

# RP02

DISK PACK FORMATTER  
MD-11-DZRPH-A

EP DZRPH-A-DL-A

OCT 1976

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**digital**

FICHE 1 OF 1

Made in U.S.A.







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4.2 STARTING ADDRESS

THE PROGRAM MAY BE STARTED AT ONE OF FOUR LOCATIONS

1. STARTING ADDRESS 600 WILL FORMAT THE ENTIRE PACK AND THEN VERIFY THAT THE HEADERS HAVE BEEN WRITTEN CORRECTLY.
2. STARTING ADDRESS 2000 WILL ALLOW THE OPERATOR TO SPECIFY A PARTICULAR HEADER TO BE REWRITTEN AND VERIFIED
3. STARTING ADDRESS 3000 WILL FORMAT THE ENTIRE PACK USING THE SECTOR ADDRESS SEQUENCE PROVIDED BY THE OPERATOR. AFTER FORMATTING THE PACK IS VERIFIED.

4.3 PROGRAM AND/OR OPERATOR ACTION

1. LOAD THE PROGRAM INTO MEMORY USING THE ABS LOADER.
2. LOAD DESIRED STARTING ADDRESS
3. SET SWITCHES (SEE SEC 5.1.1)
4. PRESS START
5. WHEN THE PROGRAM IS COMPLETE, IT WILL RECYCLE.

5.0 OPERATING PROCEDURE

5.1 OPERATIONAL SWITCH SETTINGS

AFTER LOADING STARTING ADDRESS SELECT THE DESIRED SWITCHES.

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5.1.1 SWITCH SETTINGS ARE:

SW<15>=1.....DELETE ERROR HALT  
SW<14> .....DELETE PRINTOUTS

5.2 SUBROUTINE ABSTRACTS

5.2.1 TRAPCATCHER

A ".+2" - "HALT" SEQUENCE IS REPEATED FROM 0-776 TO CATCH ANY UNEXPECTED TRAPS. THUS ANY UNEXPECTED TRAPS OR INTERRUPTS WILL HALT AT THE VECTOR +2.

5.2.2 ERROR HANDLER

THIS ROUTINE IS ENTERED UPON DETECTION OF AN ERROR. THE ERROR ADDRESS, PDP-11 STATUS, AND RELEVANT ERROR INFORMATION IS TYPED OUT. INHIBIT TYPEOUTS, AND HALT ON ERROR SWITCHES ARE TESTED.

6.0 ERRORS

6.1 ERROR PRINTOUTS

#1 ERROR MESSAGE FORMAT:

ERROR AT ADDRESS XXXX PS= PROCESSOR STATUS  
CALLED FROM SUBROUTINE AT YYY  
RPCS = CONTENTS OF RPCS  
RPCS = CONTENTS OF RPCS  
RPER = CONTENTS OF RPER  
RPDS = CONTENTS OF RPDS

XXXX = THE ADDRESS WHERE THE ERROR WAS  
ENCOUNTERED.  
YYY = IF THE ERROR WAS ENCOUNTERED IN A  
SUBROUTINE, THIS ADDRESS REFERS BACK TO THE  
MAINLINE CODE WHICH CALLED THE SUBROUTINE.

#2 ERROR AT ADDRESS XXXX PS= PROCESSOR STATUS  
CALLED FROM SUBROUTINE AT YYY

	CYLINDER	TRACK	SECTOR
GOOD =	-	-	-
BAD =	-	-	-

THIS MESSAGE IS GIVEN IF AN ERROR OCCURS WHILE VERIFYING A HEADER. GOOD EQUALS THE EXPECTED CONTENTS OF THE HEADER AND BAD EQUALS WHAT WAS ACTUALLY FOUND IN THE HEADER.

7.0 RESTRICTIONS

NONE

8.0 MISCELLANEOUS

8.1 EXECUTION TIME

AFTER PERFORMING THE SELECTED TASK, THE PROGRAM WILL RECYCLE..

8.2 STACK POINTER

THE STACK IS INITIALLY SET TO 600.

9.0 PROGRAM DISCRIPTION

9.1 STANDARD FORMATTER

ONCE STARTED THE PROGRAM TYPES:

UNIT

AND WAITS FOR INPUT. RESPOND WITH THE RELEVANT OCTAL NUMBER (0-7) AND TERMINATE WITH A CARRIAGE RETURN.

THE TTY THEN PRINTS:

SET THE FORMAT ENABLE SWITCH.

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SET THE RP11C WRITE ENABLE SWITCH.  
SET THE SELECTED UNIT WRITE ENABLE SWITCH.



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STRIKE ANY TELETYPE KEY WHEN READY.

STRIKING ANY KEY CAUSES THE FORMATTING OPERATION TO BEGIN. WHEN THE DISK HAS BEEN FORMATTED, THE TTY PRINTS:

RESET THE FORMAT ENABLE SWITCH TO NORMAL.  
STRIKE ANY TELETYPE KEY WHEN READY.

STRIKING ANY KEY CAUSE THE PROGRAM TO ENTER A READ/COMPARE HEADER SEQUENCE. WHEN COMPLETE THE PROGRAM WILL RECYCLE.

9.2 SINGLE HEADER FORMATTER

ONCE STARTED, THE PROGRAM QUERIES FOR THE UNIT NUMBER AS IN 9.1. THE PROGRAM THEN PRINTS:

CYLINDER TRACK SECTOR  
OLD:

AND WAITS FOR INPUT.  
TYPE THE PHYSICAL CYLINDER, TRACK, AND SECTOR OF THE DESIRED ADDRESS. TERMINATE THE FIRST TWO WITH A SPACE AND THE LAST WITH A CARRIAGE RETURN.  
THE PROGRAM THEN TYPES:

NEW

AND WAITS FOR INPUT. THE THE DESIRED ADDRESS IN THE SAME SEQUENCE AS ABOVE. THE PROGRAM WILL FIRST REWRITE AND THEN READ THE DESIRED HEADER TO DETERMINE VALIDITY. WHEN FINISHED THE PROGRAM WILL RECYCLE.

9.3 SPECIAL FORMATTER

ONCE STARTED, THE PROGRAM QUERIES FOR THE UNIT NUMBER AS IN 9.1. THE PROGRAM THEN PRINTS:

INPUT THE SECTOR NUMBERS (0-9) IN THE DESIRED ORDER.

0:

RESPOND WITH THE FIRST DESIRED SECTOR NUMBER. THE OTHER NINE NUMBERS ARE REQUESTED AND SPECIFIED IN LIKE MANNER. ONCE A SECTOR NUMBER HAS BEEN USED IT

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347

CANNOT BE SPECIFIED AGAIN.

K01

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PAGE 8

AFTER THE LAST PARAMETER HAS BEEN PROCESSED, THE PROGRAM WRITE THE PACK TO THE DESIRED FORMAT AND THEN ENTERS A READ/COMPARE HEADER SEQUENCE TO ENSURE THE VALIDITY OF ALL ADDRESSES. WHEN THE PROGRAM IS FINISHED IT WILL RECYCLE.

