigned a logical tape unit number. The administrator can change these assignments using the **SET-TAPE** and **RESET-TAPE** commands. The default tape drive is logical tape unit 0 (LTU 0), and is automatically selected for an account.

### Changing Tape Block Size

Tape block size can be changed in two ways by using commands that change the block size to match the block size used when the data is dumped to tape. A block size can be:

1. Specified with the **T-ATT** command. Specified block sizes are tested against a range of values permissible for the system configuration. If the block size specified with the **T-ATT**command falls outside the valid range for that configuration, the existing block size will be adjusted.
2. Read from a tape label by the tape-reading commands **T-RDLBL** and **T-READ**. In this case it is adjusted because the (1/4-inch) tape drive is unable to read the tape.

The read operation terminates and the following message displays:

|  |
| --- |
| [6003] BLOCK SIZE OUT OF RANGE  INSUFFICIENT TAPE BUFFER SPACE (C/Q)? |

|  |  |
| --- | --- |
| **NOTE** | The sum of the block sizes, for all processes using tape or floppy disk drives, must not exceed 80K. If an attempt is made to exceed this limit, an error message displays: |

* + Type **Q** to abort the tape attachment process.
  + Type **C** to reattempt tape attachment. The reattempt to attach tape may succeed if another tape unit is detached, making more tape buffer space available.

### Copying Data Between Two Tape Drives

If you have multiple tape drives, you can use the **T-COPY** command to copy all or part of a tape to another tape. The copy operation takes place between a source tape drive and a destination tape drive that is to receive the copy of the tape. The source tape should be on a tape unit that is selected for the user’s process but not attached to any process (including the user’s). This is the tape drive that is specified as a parameter to the **T-COPY** command. The destination tape should be on a tape unit that is both attached to and selected for the user’s process.

**Format**

|  |
| --- |
| T-COPY *tapeunit* [(*number*)] |

**Parameter(s)**

|  |  |
| --- | --- |
| ***tapeunit*** | Number of the tape unit on which the source tape is mounted. |
| ***number*** | Number of files you want to copy. If you do not specify number, all files on the tape are copied. |

Here are a few guidelines for copying tapes:

* Tapes not configured for use with mvBase cannot be copied using **T-COPY**.
* SYS1 privileges are required.
* Multireel tapes should not be copied. The last block of a tape could be lost, or it might be duplicated at the end of one tape and the beginning of the next.
* If the source tape is unlabeled, the block size of the destination tape must be equal to or greater than the block size of the source tape.

### Detaching a Tape or Floppy Disk Unit

The **T-DET** command detaches the currently attached tape unit from your process. Detaching the tape unit releases it from the exclusive control of your process and makes it available to other users. The tape unit remains selected, however.

If multiple tape units are attached to your process, **T-DET** detaches all of them.

If a selected tape unit is currently attached to another process, using **T-DET** with the **U** option detaches the tape unit from the other process and makes it available again. If the selected tape unit is one of a chained set, the entire set is detached.

|  |  |
| --- | --- |
| **NOTE** | Do not detach a tape drive that is currently being used, and never hand-code a **T-DET U** into a program. |

### Dumping a File to Tape or Floppy Disk

The **T-DUMP** command transfers a copy of all or selected file items in random order to tape, and also creates a tape label and writes an End-Of-File (EOF) mark on the tape after the transfer is complete.

This topic demonstrates how to make a tape containing the data from a single file. The **ORDERS** file is dumped to tape using the **T-DUMP** command. This operation does not affect the contents of the file; it can be viewed as making a copy of the file and placing it on tape.

**Format**

|  |
| --- |
| T-DUMP [DICT] *filename* [*item-list*] [*selection*][HEADING "*text*"] [*modifiers*] [(*options*)] |

**Description**

The syntax follows standard INFO/ACCESS conventions, except that no output specifications are accepted. The filename identifies the source of the items that **T-DUMP** is to copy. If you don’t specify an item list, or if a select-list is not active, then **T-DUMP** copies all items in the file. **T-DUMP** copies the entire item; you cannot supply any output specification.

The **S-DUMP** command is a version of **T-DUMP** that accepts a sort expression (see INFO/ACCESS **SORT** command). The following modifiers operate in a different way when used with **T-DUMP** and **S-DUMP** than the standard way when used with other INFO/ACCESS commands:

|  |  |
| --- | --- |
| **HEADER "*text*"** | Specifies heading text that is used in the tape label. |
| **HEADING "*text*"** | Same as **HEADER**. |
| **HDR-SUPP** | Suppresses the creation of a tape label. |
| **ID-SUPP** | Suppresses listing of item-IDs during the copy-to-tape operation. |

In the following example, **T-DUMP** makes a tape containing the entire **ORDERS** file:

|  |
| --- |
| >**T-DUMP ORDERS**    DEVICE ATTACHED BLOCK SIZE:  16896       1 10107       2 10119       3 10110       4 10122       5 10113       6 10104       7 10116       8 10101       9 10134      10 10105      11 10108      12 10120      13 10111      14 10114      15 10102  15 ITEMS DUMPED. |

15 items in the **ORDERS** file were dumped to tape. If you try this, you will find that it takes a while to complete. That is because when you write to the beginning of the tape, the tape drive performs a separate pass to erase the tape called the erase pass or retension cycle. The data is written to tape only after the retension cycle is finished.

|  |  |
| --- | --- |
| **NOTE** | The retension cycle is performed on 1/4-inch tapes only. |

Once the TCL prompt returns, the operation has been completed. The tape is now positioned just after a mark known as the End-Of-File (EOF) mark. At this point, use the **T-DET** command to detach the tape drive. Type:

|  |
| --- |
| T-DET |

No message displays if the tape drive is successfully detached. You can now remove the tape from the tape drive, and make the drive once again available to other users.

|  |  |
| --- | --- |
| **NOTE** | When the user logs off, the tape is automatically detached. |

If the tape’s write protection is on or if no write ring is present, the following message displays:

|  |
| --- |
| WRITE PROTECTED  CONTINUE/QUIT (C/Q)? |

Remove the write protection, then type **C** to continue, or type **Q** to quit.

