

FOUND

1950



1 026 6506 2

e1, text /no subfile of /
 e2, text /directory full/
 e3, text / not found/
 e4=e6+5 /text/field /
 e5, text / not assigned/
 e6, text /can't assign field /
 e7, text /illegal field number/
 e8, text / has subfiles/
 e11, text /tape error /
 e12, text /tape full/
 e13, text /anomalous directory/
 e14, text /anomalous text /
 e15, text /no write permit, type an "r" to try again /
 e20, text / 1/
 e22, text /directories do not match - both are ok/
 e23, text / 1 and /2 ✓
 e24, text /anomalous tape / *e21, text / 2 ✓*
 e25, text /hardware failure/
 e26, text /write not allowed/
 e27, text /drum error/
 e30, text /tape /
 e31, text / busy /
 e32, text /push down capacity exceeded /

Inaccurate

/format of directory entries

↪ /word 0: pointer to next block on this level (0 ⇒ no more blocks on level)
 /word 1: 1st three chars of name
 /word 2: 2nd three
 /word 3: 3rd three
 ↪ /word 4: pointer to value (-0 ⇒ block in free chain)
 / bit 0 => value is a file; otherwise, list of subfiles
 / if bit 0 = 1 then the format of word 4 is the same as the
 / format of a tape block word
 /ntb contains pointer to directory
 /ntb+1 contains free directory block list
 /ntb+2 to ntb+777 contain 146 directory blocks

/format of tape block entries in directory

↪ /each word has bit 0 = 1
 /the right half of each word is a pointer to the next tape block
 /bits 2-8 of each word indicate the number of all-zero blocks to be
 /placed before the next block
 /a right half that is all 0 indicates that this is the last block of
 /a file that is nonzero. All zero blocks may follow.
 /dbt to dbt 777 contains 1000 tape block words
 /the file system and the directories occupy tape blocks 0-11 and
 /773-777. These blocks are chained together starting at word 0.
 ↪ /The tape name is encoded in the zero block field (bits 2-8) of
 /dbt to dbt 11

2F ✓
round file ~~72~~ jun71

ffb_=12 /first free tape block
bs_=2 /block spacing
ebuf_=7600 /edit list
wbuf_=7700 /drum work buffer (small swaps)
bbuf_=7740
b=bbuf+32 /e.t. 20372
tbufl=6000 /tape buffer

0/ jmp in /entry to update file system

org_=100

org/ ~~70612~~ ✓ /date

hlt
TXAP|
law 16
dap tvk
lio ([ffb-1]*i+1
law 500

tvk, ivk /tape ivk

rrr, iam /change to jmp .-2 when error in w

lem
law 34
.ivk0:, ivk 100

dck, dzm ;dcna /directory checker

dzm ;dcnb
dzm ;bck
lac .nop
dac tyo.
dap dcf
jmp pa

dcaa, adm dcnb
dca, lac .ivk0
dac tyo.

law pdl
dap pdp
law 600
dap dcf

lac dbt+4 /number of usable blocks (usually 766)

sas dcna /wrong number of tape blocks
jmp erb

law 146
sas dcnb

jmp erb /wrong number of directory entries

dsd, jmp cr

constant

12 June

RPH-2 RPH-1

28/6

E

Latest on RPH-0

Called round 1/02

latest on JFC-4

```

erp,      xct dcf          /print number of blocks in bottom level file
          jmp ptt
          jdp car
          TXXA
          jdp prz
.lai:,    lai
          jdp ocp

rst,      law pdl          /reset, garbage collect
          dap pdp
          jmp rsp

rsj,      TXA
          jdp flh

rsp,      lxr (ntb+2
rsa,      lac i 4
          TAAP|
          jmp rsj
          TAAM
          and (200000
          TA=|

rsd,      jmp rsb
          lac i 4
          jdp uch
          law i 0
          dac i 4
          lac ntb+1
          dac i 0
          law ntb
          XMAA
          dac ntb+1

rsb,      law 5
          A+XAX
          sas (ntb+1000
          jmp rsa
          skp 3
          jmp q
          skp 20

wrđ,      jdp wdy          /`write directory` command