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364	177570
365	177776
366	177560
367	177562
368	177564
369	177566
370	000060
371	000064
372	
373	000015
374	000012
375	000006
376	000000
377	000001
378	000002
379	000003
380	000004
381	000005
382	000006
383	000007
384	000007
385	000000
386	177776
387	000240
388	000000
389	000040
390	000100
391	000140
392	000200
393	000240
394	000300
395	000340
396	000001
397	000002
398	000004
399	000010
400	000020
401	000040
402	000100
403	000200
404	000400
405	001000
406	002000
407	004000
408	010000
409	020000
410	040000
411	100000
412	104000
413	104400

%

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.ABS
:RPI1 DISK FORMATTER
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:JANUARY 29,1971

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SR=177570           ;SWITCH REGISTER
CC=177776           ;CONDITION CODES
TKS=177560
TKB=177562
TPS=177564
TPB=177566
TKV=60
TPV=64

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;STACK POINTER

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CR=15
LF=12
SP=%6
RO=%0
R1=%1
R2=%2
R3=%3
R4=%4
R5=%5
R6=%6
R7=%7
PC=%7
XX=HALT
PS=CC
NOP=240
PO=0
P1=40
P2=100
P3=140
P4=200
P5=240
P6=300
P7=340
B0=1
B1=2
B2=4
B3=10
B4=20
B5=40
B6=100
B7=200
B8=400
B9=1000
B10=2000
B11=4000
B12=10000
B13=20000
B14=40000
B15=100000
ERR=EMT
ERM=TRAP

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# MO1

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000001  
000002  
000004  
000010  
000020  
000040  
000100  
005726  
022626

GB=B0  
DD=B1  
DS=B2  
ER=B3  
CS=B4  
DA=B5  
HD=B6  
POP=5726  
POPPOP=22626

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.MACR ANDI A,B
BIC #-A-1,B ;MASK A APPLIED TO B
.ENDM

.MACR AND A,B
COM B ;C(B) =MASK. INVERT IT
BIC B,A ;AND A WITH B
COM B ;RESTORE B
.ENDM

.MACR ROTR A
JSR PC,RTR ;ROTATE RO A PLACES RIGHT
.WORD A
.ENDM

.MACR ROTL A
JSR PC,RTL ;ROTATE RO A PLACES LEFT
.WORD A
.ENDM

.MACR LOOP A,B
JSR PC,#LERCHK ;LOOP TO A ON ERROR IF SR13=1
JMP A
B: JSR PC,#LUPCHK ;LOOP TO A UNCONDITIONALLY IF SR12=1
JMP A
.ENDM

.MACR PNTM A
MOV #A,RO ;PRINT MESSAGE
JSR PC,TYPOUT ;POINTED TO BY A
.ENDM

.MACR PNTOL A
MOV A,RO ;PRINT 6 OCTAL
JSR PC,PNTOCT ;NUMBERS IN A
.ENDM

.MACR PNTO A
MOV A,RO ;PRINT OCTAL
JSR PC,OCTPNT ;NUMBER IN A WITHOUT LEADING 0'S
.ENDM

.MACR PNTD A
MOV A,RO ;PRINT DECIMAL NUMBER
JSR PC,DECPNT ;IN A WITHOUT LEADING 0'S
.ENDM

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470					
471					
472					
473		000000	.=0		
474			.REPT	140	
475			.+2		; TRAPPED OR INTERRUPTED TO PREVIOUS ADDRESS
476			HALT		
477			.ENDR		
478					
479		000030	.=30		
480	000030	005532	.WORD	ERROR	
481	000032	000340	.WORD	340	
482	000034	005532	.WORD	ERROR	
483	000036	000340	.WORD	340	
484					

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000600 012706 000600  
000604 012767 000340  
000612 000005  
000614 004767 003202  
000623  
000630 004767 004006

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. =600  
START1: MOV #START1,SP  
MOV #PT,CC  
RESET  
ILI: JSR PC,UNIQ  
JRDY1: FNTM SWMES  
JSR PC,RIN

:INITIALIZE STACK POINTER  
:LOCKOUT OTHER DEVICES  
:CLEAR THE WORLD  
:GET UNIT#  
:WAIT FOR KEYBOARD RESPONSE

496										
497	000634	004767	003362		NS2:	JSR	PC,HOME		:HOME SEEK	
498	000640	012777	000732	006650		MOV	#RPI, JRPIV		:RPI1 PI VECTO	
499	000646	012777	000340	006644		MOV	#P7, JRPSV		:RPI1 P STATUS	
500	000654	012777	000001	006570		MOV	#1, JRPMC		:ALLOW DSH BREAKS	
501	000662	062777	014103	006556		ADD	#14103, JRPCS		:WRITE 10/15 HEADER (FORMAT) WITH PI ON	
502	000670	112767	000200	177100		MOVB	#P4, PS		:LOWER CPU PRIORITY	
503	000676	017704	006560		IL2:	MOV	RRPDA, R4		:SAVE ADDRESS	
504	000702	012767	010560	006452		MOV	#6000, TOG1		:SETUP TIMEOUT	
505	000710	020477	006546		IL3:	CMP	R4, RRPDA		:HAS ADDRESS CHANGED?	
506	000714	001370				BNE	IL2		:YES - RECYCLE	
507	000716	005367	006440			DEC	TOG1		:NO - HAS 100 MSEC. TIMED OUT?	
508	000722	001372				BNE	IL3		:NO - KEEP CHECKING	
509	000724	104074				ERR+DS+CS+ER+DA			:DISK ADDRESS NOT CHANGING IN TIME	
510	000726	000167	177702			JMP	NS2		:TRY AGAIN	
511	000732	004567	006150		RPI:	JSR	R5, SAV05		:RPI1 PI HANDLER - SAVE RD-5	
512	000736	032777	100000	006502		BIT	#B15, JRPCS		:ERROR?	
513	000744	001407				BEQ	PIOK1		:NO	
514	000746	104034				ERR+ER+CS+DS			:ERROR DURING FORMAT GENERATION	
515	000750	004567	006146		RPIX:	JSR	R5, REST05		:RESTORE RD-5	
516	000754	005726				POP			:POP OLD PC	
517	000756	012746	000634			MOV	#NS2, -(SP)		:PUSH A NEW PC	
518	000762	000002				RTI			:EXIT	
519	000764	032777	000200	006454	PIOK1:	BIT	#B7, JRPCS		:DONE?	
520	000772	001002				BNE	.+6		:YES	
521	000774	104050				ERR+CS+ER+CS			:EXTRANEIOUS PI DURING FORMAT PASS	
522	000776	000764				BR	RPIX		:TRY AGAIN	
523	001000	004567	006116			JSR	R5, REST05		:RESTORE RD-5	
524	001004	005726				POP			:POP OLD PC	
525	001006	012746	001200			MOV	#START2, -(SP)		:PUSH A NEW PC	
526	001012	000002				RTI			:EXIT TO PASS 2	



