

## Version 6.78

# BACKUP+/iX Communicator

BACKUP+/iX version 6.78 includes a number of desirable fixes and enhancements to the product. The main enhancements are implementation of the Advanced Encryption Standard (AES) with Cipher-Block Chaining (CBC) Module as an encryption option. Additional enhancements are to the Backup/iX commands COPY, DUMP and to a lesser degree, the LISTDIR, RESTORE and STORE commands. The most important changes in this version of Backup/iX are the multiple drive support for the Backup/iX commands COPY and DUMP and the single drive COPY operation. This involved a change in the syntax of the COPY command, and addition of new options for COPY and DUMP commands. COPY and DUMP can now create/copy tapes that can be used with the Wizard module of the Backup/iX product, and be contained in a robotic tape library with the OLM product.

The syntax of the LISTDIR command has been changed to support file selection.

OLDDATE is the new default behavior of the RESTORE command. A new option "NEWDATE" will need to be used with the RESTORE in order to restore files with the current date (old behavior).

RESTORE command now has new restore options "ON VOLUME DO *mpe\_command*", "ON ERROR DO *mpe\_command*".

STORE and RESTORE commands can use the GETDATE option local to a file set.

Indirect files specified in the STORE and RESTORE commands can contain comments.

This document also describes the fixes, enhancements, and improved functionality implemented in BACKUP+/iX versions 6.67 through 6.78. For changes in prior releases, refer to the appropriate Communicators.

Significant changes in BACKUP+/iX version 6.78 include the following:

- Implementation of the Advanced Encryption Standard (AES) encryption algorithm.
  - CBC is implemented as the default cipher mode.
  - ECB mode can be invoked by setting the JCW AESENCRYPTMODEECB to the value '1'.
- Enhancements specific to COPY
  - Multiple drives support for source and target tapes
  - Single drive COPY support
  - Source tapes can be given in any order
  - OLM support
  - TML support
  - Progress report
  - Tape statistics for source and target tapes
- Enhancements specific to DUMP
  - Multiple drives support
  - TML support
- Enhancements specific to LISTDIR
  - Supports file selection
- Enhancements specific to RESTORE

## Summary of Changes

- Option OLDDATE is the default behavior
- New option NEWDATE to emulate earlier Backup/iX version behavior.
- New option ON VOLUME DO
- New option ON ERROR DO
- Enhancements specific to STORE
  - GETDATE option can be used local to a file set.
- Enhancements specific to READALL
  - OLM support
  - TML support
- Comments can be used in indirect files
- New progress message while resetting store/restore bits
- Expired product now displays a message indicating that it can be used to perform only the RESTORE command.
- Changes to the semantics of OLDDATE and the introduction of a new keyword, NEWDATE. **Note:** As of V6.73, OLDDATE is now the default for restore. In order to perform a restore with all access dates defaulting to the current time of file creation, specify the NEWDATE option.
- Miscellaneous fixes

**Compatibility**

MPE/iX version 6.0 or later is required to support BACKUP+/iX version 6.78.

**Explanation of terms**

BACKUP+	Refers to the product Backup/iX
Vn.nn	Refers to BACKUP+/iX version n.nn
KB	Refers to kilo bytes
GB	Refers to giga bytes.
TML	Refers to Tape Manager & Librarian that comes with the Wizard module of Backup/iX
OLM	Refers to the Orbit Library Manager. This gives BACKUP+ the capability to use tapes stored in a tape library.
RESTORE	Refers to the “restore” command of BACKUP+
DUMP	Refers to the “dump” command of BACKUP+
COPY	Refers to the “copy” command of BACKUP+
STORE	Refers to the “store” command of BACKUP+
LISTDIR	Refers to the “listdir” command of BACKUP+
Ldev	Refers to the logical device number of tape drive.

**Advanced Encryption Standard**

**Overview**

The Advanced Encryption Standard (also referred to as “Rijndael”), supports three different key sizes: 128 bits, 192 bits and 256 bits. All three have been implemented within BACKUP+/iX. Key management has been changed to support the stronger split key/dual control methodologies.

Keys are now obtained from two external files and merged together to construct the final key. The key files may be in separate locations and under different access controls such that no one individual may know the key.

The contents of these two files must be 32, 48 or 64 characters of hexadecimal (“0123456789abcdef”) data as strings which represent 128, 192 or 256 bit keys. The keys in these two files are converted to their binary equivalents and then

XORed one against the other to produce the final key that is then used for encryption and decryption.

In order to incorporate most of the above enhancements, the syntax of ENCRYPT has been changed. The old ENCRYPT syntax was as follows:

**Old Encrypt Syntax**

```
>ENCRYPT [=encryptionmethod, key]
```

The new ENCRYPT syntax is as follows:

**New Encrypt Syntax**

```
>[, ENCRYPT [=encryptionmethod, {key | (keyfile1, keyfile2) }]]
```

**Parameters**

<i>encryptionmethod</i>	The encryption algorithm used for STORE, specified as an integer value (0 to 3) as follows: <ul style="list-style-type: none"> <li><b>0</b> No encryption; keyword-protection only</li> <li><b>1</b> Fast, proprietary algorithm (the default)</li> <li><b>2</b> DES (Data Encryption Standard) algorithm</li> <li><b>3</b> AES (Advanced Encryption Standard) algorithm</li> </ul>
<i>key</i>	The key used for encryption of up to 8 alphanumeric characters, which can include special characters other than quotes and spaces.  The encryption key is case sensitive: lower case characters are not upshifted.
<i>keyfile1, keyfile2</i>	The key files used to contain the 128, 192 or 256 bit keys.