```

cr,

```
cla 7 /command loop
dap e7f
dap cd
dap gof
dap sff
dap stm
dap sbf
cks
ril 8s
spi
law 600
dap prf
sza
law 102
dac ;as
law 1
jdp saf
jdp car
lac .add /400000
dac ;ftp /file type
law i 3 /number of retries on tape error
dac ;ttr
jsp ll /get command
nop /
A+XX| /cr
ZX /space
lac van
dip etb
dip tbd
lio (770000
lac i tbl
dap dsd
xor van
A←IP|
jmp dck /dispatch on command
SXX
jmp cm
```

cm,

tbl,	660000	fil	/file
	650000	edi	/edit
	610000	app	/append
	220000	sav	/save
	240000	uns	/unsave
	640000	del	/delete
	670000	go	/go
	430000	loa	/loadgo
	510000	ren	/rename
	470000	pri	/print file
	230000	tex	/text
	450000	ngt	/assemble
	620000	bin	/binary
	150000	abl	/append block (for FORTRAN)
	160000	rbl	/read block (for FORTRAN)
	etb,	q	
470000		pa	/print all
470000		pt	/print top level
000000		cr	/null
650000		edz	/edit
670000		goa	/go
620000		ddt	/back to ID
450000		ngz	/assemble
200000		sys	/tape 0
010000		sys	/tape 1
020000		sys	/tape 2
030000		sys	/tape 3
040000		sys	/drum filesys
050000		sys	/drum FORTRAN
060000		sys	/drum tape 6
070000		sys	/drum tape 7
300000		you	/tape name
230000		ptt	/print totals
260000		wrd	/write directory
510000	rwd	/rewind tape	
tbd,	q		
ddt,	jdp	rew	/`back` command
	jdp	car	
		ZXIA	
		dsm	
you,	lxr	(dbt-1	/`you` command
	jmp	yoa	
bin,	jdp	gtf	/`binary` command
	jmp	+.2	
	jmp	erg	/comma
	ior	(500000	
	dac	i 4	/set mode to binary
	jmp	wre	
rwd,	law	i 0	/`rewind` command
	xct	tvk	
.dvb:,	dac	vbf+11	/nop
	jmp	cd	

```

ll,          dap ell          /listen loop
            law vbf
            dap tlc
            dap lp4
            lxr (-20
            dzm i pnu+20
            SXXP
tia,         jmp .-2
ti,         law tbuf          /for FORTRAN
            ivk 200
            X+AP|
            jmp tia          /flush leading spaces
            lia 1
            sad (40
            jmp cd           /center dot
            lxr (-3
            sad i tit+2
            jmp lla          /space, c.r., or comma
            SXXI>
            jmp .-3
            sad (75
            jmp tbs          /backspace
tlc,        dac              /put character in buffer
            lac .dvb        /dac vbf+11
            sas tlc
            idx tlc
            jmp tia
tbs,        law i 1          /remove character from buffer
            add tlc
            sas .dpnu       /dac vbf-1
            dac tlc
            aam
            dzm tlc
            jmp tia

```

```

lla,      dzm vbf+11      /character packer
          dio ;lp3
          ZX
ccr,      law cct
          dap lp2
          SXX
lp4,      lac
          TAIAP|
          jmp lle
lp2,      xct
          adm i van-1      /assemble packed character string
          law 20
          AMI=
          law 7
          AMI>=
          stf 1           /if non-numeric character
          lac pnu
          rir 3s
          rcl 3s
          ior .add        /400000
.dpnu:,   dac pnu         /assemble octal number
          idx lp4
          idx lp2
          sad (xct cct+3
          jmp ccr
          jmp lp4
lle,      lxr lp3         /return, with appropriate skip
          CXX
          law etb-tbl+1   /used in command loop
          aam
ell,      jmp

```


0	601	012	395	678
		0	000	001
1	522	101	010	010
2	601	0	000	001
	225		010	101
3			000	101
4	205			
			001	001
5	611		000	010
6	203			
7	703	1	000	011
10			110	001
11	261			

9 6 = 52
6
?