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527
528      001200      . =1200
529
530 001200 012767 000340 176570 START2: MOV      #P7,PS      ;LOCKOUT PI'S
531 001206      PNTM      NSWMES
532 001216 004767 003420      JSR      PC,RIN      ;WAIT FOR OPERATOR
533 001222 012777 000001 006216 P2L1:  MOV      #1,ARPCS  ;RESET RP11
534 001230 116777 006142 006212      MOVB     UNIT,ARPCS1 ;LOAD UNIT #
535 001236 004767 002760      JSR      PC,HOME     ;HOME SEEK
536 001242 005067 006134      CLR      CYL         ;CYL=0
537 001246 016777 006130 006202 P2L2:  MOV      CYL,ARPCA   ;START AT
538 001254 005077 006202      CLR      ARPDA       ;SAR & TAR = 0
539 001260 112777 000011 006160      MOVB     #11,ARPCS   ;SEEK
540 001266 036777 006106 006142      BIT      ATN8,ARPCS  ;WAIT FOR
541 001274 001774      BEQ      .-6         ;ATTN.
542 001276 105077 006134      CLRB     ARPDS       ;CLEAR ATTN
543 001302 032777 004000 006126      BIT      #B11,ARPCS  ;DONE?
544 001310 001402      BEQ      .+6         ;YES
545 001312 104074      ERR+ER+CS+DS+DA    ;NO- SEEK INCOMPLETE ON PASS2 SEEK
546 001314 000742      BR      P2L1        ;TRY AGAIN
547 001316 012777 176650 006126      MOV      #-600.,ARPC ;READ ONE CYLINDER OF HEADERS INTO
548 001324 012777 007722 006122      MOV      #INBUF,ARPC ;BUFFER
549 001332 052777 014000 006106      BIS      #14000,ARPC ;10/15 HEADER MODE
550 001340 112777 000005 005100      MOVB     #5,ARPCS    ;READ HEADERS
551 001346 032777 100200 006072      BIT      #B15+B7,ARPCS ;ERROR OR DONE
552 001354 001774      BEQ      .-6         ;NOT YET
553 001356 100002      BPL     P2N1        ;DONE
554 001360 104074      ERR+ER+DS+CS+DA    ;ERROR ON READ HEADER CP.
555 001362 000731      BR      P2L2        ;RECYCLE
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# H02

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669          003000          . =3000
670
671 003000 012706 000600 SFSTRT: MOV #START1,SP ;SET STACK
672 003004 012767 000340 174764 MOV #P7,CC ;LOCKOUT PI
673 003012 000005 RESET ;CLEAR
674 003014 004767 001002 JSR PC,UNIQ ;GET UNIT#
675 003020 SFSL1: PNTM SECMES
676 003030 004767 000446 JSR PC,CLRS ;CLEAR FLAG STRING
677 003034 012767 177766 004320 MOV #-10.,TOG1 ;DO BELOW 10 TIMES
678 003042 012705 003740 MOV #NSTR,R5 ;POINTER TO MESSAGE POINTERS
679 003046 012704 003764 MOV #SCSL1,R4
680 003052 012500 SFSL2: MOV (R5)+,R0 ;FETCH POINTER
681 003054 004767 004230 JSR PC,TYP0UT ;FOR MESSAGE
682 003060 004767 000436 JSR PC,SIN ;GET PARAMETER
683 003064 000755 BR SFSL1 ;ERROR
684 003066 005267 004270 INC TOG1 ;DONE?
685 003072 001367 BNE SFSL2 ;NOT YET
686 003074 004767 000472 SFSL3: JSR PC,MKBUF ;GENERATE A TABLE OF ADDRESSES
687 003100 116777 004272 004342 MOV#B UNIT,ARPCS1 ;RESET
688 003106 004767 001110 JSR PC,H0ME ;SELECTED UNIT
689 003112 005067 004264 CLR CYL ;START AT CYL=0
690 003116 016777 004260 004332 SFSL4: MOV CYL,ARPCA ;LOAD
691 003124 005077 004332 CLR ARPDA ;DISK ADDRESS
692 003130 004767 000534 JSR PC,SEKE ;SEEK
693 003134 000757 BR SFSL3 ;ERROR RETURN
694 003136 012777 176650 004306 MOV #-600.,ARPC ;GOOD RETURN
695 003144 012777 012222 004302 MOV #OUTBUF,ARPC ;WC&CA
696 003152 052777 014000 004266 BIS #14000,ARPC ;10/15 HEADER MODE
697 003160 112777 000003 004260 MOV#B #3,ARPC ;WRITE
698 003166 032777 100200 004252 BIT #B15+B7,ARPC ;ERROR OR DONE
699 003174 001774 BEQ #-6 ;WAIT
700 003176 100002 BPL SFSN1 ;DONE
701 003200 104074 ERR+ER+DS+CS+DA ;ERROR ON WRITE HEADER OP
702 003202 000745 BR SFSL4 ;REPEAT
703 003204 012767 177470 004150 SFSN1: MOV #-200.,TOG1
704 003212 012705 012224 MOV #OUTBUF+2,R5
705 003216 062715 000100 SFSL5: ADD #100,(R5) ;ADVANCE CYLINDER ADDRESS
706 003222 062705 000006 ADD #6,R5 ;INDEX
707 003226 005267 004130 INC TOG1 ;DONE?
708 003232 001371 BNE SFSL5 ;NO
709 003234 005267 004142 INC CYL ;ADVANCE CYLINDER
710 003240 026727 004136 000312 CMP CYL,#202. ;DONE?
711 003246 101001 BHI SFCHK ;YES
712 003250 000722 BR SFSL4 ;NO
713 003252 012767 000340 174516 SFCHK: MOV #P7,PS ;LOCKOUT PI
714 003260 116777 004112 004162 MOV#B UNIT,ARPCS1 ;SET UNIT
715 003266 004767 000730 JSR PC,H0ME ;HOME SEEK
716 003272 005067 004104 CLR CYL ;CYL=0
717 003276 016777 004100 004152 SFCL1: MOV CYL,ARPCA ;TAR=0
718 003304 005077 004152 CLR ARPDA ;SAR=0
719 003310 004767 000354 JSR PC,SEKE ;SEEK
720 003314 000756 BR SFCHK ;ERROR RETURN
721 003316 012777 176650 004126 MOV #-600.,ARPC ;WC
722 003324 012777 007722 004122 MOV #INBUF,ARPC ;CA

