

# Chapter 2

# JOB CONTROL LANGUAGE

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**Objectives**

You will learn:

- How to use and manage Job Control statements:  
EXEC, SYSOUT DD, SORTIN DD, SYSIN DD, \$ORTPARM DD
- How to concatenate input datasets.
- How to perform and manage tape sorts.
- Exit routines which require linkediting at execution time.

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## 1 Program Applications and Datasets

Syncsort's job control statements follow the standard operating system conventions in the job control language manuals.

For every dataset used, each program application will require:

- A JOB statement.
- An EXEC statement.
- A DD - data definition statement.

The exception is the dynamic allocation of work files using DYNALLOC or DYNATAPE.

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### 1.1 DD Statement Requirements

Disk Sort DD Statements	Description
//SYSIN DD	Control statement dataset.
//SYSOUT DD	Message dataset. It is required; unless all messages are routed to console.
//SORTWKnn DD	Disk work area definition. It is required. The exceptions are an incore sort, DYNALLOC, MERGE, or restarting at a MAXSORT merge breakpoint.
//SORTIN DD	SORT input dataset. It is required; unless there is an E15. It is ignored if the invoking program supplies an inline E15 exit routine. It is optional if the MODS statement activates an E15 exit routine.
//SORTINnn DD	MERGE input dataset. It is required; unless there is an E32.
//SORTOUT DD	Output dataset. It is required, unless there is an E35. It is ignored if the invoking program supplies an inline E35 exit routine; this is optional when the MODS statement activates an E35 exit routine.
//SORTOFxx DD //SORTOFx DD	It is required if multiple output files are used.

Disk Sort DD Statements	Description
//SORTCKPT DD	Checkpoint dataset. It is required if Checkpoint-Restart is used.
//SORTMODS DD //SYSLIN DD	It is required if the user exits are in SYSIN.
//SYSLMOD DD //SYSUT1 DD //SYSPRINT DD	It is required if the user exits are to be linkage-edited at execution time.
//ddname DD	It is required if an exit is neither in SYSIN nor in LINKLIB/JOBLIB/STEPLIB.
//\$ORTPARM DD	Used to override PARM or control statement information.

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## 1.2 DYNALLOC Parameter

The DYNALLOC parameter dynamically allocates SORTWK datasets.

DYNALLOC datasets supplement any SORTWKnn DD statements that are supplied to the sort.

DYNALLOC={n|OFF}

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**2 EXEC Statement**

The EXEC statement indicates to the operating system that the job is a sort/merge application.

```
//stepname EXEC PGM=SORT,PARM='...'
```

The PARM parameter may be used to pass the sort/merge program keyword parameters, modifying it to meet the needs of the individual application.

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**3      SYSOUT DD Statement**

This statement defines the dataset for Syncsort messages.

```
//SYSOUT DD SYSOUT=*
```

If the SYSOUT DD statement is omitted, any message routed to the printer will be diverted to the console.

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## 4 SORTIN DD Statement

The SORTIN DD statement defines the dataset to be sorted or copied. The input file for a merge application is defined by the SORTINnn DD statement.

The SORTIN file must have physical sequential organization or be a member of a partitioned dataset. The AMP subparameters BUFND, BUFNI, and/or BUFSP are recommended to optimize performance on a VSAM KSDS.

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### 4.1 Concatenating Input Datasets

Any number of datasets may be concatenated to SORTIN provided that the operating system supports concatenation and the RECFMs are compatible.

It is possible to merge up to 32 datasets. Each input dataset carries a SORTINnn name, with nn a two-digit decimal number between 01 and 32. The only restriction on this numbering is that each file receives a different number. Numbers may be skipped or used out of sequence. There are no restrictions as to which input files are to receive which numbers.

Each input dataset must have the same RECFM and the records in each file must already be in the specified sequence.

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**5 SORTOUT DD Statement**

The SORTOUT, SORTOFnn, SORTnn statements are used to define one or more output files. These output datasets may be directed to a BSAM or VSAM supported device.

The AMP subparameters BUFND, BUFNI, and/or BUFSP are recommended to optimize performance on a VSAM KSDS.

