



DECUS

PROGRAM LIBRARY

DECUS NO.	12-18
TITLE	"FAILSAFE"
AUTHOR	Gary B. Jennings
COMPANY	Digital Equipment Corporation Northbrook, Illinois
DATE	November 23, 1970
SOURCE LANGUAGE	LAP6

"FAILSAFE"

DECUS Program Library Write-up

DECUS No. 12-18

/PROGRAM "FAILSAFE"
/GARY B. JENNINGS - CHICAGO OFFICE,
/DIGITAL EQUIPMENT CORPORATION.
/
/MINIMUM HARDWARE REQUIREMENT IS A PDP-12B WITH 8K OF CORE MEMORY.
/
/PROGRAM EXECUTION TIME IS LESS THAN 3 MINUTES.
/
/THIS PROGRAM PROVIDES A FAILSAFE METHOD OF DUPLICATING A LINC TAPE ON
/UNIT 0 ONTO A LINC TAPE ON UNIT 1.
/
/THE TAPES ARE DUPLICATED BY TRANSFERRING 36 OCTAL BLOCKS AT A TIME, FIRST
/READING FROM UNIT 0, THEN WRITING AND CHECKING ON UNIT 1. BLOCKS READ
/FROM UNIT 0 ARE COUNTED IN THE MQ. BLOCKS WRITTEN ON UNIT 1 ARE COUNTED
/IN THE AC. BLOCKS CHECKING ARE COUNTED IN THE MB.
/
/AFTER THE TRANSFER IS COMPLETE, BOTH UNITS ARE REWOUND AT THE SAME TIME AND
/THE COMPARE PORTION OF THE PROGRAM IS INITIATED.
/
/UNIT 0 IS READ BLOCK BY BLOCK AND THE COMPUTED CHECKSUMS FOR EACH BLOCK
/ARE STORED IN MEMORY. THEN UNIT 1 IS READ BLOCK BY BLOCK AND ITS COMPUTED
/CHECKSUMS ARE COMPARED WITH THOSE FROM UNIT 0. WHEN A CHECKSUM/CHECK-
/SUM ERROR IS ENCOUNTERED, THE PROGRAM HALTS WITH THE INCORRECT BLOCK
/NUMBER IN THE ACCUMULATOR. DEPRESS "CONTINUE" TO RESUME CHECKING.
/
/AT THE END OF THE PROGRAM, THE NUMBER OF ERRORS ENCOUNTERED ARE DISPLAYED
/IN THE ACCUMULATOR WHILE BOTH TAPE UNITS REWIND AT THE SAME TIME AND ENTER
/DIAL.
/
LMODE
SEGMENT 0
*0020
BEGIN, CLR
GO, LDA I
1000
STA
RTRGT
STC WTRGT/START ADDRESS.
LDA I
0020
STA

```

RBANK
STC WBANK
RDO, LDA I
RBANK, 0020
AXO/BANK, EXT. ADD.
READ, LDA I
RTRGT, 0000/START. ADD.
TMA
LDA
WBLOK
ADA I
-1
RDE I
RBLOK, 0000
LDA I
0001
ADM
RBLOK
JMP SETUP1
LAM
RTRGT
LDA
RBLOK
SAE I
1000
SKP
JMP WDO/DONE READ TAPE
LDA
RTRGT
AZE
JMP READ/FILL CORE
LDA
RBANK
SAE I
0020
JMP WDO/DONE READ 36 BL
LDA I
1020
STC RBANK
JMP RDO/FILL UPPER 4K
WDO, LDA I
WBANK, 0020
AXO/BANK, EXT ADD.
WRITE, LDA I
WTRGT, 0000/START ADDRESS
TMA
LDA
WBLOK

```

```

ADA I
-1
WRI I 1Ø
WBLOK,ØØØØ/WRITE ON UNIT 1
LDA I
ØØØ1
ADM
WBLOK
JMP SETUP1
LAM
WTRGT
LDA
WBLOK
SAE I
1ØØØ
SKP
JMP CHEK/DONE WRITE ALL.
LDA
WTRGT
AZE
JMP WRITE
LDA
WBANK
SAE I
ØØ2Ø
JMP CHEK/DONE WRI 36 BLK
LDA I
1Ø2Ø
STC WBANK
JMP WDO/WRITE UPPER 4K
CHEK, LDA
WBLOK
ADA I
-1
CHK I 1Ø
CBLOK,ØØØØ
SAE I
7777
JMP REWRI/BAD TAPE, WRITE
LDA
CBLOK
SAE I
Ø777
SKP
JMP COMPAR
LDA I
ØØØ1
ADM
CBLOK
SAE
RBLOK
JMP CHEK/NOT DONE CHEK.