151V59 23A

1140 0

1102

2242

49
61
22
46
45

3

```

cct,      rar 6s
          ral 6s
.nop:,    nop

tit,      0          /skip twice
.a77:,    77         /skip
          33         /don't skip

sys,      lac van    /`0`, `1`, `2`, `3`, `4`, `5`, '6', '7' commands
          ral 6s
          and 7
          dac aff    /new tape drive number
          ral 6s
          mta 306     /assign it
          jmp sye     /busy
          dap syr
          law i 7177
          dap sff

syr,      ivk        /try rewinding it
          jmp syf     /not ready
          jdp rew     /clears I
          mta 204
          ral 6s
          ior syr
          mta 401
          lac tvk
          dac 100
          TAX
          law 100
          jmp 100     /start it

sye,      jsp eya     /can't assign tape ...
          text /can't assign /
e17,      text /tape :/

syf,      law e17     /tape ... not ready
          jdp txp
          lac aff
          jdp ocp
          jsp ex
          text / not ready:/

```

```

gef,          dap gee          /get file name
              dzm ;sga
              clf 6
              cla↓clf 5
.adntb:,     add ntb
gea-1,       dac sfp
gea,         jsp ll
.a777:,      add 777          /,
              TXA|          /cr
              jmp gem        /space
              stf 6
              adm gee
gem,         dzm ;gez
              lxr (ntb
gen,         lac sfp
              skp 5
              jmp guc
              X→AXP|
              jmp gun
              law ntb
              X+AXI
              lac i 0
.dsfp:,     dac sfp
              lac van
              sza i
              jmp gou
              sas i 1
              jmp geo
              lac van+1
              sas i 2
              jmp geo
              lac van+2
              sas i 3
              jmp geo
geu,         TXXI          /found a match at this level
              dio sga
              skp 6
              jmp got
              lac i 4
              sma
              jmp gea-1
              law e1        /no subfile of ...
yoa,         jdp txp
              jdp prn
              jmp cd

```

```

gun,      jdp gfa
          lxr sga
          law ntb-4
          TXXP|
          TAX
          lac i 4
          dio i 4
          TAXI
gua,      dac i ntb
          law ntb
          A+XXI
          lac van
          sza i
          jmp gos
          dac i 1
          lac van+1
          dac i 2
          lac van+2
          dac i 3
          dio sga
          skip i 6
          jmp gub
          lac .add      /400000
          dac i 4
          jmp got
gub,      stf 5
          law 4
          A+XA
          dap guc
          jdp gfa
          jmp gea
guc,      dac
          TAXI
          jmp gua
gos,      law i 1
          adm pdp
          sad (dac pdl
          jmp erg+1
          lac .add      /400000
          xct guc
          TXXA
          jdp flh
gou,      lxr sga
got,      TXXAP|
          jmp erg
gee,      jmp

```

```

geo,      skip 2          /look for partial match
          jmp gen
          law 1
          dap gep
          law van
          dap ger
ger,      lac i
          lio
          sni i
          A$IP|
          jmp ges
          and (777700
          A$IP|
          jmp ges
          and (770000
          A$IP
          jmp gen          /no match
ges,      idx ger
          idx gep
          sas .laci4
          jmp gep
          idx gez
          TXXA
          dac ;gey
          jmp gen

nom,      lxr gey          /no exact match
          lio gez
          law 600
          dap stm          /partial match flag
          law i 1
          A+II=|
          jmp geu          /accept partial match
          law e23
          TIK

er3,      jmp ex          /ambiguous
          jdp car          /... not found
          lxr (van-1
          jdp prn
          jsp ex
          text / not found:/

```

```

gfa,      0          /get new directory entry
          skp i 2
          jmp nom     /no perfect match
          lac ntb+1
          TAIAP|
          jmp er2     /directory full
          dac sfp     /point things at the new entry
          add (ntb
          TAXA
pdp,      dac pdl     /remember in case of error
          idx pdp
          lac i 0
          dac ntb+1
          law i 0
          dac i 0
          dzm i 4
          jmp i gfa

er2,      jsp ex
          text //??/directory full:/

car,      0          /print c.r.
          law 77
          xct tyo.
          jmp i car

uch,      0          /release tape block entries
          xor .add    /400000
          and .a777   /400777
          TAA>
          jmp i uch
          add (dbt
          dap .+2
          dap .+2
          lac
          dzm
          jmp uch+1