If a **T-DUMP** is executed, but the file is empty (i.e. no items are dumped), an EOF mark is written to tape. This allows a Proc that executes multiple **T-DUMP**s followed by as many **T-LOAD**s to function properly.

### Examining the Contents of a Tape or Floppy Disk

The **T-READ** command reads a tape record and displays its contents on the screen or sends it to the printer. It does not restore the data or format it. It is somewhat the equivalent of the**DUMP** command, which dumps a specified frame on the screen. **T-READ** dumps one or more blocks from tape, and you can use it to examine the tape to locate a specific file.

**Format**

|  |
| --- |
| T-READ [*n-m*] [(*options*)] |

**Parameter(s)**

|  |  |  |
| --- | --- | --- |
| ***n*** | Number of tape records to read and display relative to the current record. If you do not specify ***n***, all records up to the next EOF are displayed. ***n-m*** specifies a range of records. | |
| ***options*** | May be one or more of the following: | |
| **A** | Converts from EBCDIC to ASCII, then displays alphanumeric segments. |
| **P** | Sends the display to the printer. |
| **S** | Prevents the tape cartridge from rewinding to a tape label. This option can be used only on a 1/4-inch tape drive. |
| **X** | Displays tape contents in hexadecimal format as well as in character format. |

On 1/4-inch tape drives, **T-READ** expects the tape to be positioned at a tape label. If this is not the case, **T-READ** rewinds the tape to BOT and tries again.

|  |
| --- |
| >**T-READ (1**  BLOCK SIZE:  512  L 0200 16:34:10  06 APR 1993 DICT MD              ~01  RECORD = 1     1 BLOCK-CONVERT^Q^BLOCK-CONVERT^^^^^^^L^10^[T-LOAD^P   51 T^35^73^[RTD^P^20A0^[DATA^CZ^[DTR^P^10A0^[LISTPEQS  101 ^P^AB^[TAPETEST^PQ^SS^IT^IF A # DALE'S ORDERS GO  151 100^HTIME^P^D0^X^100 ONOT THE RIGHT TAPE^P^[IT^PQ^  201 IT^D0^HTIME^P^[X-ON^P^510E^[T3^PQ^T (-5),"TWINKLE"  251 ,(-6)^[B^PQ^HSORT ORDERS BY-EXP^S2^A^HBREAK-ON^B^D  301 0^A^HTOTAL AMOUNT^P^[HEADING^CL^[BLOCK-PRINT^P^500  351 A^41^[SS^PQ^SS^HLIST CUSTOMERS^A2^D0^P^[\*A10^A^10^  401 ^^^^^^L^10^[LOCALSUB^PQ^HSORT CUSTOMERS BY^A2^HLNA  451 ME FNAME^ODOUBLE SPACE?+^IP^S3^IF A = Y [] 20^P^X^  501 20 H DBL-SPC  > |

In the following example, the **T-FWD** command is used to advance four physical tape records. **T-READ**, entered with **S** option, displays the block at that position.

|  |
| --- |
| >**T-FWD (4)**  BLOCK SIZE:  512  >**T-READ (1S)**  BLOCK SIZE:  512  RECORD = 1     1  REPORT+^IP?^IF A = YES GO 500^IF A # YES X REPORT   51  NOT GENERATED^500 HSORT CUSTOMERS BY LNAME^H LNAM  101 E\_[ FNAME^P^[TESTIP2^PQ^ODO IT+^IP?^IF A = N GO 99  151 9^HSORT CUSTOMERS^P^999 X I WON'T THEN^[CUST-FIND^  201 P^E6^^^BP^[DEBUG-OFF^P^1243^[FXSUB^P^E6^^^BASICLIB  251 ^[D^P^242^[SIZE^A^9999^^^^^^MR0^R^10^[C-O^PQ^H.R M  301 D CUST.ORDER.LIST^P^[LBP^Q^LMUI^BP^^^^^^L^10^[V/CO  351 NV^A^07^CONVERSIONS^^^^^^L^30^1^[LIST-LABEL^PA^35^  401 4D^7D^[BUILD-LOCK-XREF^P^E6^^^BASICLIB^[L/UPD^A^06  451 ^^^^^^^L^5^[ADDD^PA^40A0^[LISTPTR^P^AE^[SORT-ITEM^  501 PA^35^4E^508 |

This block is somewhere in the middle of a file. No label is displayed. Without the **S** option, the tape would have been rewound to the beginning and the output would be the same as in the previous example.

### Formatting Tape Devices

mvBase reverts to automatic (default) density selection for a given tape drive without special formatting. mvBase writes data to the medium at either the existing format currently on the medium or, for new tapes, the highest density (format) supported for that tape.

When using the **T-FORMAT** command, mvBase supports the following options. For floppy drives, virtual tape files, and virtual tape devices, mvBase supports these **T-FORMAT** options:

|  |  |
| --- | --- |
| **RAW-ON** | 512 byte blocks with no EOF (End-Of-File). |
| **RAW-OFF** | (default) 500 byte blocks with no EOF support. |

When using 1/4-inch tape devices, mvBase supports these **T-FORMAT** options:

|  |  |
| --- | --- |
| **(N)** | Suppresses the erase cycle when writing to a tape at BOT (default is not suppressed). |
| **(S)** | SHORT LABEL for backwards compatibility with old Mentor tapes (default is LONG LABEL for AP/PRO compatibility). |

### Forwarding the Tape or Floppy Disk

The **T-FWD** command advances a specified number of tape records or to the End-Of-File (EOF) mark.

**Format**

|  |
| --- |
| T-FWD [*record*] |

**Parameter(s)**

|  |  |
| --- | --- |
| ***record*** | Number of records you want to advance. The maximum is 32,767. |

If an EOF mark is encountered before passing the specified number of records, or if record is not specified, the tape is positioned after the first EOF mark.

The following example moves the attached tape forward one record:

|  |
| --- |
| >**T-FWD 1**  BLOCK SIZE:  16896 |

You can also specify the argument in parentheses.

### Including Data from Tape or Floppy Disk in Reports

The **TAPE** modifier can be used with any INFO/ACCESS modifier to retrieve data from tape and display it in reports. (The tape unit must be attached prior to using the **TAPE** modifier.) By adding the **TAPE** keyword to an INFO/ACCESS statement, the report uses the items from the file on tape, even if there is a data file on disk drive with the same name and containing the same items.