**Example**

To perform a backup with AES data encryption, create two files called "KEY1" and "KEY2" with your favorite editor. In the file KEY1, use the string "000102030405060708090a0b0c0d0e0f" and in the file KEY2, use the string "00102030405060708090a0b0c0d0e0f0". These two files when XORed together will represent the actual 128 bit key of "00112233445566778899aabbccddeeff". Then to perform the backup:

```
>STORE @.FILES.PAYROLL; *T; &
>ENCRYPT=3, (KEY1.GROUP1.ACCT1, KEY2.GROUP2.ACCT2)
```

**Enhancements to COPY**

**Overview**

The COPY command has been enhanced in the following manner:

- Multiple drives support for source and target tapes
- Single drive support for both source and target tapes

- Source tapes can given in any order
- OLM support
- TML support
- Progress report
- Tape statistics for source and target tapes

In order to incorporate most of the above enhancements, the syntax of COPY has been changed. The old COPY syntax was as follows:

### Old Copy Syntax

```
>COPY *tapefile1 TO *tapefile2 [;copyoption[;...]]
```

#### Copyoption

```
[;BACKUP=backupspec]
[;LABEL=volsetid [,expirationdate[,comment]]]
[;SINGLEDRIIVE | ;MULTIDRIIVE ]
[;TOVOLID=volidlist]
[;VOLID=volidlist ]
```

The new COPY syntax is as follows:

### New Copy Syntax

```
>COPY *tapefile1 [;Incopyoption[;...]] &
>TO *tapefile2 [;Outcopyoption[;...]]
```

#### Parameters

*Tapefile1* Backreferences a file equation for the source tape drive.

*Tapefile2* Backreferences a file equation for the target tape drive.

*Incopyoption*

```
[;AUTOREPLY=ldevlist ]
[;BACKUP=backupspec ]
[;CYCLE=cyclename, GEN[ERATION] = [-] gen#]
[;DRIVES=n ]
[;LABEL=volsetid ]
[;OLM= [hostname:libname[,ansi|noansi]]
[;ON VOLUME DO "mpe command"]
[;SEQUENCE=ldevlist ]
[;SINGLEDRIIVE | ;MULTIDRIIVE ]
[;VOLID=volidlist ]
```

*Outcopyoption*

```
[;AUTOREPLY=ldevlist ]
[;BACKUP=backupname ]
[;CYCLE=cyclename ]
[;DRIVES=n[, {P|S}] ]
[;LABEL=volsetid[, expirationdate[, comment]]]
[;OLM= [hostname:libname[,ansi|noansi]]
[;ON VOLUME DO "mpe command"]
[;SEQUENCE=ldevlist ]
[;VOLID [=volidlist] ]
```

## Input Copy Options (InCopyOption)

**AUTOREPLY=***ldevlist*

**BACKUP=***backupspec*

```
[ ; PROGRESS [=n] ]
```

The following options apply to the source tape volume(s) of COPY:

Automatically replies to the console requests for the specified ldev(s).

**Ldevlist:** The logical device number(s) of the backup device(s) for which BACKUP+ should automatically reply, specified in one of the following formats:

- A specific ldev number (e.g., "14").
- A range of ldevs (e.g., "14/16").
- Selected ldevs (e.g., "14, 17").
- Any combination of the above (e.g., "14/16, 18, 22/24").

### Example

To COPY from two tape drives: 7 and 8, and have BACKUP+ automatically reply to Console tape requests:

```
>Copy *T1; Drives=2;Autoreply=7,8 To..
```

### Notes

DRIVES option is required when AUTOREPLY specifies more than one drive. AUTOREPLY cannot be used with ANSI labelled tape volumes.

BACKUP option specifies which backup to COPY in an appended backupset.

**Backupspec:** References the desired appended backup in one of the following formats:

- A user-assigned backupname by which the backup is referenced. Up to 8 characters, alphanumeric, first character must be alphabetic.
- A number indicating the sequence of the desired backup within the backupset, where 1 is the first backup in the backupset. (The sequence number does not reset on volume change.)
- "FIRST", meaning the first backup in the backupset.
- "LAST", meaning the last backup in the backupset. (This is the default.)
- A number preceded by a minus sign ("-"), indicating a backup relative to the last backup. May be used in combination with "LAST" (e.g., "LAST-1").

- A number preceded by a plus sign ("+"), indicating a backup relative to the first backup. May be used in combination with "FIRST" (e.g., "FIRST+1").

If the BACKUP option is not specified when copying an appended backup, then LAST is assumed.

