RSX–11M/M–PLUS
PDP–11 SORT/MERGE
Installation Guide

Order No. AA–AK92A–TC

April 1984

This manual describes the procedures for installing PDP–11 SORT/MERGE.

OPERATING SYSTEMS AND VERSION: RSX–11M V4.1
RSX–11M–PLUS V2.1

SOFTWARE VERSION: PDP–11 SORT/MERGE V3.0

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CONTENTS

This document tells how to install PDP-11 SORT/MERGE on RSX-11M and RSX-11M-PLUS. The installation requires that you perform these two tasks:

1. Mount the distribution volume
2. Answer the system prompts

After you answer all of the prompts, the installation procedure continues without operator intervention and displays the operations it performs. These operations proceed in the following order:

- Task building the SORT utility
- Task building the MERGE utility
- Installing SORT/MERGE task files
- Copying callable interface support files
- Optionally installing the SORT/MERGE resident library files
- Certifying the success of the installation

PDP-11 SORT/MERGE can be installed by any system user who has a privileged account or who has access to one. The installation, however, is usually performed by a system manager.

You should read this entire document before beginning the installation.

1 RELEASE NOTES

The release notes for SORT/MERGE include important information that is not included in the User's Guide, and you should print a copy after you install SORT/MERGE. The release notes are installed with the software, and they will be available in the account from which the installation was run after the installation is complete. The file name for the release notes is STMGRN.MEM. For example, if you log into [1,41] and install SORT/MERGE from that account, the release notes will be in [1,41]STMGRN.MEM.

2 SYSTEM REQUIREMENTS

Before installation can begin, the system on which you run the installation must have had RMS-11K installed. It must also have the following utilities in the system library:

- PIP utility (PIP.TSK)
- CMP utility (CMP.TSK)
- MACRO assembler
- Task Builder (TKB.TSK)
- FLX utility (FLX.TSK), if the kit is on tape

If you plan to run SORT/MERGE on a system other than the one on which you build it, make sure that RMS-11K was previously installed on the target system (RMS-11 is a subset of RMS-11K and is not sufficient for running SORT/MERGE).

The installation also requires that the system public disk structure have at least 2500 free blocks. Of these blocks you need approximately:

- 390 contiguous blocks to build the maximum size SORT
- 370 contiguous blocks to build the maximum size MERGE
- 105 contiguous blocks to build the specification file translator

The exact number of contiguous blocks needed for successful installation varies, depending on your disk structure.

If your system meets the above requirements, you can install PDP-11 SORT/MERGE.

3 UTILITY INSTALLATION AND CERTIFICATION

It takes between 20 and 45 minutes (depending on your CPU type and disks) to install SORT/MERGE on RSX-11M V4.1 or RSX-11M-PLUS V2.1.

Use a hardcopy terminal, if available, since you may need to examine a listing for errors.

To start the installation, follow these steps:

1. After logging in on a privileged account, physically mount the tape or disk from your kit. When mounting a disk, you may wish to depress the write protect switch on the disk drive. This provides maximum write protection to your kit contents during the installation procedure.

2. Make sure your terminal is in MCR command line mode. If it is not, use the following command:

```
SET TERMINAL MCR
```

3. Logically mount the tape or disk.

   If the kit is on disk, use the following command to ensure read-only access (replace ddnn: with the logical name for the disk drive on which you mounted the kit):

```
MOUNT ddnn:SM3KIT/NOWRITE
```

   If the kit is on tape and you are installing it on an RSX-11M-PLUS system, use the following command (replace ddnn: with the logical name for the tape drive on which you mounted the kit):

```
MOUNT ddnn:SM3KIT/FOR
```

   If the kit is on tape and you are installing it on an RSX-11M system, you do not need to logically mount the tape.

