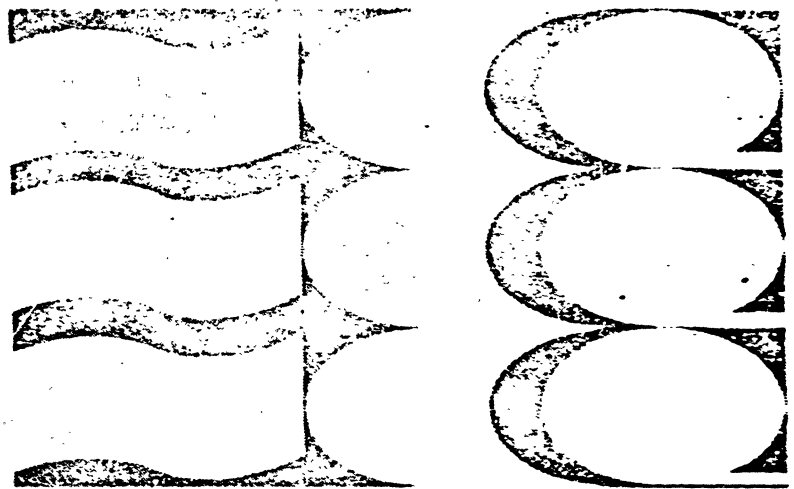# UNIVAC ENGINEERING PROGRAMMING LIBRARY

ENGINEERING PROGRAMMING SECTION - DATA PROCESSING DIVISION, ROSEVILLE, MINNESOTA

9400 On-Line Tape Copy
Program Description Drawing

UNIVAC
ENGINEERING PROGRAMMING LIBRARY

9400 On-Line Tape Copy
Program Description Drawing

	SIGNATURE	TITLE	DATE
APPROVAL			
APPROVAL			
APPROVAL			
APPROVAL			

Associate Idsting Revision is A

REVISION STATISTICS RECORD

4091653

DWG REV	MSTR REV	RELEASE DATE	DESIGNER NAME	EIR NUMBER	FCO NUMBER
–	F	10/10/69	O. J. Curl	A 89798	A 30190029
A	G	3/06/70	R. H. Dee	A 89800	A 30190030

REVISION DESCRIPTION RECORD   4091653

REV	DESCRIPTION
-	Release
A	Document upgraded to describe the program capability.

4091653

Table of Contents

409165<

1.0   INTRODUCTION

1.1   Purpose - This document describes the 9400 On-Line Tape copy Program and the required operating information.

1.2   Major Objectives - This program enables the user to make up to 15 copies of a magnetic tape - including Master Tapes. The number of copies that can be produced during one program execution is limited by the user's equipment configuration.

1.3   Equipment Configuration - This program is designed to make up to 15 copies of a magnetic tape using UNISERVO VI-C, XIII. or XVI Magnetic Tape Units on the Multiplexer and/or Selector I/O Channels of the 9400 Processor. The UNIVSERVO types can be used in any combination.

1.4   Associated Software - This program is designed to operate under the 9400 Tape Operating System Supervisor.

1.5   Reference Documents - The following documents contain information relevent to the design and operation of this program.

Drawing	Revision	Title
4091627		9400 Tape Copy Service Routine
UP-7689		9400 Tape Operating System Supervisor
UP-7585		9400 Job Control for Disc Subsystem

1.6   Restrictions -

2.0   FUNCTIONAL DESCRIPTION - The On-Line Tape Copy Program copies a magnetic
tape by reading data from an input device and writing the same data
on up to 15 output devices. Initially the program rewinds each assigned
tape unit. Then each data block and tape mark on the input (Master)
tape is recorded on each output tape. The copy sequence ends when the
program detects two sequential tape marks on the input tape. Each tape
is again rewound. In the next sequence the program compares the output
tapes with the input tape in the following manner.