```

```

flh,      0          /flush file completely
          dac ;fla
          TAX
.laci4:,  lac i 4
          ral 1s
          spa
          jmp i flh
flz,      lxr fla
fli,      lac i 4
          spq
          jmp flb
          add (ntb+4
          dap .+1
          lac
          and (200000
          sza
          jmp flb
          law ntb
.lioi4:,  lio i 4
          A+IX
          k io i 0
          sni i
          jmp .-3
          jmp fli
flb,      lac (200000
          ior i 4
          dac i 4
          lio i 0
          dzm i 0
          dio ;fle
          TII|M
          jmp i flh
          law ntb
          dac ;svl
          XMAA
          sad ntb
          jmp fp5
          dac ;flf
          lxr (-776
          lio .a5
flg,      sad i ntb+1000
          jmp fp0
          sad i ntb+1004
          jmp fp4
          X+IX>=
          jmp flg
          jmp fp1

```

```

fp0,      law ntb+1000
          skp i
fp4,      law ntb+1004
          A+XAX
          dac svl
          lac fle
          dac i 0
fp1,      law ntb
          add flf
          sas fla
          jmp flz
          jmp i flh

fp5,      dio ntb
          jmp i flh

wdy,      0                /write directory
wtd,      skp              /skip if directory is to be rewritten
          jmp i wdy
          lio (ffb-2
          law tbuf
          xct tvk
          jdp tpe
          lac tbuf+3
          sas dbt+3
          jmp ery          /wrong tape
          lio (40000+ffb-4
          lac .adntb      /400000+ntb
          xct tvk
          jdp tpe
          law 0
          dap wtd
          jmp i wdy

ery,      jsp ex
          text /wrong tape, can't rewrite directory:/

```



```

e1,      text //77/no subfile of :/
e6,      text /can't assign /
e4,      text /field :/
e7,      text /illegal field number:/
e10,     text //77/no text:/
e12,     text /tape full:/
e14,     text /anomalous text - :/
e15,     text /no write permit, type a character to try again/77://
e21,     text /text file:/
e22,     text //77/partial match not allowed:/
e23,     text //77/ambiguous:/

txp,     0          /text printer
          dap txy
txy,     lio
          idx txy
txy+2,   lac (607600
          rcl 6s
          sad .lai
          jmp i txp
          sad .swp
          jmp txy
tyo.::,  ivk 100
          jmp txy+2

prn,     0          /file name printer
          law 1
          dap .+1
prn+3,   lio i
prn,     sni
          jmp prs
          law 0
          rcl 6s
          xct tyo.
          jmp prr
prs,     idx prn+3
          sas .lio4
          jmp prn+3
          idx dcnb
          sad (777          /must be > 146*2
          jmp erb
          jmp i prn

gnu,     0          /get number from input
          clf 2
          jsp ll
          jmp .+2
          stf 2          /cr typed
          lac pnu
          skp i 1
          jmp i gnu
erg,     jdp car          /question mark
          stf 3
          jmp cd

```

```

gtf,      0                /get bottom level file
          jsp gef
          idx gtf
          TXXI
ggt,      law 4
          X+AA
          dap ucp
          dap drd
          lac i 4
          dac ;bkp
          spa
          jmp i gtf
          add (ntb
          skp i 2
          TAX                /find single subfile
          sad i 0
          jmp gtt
          TIX                /... has subfiles
          jdp car
          jdp prn
          jsp ex
          text / has subfiles:/

gfl,      0                /get field number
          jdp gnu
          sza
          jdp saf
          skp 2
          idx gfl            /if cr typed
          jmp i gfl

saf,      0                /set up drum field pointers
          and (277
          dac ;aff
          and .a77
          rar 6s
          dac ;afz
          ral 6s
          sas aff
          law i-[mta 104]
          ior (ivk
          dac fiv
          lac aff
          jmp i saf

```

```
er6,      law e6          /can't assign field ...
eya,      jdp txp
           lac aff
ey,       jdp ocp
           jmp cd
```

```
ocp,      0              /octal print
           lio opb
           rcl 3s
           sni
```

```
opa:,     jmp .-2
           A→IAP
           sni
```

```
opb:,     law 20
           xct tyo.
           law 0
           rcl 3s
           A→IAP
           jmp opa
           jmp i ocp
```

```

tf,          0          /test and assign field
             law i 200
             and aff
             TAI A>=
             jmp er7    /illegal field number
             sad aff
             jmp tfb    /pseudo field
             sza
             sub (27
             spa
             jmp i tf
er7,         law e7    /illegal field number
e7f,         skip i
era,         law e10   /no text
ex,          jdp txp

cd,          skip i    /center dot
             jmp rem
             lac syr
sff,         skip i
             mta 204
cda,         law i 1
             adm pdp
             sad .dsfp /dac pdl-1
             jmp rst
             dap .+1
             lac
             jdp flh
             jmp cda

tfb,         idx tf
prf,         law 17
             skip i
             law 77
             A←IAP
             A$IP
             jmp er7   /illegal field number
             mta 400
             sza
             ior (7777
             sas (757777
             sad (57777
             jmp i tf
             skip 2
             jmp tfa
             sad .i7777 /((47777
             jmp i tf
             xct e7f
             jmp era    /no text
             law e4    /field ... not assigned
             jdp txp
             lac aff
             jdp ocp
             jsp ex
             text / not assigned:/
tfa,         TIA
             mta 300
             jmp er6    /can't assign
             jmp i tf