Type the following syntax to read the items from tape, using the **ORDERS** dictionary.

|  |
| --- |
| >**LIST ORDERS CUST.ID DATE TOTAL.AMT TAPE** |

A report displays on the screen:

|  |
| --- |
| PAGE  1                                15:02:22  DD MMM YYYY  ORDERS.... Amount.... Date of Order  10121          $68.94 09/15/94  END OF LIST |

Note that the file name **ORDERS** as specified in the statement identifies only the dictionary used to issue the report. It does not identify the file on tape.

### Listing Current Device Assignments

Whenever a user logs on to the system, tape unit 0 is automatically selected by default. If you have only one tape drive on your system, it will be set up as the default tape drive (LTU 0).

The current tape assignments are determined by examining the report produced by the **T-WHAT** and **T-STATUS** commands. If you have more than one tape drive on your system, **T-WHAT**indicates the one most recently selected.

**T-STATUS** lists all assigned logical tape units, the tape devices to which they are assigned, the processes (if any) to which they are attached, and the tape format specifications.

Any tape units that have not been assigned with the **SET-TAPE** command are not listed in the **T-STATUS** report.

### Moving a Tape or Floppy Disk Backward

The **T-BCK** command is used to move the tape or floppy disk backward for a specified number of records or to a previous End-Of-File mark. On floppy drives, this operation is possible in RAW-OFF mode.

**Format**

|  |
| --- |
| T-BCK [*record*] |

**Parameter(s)**

|  |  |
| --- | --- |
| ***record*** | Number of tape or floppy disk records you move back over. The maximum is 32,767. If a number is not specified, **T-BCK** backspaces to the previous End-Of-File mark or to the load point. |

If an End-Of-File is encountered before the specified number of records are backspaced over, or if record is not specified, the tape or floppy disk is positioned before the End-Of-File mark. A **T-FWD** must be issued to position the tape or floppy disk after the End-Of-File mark before reading the next record.

|  |  |
| --- | --- |
| **NOTE** | **T-BCK** is not supported on 1/4-inch tape drives. |

|  |
| --- |
| >**T-EOD**  BLOCK SIZE:  16896  [92] END OF RECORDED DATA - 1 FILE(S) |

Once the tape is positioned at the EOD, you can dump another file to tape.

The following example dumps the **CUSTOMERS** file:

|  |
| --- |
| >**T-DUMP CUSTOMERS**    BLOCK SIZE:  16896    1 AEDWA51BLA    2 SPIRS112A    3 AJOHN760JE    4 HJENK1222M    5 AMEAD251BL    6 JBROW129BO    7 BLEAR34TRE    8 JPEER89RIA    9 HJOHN455OT   10 JBOHA126TR   11 JBUCK26STO   12 HHIGG5425T   13 DEDGE338BR   14 AORLA55VEN   15 MASH912AE   16 RPIER123WE   17 BLAMP344TR   18 JMASO226RO  18 ITEMS DUMPED. |

### Moving to a Specified File

The **T-SPACE** Proc spaces a tape forward over a specified number of files. The **T-SPACE** Proc executes the **T-RDLBL** and **T-FWD** commands as many times as number specifies.

**Format**

|  |
| --- |
| T-SPACE *number* |

**Parameter(s)**

|  |  |
| --- | --- |
| ***number*** | Number of files to space over. If you do not type ***number*** in the command line, you are prompted to enter it. |

This example moves the tape forward one file:

|  |
| --- |
| >**T-SPACE 1**  BLOCK SIZE:  16896  BLOCK SIZE:  16896  BLOCK SIZE:  16896  > |

### Operating Physical Tape Devices Using T-ONLINE

Issue the **T-ONLINE** command at the TCL prompt prior to attempting mvBase tape unit operation. The **T-ONLINE** command resets the selected tape media, checks that a tape media has been inserted, and rewinds the tape.

If the tape unit has not been attached, **T-ONLINE** completes these actions:

* Attaches the selected tape unit to your process.
* Resets the tape drive.
* Determines that a tape has been inserted into the tape drive.
* Rewinds the tape.

|  |  |
| --- | --- |
| **NOTE** | All mvBase tape units, whether physical or virtual, require the same sequence of MultiValue tape commands once they are configured for use with mvBase (e.g., **T-ATT**, **T-ONLINE**, **T-REW**, etc.). |

### Positioning the Tape or Floppy Disk

This topic discusses commands used to position, rewind and advance the backup medium (physical tape or sectored floppy disk) to specific data blocks or to an EOD (End-Of-Data) or EOF (End-Of-File) mark.

The EOD mark is indicated differently on tape and floppy disk. For 1/4-inch tape, 4mm DAT and 8mm tape, EOD is indicated by a blank section of the tape. For floppy disk, a pair of EOF marks is used; the floppy disk will be positioned after the first of these EOF marks.

There is an important difference between tape drives. 1/4-inch tape drives cannot back up one record or file at a time, 8mm tape drives, DAT, and floppy drives can. When using a 1/4-inch tape, you must rewind the tape to the beginning and then position the tape by moving forward.

When a file is written to tape, an EOF mark is written after the end of the last tape record used by the file. To locate a particular file on tape, you position the tape just after the EOF preceding the specified file.

The **T-REW** command rewinds a tape to the load point (BOT).

The **T-FWD** command advances a specified number of tape records or to the End-Of-File mark. The **T-FWD** command advances a specified number of tape records or to the End-Of-File mark. If an End-Of-File mark is encountered before passing the specified number of records, or if record is not specified, the tape is positioned after the first End-Of-File mark.

**T-RDLBL** reads the tape and displays on the screen the reel number, block size, time, and date from when the tape was written, and a header text. Using the **T-RDLBL** command when a labelled tape is mounted sets the block size to the record length specified in the label. **T-RDLBL**, like **T-READ**, if not at a label, will rewind the tape.

The **T-SPACE** Proc spaces a tape forward over a specified number of files, and executes the **T-RDLBL** and **T-FWD** commands as many times as number specifies.

The **T-EOD** command moves a tape forward to the end of the recorded data. At the EOD mark, you can append new data to the tape.

The **T-WEOF** command writes an End-Of-File mark on the tape at the current position.