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723										
724	003332	052777	014000	004106		BIS	#14000,ARPCS		;10/15 HEADER OP	
725	003340	112777	000005	004100		MOVB	#5,ARPCS		:READ	
726	003346	032777	100200	004072		BIT	#B15+B7,ARPCS		;ERROR OR DONE?	
727	003354	001774				BEQ	-6		;NOT YET	
728	003356	100002				BPL	SFCL1		;JUMP IF DONE	
729	003360	104074				ERR+ER+DS+CS+DA			;READ HEADER ERROR	
730	003362	000745				BR	SFCL1		;LOOP	
731	003364	012705	003764		SFCN1:	MOV	#SCSLT,R5		;SETUP SECTOR LIST AND	
732	003370	012767	177766	003764		MOV	#-10.,TOG1		;COUNTER	
733	003376	005067	004002			CLR	HED		;SETUP GOOD DATA	
734	003402	012704	007722			MOV	#INBUF,R4		;SETUP BUFFER POINTER	
735	003406	012567	003774		SFCL2:	MOV	(R5)+,SEC		;FETCH A SECTOR	
736	003412	004767	000730			JSR	PC,CHKAD		;CHECK ADDRESS	
737	003416	000240				NOP			;NO LOOPING	
738	003420	005267	003736			INC	TOG1		;DONE ONE SURFACE?	
739	003424	001370				BNE	SFCL2		;NO	
740	003426	012705	003764			MOV	#SCSLT,R5		;YES - RESET	
741	003432	012767	177766	003722		MOV	#-10.,TOG1		;SECTOR PARAMETERS	
742	003440	005267	003740			INC	HED		;ADVANCE TRACK	
743	003444	026727	003734	000023		CMP	HED,#19.		;DONE?	
744	003452	101755				BLOS	SFCL2		;NO	
745	003454	005067	003724			CLR	HED		;YES - RESET HEAD	
746	003460	005267	003716			INC	CYL		;ADVANCE CYLINDER	
747	003464	026727	003712	000312		CMP	CYL,#202.		;DONE?	
748	003472	101701				BLOS	SFCL1		;NOT YET	
749	003474	000240				NOP			;A HALT CAN GO HERE	
750	003476	000167	177276			JMP	SFSTR		;DO IT AGAIN	
751	003502	012705	177742		CLRS:	MOV	#-30.,R5		;CLEAR	
752	003506	012704	003764			MOV	#SCSLT,R4		;THE SECTOR	
753	003512	105024			CLRS1:	CLRB	(R4)+		;SLOTS AND	
754	003514	005205				INC	R5		;FLAG POINTERS	
755	003516	001375				BNE	CLRS1		;EXIT	
756	003520	000207				RTS	PC		;WHEN DONE	
757	003522	004767	001114		SIN:	JSR	PC,RIN		;ASSEMBLE	
758	003526	004767	003444			JSR	PC,TTO		;ECHO	
759	003532	162700	000260			SUB	#260,R0		;A LIST OF	
760	003536	020027	000011			CMP	R0,#9.		;LOGICAL SECTOR	
761	003542	101012				BHI	SIN1		;NUMBERS	
762	003544	005700				TST	R0		;TOO SMALL?	
763	003546	100410				BMI	SIN1		;0-9 ARE LEGAL	
764	003550	105760	004010			TSTB	SCFLG(R0)		;HAS THIS NUMBER BEEN USED?	
765	003554	001005				BNE	SIN1		;ERROR - THIS NUMBER ALREADY USED	
766	003556	105160	004010			COMB	SCFLG(R0)		;SET FLAG	
767	003562	010024				MOV	R0,(R4)+		;STORE SEC#	
768	003564	062716	000002			ADD	#2,(SP)		;ADVANCE RETURN	
769	003570	000207			SIN1:	RTS	PC		;AND EXIT	
770	003572	012767	177754	003562	MKBUF:	MOV	#-20.,TOG1		;TOG1=COUNTER	
771	003600	012705	012222			MOV	#OUTBUF,R5		;R5=POINTER TO BUFFER	
772	003604	012704	003764			MOV	#SCSLT,R4		;R4=POINTER TO SECTOR LIST	
773	003610	012767	177766	003546		MOV	#-10.,TOG2		;TOG2=SECTOR COUNT	
774	003616	005067	003550			CLR	WORK			
775	003622	005025			MKBL1:	CLR	(R5)+		;WORD1=0	
776	003624	016725	003542			MOV	WORK,(R5)+		;WORD2=CYL+HEAD	
777	003630	012425				MOV	(R4)+,(R5)+		;WORD3=SECTOR	
778	003632	005267	003526			INC	TOG2		;DONE 10?	

J02

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779 003636 001371

BNE

MKBL1

;NO





817									
818	004022								
819	004032	004767	000464		UNIQ:	PNTM	UMES		
820	004036	000771				JSR	PC,TTIO		: READ UNIT #
821	004040	020027	000007			BR	UNIQ		: ERROR RECYCLE
822	004044	101366				CMP	RO,#7		: TOO BIG
823	004046	010067	003324			BHI	UNIQ		: YES
824	004052	012700	000001			MOV	RO,UNIT		: SAVE IT
825	004056	005767	003314			MOV	#1,RO		: DETERMINE ATTENTION BIT
826	004062	001406				TST	UNIT		: NO ROTATION
827	004064	016767	003306	000004		BEQ	UNSI		: IF 0
828	004072	004767	001406			MOV	UNIT,DS1		: NUMBER OF ROTATES
829	004076	000001			DS1:	JSR	PC,RTL		: TO DETERMINE ATTENTION BIT
830	004100	010067	003274		UNSI:	.WORD	1		: IS PUT HERE
831	004104	116777	003266	003336		MOV	RO,ATNB		: SAVE BIT
832	004112	032777	100000	003316		MOVB	UNIT,ARPCSI		: SELECT UNIT
833	004120	001401				BIT	#B15,ARPDS		: IS IT READY?
834	004122	000207				BEQ	.+4		: NO
835	004124	104434				RTS	PC		: YES - EXIT
836	004126	000766				ERM+DS+ER+CS			: SELECTED UNIT READY NOT UP
837	004130				SPACE:	BR	UNSI+4		: LOOP UNTIL FIXED
838	004140	005367	003260			PNTM	S1		: PRINT NUMBER OF SPACES
839	004144	001371				DEC	TTG		: IN TTG. THEN
840	004146	000207				BNE	SPACE		: EXIT
841	004150	004767	000346		PARIN:	RTS	PC		: READ SOME NUMBERS
842	004154	000401				JSR	PC,TTIO		: THIS IS NOW THE GOOD RETURN
843	004156	000207				BR	.+4		: CR IS ILLEGAL FOR THIS SEQUENCE
844	004160	020027	000240			RTS	PC		: IS IT A SPACE?
845	004164	001015				CMP	RO,#240		: NO - EXIT
846	004166	026705	003202			BNE	PRX		: TOO BIG?
847	004172	101012				CMP	WORK1,R5		: YES - EXIT
848	004174	005267	003224			BHI	PRX		: TTG=# OF SPACES
849	004200	026727	003220	000005		INC	TTG		: TOO MANY
850	004206	101004				CMP	TTG,#5		: YES
851	004210	004767	177714			BHI	PRX		: JUSTIFY NEXT ENTRY
852	004214	062716	000002			JSR	PC,SPACE		: SKIP FOR GOOD RETURN
853	004220	000207			PRX:	ADD	#2,(SP)		: EXIT
						RTS	PC		