### Example

To COPY "bkup1" from the appended backup tape on drive 7:

```
>Copy *T1; Autoreply=7; Backup=bkup1 To...
```

**CYCLE=cyclename,Gen=nn**

This option is available with the COPY command only with the Wizard (TML) module. This option is used when the source tape is created using TML store. It specifies the TML cycle and generation associated with the source tape.

**CycleName:** Refers to the TML cycle with which the source tape was created.  
**nn:** The generation value of the TML cycle of the source tape. It could be:

- 0, for most recent generation
- Positive integer, for absolute generation number

### Example

To COPY the tape associated with the last FULL (TML cyclename) backup on drive 7:

```
>Copy *T1; Autoreply=7; Cycle=FULL, gen=0 To...
```

### Notes

Please note that generation must be specified when using CYCLE as an input option.

**DRIVES=numdrives**

This option allows multiple tape drives to be used in parallel with the source tape. Tape drives must be of the same type (e.g., DLT or DDS but not mixed) density, configuration and device class.

**Numdrives:** Total number of drives associated with the source tape. It can be any value between 1 and 64.

If DRIVES option is not specified then default of one drive is used.

### Example

To COPY from 2 tape drives: 7 and 8, and have BACKUP+ automatically reply to Console tape requests:

```
>Copy *T1; Drives=2;Autoreply=7,8 To...
```

**LABEL=volsetid**

This option is used with the source tape to ensure that the correct tape is being copied.

**Volsetid:** Specifies the user defined tape volumeset id associated source tape. It has a maximum of 6 alphanumeric characters and is case sensitive.

**Example**

To ensure that the tape being copied was created with volumeset id "ARCHV"

```
>Copy *T1; Label=ARCHV To...
```

OLM=[hostname:]libname[,ansi  
noansi]

This option is available with the COPY command only with the OLM module. This option is used when the source tape being copied is contained in a tape library.

**hostname:** Optional. Specifies the name of the machine (host) to which the tape library is connected. By default this is the machine on which that Backup/iX is being run.

**libname:** Name of the tape library.

**ansi:** Specifies that the tape has ANSI labels. The default is "noansi".

**noansi:** Specifies that the tape has no ANSI labels. This is the default setting.

**Notes**

- AUTOREPLY or SEQUENCE option has to be specified in order to identify the ldevs to be used. The ldevs specified must be part of the library.
- If TML (Wizard) is not being used, VOLID and LABEL options must be specified. VOLID and LABEL do not specify ANSI labels during OLM operations unless the ANSI option is specified.

**Example**

To copy the following source tape volumes:

- volume ids ABC123, ABC234
- label SRC1
- contained in the drives 51 and 52, where the drives are part of the library named st4x30.

```
>Copy *T1; OLM=st4x30; Drives=2;Autoreply=51,52;LABEL=SRC1;VOLID=ABC123, ABC234 To...
```

**ON VOLUME DO mpe\_command**

This option allows an MPE/iX command to be executed on a mount request for a new tape volume of the source tape.

**mpe\_command:** Any MPE/iX command.

**Example**

To display the message “changing input tape volumes” on the console, when a request for a new source tape volume is issued by COPY:

```
>Copy *T1; ON VOLUME DO "tellop changing input tape
volumes" To...
```

### SEQ[UENCE]=*ldevlist*

Specifies the order in which the multiple backup devices are opened.

***ldevlist***: The logical device number(s) of the backup device(s) for which BACKUP+ should automatically reply, specified in one of the following formats:

- A specific ldev number (e.g., “14”).
- A range of ldevs (e.g., “14/16”).
- Selected ldevs (e.g., “14, 17”).
- Any combination of the above (e.g., “14/16, 18, 22/24”).

### Example

To COPY from 2 tape drives: 7 and 8, and have BACKUP+ automatically reply to Console tape requests:

```
>Copy *T1; Drives=2; Seq=7,8 To...
```

### Notes

- DRIVES option is required when SEQUENCE specifies more than one drive.
  - SEQUENCE cannot be used with ANSI labeled tape volumes (to specify the drive opening sequence using ANSI-labeled tapes, list the volids in the desired order in the VOLID option).

### VOLID=*validlist*

Specifies ANSI format tape labels and the volids for up to 8 tape volumes, unless used with the OLM option. In the event that the eight-valid list becomes exhausted, more volids will be requested from the console operator.

***validlist***: Specifies a comma-delimited list of up to 8 volume IDs to be used for the first 8 tapes in the source tape. Each valid may be a maximum of 6 alphanumeric characters for each valid and is case sensitive.

### Example

To ensure that the ansi-labeled tapes being copied were created with volumeset id “ARCHV” and volume id: VOL1 and VOL2 contained in 2 drives:

```
>Copy *T1 ;Drives=2 ;Label=ARCHV ;Valid=VOL1,VOL2 To...
```

### Notes

- VOLID must be specified along with LABEL option.
- VOLID cannot be used with the CYCLE option.
- VOLID cannot be used with AUTOREPLY or SEQUENCE unless used with OLM.