The **T-BCK** command is used to move the tape or floppy disk backward for a specified number of records or to a previous End-Of-File mark. On floppy drives, this operation is possible inRAW-OFF mode.

|  |  |
| --- | --- |
| **NOTE** | **T-BCK** is not supported on 1/4-inch tape drives. |

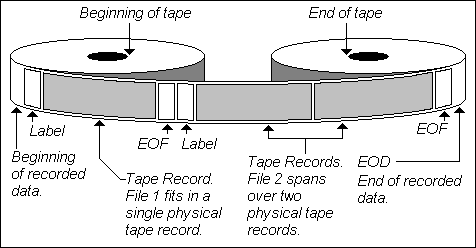
The figure below shows a sample layout of data on a cartridge tape. The contents of a file are stored in physical tape records. These records are of fixed length, specified as the block size when the tape is attached. If the contents of a file do not fill up the tape record, the record is padded to fill. If the contents of the file do not fit in a single tape record, then the file will span a second tape record.

See the figure below in relation the following example on how to position a tape head to the desired data. Keep in mind that 1/4-inch tape drives do not support back-up (in other words, they can not back up the tape one file or one record at a time). If the tape head has passed the desired file or record, the only way to position it at the desired place is by rewinding the tape and advancing forward. (On tape drives that support backing up, such as DAT, 8mm, and floppy, the tape can be backed up one file or record at a time.)

First, use **T-REW** to reposition the tape at the beginning and use the T-RDLBL command to examine the label of the first file on tape:

|  |
| --- |
| >**T-REW**  BLOCK SIZE:  16896    >**T-RDLBL**  BLOCK SIZE:  16896  L 4200 14:43:11  29 MAR 1993 ORDERS                    ~01    > |

For example, this label identifies the ORDERS file. After executing the **T-RDLBL** command, the tape is positioned after the label. To be able to read the label of the next file on tape, you must advance the tape to the next EOF mark.



There are two ways to advance the tape:

1. The **T-SPACE** command counts EOF marks to advance the tape past a specified number of files.
2. The **T-FWD** command counts physical tape records to move forward a specified number of blocks.

Because the first file consists of only a single block of data, and the tape is positioned before the first block, you can use **T-FWD** to advance to the next EOF mark.

|  |
| --- |
| >**T-FWD**  BLOCK SIZE:  16896  [94]  END OF FILE    >**T-RDLBL**  BLOCK SIZE:  16896  L 4200 15:03:37  29 MAR 1994 CUSTOMERS                   ~01    > |

**T-RDLBL** displays the label that identifies the **CUSTOMERS** file.

The **T-FWD** command moves ahead to the next tape record. If a file spans several tape records, you can advance the tape a record at a time or for a specified number of records using **T-FWD**. If a block size smaller than the default is specified, then it is more likely that a file will stored on tape in multiple tape records. If this is the case, you might find it easier to position the tape using the **T-SPACE** command, which is the same as a sequence of **T-FWD** commands.

**T-SPACE** is a Proc that executes **T-RDLBL** and **T-FWD** to move ahead by a specified number of files. In the following example, the tape is rewound, then the **T-SPACE** Proc is used to position the tape at the beginning of the second file.

|  |
| --- |
| >**T-REW**  BLOCK SIZE:  16896  >**T-SPACE 1**  BLOCK SIZE:  16896  BLOCK SIZE:  16896  L 4200 14:43:11  29 MAR 1994 ORDERS                     ~01  BLOCK SIZE:  16896    > |

The **T-SPACE** Proc displays the label of the file that it passes over. The tape is now positioned at the beginning of the **CUSTOMERS** file. Use **T-LOAD** to restore items from the tape file.

Before continuing, detach the tape drive from the process and remove the tape cartridge from the drive.

### Reading Tape or Floppy Disk Labels

The **T-RDLBL** command reads a tape label, whether it is at the beginning of a tape, or at the beginning of a file (i.e., after an End-Of-File mark). Using the **T-RDLBL** command when a labelled tape is mounted sets the block size to the record length specified in the label.

**Format**

|  |
| --- |
| T-RDLBL [*number*] |

**Parameter(s)**

|  |  |
| --- | --- |
| ***number*** | Hexadecimal number of the tape cartridge. |

**T-RDLBL** reads the tape and displays on the screen the reel number, block size, time, and date from when the tape was written, and a header text. **T-RDLBL**, like **T-READ**, if not at a label, will rewind the tape.

If you use **T-RDLBL** on a tape that is one of a set of tapes, the number of the tape is included with the label. At the end of the tape, you are prompted to load the next tape in sequence. If you supply a tape number, it overwrites the number read from tape. Thus, you could type **T-RDLBL 3** for any tape so that when the **NEXT-TAPE-REQUIRED** message appears, you must mount tape 4.

### Restoring Items from Tape or Floppy Disk

The **T-LOAD** command restores file items that were previously copied to tape with either the **T-DUMP** or **S-DUMP** commands. These file items can be copied only to an existing file.

**T-LOAD** is an INFO/ACCESS command with the same syntax as **T-DUMP**. Specify the name of the file to which the specified items will be restored. The file is the destination of the operation and the tape is the source of the items to be copied. If an item list is not specified, all items are copied, providing that they do not already exist on file.

To demonstrate **T-LOAD**, delete a single item from the file, then restore it from tape. The following command deletes one of the items from the **ORDERS** file on disk drive.

|  |
| --- |
| >**DELETE ORDERS 10121**  '10121' DELETED |

In the following example, item **'10121'** is restored from tape and placed in the **ORDERS** file.

|  |
| --- |
| >**T-LOAD ORDERS '10121'**  BLOCK SIZE:  16896      1 10121  1 ITEM(S) LOADED |

It is important to realize that ***filename*** specifies where the item is to be copied. For example:

|  |
| --- |
| T-LOAD [DICT] *filename* [*item-list*] [*selection*] [*modifiers*] [(*options*)] |

This does not identify the file on tape. The tape file is determined by the position of the tape. Thus, **T-LOAD** searches for the specified data item in the current file on tape. If, for instance, the CUSTOMERS file is specified, the item **'10121'** is copied from tape to the CUSTOMERS file.