854											
855	004222	105077	003210		HOME:	CLRB	ARPCD				; CLEAR ATTN BITS
856	004226	112777	000015	003212		MOVB	#15,ARPCD				; HOME SEEK
857	004234	012767	000005	003454		MOV	#5,DEBUG+174				; WAIT FOR
858	004242	005367	003450		WWW:	DEC	DEBUG+174				; SEEK TO
859	004246	001375				BNE	WWW				; START
860	004250	032777	002000	003160		BIT	#810,ARPCD				; IS SEEK UNDERWAY?
861	004256	001002				BNE	+6				; YES
862	004260	104434				ERM+ER+DS+CS					; SEEK NOT UNDERWAY
863	004262	000757				BR	HOME				; FIX IT
864	004264	036777	003110	003144		BIT	ATNB,ARPCD				; WAIT FOR
865	004272	001774				BEQ	-6				; ATTENTION TO SET
866	004274	032777	004000	003134		BIT	#811,ARPCD				; SEEK INCOMPLETE?
867	004302	001402				BEQ	+6				; NO
868	004304	104434				ERM+ER+DS+CS					; DEVICE STATUS ERROR
869	004306	000745				BR	HOME				; LOOP
870	004310	132777	000023	003122		BITB	#23,ARPCD1				; ANY ERRORS?
871	004316	001402				BEQ	+6				; NO
872	004320	104434				ERM+ER+CS+DS					; DEVICE STATUS ERROR
873	004322	000737				BR	HOME				; LOOP
874	004324	112777	000001	003114		MOVB	#1,ARPCD				; RESET THE RP11
875	004332	105077	003100			CLRB	ARPCD				; CLEAR ATTN
876	004336	116777	003034	003104		MOVB	UNIT,ARPCD1				; RELOAD UNIT#
877	004344	000207				RTS	PC				; EXIT
878	004346	062704	000002		CHKAD:	ADD	#2,R4				; SKIP 1ST WORD
879	004352	012467	003034			MOV	(R4)+,HEDR				; FETCH HEAD AND
880	004356	016767	003030	003024		MOV	HEDR,CYLR				; CYLINDER READ
881	004364	006067	003022			ROR	HEDR				; JUSTIFY HEAD
882	004370	006167	003014			ROL	CYLR				; AND
883	004374	006167	003010			ROL	CYLR				; CYLINDER
884	004400	000367	003004			SWAB	CYLR				; FOR CHECKING
885	004404	012467	003004			MOV	(R4)+,SECR				; FETCH SECTOR READ
886	004410					ANDI	17,SECR				
887	004416					ANDI	37,HEDR				
888	004424					ANDI	377,CYLR				
889	004432	026767	002744	002750		CMP	CYL,CYLR				; IS CYL# OK?
890	004440	001013				BNE	CMER				; NO
891	004442	026767	002736	002742		CMP	HED,HEDR				; IS TRACK# OK
892	004450	001007				BNE	CMER				; NO
893	004452	026767	002730	002734		CMP	SEC,SECR				; IS SECTOR# OK?
894	004460	001003				BNE	CMER				; NO
895	004462	062716	000002			ADD	#2,(SP)				; ALL ADDRESSES
896	004466	000207				RTS	PC				; OK - EXIT
897	004470	104500			CMER:	ERM+HD					; HEADER COMPARE ERROR
898	004472	000207				RTS	PC				; ERROR EXIT
899	004474				SUBER:	PNTM	SUBRMS				
900	004504	016600	000022			MOV	22(SP),R0				; FETCH PC OF SUBROUTINE CALL
901	004510	162700	000004			SUB	#4,R0				; PC-4=ADDRESS OF SUBROUTINE CALL
902	004514	004767	002426			JSR	PC,OCTPNT				; PRINT ADDRESS
903	004520	000207				RTS	PC				; EXIT



950	005047	046	051446	052105	UMES:	.ASCII	/88UNIT: 2
951	005054	052040	042510	043040	SECMES:	.ASCII	/88INPUT THE SECTOR NUMBERS(0-9) IN THE ORDER DESIRED.2/
952	005062	051117	040515	020124			
953	005070	047105	041101	042514			
954	005076	051440	044527	041524			
955	005104	027110					
956	005106	051446	052105	052040		.ASCII	/88SET THE RPI1 WRITE ENABLE SWITCH./
957	005114	042510	051040	030520			
958	005122	020061	051127	052111			
959	005130	020105	047105	041101			
960	005136	042514	051440	044527			
961	005144	041524	027110				
962	005150	051446	052105	052040		.ASCII	/88SET THE SELECTED UNIT WRITE ENABLE SWITCH./
963	005156	042510	051440	046105			
964	005164	041505	042524	020104			
965	005172	047125	052111	053440			
966	005200	044522	042524	042440			
967	005206	040516	046102	020105			
968	005214	053523	052111	044103			
969	005222	056					
970	005223	046	052123	044522		.ASCII	/88STRIKE ANY TELETYPE KEY WHEN READY.82.
971	005230	042513	040440	054516			
972	005236	052040	046105	052105			
973	005244	050131	020105	042513			
974	005252	020131	044127	047105			
975	005260	051040	040505	054504			
976	005266	023056	100				
977							
978	005271	046	051046	051505	NSWMES:	.ASCII	/88RESET THE FORMAT ENABLE SWITCH TO NORMAL./
979	005276	052105	052040	042510			
980	005304	043040	051117	040515			
981	005312	020124	047105	041101			
982							
983							
984							
985							
986							
987							
988							
989							
990							
991							

992	005320	042514	051440	044527
993	005326	041524	020110	047524
994	005334	047040	051117	040515
995	005342	027114		
996	005344	051446	051124	045511
997	005352	020105	047101	020131
998	005360	042524	042514	054524
999	005366	042520	045440	054505
000	005374	042540	042510	020116
001	005402	042522	042101	027131
002	005410	040046		