## Output Copy Options (OutCopyOption)

**AUTOREPLY=*ldevlist***

- If used with the OLM option, the “ansi/noansi” parameter of the OLM option determines whether an ansi label is created or not.

These options apply to the target tape volume(s) of COPY

Automatically replies to console requests for the specified *ldev(s)*.

***Ldevlist***: The logical device number(s) of the backup device(s) for which BACKUP+ should automatically reply, specified in one of the following formats:

- A specific *ldev* number (e.g., “14”).
- A range of *ldevs* (e.g., “14/16”).
- Selected *ldevs* (e.g., “14, 17”).
- Any combination of the above (e.g., “14/16, 18, 22/24”).

### Example

To COPY from one tape drive: 7 to two drives 8 and 9, and have BACKUP+ automatically reply to Console tape requests:

```
>Copy *T1; Autoreply=7 To *T2; Drives=2;
Autoreply=8,9
```

### Notes

DRIVES option is required when AUTOREPLY specifies more than one drive. AUTOREPLY cannot be used with ANSI labeled tape volumes.

**BACKUP=*backupname***

BACKUP option assigns the specified *backupname* to the copied backup, which can reference this backup.

***Backupname***: An alphanumeric string of up to 8 characters, first character must be alphabetic. "FIRST" and "LAST" are reserved and cannot be used as a user defined “*backupname*”.

### Example

To COPY the LAST backup from an appended backup tape on drive 7 as “bkupcopy” to the tape on drive 8:

```
>Copy *T1; Autoreply=7 To *T2; Autoreply=8;
;Backup=BkupCopy
```

The option “BACKUP=LAST” is not required to be specified with the source tape in the COPY command shown above, as this is the default action for an appended source tape.

### CYCLE=*cyclename*

This option is available with the COPY command only with the Wizard (TML) module. This option is used to create a target tape that needs to be associated with the TML cycle, “cyclename”. The generation value will be assigned automatically as the next available value for that cycle.

**CycleName:** Name of the TML cycle to which the target tape will be associated.

### Example

To COPY the tape associated with the last FULL (TML cyclename) backup on drive 7 to the TML cycle FULLCOPY

```
>Copy *T1; Autoreply=7; Cycle=FULL, gen=0 To *T2;
CYCLE=FULLCOPY
```

### DRIVES=*numdrives*[*S*/*P*]

This option allows multiple tape drives to be used in parallel or serial with the target tapes. Tape drives must be of the same type (e.g., DLT or DDS but not mixed) density, configuration and device class.

**Numdrives:** Total number of drives associated with the target tape. It can be any value between 1 and 64.

**P:** Specifies parallel handling of multiple tape drives.

**S:** Specifies serial handling of multiple tape drives.

DRIVES option is not specified then default of one drive is used. If “P or S” is not specified, then “P” is the default behavior.

### Example

To COPY from one drive, 7 to two drives 8 and 9 in a serial fashion, and have BACKUP+ automatically reply to Console tape requests:

```
>Copy *T1; Autoreply=7 To *T2; Drives=2,s; Autoreply=8,9
```

### LABEL=*volsetid*[*expirationdate*][*comment*]]

This option is used to write a tape label containing the volsetid, expiration date, and comment to each tape volume.

**Volsetid:** Specifies the user defined tape volumeset id for the target tape. It has to have a maximum of 6 alphanumeric characters and is case sensitive.

**expirationdate:** Specifies the date on which all the volumes in the target tape expire and before which it may not be over written. The date is specified in mm/dd/yy[yy] format.

**comment:** Freeform, user-specified comment. Alphanumeric string of up to

40 characters.

**Example**

To make a copy of a tape with label “ACCT”, that needs to expire on Sept 20<sup>th</sup>, 1991 and a comment “ACCOUNTING COPY”:

```
>Copy *T1 To *T2; Label=ACCT, 09/20/91,accounting copy
```

**Notes**

- LABEL along with VOLID option, specifies an ansi-labeled tape.
- LABEL cannot be used with the CYCLE option.

This option is available with the COPY command only with the OLM module. This option is used when the target tape is contained in a tape library.

- hostname:** Optional. Specifies the name of the machine (host) to which the tape library is connected. By default this is the machine that Backup/iX is being run.
- libname:** Name of the tape library.
- ansi:** Specifies that the tape has ANSI labels. The default is “noansi”.
- noansi:** Specifies that the tape has no ANSI labels. This is the default setting.

**Notes**

- AUTOREPLY or SEQUENCE option has to be specified in order to identify the ldevs to be used. The ldevs specified must be part of the library.
- If TML (Wizard) is not being used, VOLID and LABEL options must be specified. VOLID and LABEL do not specify ANSI labels during OLM operations unless the ANSI option is specified.

**Example**

To make a copy of the following source tape volumes:

- volume ids ABC123, ABC234
- label SRC1
- contained in the drives 51 and 52, where the drives are part of the library named st4x30, which is connected to the system on which Backup+ is being run as the following target tape volumes:
- volume ids XYZ456, XYZ567
- label TGT1
- contained in the drives 53 and 54, where the drives are part of the library named st4x30, which is connected to the system on which Backup+ is being run.