```

```
del,      jsp gef      /\`delete` command
          jmp .+2
          stf 2
stm,      skip i
          jmp er22    /partial match
          jdp flh
          law 600
          dap wtd
          skip i 2
          jmp del
          jmp rst

ren,      jsp gef      /\`rename` command
          jmp reo
q,        law cr      /question mark
          jda txp
          flexo ?
.add:,    400000
```

reo,
er22,

dac ;reu
law e22
xct stm
jmp ex
lac i 1
dac ;sve
lac i 4
dac ;rsi
law 600
dap cd
dac i 1
dzm i 4
stf 2
jsp gef
jmp er4

/partial match not allowed

flt,

TXA
dac ;snx
lxr snx
lac i 4
spq
jmp flu
add (ntb
jdp flh
jmp flt
jdp uch
lac rsi
dac i 4
lac reu
jdp flh
jmp wre

/flush all subfiles

flu,

er4,
rem,

stf 3
lxr reu
lac sve
dac i 1
lac rsi
dac i 4
jmp cda

```

go,          jdp gfl          /`go` command
             jmp .+2
             jmp goa
             jdp gnu
             skp i 2
             jmp erg          /another comma

gob,         dac as
goa,         clf 2
             jdp tf
.lebuf:,     lac ebuf          /used as constant
             law 7776
             add as
             dap gcu
             and (7777
             xct prf
             sub (100
             spa
             jmp erz          /can't do in PRL
             jdp rew
             jdp car
             ZXA
             lio afz
             xct prf
             law 100
             mta
             A+II
             cma
             sub .mi          /-10000
             dap gct
             lac fiv
gcu,         dac
gct,         law
             jmp i .-2        /yes, two locations lose

rew,         0                /rewind tape
             jdp wdy
             clc↓cli
             lpf
             xct tvk
.i7777:,     47777
             law 77
             and tvk
             skp i 60
             mta 204          /deassign tape if ss6 is down
             jmp i rew

erz,         jsp ex
             text /illegal with PRL:/

```

```

uns,      jdp gtf      /\`unsave` command
          jmp loc
          jdp gfl
          jmp erg      /comma typed after field
loc,      lio bkp
          law e21
          ril 2s
          spi i
          jmp ex       /text file
          stf 2
          jdp tf
          jmp er7      /illegal field number
          lac aff
          dac ;af
rba,      law 0
          jdp dro
gof,      skp
          jmp rst
          lac af
          jdp saf
          jmp goa

tpe,      0           /tape error ...
          dio ;ter    mta 2 ✓
          sad (6
          jmp fpt
          dap aff
          isp ttr
          jmp trt      /retry
          jsp eya
          text /tape error :/

fpt,      law e15     /no write permit
          jdp txp
          ivk 200
          sad (40
          jmp cd
trt,      law i 3
          adm tpe
          lio ter
          jmp i tpe