4. Copy the indirect command file from the kit using one of these commands (replace ddnn: with the logical name for the device on which you mounted the kit):

   For a kit on disk:

```
PIP SY:=ddnn:[1,2]STMGV3.CMD
```

   For a kit on tape:

```
LIX /RS=ddnn:[1,2]STMGV3.CMD/DO
```

5. Execute the indirect command file STMGV3.CMD as follows:

```
@STMGV3
```

After you execute the indirect command file, the STMGV3 procedure prompts you with the two questions shown below. When responding, replace MM0 with the logical name for the disk or tape drive you are using (do not include the colon). The account designated [X,Y] varies according to the user's system. Replace [1,54] with the account in which you want the SORT/MERGE task files to reside (include the brackets).

```
*  What device is your distribution kit mounted on (NO COLON)
*                                          [S RT2-4]: MM0 (RET)
*
*  What directory do you want the SORT/MERGE tasks assigned to
*                                  ( [X,Y] ) [S]:  [1,54] (RET)
```

After this step, the following display introduces the dialogue that allows you to define the attributes for SORT/MERGE on your system. The attributes that you should select depend on the requirements and resources of your system. The default attributes in the display provide optimal SORT/MERGE performance for typical systems. Read the PDP-11 SORT/MERGE User's Guide to learn about the functions of specific attributes.

In this dialogue, the default answers are shown in angle brackets (for example, <YES>); you can select any default answer simply by pressing <RETURN>. When you have a choice among different alphabetic responses, you can type only the first letter and then press <RETURN>. If you give an invalid answer to a question, the question is redisplayed.

For the purposes of this installation document, the questions in the installation procedure have been numbered. When you install PDP-11 SORT/MERGE, the questions will not be numbered.

```
*****************************************************
*     This is the beginning of the dialogue to      *
* define the attributes of your SORT/MERGE utility  *
*****************************************************

This procedure will, by default, build and install
SORT and MERGE for optimum performance. The utility
SORT and MERGE tasks will have the following attributes:

SORT  built at 32K WORDS / MERGE built at 32K WORDS
Have ASCII as the default character collating sequence
Process duplicate records
Do a non-stable SORT and MERGE
Retry 2000 times when trying to read a locked bucket
Allow 55% of the SORT work area for SORT tree structure
Allow 30% of the MERGE work area for MERGE data structure
Use five (5) work files for SORT
Use the RECORD sort process
Sequence check the input files for MERGE

Additionally, the default will NOT build the
SORT and MERGE callable subroutines as a resident library.


If you want the installation to proceed using
these defaults, answer YES. If you want to
change any of these defaults, answer NO.

Do you want to proceed with the default installation
<YES>?
```

If you answer YES, go to Question 22 to verify your selection of attributes. If you answer NO, go to Question 1.

1. If you want to change the default size of the SORT or MERGE task, answer YES, otherwise answer NO.

   ```
   Do you want to change the default task size   <NO>?
   ```

If you answer NO, go to question 5. If you answer YES, go to Question 2.

2. The size of the final SORT and MERGE tasks can be varied by changing the default size of the work area. The work area is currently set to be the maximum allowed by your operating system in order to give SORT/MERGE the optimum performance.

   ```
   Which task size do you want to change
   SORT      MERGE      BOTH      NEITHER          <BOTH>?
   ```

If your answer is either BOTH or SORT, go to Question 3. If your answer is MERGE, go to Question 4. If your answer is NEITHER, go to Question 5.

3. The maximum SORT task size is 32K words.
   The minimum SORT task size is 17K words.
   The chosen size must be a whole number between these inclusive limits. Decimals will be truncated.

   What size do you want your SORT task to be <32>?

If you answered SORT to Question 2, go to Question 5. If you answered BOTH to Question 2, go to Question 4, then go to Question 5.

4. The maximum MERGE task size is 32K words.
   The minimum MERGE task size is 17K words.
   The chosen size must be a whole number between these inclusive limits. Decimals will be truncated.

   What size do you want your MERGE task to be <32>?