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## **6 SORTWKnn DD Statement**

Each work file carries a SORTWKnn name, with nn a two-digit number between 01 and 32. Up to 32 datasets may be specified for intermediate storage when sorting. A SORTWKnn must be allocated on a single unit and a single volume.

Although SORTWK space can be allocated in blocks, tracks, or cylinders, allocating in cylinders will yield optimal performance. The CONTIG option of the SPACE parameter should be avoided since it may delay allocation and offers no performance advantage.

There is no need to specify RLSE and a secondary allocation value on the SORTWKnn DD statement at installations that have set these defaults at Syncsort installation time.

SORTWKnn DD statements are not used for merge or copy applications. They are not required for sorts executed using the DYNALLOC option.

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### **6.1 Tape Sort**

When intermediate storage is on tape, from 3 to 32 datasets may be specified. Tape SORTWKnn files must begin with SORTWK01 and be numbered consecutively.

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**7      SYSIN DD Statement**

The dataset defined by the SYSIN DD statement contains Syncsort control statements.

The SYSIN DD statement is required in order to initiate the sort/merge through job control language.

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## 8 \$ORTPARM DD Statement

The dataset defined by the \$ORTPARM DD statement may contain PARM parameters and any of the sort control statements. Parameters and control statements passed using the \$ORTPARM DD statement generally override all other passed, whether the sort/merge is called from a program or initiated through job control language.

The \$ORTPARM datasets must be formatted in accordance with these rules:

- PARM specifications included in the \$ORTPARM datasets must be specified before any sort control statement specification.
- PARMS must be specified without the keyword PARM= and without quote marks.
- A comma in columns 2 - 70 of a PARM card image followed by a blank, or a comma alone in column 71, may be used to indicate that the next record is part of the current statement.

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## 9 Exit Routines Requiring Linkediting at Execution Time

These DD statements are required whenever an exit routine is to be linkedited at execution time.

Statement	Linkedit Implication
SORTMODS DD	The partitioned dataset which is being defined must be sufficiently large to contain all the exit routes entered in SYSIN.
SYSLIN DD	The SYSLIN DD statement defines the temporary dataset that will contain the linkage editor control statements created by Syncsort for the exit routine(s).
SYSLMOD DD	The SYSLMOD DD statement defines the temporary dataset that will contain the linkedited exit module(s).
SYSPRINT DD	The SYSPRINT DD statement defines the message dataset for the linkediting of sort exits.
SYSUT1 DD	The SYSUT1 DD statement is used to define the temporary dataset used as a work area when Syncsort linkedit an exit routine.

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## 10 SORT Example - Simple Sort

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This example will generate a dataset from in stream data and store the data in a temporary file. It is sorted on the first 9 characters of the data in ascending order.

```
//STEP10 EXEC PGM=IEBGENER
//SYSPRINT DD SYSOUT=*
//SYSIN DD DUMMY
//SYSUT2 DD DSN=&&SORTTEMP,DISP=(,PASS),
// UNIT=SYSDA,SPACE=(TRK,3),
// DCB=(LRECL=80,BLKSIZE=0,RECFM=FB)
//SYSUT1 DD *
//STEP20 EXEC PGM=SORT
//SYSOUT DD SYSOUT=*
//SORTIN DD DSN=&&SORTTEMP,DISP=(OLD,PASS)
//SORTOUT DD SYSOUT=*
//SYSIN DD *
* SORT THE DATA USING A STANDARD SORT CONTROL CARD
  SORT FIELDS=(1,9,CH,A)
  END

* SORT THE DATA USING A STANDARD SORT CONTROL CARD
  SORT FIELDS=(1,9,CH,A)
  END
WER276B SYSDIAG= 1864461, 27671196, 27671196, 25684650
WER164B 2,800K BYTES OF VIRTUAL STORAGE AVAILABLE, MAX REQUESTED,
WER164B 20K BYTES RESERVE REQUESTED, 2,028K BYTES USED
WER146B 20K BYTES OF EMERGENCY SPACE ALLOCATED
WER108I SORTIN : RECFM=FB ; LRECL= 80; BLKSIZE= 27920
WER110I SORTOUT : RECFM=FB ; LRECL= 80; BLKSIZE= 27920
WER410B 1,772K BYTES OF VIRTUAL STORAGE AVAILABLE ABOVE THE 16MEG LINE,
WER410B 0 BYTES RESERVE REQUESTED, 1,772K BYTES USED
WER036B G=372
WER177I TURNAROUND SORT PERFORMED
WER045C END SORT PHASE
WER211B SYNC SMF CALLED BY SYNC SORT; RC=0000
WER416B SORTIN : EXCP'S=1,UNIT=3390,DEV=22E6,CHP=141C949C,VOL=WRKT0X
WER416B BSAM WAS USED FOR SORTOUT
WER246I FILESIZE 4,560 BYTES
WER054I RCD IN 57, OUT 57
WER072I NOEQUALS, BALANCE IN EFFECT
WER169I RELEASE 1.3 BATCH 0477 TPF LEVEL 2.1
WER052I END SYNC SORT -
#6005S,STEP20,,DIAG=AC00,628B,9110,64CC,E4EE,4883,0600,4C64

011293323TOM CLANCY D02 0012300
011293327BEN FRANKLIN D03 0046000
011298907WILSON PICKETT D03 0023000
095763331FRED FLINTSTONE D03 0060000
095763336ROBERT KENNEDY D01 D03 0070000
```