OLM=[hostname:]libname[,ansi|noansi]

**ON VOLUME DO *mpe\_command***

```
>Copy *T1; OLM=st4x30; Drives=2; Autoreply=51,52;
LABEL=SRC1; VOLID=ABC123, ABC234 To *T2; OLM=st4x30;
Drives=2; Autoreply=53,54; LABEL=TGT1; VOLID=XYZ456, XYZ567
```

This option allows a MPE/iX command to be executed on a mount request for a new tape volume of the target tape.

***mpe\_command***: Any MPE/iX command.

**Example**

To display the message “changing output tape volumes” on the console, when a request for a new target tape volume is issued by COPY:

```
>Copy *T1 TO *T2; ON VOLUME DO "tellop changing output tape
volumes"
```

**SEQ[UENCE]=*ldevlist***

Specifies the order in which the multiple backup devices are opened.

***ldevlist***: The logical device number(s) of the backup device(s) for which BACKUP+ should automatically reply, specified in one of the following formats:

- A specific ldev number (e.g., “14”).
- A range of ldevs (e.g., “14/16”).
- Selected ldevs (e.g., “14, 17”).
- Any combination of the above (e.g., “14/16, 18, 22/24”).

**Example**

To COPY from two tape drives: 7 and 8, to the tapes on the drives 9 and 10 in a parallel manner, and have BACKUP+ open the drives in a certain sequence and automatically reply to Console tape requests:

```
>Copy *T1;Drives=2;Seq=7,8 To *T2;Drives=2;Seq=9,10
```

**Notes**

- DRIVES option is required when SEQUENCE specifies more than one drive.
  - SEQUENCE cannot be used with ANSI labeled tape volumes (to specify the drive opening sequence using ANSI-labeled tapes, list the volids in the desired order in the VOLID option).

**SINGLEDRIIVE**

Specifies that the target tape drive will be the same as the source tape drive. This is the opposite of **MULTIDRIIVE**, which is the default COPY operation. The backup will be read from tape and staged on disk. Once the original backup has been completely read, the tape(s) will be dismounted, the drive closed and reopened to write the new tape(s).

**Example**

To COPY from 1 tape drive to itself and drive 7, and have BACKUP+ automatically reply to Console tape requests:

```
>Copy *t;autoreply=7 to *t;autoreply=7;singledrive
```

**Notes**

- A single drive copy will consume *more* disk space than the original backup consumed due to overhead such as the Backup+ directory and other overhead such as tape block headers. A single drive copy is not recommended but for the smallest of backups.

**VOLID=validlist**

Specifies ANSI format tape labels and the volids for up to 8 tape volumes, unless used with the OLM option. In the event that the eight-void list becomes exhausted, more volids will be requested from the console operator.

**validist:** Specifies a comma-delimited list of up to 8 volume IDs to be used for the first 8 tapes in the target tape. Each valid may be a maximum of 6 alphanumeric characters for each valid and is case sensitive.

**Example**

To create a copy of the tapes in drives 7 and 8 in an ansi-labeled tape format with volumeset id "ARCHV" and volume ids VOL1 and VOL2 contained in the drives 9 and 10:

```
>Copy *T1; Drives=2;Autoreply=7,8 To *T2; Label=ARCHV;
Valid=VOL1, VOL2
```

**Notes**

- VOLID must be specified along with LABEL option.
- VOLID cannot be used with the CYCLE option.
- VOLID cannot be used with AUTOREPLY or SEQUENCE unless used with OLM.
- If used with the OLM option, the "ansi/noansi" parameter of the OLM option determines whether an ansi label is created or not.

**PROGRESS[=minutes]**

This option applies to the entire COPY command, rather than the source or target tape(s). It has been placed in the list of output copy options arbitrarily.

This option specifies the time interval at which the percentage completed progress messages need to be displayed. The default time interval is 5 minutes. When the COPY command is run from a session, the progress message is displayed on the terminal. If the command is run in a batch, the messages are listed on the system console.

**minutes:** Can be an integer between 0 and 1000. This value refers to the time interval between successive progress messages. A value of 0 suppresses the progress messages completely.

**Example**

To display a progress message every minute:

```
>Copy *T1 To *T2; Progress=1
```

**Enhancements to DUMP**

The DUMP command has been enhanced in the following manner:

- Multiple drives support
- TML support

In order to incorporate the above enhancements, the existing DUMP options have been enhanced and new dump options added.

The new options added are DRIVES, SEQUENCE, and CYCLE.

The existing DUMP option AUTOREPLY now accepts a list of ldevs as opposed to a single ldev number.