A.   The first block of the input tape is read. Two checkwords are
formed and saved for later use. First, a checkword containing
the sum of all bytes of data in the block is formed. Then all
data bytes are EXCLUSIVE ORed to form the second checkword.

B.   The first block of each output tape is read and the checkwords are
formed as described in step 'a' above. The checkwords are compared
with those from the input tape. If they are not equal, the pro-
gram prints a copy error message and deletes the output device in
error.

C.   The second block of the input tape is then read. The operation
described in steps 'a' and 'b' is repeated until two sequential
tape marks are encountered. At this time, all tapes are rewound
and the program terminates.

This program operates under the 9400 Tape Operating System Supervisor
(TOS). All I/O recovery is handled by the TOS. If a device fails
recovery it is deleted by the program and the operator is notified by
a message containing the deleted device address. The program continues
if possible.

All magnetic tape devices used in the program must be defined by DVC-LFD
control card pairs in the job control stream. No other parameters
are accepted or options offered by the program.

The program determines which devices have been assigned by performing
a RDFCB for each of the 16 valid file names. A message containing
the file name and device address is printed for each defined device
whose file name is valid.

If no Master (input) file is found the program issues a message to
that effect and terminates the job. If no output files are found the
program issues a message to that effect and terminates the job.

409 1653

3.0   <u>OPERATING PROCEDURES</u> (For Tape Operating System)

3.1   <u>Job Control Stream</u> - The operation of the Tape Copy program is deter-
mined by the job control stream card deck. In the example shown below
and described in section 3.2, the Tape Copy program is directed to
read the tape whose file name is MASTER and reproduce it on COPYØ1 and
COPYØ2. The tape which contains the Tape Copy program is mounted
on TCOPY.

```
// JOB TCOPY
// DVC 3*
// LFD PRNTR
// DVC 6
// VOL LOAD
// LFD TCOPY
// DVC 7
// VOL IN
// LFD MASTER
// DVC 8
// VOL OUT
// LFD COPYØ1
// DVC 9
// VOL OUT
// LFD COPYØ2
// EXEC TCOPYOL,, TCOPY
/&
```

*The device numbers are only examples. The device numbers indicate
a type of device which is determined at (System Software) system
generation.

3.2   <u>Job Control Stream Description</u> - This section describes the job control
stream example shown in section 3.1. For a more detailed description,
consult UP-7585-9400 Job Control for Disc Subsystems.

<u>Card</u>	<u>Description</u>
// JOB TCOPY	Indicates the beginning of control information for a job. Specifies TCOPY as job name.
// DVC 3 // LFD PRNTR	Requests allocation of a peripheral device to the job. Device type is a logical unit 3 type as defined at systems generation. LFD statement applies file name PRNTR to this device.

// DVC 6
// VOL LOAD
// LFD TCOPY
	Requests allocation of logical unit 6 type device to the job. Applies file name TCOPY to this device. VOL statement causes volume name LOAD to be displayed in job allocate and mount message opposite the logical unit number 6 and the device identification.

Card (cont.)   Description (cont.)   4091653

// DVC 7   Requests allocation of logical unit 7 type device
// VOL IN   to the job. Applies file name MASTER to this device.
// LFD MASTER   Volume name IN will be displayed in job allocate
                  and mount message.

// DVC 8   Requests allocation of logical unit 8 type device
// VOL OUT   to the job. Applies file name COPY∅1 to this device.
// LFD COPY∅1   Volume name OUT will be displayed in job allocation
                  and mount message.

// EXEC TCOPYOL,TCOPY   Directs the Supervisor to load and execute
                  the program whose load name is TCOPYOL from the device
                  whose file name is TCOPY.

/&   Indicates end of job control stream.

3.3   Valid File Names - The LFD statements which define files to be used by
      the Tape Copy Program must specify only valid file names. The input
      tape file name must be MASTER. An output tape file name may be any
      of the following: COPY∅1, COPY∅2, COPY∅3, COPY∅4, COPY∅5, COPY∅6, COPY∅7,
      COPY∅8, COPY∅9, COPY1∅, COPY11, COPY12, COPY13, COPY14, COPY15.
      A different file name must be used for each device.