```


edi, edz,	jsp eed law 221 jdp saf law 104 jmp gob	/`edit` command
app,	jdp afp jsp eet jmp rst	/`append` command
fil,	jdp afp stf 2 jdp gtf jmp .+2 jmp erg law i 400 add b dac hig xct ucp jdp uch lac (20000 jmp dri	/`file` command /comma
tex, eed, eet, eec, eea,	law rst lio .ett dio b dap ete law ebuf dap eea dap eeb jdp gtf jmp eek dac idx eea jmp eec	/`text` command

```

eek,      stf 2
          xct eea
eeb,      lac
          dac bkp
          idx eeb
          sub eea
          sad (lac-dac 2
          jmp eel
          law i 7777
          and b
          ral 6s
          jdp saf
          jdp tf           /will always skip
csc:,     131313
          law 7777
          and b
          jdp dro
          lac tbuf+377
          sad csc
          jmp eep
          add b
          sub .ett
          dac ;sb
          sub afz
          sub ofs
          CAIA<M
          law 400
          AMIX>
          jmp ant
          lac i tbuf-1
          sad csc
          jmp een

ant,      law e14           /anomalous text - ...
          jdp txp
          lac eeb
          sub .lebuf
          jdp ocp
          jdp car
eep,      lac ofs
          add afz
          jmp .+2
een,      lac sb
          dac b
          jmp eeb

eel,      lac .ett
          dac b+1
          law bbuf
          mta
          law 60
          lio (340
          ivk 2
          jmp .-1
ete,      jmp

```

```

afp,          0          /test for e.t. text
              law 2
              jdp saf
              law 600
              dap e7f
              jdp tf          /will always skip
.ett:,       20400
              law wbuf
              mta
              law 100
              lio (300
              xct fiv
              jmp .-1
afs,         law i 1
              add b
              lia
              and (770000
              sad afz
              jmp afr
              idx aff
              jdp saf
              jdp tf          /will always skip
.i20:,      10020
              jmp afs
afr,         law 37
              A←IX
              law 40
              xct fiv
              jmp .-1
              lac i wbuf
              sas csc
              jmp era          /no text
              jmp i afp

ngt,         jsp eed          /'nightmare' command
ngz,         law 222
              jdp saf
              law 102
              jmp gob

```

```

dro,          0                /tape to drum
              dac ofs
              and (37
              cma
              add (tbuf
              dac ;bsb
              dzm ;sbs
              sad (tbuf
              jmp drb
              mta
              law 7740
              and ofs
              lia
              dac ofs
              law 40
              dac sbs
fiv,          0
drb,          jmp .-1
              clf 6
              lac (77777
              and bkp
              TAIAP|
              jmp drf
              ior (777
              sad (777
              jmp droa
              lxr (-400
              dzm i tbuf+400
              SXX IP
              jmp .-2
              law i 1000
              adm bkp
droa,         dio ;blk        /0 if 0 block
              lac .mi
              add ofs
              spa
              jmp drp
              dac ofs
drr,         idx aff
              jdp saf
              jdp tf          /will always skip
.mi:,        -10000
              skp 6
              jmp sp2
drp,         lio blk
sbf,         skp i
              isp pne
              jmp .+2
              jmp doc        /for single block read
              law 7777
              A←IIP|
              jmp drob
              law tbuf
              xct tvk
              jdp tpe

```

```

drob,      xct sbf
           jmp i dro
           lac bsb
           mta
           lio ofs
           law 7401
           sub sbs
           AMI>
           jmp sp1
           law 420
sp4,      add sbs
           xct fiv
           jmp .-1
           lxr (-40
           lac i tbuf+400
           dac i tbuf
           SXXP
           jmp .-3
           law 400
           skip 6
           lac sp3
           adm ofs
doc,      lxr blk
           lac i dbt
           TXXP      /skip if 0 block
           dac bkp
           jmp drb

sp1,      lac .i20
           AMIA
           xct fiv
           jmp .-1
           cma 16
           add (420
           dac ;sp3
           dzm ofs
           jmp drr

sp2,      law 400
           add bsb
           sub sp3
           mta
           cli
           law 20
           add sp3
           jmp sp4

drf,      xct sbf
           jmp erg
           law tbuf
           sub bsb
           adm ofs
           jmp i dro