In the previous topic, the example copied the ORDERS file to tape. In this topic, the example restores one of the items from tape. If you removed the tape at the end of the previous topic, you need to replace the tape cartridge in the tape drive.

Type the **T-ONLINE** command to attach the tape drive and rewind the tape. The tape is now positioned at the beginning of the tape, which is also the beginning of the **ORDERS** file.

The following example restores from tape all items from the tape file to the **ORDERS** file. This **I** option suppresses the listing of item-IDs:

|  |
| --- |
| >**T-LOAD ORDERS (I)**  24 ITEMS LOADED. |

The **T-LOAD** command will not overwrite an item if it already exists on file. Reissuing the same command produces the following result:

|  |
| --- |
| >**T-LOAD ORDERS '10121'**  BLOCK SIZE:  16896    '10121' exists on file.  0 ITEM(S) LOADED |

The item is not written from tape. If you want the item from tape to overwrite the item on file, use the parenthetical option **O** with **T-LOAD**.

When a restoration is finished, the tape is positioned at an EOF mark following the file. To read from the same file on tape, you must reposition the tape back to the beginning of the file. When using a cartridge tape, you must go back to the beginning of the tape and advance forward to the particular position of the file. Because there is only one file on this tape, you only need to rewind the tape to the beginning. Use the **T-REW** command to rewind the tape.

|  |
| --- |
| >**T-REW**  BLOCK SIZE:  16896 |

**T-REW** also reports the current block size. If you are near the system itself, you should be able to hear the tape being rewound.

### Rewinding the Tape or Floppy Disk

The **T-REW** command rewinds a tape to the load point (BOT).

**Format**

|  |
| --- |
| T-REW |

After entering **T-REW**, you are returned to TCL immediately. If the tape is already at the beginning, no action is performed.

The following example rewinds the attached tape:

|  |
| --- |
| >**T-REW**  BLOCK SIZE:  16896 |

### Selecting a Tape Unit

You need to select a tape drive only when you are not going to use the default tape drive. All tape commands use the currently selected tape drive; if none is selected, the default tape drive is used.

To select a tape device other than the default and attach it to your process, use the **T-SELECT** command to specify the logical tape unit.

**Selecting a Tape Drive for an Account**

Although tape unit 0 is automatically selected by default when a user logs onto the system, it is not, however, attached to the user’s process. The **T-SELECT** command selects one or more tape units and attaches them to your current process. The tape drive may not be attached to any other process in order for you to attach it to yours.

These tape units remain selected until the user either logs off or selects another tape unit. They remain attached until the user logs off or detaches them with the **T-DET** command.

|  |  |
| --- | --- |
| **NOTE** | You must have at least SYS1 privileges to use **T-SELECT**. |

The **T-SELECT** command can be used to chain two or more tape drives to a single process. A series of 1/4-inch, 4mm DAT, 8mm, or floppy tape drives can be chained together and selected for the same process. This allows multireel tape operations to be performed without operator intervention.

|  |  |
| --- | --- |
| ***CAUTION*** | Each of the tape units must be assigned to tape drives of the same type and use the same format. |

Tape operations using this set proceeds from tape unit 0 to tape unit 2. A second set of reels can then be mounted, and operations returns from tape unit 2 to tape unit 0. Tape operations can then proceed, going around the chain again in the same order.

**Selecting a Remote Floppy Drive**

When you use **T-SELECT** to select a remote floppy device, the client's or Workstation's PC floppy drive replaces the A: in the mvBase Server's tape device table. The client may now use this floppy drive, rather than using the floppy drive located on the Server. Tape commands on the remote floppy function normally. When the user detaches from the remote floppy, the path to a: is restored.

You can create multiple aliases for a single floppy tape device. Consequently, while one user is **T-ATT**ached to the floppy device, another user can **T-ATT**ach to the same device using a different alias. However, the second user receives the **DEVICE NOT READY** message if attempting to access the floppy tape device. This same message displays if the device is in use by another program running on the host operating system.

### Specifying Tape Drive or Floppy Disk Drive Format

The **T-FORMAT** command rewinds the tape and sets the tape format. Supported tape formats are listed below. Your choice of formats is limited by the capabilities of the tape drive and the tape cartridge currently in the drive. The following tape formats are available for 1/4-inch tape drives:

* QIC11
* QIC24
* QIC120
* QIC150
* QIC525
* QIC1000
* QIC2000

The following tape formats are available for 8mm tape drives:

* 8200
* 8200C
* 8500
* 8500C
* HD/LD (High Density/Low Density) provided for backward compatibility on 8500 drives

The following floppy disk formats are available for floppy disk drives:

* RAW-ON
* RAW-OFF

**To determine what tape format is currently set:**

1. Type **T-FORMAT** with the **?** option. Messages similar to the following display:

|  |
| --- |
| [6032] FLOPPY TAPE. FORMATTED DATA READ/WRITE  [6045] FLOPPY RAW MODE OFF  [6061] QUARTER INCH TAPE, QIC 150 FORMAT |

1. Select the tape and floppy disk formats from a menu. Each of the format values can be specified on the command line.
2. When the tape format is set, or if the tape unit is already set to the format you specify, the following message displays:

|  |
| --- |
| TAPE FORMAT SET |

If an invalid selection is entered at the prompt, the following message displays:

|  |
| --- |
| [ 6013 ] INVALID TAPE FORMAT SPECIFIED |

### Transferring Data to and from Other Systems

This topic examines specific issues that are involved when using tape media to transfer data between computer systems.

The most reliable method of transferring data between an mvBase system and a system operating under another manufacturer’s version of the MultiValue Operating System is using **T-DUMP**to create the tape and **T-LOAD** to restore it. As a rule, a tape block size of 512 bytes is recommended. This block size is the minimum size of memory buffers in MultiValue machines, and assures backward compatibility, although 4096 is sometimes used also. When loading a tape onto an mvBase system, use **T-READ** to read the label and re-attach the tape using the correct block size. It is also a good idea to suppress the tape label when making the tape, as tape labels vary between different versions and releases.