The syntax of the new DUMP command is as follows:

```
>DUMP diskfile;*tapefile[;dumpoption[;...]]
```

**New Dump Syntax**

*dumpoption*

```
[;APPEND]
[;AUTOREPLY=ldevlist]
[;BACKUP=backupname]
[;CYCLE=cyclename]
[;DRIVES=n[,P|S]]
[;LABEL=volsetid [,expirationdate[,comment]]]
[;MAXERRORS=numerrors]
[;MAXRETRIES=numretries]
[;NOLABEL]
[;OLM=[hostname:]libraryname [, [NO]ANSI]]
[;PROGRESS [=minutes]]
[;SEQUENCE=ldevlist]

[;SHOW [=
    SHORT
    LONG
    DIRECTORY
    FILENAME
    ,DATES
    ,SECURITY
    ] [,OFFLINE] [,...]]

[;VOLID=volid [,...]]
```

**Modified/New Dump Options  
(DumpOption)**

This section will cover only the DUMP options that were modified or added to support multiple drives and TML. For notes on the unchanged DUMP options, please refer to the Backup/iX User manual.

**AUTOREPLY=*ldevlist***

Automatically replies to console requests for the specified *ldev(s)*.

***Ldevlist***: The logical device number(s) of the backup device(s) for which BACKUP+ should automatically reply, specified in one of the following formats:

- A specific *ldev* number (e.g., "14").
- A range of *ldevs* (e.g., "14/16").
- Selected *ldevs* (e.g., "14, 17").
- Any combination of the above (e.g., "14/16, 18, 22/24").

**Example**

To DUMP a disc-to-disc backup, "D2D" onto two tapedrives 8 and 9, and have BACKUP+ automatically reply to Console tape requests:

```
>Dump D2D; *T ;Drives=2; Autoreply=8,9
```

**Notes**

DRIVES option is required when AUTOREPLY specifies more than one drive. AUTOREPLY cannot be used with ANSI labeled tape volumes.

**CYCLE=*cyclename***

This option is available with the DUMP command only with the Wizard (TML) module. This option is used to create a target tape that needs to be associated with the TML cycle, "*cyclename*". The generation value will be assigned automatically as the next available value for that cycle.

***CycleName***: Name of the TML cycle to which the target tape will be associated.

**Example**

To DUMP a disc-to-disc backup, "D2D" onto a tape on drive 7, and create a new generation of the TML cycle FULL:

```
> Dump D2D ;*T ;Autoreply=7 ;Cycle=FULL
```

**DRIVES=*numdrives*[,*S*/*P*]**

This option allows multiple tape drives to be used in parallel or serial with the "dumped" tapes. Tape drives must be of the same type (e.g., DLT or DDS but not mixed) density, configuration and device class.

***Numdrives***: Total number of drives associated with the dump tape. It can be any value between 1 and 64.

***P***: Specifies parallel handling of multiple tape drives.

***S***: Specifies serial handling of multiple tape drives.

DRIVES option is not specified then default of one drive is used. If "P or S" is not specified, then "P" is the default behavior.

**SEQ[UENCE]=*ldevlist*****Example**

To DUMP a disc-to-disc backup, "D2D" onto two drives 8 and 9 in a serial fashion, and have BACKUP+ automatically reply to Console tape requests:

```
>Dump D2D ;*T ;Drives=2,s ;Autoreply=8,9
```

Specifies the order in which the multiple backup devices are opened.

**Ldevlist:** The logical device number(s) of the backup device(s) for which BACKUP+ should automatically reply, specified in one of the following formats:

- A specific ldev number (e.g., "14").
- A range of ldevs (e.g., "14/16").
- Selected ldevs (e.g., "14, 17").
- Any combination of the above (e.g., "14/16, 18, 22/24").

**Example**

To DUMP a disc-to-disc backup, "D2D" onto the tapes on the drives 9 and 10 in a parallel manner, and have BACKUP+ open the drives in a certain sequence and automatically reply to Console tape requests:

```
> Dump D2D ;*T ;Drives=2 ;Seq=9,10
```

**Notes**

- DRIVES option is required when SEQUENCE specifies more than one drive.
  - SEQUENCE cannot be used with ANSI labeled tape volumes. To specify the drive opening sequence using ANSI-labeled tapes, list the volids in the desired order in the VOLID option.

**Enhancements to LISTDIR**

The LISTDIR command lists the directory of the backup tape or disc-to-disc backup file. In the earlier versions of BACKUP+, LISTDIR syntax did not support file-selection from the list of directory entries. In V6.78 version of BACKUP+, the syntax of the LISTDIR command has been changed to support file-selection.

The old syntax of LISTDIR was as follows:

```
>LISTDIR diskfile    [;listdiroption[;...]]
        *tapefile
```

**Old syntax of LISTDIR****New syntax of LISTDIR**

The new syntax of LISTDIR is as follows:

```
>LISTDIR { diskfile } [; [filesetlist] [;listdiroption[;...]] ]
          { *tapefile }
```