```

rbl,	jdp gtf	/`read block` command
	jmp erg	/cr?
	jdp gnu	
	cma	
	dac pnu	
	skp i 2	
	jmp erg	/comma or space
	law 600	
	dap sbf	/only one block
	jmp rba	
abl,	stf 2	/`append block` command
	jdp gtf	
	jmp .+2	
	jmp erg	/comma?
	dzm ofs	
	dzm hig	
	lac (500000	
	dac ftp	
	cli 2	
	lac ucp	
aba,	A+IXA	
	dap drd	
	lac i 0	
	rcr 9s	
	and .a77	
	dac t	
	law 777	
	and i 0	
	lio (dbt	
	sza	
	jmp aba	
	law 400	
	jmp abb	

```
pri,      jsp gef      /\`print` command
          skp i
          stf 2
          xct stm
          jdp prn      /print file name on partial match
          lxr i 4
          jmp prh
pt,        stf 2      /print top level
pa,        lxr ntb      /print all
          stf 4
          law c0
          jdp txp
prh,      TXX>
          jmp erp
          jdp crp
          dzm ;nip
prm,      TXX|=
          jmp prp
          jdp ttx
          law ntb
          X+AX
          lac (dac pdl
          sub pdp
          dac ;nid
          lio nip
          sni i
          A$IM|
          sza 2
          jmp prq
```

```
prv,      jdp crp
          dzm nip
          lio nid
          ZAP
          xct tyo.
          SII>
          jmp .-2
prw,      jdp prn
          lac i 4
          sma
          jmp phi
          jdp prz
.swp:,    swp
          adm bck
          lxr i 0
          jmp prm
phi,      lac i 0
          xct pdp
          idx pdp
          lxr i 4
          jmp prm

prz,      0
prz+2,    cli
          and (777
          sza i
          jmp i prz
          add (dbt
          dap prza
          SIIA
          sas (777
prza,     lac
          spa
          jmp prz+2

erb,      xct dcf      /anomalous directory
          jmp dca
          jsp ex
          text //77/anomalous directory:/

prq,      stf 6
          jmp prw
```



```

prp,      law i 1
          adm pdp
          dap .+1
          lxr
          sas .dsfp      /dac pdl-1
          jmp prm
          jdp crp
          skp i 4
          jmp rst

ptt,      jdp car      /`totals` command
          lxr (-1000+ffb
          law i 1
          dac ;dcd
          cla 4
          lio i dbt+1000
          sni
          SAA
          SXX=
          jmp .-4
          xct dcf
          adm dcna
          jdp ocp
          law c1
          jdp txp
          SXX>

dcb,      jdp ttx
          lxr i ntbb
          idx dcd
          lio i ntbb+4
          TXXP
          TI|=
          sad (777      /must be > 146*2
          jmp erb
          TXXP
          jmp dcb
          xct dcf
          jmp dcaa
          jdp ocp
          law c2
          jdp txp
          jmp rst

c0,      text //7777/file      blocks:/
c1,      text / free tape blocks/77:/
c2,      text / free directory entries/77:/

```

crp,

0
lac bck
TAA|M
jmp crq
adm dcna
law 36
xct tyo.
law 57
skp 6
xct tyo.
lac bck
jdp ocp
law 55
skp 6
xct tyo.
clc 6
dac bck
jdp car
skp 600
jmp i crp
skp 10
jmp rst
jmp i crp

crq,

dcf,

```

sav,      stf 2           /\`save` command
          jdp gtf        /get file name
          jmp saa        /c.r. after file name
          jdp gfl        /get field number
          jmp sab        /comma after field number
saa,      lac aff
          dac ;sf1
          jmp sae

sab,      dac sf1        /beginning field of multiple field save
          jdp gfl        /get ending field of save
          jmp erg        /another comma?
          lac aff

sae,      dac ;sf2        /ending field
          sub sf1
          spa
          jmp erg        /second number smaller than first
          lac sf1

sac,      jdp saf
          clf 2
          jdp tf
.4tbuf:,  add tbuf        /nop
          idx aff
          lio sf2
          AMI>
          jmp sac
          SIA
          and ,a77
          rar 6s
          dac hig

ucp,      lac
          jdp uch        /flush old file contents
          lac (500000
          dac ftp        /file type
          lac sf1
          jdp saf
          law i 400
          add afz

```

```

dri,      dac ofs      /drum to tape
          law dbt+ffb-bs
          dap tbo
dre,      dzm ;t
drl,      lac t
          rar 9s
          ior ftp
          xct drd
          law 400
          adm ofs
          sub ;hig
          spa
          jmp drg
          skp 2
          skp 4
          jmp wre      /exit
          stf 4
drg,      law 200
          and aff
          rar 6s
          ior ofs
          ral 6s
          jdp saf
          law tbuf
          mta
.lofs:,   lio ofs
          law 400
          xct fiv
          jmp .-1
abb,      CAX
          lac t
          sad .a77
          jmp drk      /store zero block anyway
          law 0
          ior i tbuf+400
          SXX=
          jmp .-2
          sza
          jmp drk
          idx t
          jmp drl

wre,      law 600
          dap wtd      /turn on write directory switch
          jmp rst