### Transferring Data via Virtual Tape Links

Transferring tape-blocked data with a virtual tape link (between two mvBase processes) requires compatible read/write commands issued at each logical tape unit (LTU) associated with the virtual tape link (VTL). Such command pairs include:

* **T-DUMP** and **T-LOAD**.
* **SAVE** and **RESTORE**.
* **TLOG-DEQUEUE** and **TLOG-RESTORE**.
* The mvBASIC **WRITET** and **READT** statements.
* The **T-READ** command can be used with any tape write operation to view the data.
* Transaction logging and transaction restore.

With each of the above command or function pairs, the VTL assigns read functions to one device and write functions to the other.

The use of VTLs with transaction logging (on the writing device) and transaction restore (on the reading device) supports the operation of Fast Fault Recovery (FFR). FFR provides for hot backup functions on the mvBase Server with an up-to-date image of the primary Server’s database.

|  |  |
| --- | --- |
| **NOTE** | The operation of update logging, transaction logging, and transaction restore (the system utilities used to implement an FFR strategy) operate in similar fashion with VTLs as they do with other tape devices. FFR with other devices is described in other documentation. |

**Perform this procedure to transfer data via a virtual tape link (procedure given here serves as an example):**

1. Execute the **T-DUMP** command for a file on the write LTU. This command line contains required syntax:

**Format**

|  |
| --- |
| T-DUMP [DICT] *filename* [*item-list*] [*selection*]  [HEADING "*text*"] [*modifiers*] [(*options*)] |

**Parameter(s)**

|  |  |
| --- | --- |
| **DICT** | Specifies the file dictionary. When copying dictionary items, the **T-DUMP** command does not copy any File Definitions to tape. |
| ***filename*** | The name of the file to be written from this device to the read LTU device. |
| ***item-list*** | The list of individual item-IDs. Enclose each item-ID in single quotes. |
| ***selection*** | Specifies one or more conditions that an item must meet in order to be copied. See other documentation of user account commands (the **LIST** command specifically) for a complete description of selection expression syntax. |
| **"*text*"** | Added to the standard tape label via the **HEADING** modifier. See other documentation for additional information about MultiValue connectives, modifiers and options. |
| ***modifiers*** | Include one or more parameters that specify the report format. These parameters affect headers, footers, spacing, totaling column figures, control breaks and more. See other documentation for additional information about MultiValue connectives, modifiers and options. |
| ***options*** | Include one or more single-character codes that specify the report format and direct or modify output. They must be enclosed in parentheses, can be entered in any order, and need not be separated by spaces or any delimiters such as commas. See other documentation for additional information about MultiValue connectives, modifiers and options. |

1. Execute the **T-LOAD** command for the same file on the read LTU. This command line contains required syntax:

**Format**

|  |
| --- |
| T-LOAD [DICT] *pipename* [*item-list*] [*selections*] [*modifiers*] [(*options*)] |

**Parameter(s)**

|  |  |
| --- | --- |
| **DICT** | Specifies the file dictionary. When copying dictionary items, the **T-DUMP** command does not copy any File Definitions to tape. |
| ***pipename*** | Specific VTL being used. |
| ***item-list*** | List of individual item-IDs. Enclose each item-ID in single quotes. |
| ***selection*** | Specifies one or more conditions that an item must meet in order to be copied. See other documentation of user account commands (the **LIST** command specifically) for a complete description of selection expression syntax. |
| ***modifiers*** | Include one or more keywords that specify the report format. These parameters affect headers, footers, spacing, totaling column figures, control breaks, and more. See other documentation for additional information about MultiValue connectives, modifiers and options. |
| ***options*** | Include one or more single-character codes that specify the report format and direct or modify output. They must be enclosed in parentheses, can be entered in any order, and need not be separated by spaces or any delimiters such as commas. See other documentation for additional information about MultiValue connectives, modifiers and options. |

Operation proceeds with dumping and loading of the selected file item(s) until the **T-DUMP** command has completed the process and written an EOF (end of file) mark.

### Verifying a Tape Unit

The **T-CHK** command checks the file currently located on a tape for parity errors.

**Format**

|  |
| --- |
| T-CHK [(A)] |

**Parameter(s)**

|  |  |
| --- | --- |
| **A** | Checks the entire tape for parity errors. |

|  |  |
| --- | --- |
| **NOTE** | The A option is not supported with 1/4-inch tape drives. |

**T-CHK** without the **A** option checks only the file at the current position of the tape for parity errors. With the **A** option, the entire tape is checked until an End-Of-Data mark is encountered.

After the tape is checked, the following message displays:

|  |
| --- |
| [91] END TAPE CHECK - *n* FILE(S) |

|  |  |
| --- | --- |
| ***n*** | Number of files checked. |

### Writing an End-Of-File Mark

The **T-WEOF** command writes an End-Of-File mark on the tape at the current position.

**Format**

|  |
| --- |
| T-WEOF |

If the tape’s write protection is on, the following message displays:

|  |
| --- |
| WRITE PROTECTED  CONTINUE/QUIT (C/Q)? |

1. Remove the write protection.
2. Type **C** to continue, or type **Q** to quit.

On a 1/4-inch tape, an erase pass is performed when you attempt to write the first data record while positioned at the Beginning-Of-Tape (BOT). The erase pass can be avoided by writing an EOF mark at the beginning of the tape. (The first time it is written the erase pass will occur.) On subsequent uses of the tape, if you advance the tape past the EOF mark using the **T-FWD** command, writing the first record can be done without causing an erase pass. This procedure can save several minutes of time. However, the machine may have trouble identifying EOD if data between the recent dump and the erased section is not erased.

|  |  |
| --- | --- |
| ***CAUTION*** | Attempting to dump data if the cartridge is not positioned correctly will cause the tape to rewind and write over existing data. The erase pass can also be avoided on 1/4-inch tape using the **T-FORMAT** command with the **N** option. |

## Troubleshooting Tape Unit Errors

This section describes errors of the following types:

* Format errors
* Parity errors
* Positioning errors
* Reading errors

**Understanding Format Errors**

A tape format problem will occur if:

* You have saved files on a release prior to mvBase and are now trying to restore those files on a newer release.
* You are trying to restore a tape on a tape device that is set for a different format. For example, the tape is QIC11 and the tape device set to read QIC 24. The tape device must be set for the same format as the tape.