<i>diskfile</i>	Name of disc-to-disc file.												
<i>tapefile</i>	Backreferences a file equation for the tape drive.												
<i>Filesetlist</i>	This is an optional field and specifies the files to be listed. If nothing is specified, this field defaults to "@.@.@". When this field is specified, it can be specified in the form: - <i>Filesetspec</i> - <i>^Indirectfile</i> - <i>!Indirectfile</i>												
<i>Indirectfile</i>	Unnumbered flat file containing file selection specification for files to be listed. May be prefixed by either "!" or "^".												
<i>filesetspec</i>	<b>Fileset</b> [, <i>fileset</i> ] ...												
<i>fileset</i>	Files to include in and/or exclude, with optional date and time restrictions, in one of the following formats: <b>filespec</b> [( <i>xDATE</i> <i>relop</i> <i>datetimespec</i> )] <b>-filespec</b> <b>filespec1 - filespec2</b>												
<i>filespec</i>	Files specified in the MPE (file.group.account), or in the HFS format (/ACCOUNT/GROUP/FILE or /DIRECTORY). If group and account are not specified in the MPE format, then they default to the current group and account. Wildcards like "@", "#", and "?" can be used at any position.												
<i>xDATE</i>	Imposes date restriction; one of the following values:  <table border="0" style="margin-left: 40px;"> <tr> <td style="padding-right: 20px;">BDATE</td> <td>Backup date and, optionally, time (only on Restore from tape with Restore Wizard)</td> </tr> <tr> <td>DATE</td> <td>Last state change date and, optionally, time</td> </tr> <tr> <td>MDATE</td> <td>Last modification date and, optionally, time</td> </tr> </table> SDATE Last state change date and, optionally, time	BDATE	Backup date and, optionally, time (only on Restore from tape with Restore Wizard)	DATE	Last state change date and, optionally, time	MDATE	Last modification date and, optionally, time						
BDATE	Backup date and, optionally, time (only on Restore from tape with Restore Wizard)												
DATE	Last state change date and, optionally, time												
MDATE	Last modification date and, optionally, time												
<i>relop</i>	One of the following relational operators:  <table border="0" style="margin-left: 40px;"> <tr> <td>=</td> <td>Equal to</td> </tr> <tr> <td>&lt;</td> <td>Less than</td> </tr> <tr> <td>&gt;</td> <td>Greater than</td> </tr> <tr> <td>&lt;=</td> <td>Less than or equal to</td> </tr> <tr> <td>&gt;=</td> <td>Greater than or equal to</td> </tr> <tr> <td>&lt;&gt;</td> <td>Not equal to</td> </tr> </table>	=	Equal to	<	Less than	>	Greater than	<=	Less than or equal to	>=	Greater than or equal to	<>	Not equal to
=	Equal to												
<	Less than												
>	Greater than												
<=	Less than or equal to												
>=	Greater than or equal to												
<>	Not equal to												
<i>datetimespec</i>	Date and optionally time, in the following format:  <ul style="list-style-type: none"> <li>- <i>mm/dd/[yy]yy [HH:MM]</i></li> <li>- <i>days</i></li> </ul> where: "mm" is the month in 2 digits "dd" is the day in 2 digits												

	<p>“[yy]yy” is the 4 digit year, the first 2 digits being optional  “HH” is the hour using 24 hour time  “MM” is the minute  “days” is relative to today.</p>
<i>listdiroption</i>	One or more of the LISTDIR command options. No change has been done to any of the options.

## Operation

The file selection field of LISTDIR is optional. When it is specified, the LISTDIR command has the same behavior as a RESTORE;PREVIEW command. No files are restored with either LISTDIR, or PREVIEW used in conjunction with RESTORE.

For example, the following LISTDIR command:

```
>LISTDIR { diskfile }; filesetlist [ ; listdiroption ]
         { *tapefile }
```

has the same effect as issuing this RESTORE with PREVIEW command:

```
>RESTORE { diskfile }; filesetlist; Preview; Show [ ; listdiroption ]
          { *tapefile }
```

## Running LISTDIR in batch mode

The LISTDIR command in an existing script or job will fail unless an additional “;” is added in between the tape reference file and the first LISTDIR option.

### Example

The following LISTDIR command:

```
>LISTDIR; *T; SHOW=DATES, SECURITY, OFFLINE
```

will need to be changed to:

```
>LISTDIR; *T; ; SHOW=DATES, SECURITY, OFFLINE
```

To list all files in PUB.SYS group that is on the backup volume on ldev 7 and have BACKUP+ automatically :REPLY to the console request:

```
>LISTDIR; *T; @.PUB.SYS; AUTOREPLY=7
```

## Enhancements to RESTORE

The RESTORE command has been enhanced in the following manner:

- Existing restore Option OLDDATE is made the default behavior.
- Added new option NEWDATE to emulate earlier Backup/iX version behavior.
- Added new option "ON VOLUME DO".
- Added new option "ON ERROR DO".

### OLDDATE –default behavior

OLDDATE is an existing RESTORE option of BACKUP+. This option prevents the modification and access timestamps of the restored files to be set to the current date and time (time of restore). Instead the restored files will have the same access and modification timestamps as that of the original stored file.

This is the default behavior of RESTORE from version V6.70 onwards. In order to restore files with their date and time set to the current date and time, the new option NEWDATE needs to be used with the RESTORE command.

### NEWDATE

NEWDATE is a new option added to the restore command of BACKUP+ in version 6.78. This option allows BACKUP+ to set the modification and access timestamps of the restored files to the current date and time (time of restore).

This was the default behavior of RESTORE for all Backup/iX versions prior to V6.70. Now NEWDATE needs to be used in order for RESTORE to behave like the RESTORE of version prior to V6.70.