.ASCII SSTRIKE ANY TELETYPE KEY WHEN READY.SD/

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1003
1004
1005
1006 005412 032777 040000 002026 HRDR: BIT #B14,ARPCS ;TEST HARD ERROR BIT
1007 005420 001001 BNE HRN1 ;OK IF SET
1008 005422 104020 ERR+CS ;HARD ERROR NOT SET. C(SP) POINTS TO CAUSE
1009 005424 032777 100000 002014 HRN1: BIT #B15,ARPCS ;TEST ERROR BIT IN PPCS
1010 005432 001401 BEQ +4 ;OK IF SET
1011 005434 000207 RTS PC ;OK- EXIT
1012 005436 104020 ERR+CS ;RPCS ERROR NOT SET. C(SP) POINTS TO CAUSE
1013 005440 000207 RTS PC ;EXIT
1014 005442 032777 040000 001776 SFTR: BIT #B14,ARPCS ;TEST HARD ERROR BIT
1015 005450 001765 BEQ HRN1 ;OK IF CLEAR
1016 005452 104020 ERR+CS ;SOFT ERROR SET HARD ERROR BIT
1017 005454 000763 BR HRN1 ;TEST INCLUSIVE ERROR
1018 005456 017667 000000 001746 RTR: MOV @2(SP),ROTOG ;FETCH SHIFT COUNT
1019 005464 062716 000002 ADD #2,(SP) ;STEP RETURN VECTOR
1020 005470 000241 RRLUP: CLC ;CLEAR THE LINK
1021 005472 006000 ROR RO ;SHIFT RO RIGHT ONCE
1022 005474 005367 001732 DEC ROTOG ;FINISHED?
1023 005500 001373 BNE RRLUP ;NO
1024 005502 000207 RTS PC ;YES- EXIT
1025 005504 017667 000000 001720 RTL: MOV @2(SP),ROTOG ;FETCH SHIFT COUNT
1026 005512 062716 000002 ADD #2,(SP) ;STEP RETURN VECTOR
1027 005516 000241 RLLUP: CLC ;CLEAR LINK
1028 005520 006100 ROL RO ;SHIFT RO LEFT ONCE
1029 005522 005367 001704 DEC ROTOG ;FINISHED?
1030 005526 001373 BNE RLLUP ;NO
1031 005530 000207 RTS PC ;YES- EXIT
1032

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F03

1079									
1080									
1081	005764	032767	020000	171576	LERCHK:	BIT	#B13,SR		;SR13(1)=LOOP ON ERROR
1082	005772	001002				BNE	+.6		;EXIT IF 1
1083	005774	062716	000004			ADD	#4,(SP)		;ADVANCE RETURN VECTOR OVER LOOP JUMP
1084	006000	000207			LERXT:	RTS	PC		;EXIT
1085									
1086	006002	032767	010000	171560	LUPCHK:	BIT	#B12,SR		;SR12(1)=LOOP ALWAYS
1087	006010	001002				BNE	+.6		;EXIT IF 1
1088	006012	062716	000004			ADD	#4,(SP)		;ADVANCE RETURN VECTOR OVER LOOP JUMP
1089	006016	000207				RTS	PC		;EXIT
1090									
1091	006020	012700	007050		GBTYPE:	MOV	#GDMS,RO		;POINTER TO "GOOD"
1092	006024	004767	001260			JSR	PC,TYP0UT		;PRINT MESSAGE
1093	006030	016700	001316			MOV	GOOD,RO		;FETCH C(GOOD)
1094	006034	004767	000230			JSR	PC,PNT0CT		;PRINT OCTAL NUMBER
1095	006040	012700	007060			MOV	#BDMS,RO		;POINTER TO "BAD"
1096	006044	004767	001240			JSR	PC,TYP0UT		;PRINT MESSAGE
1097	006050	016700	001300			MOV	BAD,RO		;FETCH C(BAD)
1098	006054	004767	000210			JSR	PC,PNT0CT		;PRINT OCTAL NUMBER
1099	006060	000207				RTS	PC		;EXIT
1100									
1101	006062	012700	006771		CSTYPE:	MOV	#CSMS,RO		;POINTER TO "STATUS"
1102	006066	004767	001216			JSR	PC,TYP0UT		;PRINT TEXT
1103	006072	017700	001350			MOV	GRPCS,RO		;FETCH C(RPCS)
1104	006076	004767	000166			JSR	PC,PNT0CT		;PRINT OCTAL NUMBER
1105	006102	000207				RTS	PC		;EXIT
1106	006104	012700	007075		DATYPE:	MOV	#DAMS,RO		;POINTER TO "DATA"
1107	006110	004767	001174			JSR	PC,TYP0UT		;PRINT TEST
1108	006114	016700	001236			MOV	DATA,RO		;FETCH C(DATA)
1109	006120	004767	000144			JSR	PC,PNT0CT		;PRINT OCTAL NUMBER
1110	006124	000207				RTS	PC		;EXIT
1111	006126	012700	007001		ERTYPE:	MOV	#ERMS,RO		;PRINT
1112	006132	004767	001152			JSR	PC,TYP0UT		;"RPER="
1113	006136	017700	001300			MOV	RRPER,RO		;PRINT
1114	006142	004767	000122			JSR	PC,PNT0CT		;RPER
1115	006146	000207				RTS	PC		;EXIT
1116	006150	012700	007011		DSTYPE:	MOV	#DSMS,RO		;PRINT
1117	006154	004767	001130			JSR	PC,TYP0UT		;"RPDS="
1118	006160	017700	001252			MOV	RRPDS,RO		;PRINT
1119	006164	004767	000100			JSR	PC,PNT0CT		;RPDS
1120	006170	000207				RTS	PC		;EXIT
1121	006172	012700	007021		ADTYPE:	MOV	#CYMS,RO		;PRINT
1122	006176	004767	001106			JSR	PC,TYP0UT		;"CAR="
1123	006202	117700	001250			MOVB	RRPCA,RO		;PRINT
1124	006206					ANDI	37,RO		
1125	006212	004767	000730			JSR	PC,OCTPNT		;CAR
1126	006216	012700	007030			MOV	#TAMS,RO		;PRINT
1127	006222	004767	001062			JSR	PC,TYP0UT		;"R="
1128	006226	117700	001232			MOVB	RRPDA1,RO		;PRINT
1129	006232					ANDI	37,RO		
1130	006236	004767	000704			JSR	PC,OCTPNT		;TAR
1131	006242	012700	007040			MOV	#SEMS,RO		;PRINT
1132	006246	004767	001036			JSR	PC,TYP0UT		;"SAR="
1133	006252	117700	001204			MOVB	RRPDA,RO		;PRINT
1134	006256					ANDI	17,RO		