3.4   Message Descriptions

3.4.1   Error Messages -

  1. Message - WRITE FAILURE

      Cause - No file named MASTER was assigned to this job. Job
              is terminated.

  2. Message - NO OUTPUT FILE JOB TERMINATED

      Cause - No output files were assigned to this job. Job is
              terminated.

  3. Message - READ FAILURE

      Cause - An unrecoverable read error or an unexpected read condition
              has occurred. This message will be followed by a Device
              Deleted message.

  4. Message - WRITE FAILURE

      Cause - An unrecoverable write error or an unexpected write
              condition has occurred. This message will be followed
              by a Device Deleted Message.

4091653

5. **Message** - REWIND FAILURE

   Cause - An unrecoverable rewind error or an unexpected rewind condition has occurred. This message will be followed by a Device Deleted message.

6. **Message** - COPY ERROR DEVICE AB2

   Cause - During the compare sequence, the data from an output tape did not compare with the data from the input tape. This message will be followed by a Device Deleted message.

7. **Message** - BUFFER OVERFLOW JOB TERMINATED

   Cause - The program attempted to read a block larger than 4096 bytes. Job is terminated.

8. **Message** - DEVICE AB2 DELETED

   Cause - This message occurs after a Read, Write or Rewind failure or a Copy Error.

9. **Message** - INSUFFICIENT DEVICES REMAINING JOB TERMINATED

   Cause - This message occurs if all of the output devices have been deleted or if the input device has been deleted.

3.4.2 <u>Informative Messages</u> -

1. **Message** - MESSAGE = AB∅

   Cause - The program prints out the file name and the device address of the device address of the input tape.

2. **Message** - COPYnn = AB1
   Where nn = ∅1 to 15

   Cause - The program prints out the file name and the device address of each output tape.

7

4091653

3.5   Sample Job Control Stream

```
// JOB TCOPY
// DVC 5
// LFD PRNTR
// DVC 6
// VOL LOAD
// LFD TCOPY
// DVC 7
// VOL IN
// LFD MASTER
// DVC 8
// VOL OUT
// LFD COPYØ1
// DVC 9
// VOL OUT
// LFD COPYØ1
// DVC 9
// VOL OUT
// LFD COPYØ2
// EXEC TCOPYOL,,TCOPY
/&
```

3.6   Sample Console Sheet

```
●  ØØ:Ø1  RUN  TCOPY ⑧
   IØØ:Ø1   Ø1  JCØ1  1Ø  3 TCOPY     MS      MB
   IØØ:Ø1.  Ø1  JCØ2  1Ø  ØØ3 = EBØ—         ØØ6=AC1—ØØLOAD  ØØ7=AC2—ØØØØIN
   IØØ:Ø1   Ø1  JCØ2  1Ø  ØØ8 = AC3—ØØØOUT ØØ9=AC4—ØØØOUT
   IØØ:Ø1   Ø1  JCØ3  1Ø  MT RDY?
●  ØØ:Ø1  RE  1Ø ⑧
   IØØ:Ø2   Ø1  VOLUME CHECKING NOT IMPLEMENTED
   IØØ:Ø2   Ø1  JCØ5  1Ø  RDY  GO?
●  ØØ:Ø2  GO  1Ø ⑧
   IØØ:Ø2   Ø1  JCØ6  1Ø  TCOPY       :    :   :663
   IØØ:Ø2   1Ø  MASTER=AC2
   IØØ:Ø2   1Ø  COPYØ1 = AC3
   IØØ:Ø2   1Ø  COPYØ2 = AC4
   IØØ:1Ø   Ø1  JTØ1  1Ø  TCOPY   RUN  TIME  :1 : 5:755
```

10