5. If you want to change any of the default runtime options, answer YES, otherwise, answer NO.

   Do you want to change any of the default runtime options <NO>?

```
**************************************************
*  IF YOU CHANGE ANY OF THE DEFAULTS, BE SURE TO  *
*  INFORM YOUR USERS, SINCE THOSE DEFAULTS MAY    *
*  NOW BE DIFFERENT FROM THE DEFAULTS STATED IN   *
*  THE SORT/MERGE DOCUMENTATION!                  *
**************************************************
```

If you answer NO, go to Question 21. If you answer YES, go to Question 6.

6. By default, SORT/MERGE will use the ASCII collating sequence when operating on character data keys.

   Do you want to change the default collating sequence <NO>?

If you answer NO, go to Question 8. If you answer YES, go to Question 7, and then go to Question 8.

7. The choices are ASCII, EBCDIC, or MULTINATIONAL.
   What do you want the default character key collating sequence to be?

   ASCII EBCDIC MULTI <ASCII>?

8. By default, SORT/MERGE will process records which are found to have duplicate key fields.

   If you wish to have SORT/MERGE eliminate records with duplicate keys by default, answer YES.

   If you wish to have SORT/MERGE keep all records with duplicate keys by default, answer NO.

   Should SORT/MERGE eliminate duplicate records by default <NO>?

If you answer NO, go to Question 9 and then Question 10. If you answer YES, the following message is displayed:

```
*************************************************************
* YOU HAVE CHOSEN TO ELIMINATE DUPLICATE RECORDS BY DEFAULT.  *
* STABLE SORT/MERGE AFFECTS DUPLICATE RECORDS. THEREFORE, THE *
* STABLE AND NODUPLICATES OPTIONS ARE MUTUALLY EXCLUSIVE.     *
* YOUR DEFAULT FOR THE STABLE OPTION MUST BE NOSTABLE.        *
*************************************************************
```

If you answered YES, go to Question 10.

9. Stable SORT/MERGE imposes extra overhead during the key comparison process. For this reason, the default is for a nonstable SORT/MERGE. If you wish to change this default, answer YES, otherwise answer NO.

   Do you wish the default to be a stable SORT/MERGE <NO>?

10. The SORT work area is divided into two areas, one for the SORT tree data structure, and one for the RMS I/O data structures. For SORT, the default division giving optimum performance is 55% to the tree and 45% to I/O. If the majority of the files you are sorting requires a large number of I/O data structures (for example, INDEXED files with many keys, or a consistently large number of input files), you may want to alter the split so that there will be enough room for the I/O requirements.

    If you want to change the default split, answer YES, otherwise answer NO.

    Do you want to change the SORT default split <NO>?

If you answer NO, go to Question 12. If you answer YES, go to Question 11 and then 12.

11. What percentage of the work area should be allotted to the SORT tree data structure? The lower limit is 45%. The upper limit is 65%. Your answer must be in whole numbers. <55>?

12. The MERGE work area is divided into two areas, one for the MERGE data structure and one for the RMS I/O data structures. For MERGE, the default division giving optimum performance is 30% to the data structure and 70% to the RMS data structures.

    If the majority of the files you are merging requires a large number of I/O data structures (for example, INDEXED files with many keys, or a consistently large number of input files), you may want to alter the split so that there will be enough room for I/O requirements.

    If you want to change the default split, answer YES, otherwise answer NO.

    Do you wish to change the MERGE default split <NO>?

If you answer NO, go to Question 14. If you answer YES, answer Question 13 and then go to Question 14.

13. What percentage of work area should be allotted to the
    MERGE data structure? The lower limit is 20%.
    The upper limit is 40%.
    Your answer must be in whole numbers. <30>?

14. The optimum number of work files for SORT is 5.
    If you wish to change this default, answer YES,
    otherwise answer NO. <NO>?

If you answer NO, go to Question 16. If you answer YES, go to Question 15 and then to Question 16.

15. The minimum number of work files is 3, the maximum is 10.
    How many work files should SORT use by default? <5>?

16. By default, SORT will carry complete records throughout
    the process and output complete records. If you are sorting
    large records with small keys and wish to conserve disk space,
    you may change this default.