Regardless of whether NEWDATE is specified or not, the file creation timestamp remains unchanged.

### Example

To restore manufacturing programs with the current access and modification date and time, do:

```
>RESTORE *T; @. PROG.MFG; NEWDATE
```

### ON VOLUME DO *mpe\_command*

This is a new option added to the restore command of BACKUP+ in the version 6.78. This option allows BACKUP+ Restore to execute the "mpe command" specified with the ON VOLUME DO option, every time a tape change is requested.

***Mpe\_command:*** any MPE/iX command.

### Example

To stream the job CHECKRUN every time a tape change is requested:

```
>RESTORE *T; @. @. @ ;ON VOLUME DO "stream checkrun"
```

### Note

**ON ERROR DO *mpe\_command***

ON VOLUME DO is not supported for disc-to-disc backup.

This is a new option added to the restore command of BACKUP+ in the version 6.78. This option allows BACKUP+ Restore to execute the "mpe command" specified with the ON ERROR DO option, every time an error occurs.

**Mpe\_command:** any MPE/iX command.

**Example**

To send the message to the console if an error is encountered:

```
>RESTORE *T; @.@.@ ;ON ERROR DO "TELOP BACKUP
error occurred"
```

**Enhancements to STORE**

**STORE syntax**

The main enhancement specific to the STORE command is with regards to the GETDATE option. The GETDATE option could only be specified in the "storeoption" field of the STORE command (syntax show below for reference).

```
>STORE filesetlist [, { *tapefile } ] [, storeoption [, ...]]
                    { diskfile }
```

So the GETDATE option would effect all the files in the "*filesetlist*".

From version V6.70 of BACKUP+, the GETDATE option can also be used in the "*filesetlist*" field so that it's effect is local to a specific "*fileset*". The *filesetlist* is defined as follows:

<i>filesetlist</i>	- Filesetspec - ^Indirect_file - !Indirect_file
<i>filesetspec</i>	Fileset [,fileset] ...
<i>fileset</i>	Fileset [(xDATE relop datetimespec)] -fileset fileset1 - fileset2

Now *fileset* can also be of the format: Fileset (GETDATE), so the new *fileset* definition is as follows:

<i>fileset</i>	Fileset [( { xDATE relop datetimespec } )] GETDATE -fileset fileset1 - fileset2
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**Example**

To do an incremental backup of all files on the system:

```
>STORE @.@.@;*T; SHOW; GETDATE
```

The above incremental backup would select only those files whose state change date is greater than the last backup done with the SETDATE option.

To backup of all files on the system, but to do an incremental backup of files in the MFG account, do:

```
>STORE @.@.@ - @.@.MFG, @.@.MFG(GETDATE);*T; SHOW
```

**Enhancements to READALL**

The main enhancement specific to the READALL command is integration with both OLM and TML.

**READALL syntax**

```
>READALL { *tapefile } [;readalloption[;...]]
           { diskfile }
```

From version V6.70 of BACKUP+, the CYCLE keyword as been added to the *readalloption*. This keyword is used to indicate the cycle upon which to perform the validation.

**Note**

TML works with volume sets, whereas READALL works with volumes. The integration of READALL with TML attempts to blurry that distinction, but that may not always be the case. Specifically, TML and READALL will have problems with certain appended backups. In this case, READALL may prompt the user for additional volumes - without knowing their volume IDs.

The *readalloption* is now defined as follows:

<i>readalloption</i>	<pre>[;AUTOREPLY=<i>ldev</i>] [;LABEL=<i>valid</i>] [;OLM=[<i>hostname:</i>]libraryname [, [NO]ANSI]] [;VOLID=<i>validlist</i>] [;DRIVES=<i>numdrives</i> [;SEQ[UENCE]=<i>ldev</i>[,...][:<i>dir</i><i>ldev</i>]]] [;ENCRYPT[=<i>encryptionmethod</i>,<i>key</i>]] [;MAXERRORS=<i>numerrors</i>] [;MAXRETRIES=<i>numretries</i>] [;ON ERROR QUIT]  [;ON { ERROR       RETRY       VOLUME } DO <i>mpecommand</i> ]</pre>
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	<pre>[;PROGRESS[=<i>minutes</i>]] [;CYCLE=<i>cyclename</i>,GEN=[-]<i>gen#</i>]</pre>
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### Example

To do a validation of the volumes in the last backup from cycle "FULL":

```
>READALL *t;CYCLE=FULL,GEN=0;OLM=st4x30;autoreply=51
```

## Comments in Indirect files

STORE and RESTORE now allows comments to be used in indirect files. Anything after the left brace (“{”) is treated as a comment until the end of line, or the right brace (“}”) is encountered.

### Example

To do an unconditional backup of all files on the system, excepting the MFG account, for which an incremental backup is done:

```
>STORE ^INDFILE; *T; SHOW
```

where INDFILE contains:

```
{ Do unconditional backup of all files except the files in
{ MGF account. }
@.@.@ - @.@.MFG

{ Do incremental backup of all files in the MFG account. }
@.@.MFG(GETDATE)
```