In the above cases, the following message displays:

|  |
| --- |
| Incorrect tape format!  (F)orward space to next file  (R)ewind tape and try again  (M)ount new tape or change device  (Q)uit  Enter Selection: |

Type **F** to continue the restore.

**Understanding Parity Errors**

Many tape problems are detected as parity errors, which can occur for a number of reasons. Perhaps the most common cause of parity errors is using the wrong block size when copying to and from tape. Dirty tape heads can also cause parity errors. The tape itself might be bad—for instance, dirty heads may have corrupted the data at the time they were written to tape.

The **T-CHK** command checks the file currently located on a tape for parity errors.

**Understanding Positioning Errors**

Another problem is that the following EOD message appears unexpectedly:

|  |
| --- |
| [6000] END OF RECORDED DATA |

If you know that the tape is not positioned at the end, perhaps the wrong format has been specified. 1/4-inch tapes made using QIC 24 standard are not interchangeable with the QIC 11 standard. Use the **T-STATUS** command to check the current tape format setting, and use **T-FORMAT** to specify the correct tape format.

**Understanding Reading Errors**

A common problem is not using the proper command to read a tape. Make sure you know what command was used to make the tape, then use the appropriate command to restore it. Obviously, physically labelling tapes is a key part of ensuring that data from tape can be restored.

## Tape Unit Command Summary

This section contains the following major topics:

|  |  |
| --- | --- |
| [Understanding Tape Command Types](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/understanding_tape_command_types.htm) | Explains the three types of tape commands: prerequisite, utility and production commands. |
| [Summary of Tape Device Commands](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/summary_of_tape_device_commands.htm) | Summarizes alphabetically the commands related to tape device tasks or functions |

**See Also**

### Understanding Tape Command Types

Tape commands are divided into three groups:

|  |  |
| --- | --- |
| Prerequisite | Provides for the orderly sharing of tape devices. |
| Utility | Sets up the tape drive, or position the tape for various operations. |
| Production | Allows you to save and restore the system, format and retrieve data, and communicate between machines. |

**Using Prerequisite Tape Commands**

The **T-ATT** and **T-DET** commands are prerequisites for the orderly sharing of tape devices. The **T-ATT** command attaches the tape drive to the user’s process and the **T-DET** relinquishes control of the tape drive when processing is complete. The system supports multiple tape devices. While only one line can be attached to a device at one time, each line can be attached to multiple devices simultaneously.

|  |  |
| --- | --- |
| **NOTE** | Multiple devices can be attached to a line from TCL at the same time. Care must be taken to ensure proper management of this feature. Always check to be sure that the correct device is being accessed for any tape operation, and that the device is attached when it is no longer needed. |

**Using Utility Tape Commands**

The utility commands **T-ONLINE** and **T-SELECT** allow a process to gain exclusive control of a tape drive. The **T-FORMAT** command establishes the format used for tape drives, but does not do low-level formatting of diskettes. The status of tape drives can be displayed with **T-STATUS**.

The utility commands **T-FWD**, **T-EOD**, **T-REW**, and the **T-SPACE** Proc are used to position the tape. **T-WEOF** is used to write an EOF mark on tape. **T-CHK** is used to check tapes for parity errors. Two utility commands, **T-READ** and **T-RDLBL**, are available to inspect tapes and may be helpful if any difficulties encountered when using a tape as a storage or transport medium.

**Using Production Tape Commands**

The production commands fall into four categories:

1. Performing an account-save or a filesave and restoration.
2. Reading and writing files using INFO/ACCESS commands.
3. Reading and writing Spooler print files.
4. Reading and writing tape records using mvBASIC.

**Performing an Account-save or a Filesave and Restore**

The commands used to save and restore the system are based on the result of the **SAVE** command. The **ACCOUNT-SAVE** Proc and the **FILE-SAVE** Proc invoke the **SAVE** command with a specific group of **SAVE** options.

Data can be retrieved from a SAVE tape by any of the following methods:

* Coldstart with the **FILE-RESTORE** option.
* **:FILELOAD** command.
* **ACCOUNT-RESTORE** command.
* **ADD-ACCOUNTS** Proc.
* **SEL-RESTORE** command.

The commands used for backing up and restoring the system are covered in other chapters of the *mvBase Operation and Administration Guide*.

**Reading and Writing Files Using INFO/ACCESS Commands**

The **T-DUMP** and **T-LOAD** commands are INFO/ACCESS commands that are used to write data to and read data from tape. **T-DUMP** saves data from one file at a time, and is the recommended method of creating tapes for data transfer. **T-DUMP** allows you to use selection expressions to identify the items that are dumped to tape. It also accepts item lists and processes an active select-list. **T-LOAD** retrieves data written by **T-DUMP** and loads it into a specified file, and also accepts selection expressions to identify a set of items to be loaded.

|  |  |
| --- | --- |
| **NOTE** | The **T-DUMP** and **SAVE** commands format the data on the tape in a different manner; thus the data is not interchangeable between those processors. |

**Reading and Writing Spooler Print Files**

Print files can be spooled to tape by assigning the tape drive as the destination for subsequent print jobs (see the **SP-ASSIGN** and **SP-EDIT** commands). Print files can be read from tape and output to the printer using the **SP-TAPEOUT** command, or they can be made into hold files with the **HS** options of **SP-ASSIGN**. Use print files to make tapes that are readable by non-mvBase machines, or use **SP-TAPEOUT** to read files on tape that use carriage returns or line feeds as record delimiters. See the topic on [The Spooler](http://www3.rocketsoftware.com/rocketd3/support/documentation/mvb/32/refman/operations/the_spooler_and_processes.htm) for more information on spooling files to tape. Also see the topic at the end of this section on transferring data to non-mvBase systems.

**Reading and Writing Print Records Using mvBASIC**

**READT** and **WRITET** are mvBASIC statements used to read to and write from tapes. These statements assume full control of all blocking and deblocking of tape data records.

Each time the **WRITET** statement is issued, a new tape block is written. The **WRITET** statement specifies a string to be placed in the next tape block. If the string does not fill up the tape block, the unused portion is padded with blanks. There are two conditions which produce messages:

1. If the string is null.
2. If the length of the string exceeds the size of the tape block.

In the latter case, the string will be truncated to fit in the tape block.