101113344	HARRY	WADE	D01	0060000
101113345	MARK	FINK	D01	0070000
101113346	ISAAC	NEWTON	D02	0020000
112323963	NELSON	ROCKERFELL	D02	0080000
112323969	MARK	TWAIN	D02	0030000
161299546	ARNOLD	STANG	D04	0030000
161299636	DONALD	DUCK	D03	0024000
161299638	MICKEY	MOUSE	D02	0040000
235443324	CARL	REINER	D05	0017000
235443423	MATT	LAUER	D04	0080000
266485644	MARTHA	WASHINGTON	D03	0070000
266485648	MARGARET	MEAD	D02	0050000
351593331	FRANK	ADAMS	D02	0030000
351593339	FRANKIE	AVALON	D02	0070000
351593455	JANIS	IAN	D02	0040000
357499626	JAMES	MADISON	D04	0010000
357499633	DONALD	TRUMP	D04	0010050
357499636	ARNOLD	PALMER	D03	0020000
377481009	THOMAS	JEFFERSON	D03	0040000
377481961	JAMES	MONROE	D03	0020000
377481969	JOHN	KENNEDY	D02	0050000
391743322	DOUGLAS	FAIRBANKS	D05	0060000
391743323	HENRY	FORD	D04	0040000
391743324	JOHN	BOOTH	D03	0080000
391743326	JOHN	GRISHAM	D01	0060000
391743455	CARL	RICHARDS	D01	0028000
391756784	CARL	JORDAN	D04	0012000
444887777	FRANK	GIFFORD	D01	0080000
444887788	GEORGE	MEADE	D04	0080000
501203323	ELEANOR	ROOSEVELT	D01	0060000
501203358	ARETHA	FRANKLIN	D02	0010000
501567358	MINNIE	MOUSE	D02	0090000
513333361	DIANE	SAWYER	D01	0045000
513333361	STEVEN	SPIELBERG	D03	0050000
513333362	JOANNE	WOODWARD	D01	0050000
513333363	LAURA	DERN	D04	0030000
513333364	JOHN	MCCAIN	D03	0040000
583793327	JACKIE	GLEASON	D05	0030000
583793328	JOHN	ADAMS	D02	0050000
737330441	BOB	HOPE	D02	0050000
737765441	BRUCE	LEE	D03	0060000
766539435	LIZA	MINNELLI	D03	0040000
766539436	TIM	ALLEN	D01	0070000
812222242	LAURA	BUSH	D05	0080000
812222247	ALBERT	EINSTEIN	D01	0034500
822173342	GEORGE	WASHINGTON	D05	0070000
822173343	JODIE	FOSTER	D01	0070000
822173344	HILARY	CLINTON	D03	0030000
822173347	DON	JOHNSON	D02	0030000
875897247	HERB	FLOWERS	ABC	0034500
912433361	DAISY	DUCK	D01	0030000
912433365	KATIE	COURIC	D04	0060000