1135	006262	004767	000660		JSR	PC,OCTPNT		;SAR
1136	006266	000207			RTS	PC		;EXIT
1137	006270	012767	000006	001072	PNTOCT: MOV	#6,TOG4		
1138	006276	010067	001070		OLUP: MOV	RO,WORK		
1139	006302				ANDI	7,WORK		
1140	006310	062767	000060	001054	ADD	#60,WORK		
1141	006316	016746	001050		MOV	WORK,-(SP)		
1142	006322	006000			ROR	RO		
1143	006324	006000			RJR	RO		
1144	006326	006000			ROR	RO		
1145	006330	005367	001034		DEC	TOG4		
1146	006334	003360			BGT	OLUP		
1147	006336	012767	000005	001024	MOV	#5,TOG4		
1148	006344	012600			MOV	(SP)+,RO		
1149	006346				ANDI	61,RO		
1150	006352	004767	000620		JSR	PC,TT0		
1151	006356	012600			TOLUP0: MOV	(SP)+,RO		
1152	006360	004767	000612		JSR	PC,TT0		
1153	006364	005367	001000		DEC	TOG4		
1154	006370	003372			BGT	TOLUFO		
1155	006372	000207			RTS	PC		
1156								
1157	006374				HCTYPE: PNTM	HDMS		
1158	006404				PNTM	GDMS		
1159	005414				PNTM	S2		
1160	006424				PNTOL	CYL		
1161	006434				PNTM	S1		
1162	006444				PNTOL	HED		
1163	006454				PNTM	S1		
1164	006464				PNTOL	SEC		
1165	006474				PNTM	CARET		
1166	006504				PNTM	S1		
1167	006514				PNTM	BOMS		
1168	006524				PNTM	S2		
1169	006534				PNTOL	CYLR		
1170	006544				PNTM	S1		
1171	006554				PNTOL	HEDR		
1172	006564				PNTM	S1		
1173	006574				PNTOL	SECR		
1174	006604				PNTM	CARET		
1175	006614	000207			RTS	PC		
1176								

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1177									
1178	006616	020046	020040	020040	HDMS:	.ASCII	/&	CYLINDER	TRACK SECTOR
1179	006624	041440	046131	047111					
1180	006632	042504	020122	052040					
1181	006640	040522	045503	051440					
1182	006646	041505	047524	040122					
1183									
1184	006654	040040			S1:	.ASCII	/ &		
1185									
1186	006656	020040	100		S2:	.ASCII	/ &		
1187									
1188	006661	046	100		CARET:	.ASCII	/&&		
1189									
1190									
1191	006663	046	042446	051122	ERMS1:	.ASCII	/&&	ERROR AT ADDRESS	&
1192	006670	051117	040440	020124					
1193	006676	042101	051104	051505					
1194	006704	020123	100						
1195									
1196									
1197	006707	046	046117	035104	OLDMS:	.ASCII	/&OLD:	&	
1198	006714	020040	020040	040040					
1199	006722	047046	053505	020072	NEWMS:	.ASCII	/&NEW:	&	
1200	006730	020040	020040	100					
1201	006735	046	040503	046114	SUBRMS:	.ASCII	/&CALLED FROM SUBROUTINE AT	&	
1202	006742	042105	043040	047522					
1203	006750	020115	052523	051102					
1204	006756	052517	044524	042516					
1205	006764	040440	020124	100					
1206	006771	046	050122	051503	CSMS:	.ASCII	/&RPCS=	&	
1207	006776	020075	100						
1208									
1209	007001	046	050122	051105	ERMS:	.ASCII	/&RPER=	&	
1210	007006	020075	100						
1211									
1212	007011	046	050122	051504	DSMS:	.ASCII	/&RPDS=	&	
1213	007016	020075	100						
1214									
1215	007021	046	040503	036522	CYMS:	.ASCII	/&CAR=	&	
1216	007026	040040							
1217									
1218	007030	020040	040524	036522	TAMS:	.ASCII	/ TAR=	&	
1219	007036	040040							
1220									
1221	007040	020040	040523	036522	SEMS:	.ASCII	/ SAR=	&	
1222	007046	040040							
1223									
1224	007050	043446	047517	036504	GDMS:	.ASCII	/&GOOD=	&	
1225	007056	040040							
1226									
1227	007060	040502	036504	040040	BDMS:	.ASCII	/BAD=	&	
1228									
1229	007066	020040	051520	020075	STMS:	.ASCII	/ PS=	&	
1230	007074	100							
1231									
1232	007075	046	040504	040524	DAMS:	.ASCII	/&DATA=	&	

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1233 007102 020075 100  
1234

1235									
1236		007106				.EVEN			
1237									
1238	007106	010446			SAVOS:	MOV	R4,-(SP)		:SAVE R0-R5 ON THE STACK
1239	007110	010346				MOV	R3,-(SP)		:R5 WAS STACKED BY THE JSR
1240	007112	010246				MOV	R2,-(SP)		:R4-R3 ARE STACKED ABOVE IT
1241	007114	010146				MOV	R1,-(SP)		:WITH R0 ON TOP
1242	007116	010046				MOV	R0,-(SP)		:R5 HOLDS THE RETURN PC, BUT AN
1243	007120	000115				JMP	(R5)		:RTS WOULD POP THE STACK-SO JUMP OUT
1244									
1245	007122	005726			RESTOS:	TST	(SP)+		:MOVE SF OVER WORD SAVED BY JSR
1246	007124	012600				MOV	(SP)+,R0		:R0-4
1247	007126	012601				MOV	(SP)+,R1		:ARE POPPED
1248	007130	012602				MOV	(SP)+,R2		:IN LIFO
1249	007132	012603				MOV	(SP)+,R3		:SEQUENCE
1250	007134	012604				MOV	(SP)+,R4		:R5 IS POPPED BY THE RTS AND
1251	007136	000205				RTS	R5		:THE PC IS TAKEN FROM R5
1252									
1253	007140	012702	000012		DECPNT:	MOV	#10.,R2		:DIVISOR OF 10 FOR DECIMAL PRINT
1254	007144	000402				BR	DECREM		:PROCESS AND PRINT NUMBER
1255	007146	012702	000010		OCTPNT:	MOV	#8.,R2		:DIVISOR OF 8 FOR OCTAL PRINT
1256	007152	004767	000060		DECREM:	JSR	PC, IDIVR		:DIVIDE (R0) BY (R2) WITH REMAINDER IN R1
1257	007156	010146				MOV	R1,-(SP)		:STACK REMAINDER
1258	007160	005700				TST	R0		:HAS NUMBER DEFLATED BELOW RADIX?
1259	007162	001402				BEQ	POPTT		:YES - POP AND PRINT
1260	007164	004767	177762			JSR	PC, DECREM		:NO - DIVIDE NUMBER BY RADIX
1261	007170	012600			POPTT:	MOV	(SP)+,R0		:POP NUMBER FROM STACK
1262	007172	062700	000060			ADD	#60,R0		:MAKE ASCII
1263	007176	032767	040000	170364	TTO:	BIT	#B14,SR		:IF SR14=1,DELETE TYPEOUT
1264	007204	001010				BNE	TTOLF-2		:EXIT
1265	007206	010067	170354			MOV	R0,TPB		:PRINT CONTENTS OF R0
1266	007212	105767	170346		TTOLF:	TSTB	TPS		:DONE YET?
1267	007216	100375				BPL	TTOLF		:NO - KEEP LOOPING
1268	007220	022700	000015			CMP	#CR,R0		:WAS CHARACTER A CR!
1269	007224	001401				BEQ	TTOLF		:YES - PRINT LINE FEED
1270	007226	000207				RTS	PC		:RETURN TO POPTT OR MAIN PROGRAM
1271	007230	012700	000012		TTOLF:	MOV	#LF,R0		:PRINT LF
1272	007234	000760				BR	TTO		:EXECUTE PRINT
1273									
1274	007236	010067	000116		IDIVR:	MOV	R0,DIVID		:SAVE DIVIDEND
1275	007242	005000				CLR	R0		:CLEAR QUOTIENT AREA
1276	007244	005001				CLR	R1		:CLEAR ACCUM.
1277	007246	060201			DIVLP:	ADD	R2,R1		:ADD DIVISOR TO ACCUM.
1278	007250	020167	000104			CMP	R1,DIVID		:COMPARE TO DIVIDEND
1279	007254	100002				BPL	DVEND		:WHEN ACCUM PASSES DIVIDEND - EXIT
1280	007256	005200				INC	R0		:INCREMENT QUOTIENT THEN
1281	007260	000772				BR	DIVLP		:ADD AGAIN
1282	007262	001003			DVEND:	BNE	DIVN1		:JUMP TO GET REMAINDER
1283	007264	005200				INC	R0		:NO REMAINDER - INCREMENT QUOTIENT
1284	007266	005001				CLR	R1		:REMAINDER OF 0
1285	007270	000207				RTS	PC		:EXIT
1286	007272	160167	000062		DIVN1:	SUB	R1,DIVID		:FANCY FINAGLING TO
1287	007276	060267	000056			ADD	R2,DIVID		:DETERMINE THE REMAINDER
1288	007302	016701	000052			MOV	DIVID,R1		:REMAINDER TO R1
1289	007306	000207				RTS	PC		:EXIT WITH QUOTIENT IN R0