```

```

drk,      law i bs
          dac ;bnl
          law bs-1
          adm tbo
          skp i 4
          jmp tbp
          lio b
          law 377
          A←IP
          dio tbuf+377
tbp,      idx tbo
          sub .lofs      /lio dbt+1000
          sma
          jmp tpf
tbo,      lio dbt+ffb-bs
          sni i
          jmp tbp
          rar 9s
          SAIA
          ior t
          rcl 9s
          ior ftp      /file type (400000 or 500000)
drd,      dac
          and (777
          add (dbt
          dap drd
          lac ftp
          xct drd      /in case of tape error
          lac .4tbuf   /400000+tbuf
          xct tvk
          jdp tpe
          jmp dre
tpf,      law dbt+ffb
          dap tbo
          isp bnl
          jmp tbp      /block ffb can't be free
          law e12      /tape full
          jdp txp
          lac sga
          lio hig
          sni i      /skip if append block command
          jdp flh      /flush file that there was no room for
          jmp wre

```

loa,	jdp gtf	/`loadgo` command
	jmp lob	/c.r. after file name
	jdp gfl	
	jmp .+2	/comma typed after field number
	jmp lob	
	jdp gnu	
	sza	/skip if nothing typed at all
	dac as	
	skp i 2	
	jmp erg	/comma typed after starting address
lob,	law 600	
	dap gof	
	jmp loc	
ttx,	0	/check validity of ntb pointer
	law i 2	
	A+XA	
	mul (1	
	div .+1	
.a5:,	5	
	law 1000	
	XMA>P	
	sni i	
	jmp erb	
	jmp i ttx	

```
constants
repeat if2, [printo [ffb-4]*400+org-,   printc 77]
[ffb-4]*400+org/
```

```
ntb,      ntb+1000/
dbt,      dbt+1000/
```

```
ofs,      ofs+1/
```

```
pnu,      pnu+1/
vbf,      vbf+12/
van,      van+4/
lp1,      lp1+1/
```

```
sfp,      sfp+1/
pdl,      pdl+146/
```

```
variables
```

```
/initialization
```

```
6000/
```

```
in,       iam
          law 16
          dap tvk
          law ntb
          lio (40000+ffb-4
          xct tvk
          hlt
          lac dbt+11
          and (400777
          sas (400773
          jmp ina
          law dbt-1      /Thiel system
          dap ine
          lac (jdp ing
          dac ti
          jmp ind
inc,      lac (ivk 200
          dac ti
          law i 7773
          jdp uch
ina,      law inf
          dap dsd
          lac dbt+4
          sza i
          law 766
          dac dbt+4
          jmp dck      /check directory
inf,     law cr
          dap dsd
          jmp inh
```

```
itn,      inc
          law ima
          jdp txp
          lxr (dbt-1
          jdp prn
          law imb
          jdp txp
ind,      jsp ll
          nop
          nop
          lac van
          sza i
          jmp i itn
          lxr (-3
          cli
          lac i van+3
ito,      A$II
          rir 5s
          dac i dbt+3
          SXXP
          jmp ito
          lac dbt+3
          dio dbt+3
          jmp i itn

ing,      0
          idx ine
ine,      lac
          rar 9s
          and (77
          jmp i ing
```



```

ini,      iam
          law inm
          jdp txp
          law 16
          dap tvk
          mta 400
          and (7
          jdp ocp
          law inn
          jdp txp
          ivk 200
          sas (30
          dsm
          lxr (-1000+ffb
          dzm i dbt+1000
          SXX=
          jmp .-2
          cli cmi
          law 2
          dac ntb+1
ink,      TAAX
          sad (1000
          jmp inj
          law 5
          X+AA
          dac i ntb
          dio i ntb+4
          jmp ink
inj,      dzm ntb+773
          dzm ntb
          law 766
          dac dbt+4
inh,      jdp itn
          lio (ffb*i
          lac (400000+org
          xct tvk
          jdp tpe
          jmp rst

```

```

inm,      text .initialize drive :.
inn,      text .?.77.:.

```

```

ima,      text //77/tape name is now `:/
imb,      text /'77/type in new name if desired/77:/

```

```

constants
start in

```