A data record written with the **WRITET** statement cannot span two blocks. It is efficient therefore to write fixed-length data records and to set the block size equal to the size of the data record or to a multiple of it.

**Using INFO/ACCESS Tape Device Commands**

Three INFO/ACCESS commands are used with tapes:

* **T-DUMP**
* **S-DUMP**
* **T-LOAD**

**T-DUMP** and **S-DUMP** create a tape containing all or selected items from a file or file dictionary.

The **T-DUMP** command transfers a copy of all or selected file items in random order to tape, and also creates a tape label and writes an End-Of-File (EOF) mark on the tape after the transfer is complete. **T-DUMP** copies the entire item; you cannot supply any output specification.

The **S-DUMP** command is a version of **T-DUMP** that accepts a sort expression (see INFO/ACCESS **SORT** command).

The **T-LOAD** command reads all or selected items from a tape and loads them into a file or file dictionary. The **T-LOAD** command restores file items that were previously copied to tape with either the **T-DUMP** or **S-DUMP** commands. These file items can be copied only to an existing file.

### Summary of Tape Device Commands

This topic summarizes alphabetically the commands related to tape device tasks or functions.

**Summary by Command Function**

This table lists (by function) the tasks which can be performed for or with tape device commands. Each of these commands is explained in greater detail in the following cyclopedic listing.

|  |  |
| --- | --- |
| **If you want to...** | **use tape command(s)...** |
| append data to tape | **T-EOD** |
| attach a cartridge tape unit | **T-ONLINE** |
| attach a tape drive or floppy disk drive | **T-ATT, T-SELECT, T-ONLINE** |
| configure tape devices and virtual tape files | **SET-TAPE, RESET-TAPE** |
| copy between two tape drives | **T-COPY** |
| detach a tape or floppy disk unit | **T-DET** |
| examine the contents of a tape or floppy disk | **T-READ** |
| list current tape or floppy disk device assignments | **T-WHAT, T-STATUS** |
| perform an account-save or a filesave and restore | **:FILELOAD, ACCOUNT-RESTORE, ADD-ACCOUNTS (Proc)** |
| position the tape or floppy disk | **T-REW, T-FWD, T-RDLBL, T-SPACE (Proc), T-EOD, T-BCK, T-WEOF** |
| restore items from tape | **T-LOAD, T-REW** |
| read and write files using INFO/ACCESS commands | **T-DUMP, S-DUMP, T-LOAD, T-REW** |
| read and write spooler printer files | **SP-ASSIGN, SP-EDIT, SP-TAPEOUT, READT, WRITET** |
| restore selected items in a file | **SEL-RESTORE** |
| save the data area to tape | **SAVE** |
| select a tape drive for an account | **T-SELECT** |
| select a tape drive or floppy drive | **T-SELECT** |
| specify tape drive or floppy disk format | **T-FORMAT** |
| transfer data to and from other systems | **T-DUMP, T-LOAD, T-READ** |
| troubleshoot | **T-CHK** |
| write a label on a tape | **T-WTLBL** |
| write a record onto a magnetic tape or floppy disk | **WRITET** |

**Summary by Alphabetical Listing**

This table lists alphabetically the tape unit commands, Procs and statement, and their associated functions. This list is more comprehensive than the preceding list.

|  |  |
| --- | --- |
| **Command** | **Description** |
| **:FILELOAD** | (SYSPROG command) Fully restores the data area from tape. |
| **ACCOUNT-RESTORE** | (SYSPROG command) Restores one or more accounts from a **FILE-SAVE**, or **ACCOUNT-SAVE** tape or floppy disk. |
| **ADD-ACCOUNTS** | (SYSPROG command) Restores accounts on tape that are not on disk. |
| **READT** | (mvBASIC statement) Reads next record from magnetic tape or floppy disk. |
| **READTX** | (mvBASIC statement) Reads the next record (block) on the magnetic tape or floppy disk unit in hexadecimal format, assigning its value to the specified variable. |
| **RESET-TAPE** | (SYSPROG command) Cancels a logical tape unit assignment. |
| **SAVE** | (SYSPROG command) Saves the data area to tape. |
| **S-DUMP** | (User account command) Copies sorted items to magnetic tape. |
| **SEL-RESTORE** | (SYSPROG command) Restores selected items in a file. |
| **SET-TAPE** | (SYSPROG command) Assigns a logical tape unit to a tape device or drive. |
| **SP-ASSIGN** | (User account command) Defines print job output assignments. |
| **SP-EDIT** | (User account command) Edits Spooler hold files. |
| **SP-TAPEOUT** | (User account command) Transfers a print file from tape to the Spooler. |
| **T-ATT** | (User account command) Attaches a tape unit to the user’s process. |
| **T-BCK** | (User account command) Moves a floppy, 1/2-inch, 8mm, or DAT backwards. |
| **T-CHK** | (User account command) Checks tape for parity errors. |
| **T-COPY** | User account command) Copies a tape to another tape. |
| **T-DET** | (User account command) Detaches a tape unit from the user’s process. |
| **T-DUMP** | (User account command) Copies items to tape. |
| **T-EOD** | (User account command) Advances a tape to the end of the data. |
| **T-FORMAT** | (User account command) Sets the tape drive format. |
| **T-FWD** | (User account command) Advances tape forward. |
| **T-LOAD** | (User account command) Restores items from tape to disk. |
| **T-ONLINE** | (User account command) Resets the tape drive. |
| **T-RDLBL** | (User account command) Reads and stores tape labels. |
| **T-READ** | (User account command) Displays the contents of a tape. |
| **T-REW** | (User account command) Rewinds a tape. |
| **T-SELECT** | (User account command) Selects and attaches tape unit to a process. |
| **T-SPACE** | (User account command) Spaces a tape forward. |
| **T-STATUS** | (User account command) Lists the current tape device assignments. |
| **T-WEOF** | (User account command) Writes an End-Of-File mark on a tape. |
| **T-WHAT** | (User account command) Displays the type drive currently selected. |
| **T-WTLBL** | (User account command) Writes a label on a tape. |
| **WRITET** | (mvBASIC statement) Write a record onto a magnetic tape or floppy disk. |

In addition to these commands, Procs and statements, the TAPE modifier reads items from the current file on tape.