    ```
    ************************************************************
    *  PLEASE NOTE THAT FOR SORTS USING OTHER THAN THE RECORD  *
    *       PROCESS, ALL INPUT FILES MUST RESIDE ON DISK.      *
    ************************************************************
    ```

    If you wish to change the default sort process, answer YES,
    otherwise answer NO.

    Do you wish to change the default sort process <NO>?

If you answer NO, skip Question 17 and answer Questions 18 and 19. If your answer is YES, answer Questions 17-19.

17. What should the default sort process be?
    RECORD TAG ADDRESS INDEX <RECORD>?

18. By default, MERGE will sequence check the input records.
    If you want to change this default, answer YES,
    otherwise answer NO. <NO>?

19. SORT/MERGE will read input files which are in use
    and opened in a shareable mode. If SORT/MERGE
    encounters a locked bucket, the operation will be
    retried a maximum of 2000 times before a fatal error
    is returned. If you want to change the number of
    retries, answer YES, otherwise answer NO.

    Do you want to change the number of retries <NO>?

If you answer NO, go to Question 21. If you answer YES, go to Question 20 and then to Question 21.

20. The maximum number of retries allowed is 9999.
    The minimum number of retries allowed is 1.
    How many times should SORT/MERGE try to
    re-read a locked bucket <2000>?

```
21. By default, the callable SORT and MERGE subroutines will
    be available via two object libraries. Additionally, if
    you want to build a combined callable SORT and MERGE
    resident library answer YES, otherwise answer NO.

    Do you want to build a combined callable SORT and MERGE
    cluster library                                          <NO>?
```

This completes the selection of attributes for your SORT/MERGE utility. The installation procedure now shows you the attributes that you have selected, and you have the opportunity to change the attributes. (The attributes shown in this example are not necessarily the default attributes, nor are they necessarily recommended for your system -- they are only a sample.)

```
22. ***********************************************
    *  Your SORT and MERGE product will be built  *
    * according to the following specifications:  *
    ***********************************************

    SORT  TASK SIZE IS 32K WORDS
    MERGE TASK SIZE IS 32K WORDS
    YOU HAVE THE FOLLOWING RUNTIME DEFAULTS:
        ASCII CHARACTER COLLATING SEQUENCE
        RECORDS WITH DUPLICATE KEYS ELIMINATED
        NO STABLE PROCESS
        2000 LOCKED BUCKET RETRIES
        55% OF WORK AREA FOR SORT DATA STRUCTURES
        45% OF WORK AREA FOR SORT RMS DATA STRUCTURES
        30% OF WORK AREA FOR MERGE DATA STRUCTURES
        70% OF WORK AREA FOR MERGE RMS DATA STRUCTURES
        03 WORK FILES
        RECORD SORT
        DO NOT SEQUENCE CHECK MERGE INPUT
    A SORT/MERGE RESIDENT/CLUSTER LIBRARY WILL BE BUILT

    ARE THE ABOVE DEFAULTS THE DESIRED ONES              <YES>?
```

If you answer NO, go back to Question 1 and repeat the dialogue procedure. If you answer YES, the following message is displayed:

```
***********************************************
*  This is the end of the installation dialogue. *
*    The installation will now proceed without   *
*         further operator intervention.         *
***********************************************
```

The installation procedure then continues without operator intervention. It will task build and install the utilities, place the callable overlay description files in the system library directory, and then make a verification pass to ensure that the utility has been properly installed. If an error is encountered, the following message is displayed:

```
????????????????????????????????????????????
?                                            ?
?   Either SORT or MERGE did not install     ?
?   properly. Contact your software          ?
?   specialist for further assistance!       ?
????????????????????????????????????????????
```

If no errors are encountered, the following messages will be displayed and the installation is complete:

```
PDP-11 SORT/MERGE V3.0 is now built.


END STMGV3.CMD - PDP-11 SORT/MERGE VERSION 3.0
```