1290						
1291	007310	010046		TYP0UT:	MOV	RO, -(SP)
1292	007312	117600	000000	TPCFCH:	MOV	2(SP), RO
1293	007316	022700	000100		CMP	#100, RO
1294	007322	001411			BEQ	TPOUX
1295	007324	022700	000046		CMP	#46, RO
1296	007330	001002			SNE	.+6
1297	007332	012700	000015		MOV	#CR, RO
1299	007336	004767	177634		JSR	PC, T0
1299	007342	005216			INC	(SP)
1300	007344	000762			BR	TPOFCH
1301	007346	005726		TPOUX:	POP	
1302	007350	000207			RTS	PC
1303						
1304	007352	000000		GOOD:	XX	
1305	007354	000000		BAD:	XX	
1306	007356	000000		DATA:	XX	
1307	007360	000000		DIVID:	XX	
1308	007362	000000		TOG1:	XX	
1309	007364	000000		TOG2:	XX	
1310	007366	000000		TOG3:	XX	
1311	007370	000000		TOG4:	XX	
1312	007372	000000		WORK:	XX	
1313	007374	000000		WORK1:	XX	
1314	007376	000000		UNIT:	XX	
1315	007400	000000		ATNB:	XX	
1316	007402	000000		CYL:	XX	
1317	007404	000000		HED:	XX	
1318	007406	000000		SEC:	XX	
1319	007410	000000		CYLR:	XX	
1320	007412	000000		HEDR:	XX	
1321	007414	000000		SECR:	XX	
1322	007416	000000		CYLA:	XX	
1323	007420	000000		HEDA:	XX	
1324	007422	000000		SECA:	XX	
1325	007424	000000		TTG:	XX	
1326	007426	000000		TEMP1:	XX	
1327	007430	000000		MASK:	XX	
1328	007432	000000		ROTOG:	XX	
1329	007434	000000		LERR:	XX	
1330	007436	176710		RPCS:	176710	
1331	007440	176711		RPDS1:	176711	
1332	007442	176712		RPER:	176712	
1333	007444	176713		RPER1:	176713	
1334	007446	176714		RPCS:	176714	
1335	007450	176715		RPCS1:	176715	
1336	007452	176716		RPWC:	176716	
1337	007454	176720		RPBA:	176720	
1338	007456	176722		RPCA:	176722	
1339	007460	176723		RPCA1:	176723	
1340	007462	176724		RPDA:	176724	
1341	007464	176725		RPDA1:	176725	
1342	007466	176726		RPM1:	176726	
1343	007470	176727		RPM11:	176727	
1344	007472	176730		RPM2:	176730	
1345	007474	176731		RPM21:	176731	

```

;STACK ADDRESS POINTER FOR MESSAGE
;FETCH ASCII B/TE
;IS IT 2(TERMINATOR)?
;YES - EXIT
;IS IT CRLF FLAG?
;NO
;YES- CHANGE DATA TO CRLF
;PRINT
;MOVE POINTER TO NEXT BYTE
;FETCH NEXT CHARACTER
;POP STACK TO REACH RETURN VECTOR
;EXIT
    
```

1346	007476	176732	RPM3:	176732
1347	007500	176733	RPM31:	176733
1348	007502	176734	RPB1:	176734
1349	007504	176735	RPB11:	176735
1350	007506	176736	RPB2:	176736
1351	007510	176737	RPB21:	176737
1352	007512	176740	RPB3:	176740
1353	007514	176741	RPB31:	176741
1354	007516	000254	RPIV:	.WORD 254
1355	007520	000256	RPSV:	.WORD 256
1356	007522	000000	DEBUG:	XX
1357		007722	INBUF=	DEBUG+200
1358		012222	OUTBUF=	INBUF+2300
1359				
1360				
1361	000001		.END	;THAT'S ALL FOLKS!













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DZRPMA.P11 CROSS REFERENCE TABLE -- USER SYMBOLS

= 007524

473#	478	479#	487#	520	528#	541	544	552	566	571	583#	640
656	669#	699	727	790	793	833	842	861	865	867	871	930
1010	1051	1054	1057	1060	1063	1066	1069	1075	1082	1087	1236#	1296





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DZRPHA.P11 CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

RTI	518	526	1077												
RTS	756	769	786	795	797	834	940	843	853	877	896	898	903	927	933
	1011	1013	1024	1031	1084	1089	1099	1105	1110	1115	1120	1136	1155	1175	1251
	1270	1285	1289	1302											
SUB	759	901	1040	1286											
SWAB	884														
TRAP	413														
TST	762	825	1245	1258											
TSTB	764	929	1266												
.ABS	359														
.ASCII	937	939	949	950	951	952	953	954	955	956	957	958	960	966	972
	980	988	996	1178	1184	1186	1188	1191	1197	1199	1201	1206	1209	1212	1215
	1218	1221	1224	1227	1229	1232									
.BYTE	815														
.END	1361														
.EVEN	1004	1236													
.MPCR	424	428	434	439	444	451	456	461	466						
.REM	1														
.REPT	474	808	812												
.WORD	480	481	482	483	811	829	1354	1355							

ERRORS DETECTED: 0  
DEFAULT GLOBALS GENERATED: 0

\*DZRPHA.DZRPHA.SEQ/SOL/CRF/DS:ERFZ/EN:ABS=DSKM:DZRPHA.P11  
RUN-TIME: 4 8 2 SECONDS  
RUN-TIME RATIO: 43/16=2.6  
CORE USED: BK (15 PAGES)