```

```

ADA I
-1
JMP GO
REWRI, LDA I
0020
STC WBANK
LDA I
1000
STC WTRGT
LDA I
-36/REWRITE 36 BLKS
ADM
WBLOK
STC CBLOK
JMP WDO
COMPAR, LDA I
0020
ESF/ I/O PRESET.
CLR
LDA I
14
AXO/HLD MOT, N.P.
MTB I
0000/UNIT 0 IN MOTN
SET I 1
-400/DELAY CONSTANT.
XSK I 2
JMP.-1
XSK I 1
JMP.-3
MTB I 10
0000/UNIT 1 IN MOTN.
JMP SETUP0
LDA I
4000
STA
BLOK4
STC BLOK14
LDA I
6001
STA
BLOK6
STC BLOK16
SET I 7
0000
CHK
0000
STD
JMP.-1/TAPE DONE?
LDA I
0020
ESF/ I/O PRESET.

```

```

LDA I
0010/NO PAUSE ONLY!
AXO
CLR
JMP READ1
STD
JMP.-1/TAPE DONE?
GO1, JMP READ2
LDA I
0002
ADM
BLOK4
JMP SETUP2
LDA I 3
ADM
5
XSK I 4
JMP.-4
LDA
5
STA I 1
XSK I 2
SKP
HLT
JMP SETUP3
STD
JMP.-1
JMP READ1
LDA I
0002
ADM
BLOK6
JMP SETUP4
LDA I 3
ADM
5
XSK I 4
JMP.-4
LDA
5
STA I 1
XSK I 2
SKP
JMP UNIT1
JMP SETUP3
STD
JMP.-1/TAPE DONE?
JMP GO1
UNIT1, LDA I
0020
ESF/ I/O PRESET.
CLR

```

```

CHK
777/STOP UNIT Ø.
LDA I
1Ø
AXO/NO PAUSE ONLY.
CLR
JMP SETUPØ
JMP READ3
STD
JMP.-1/TAPE DONE?
GO2, JMP READ4
LDA I
ØØØ2
ADM
BLOK14
JMP SETUP2
LDA I 3
ADM
5
XSK I 4
JMP.-4
LDA
5
SAE I 1
JMP ERROR1
MOVE1, XSK I 2
SKP
HLT
JMP SETUP3
STD
JMP.-1/TAPE DONE?
JMP READ3
LDA I
ØØØ2
ADM
BLOK16
JMP SETUP4
LDA I 3
ADM
5
XSK I 4
JMP.-4
LDA
5
SAE I 1
JMP ERROR2
MOVE2, XSK I 2
SKP
JMP RETURN
JMP SETUP3
STD
JMP.-1/TAPE DONE?

```



```

JMP GO2
READ1,RDE I
BLOK4,4000/EVEN BLK,UNIT 0
JMP 0
READ2,RDE I
BLOK6,6001/ODD BLKS,UNIT 0
JMP 0
READ3,RDE I 10
BLOK14,4000/EVEN BLK,UNIT 1
JMP 0
READ4,RDE I 10
BLOK16,6001/ODD BLKS,UNIT 1
JMP 0
ERROR1,LDA
0006
XSK I 7/COUNT NO. ERRORS
HLT
JMP MOVE1
ERROR2,LDA
0006
XSK I 7/COUNT NO. ERRORS
HLT
JMP MOVE2
SETUP0,SET I 1
0777/BEG.STORE SUMS.
SET I 2
-1000/NO. BLOCKS.
SET I 6
0000/COUNT BLKS IN 6
JMP 0/EXIT SETUP0.
SETUP1,CLR
LDA
RBLOK
ADA I
-1
ROR 14/BLOK NO. TO MQ.
LDA I
0400
JMP 0/EXIT SETUP1
SETUP2,SET I 3
3777/0000 OF DATA FL
SET I 4
-400/NO. WORDS/BLOCK
SET I 5
0000/ADD WORDS HERE.
JMP 0/EXIT SETUP2
SETUP3,XSK I 6/COUNT BLOK NOS.
LDA
0006
ROR 14/BLOK NO. TO MQ.
COM

```

7000/-BLOK NO. TO AC.
JMP 0/EXIT SETUP3
SETUP4, SET I 3
2777/1000 OF DATA FL
SET I 4
-400/NO. WORDS/BLOCK.
SET I 5
0000/ADD WORDS HERE.
JMP 0/EXIT SETUP4
RETURN, LDA I
0034/EX. AD, HLD MO, NP
AXO
MTB I 10
0300/UNIT 1 IN MOTN.
LOAD, LDA I
DTRGT, 4000
TMA
LDA
0007/NO. ERRORS TO AC
RDE I
DBLOK, 0300
STD
JMP. -1/TAPE DONE?
LDA I
0400
ADM
DTRGT
LDA I
0001
ADM
DBLOK
SAE I
0310/DIAL IN CORE?
JMP LOAD
LDA I
0020
ESF/ I/O PRESET.
LIF 2
LDF 3
JMP 20/ENTER DIAL
/END FAILSAFE