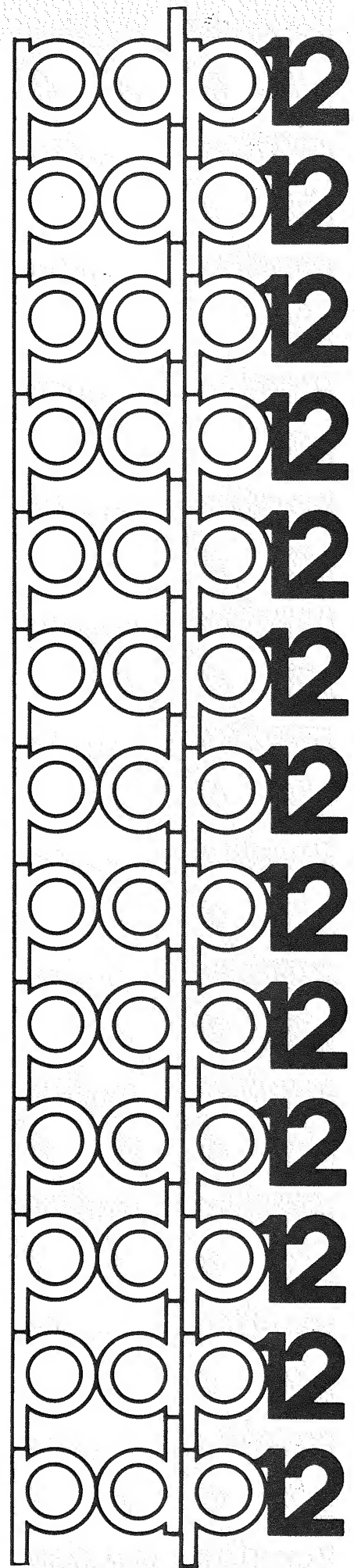


digital

DISPLAY



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DISPLAY

1. INTRODUCTION

DISPLAY enables a data display facility for those routines which do not require complex display processing or cannot sacrifice the core for such a display. The routine displays any contiguous section of core via a moving window, with a cursor and octal read out of cursor positions to facilitate operator interaction.

2. ENVIRONMENT

2.1 Hardware

A PDP-12A computer.

2.2 Core Allocation

Any two PDP-8 pages in field 0 except page 0 that are segment contained, beta registers 0, 1, and 2 of the segment, and any six page 0 locations are the core requirements. The actual binary output resides in one tape block.

3. CALLING PROCEDURE

There are two calls to DISPLAY: an initial call and a refresh call, both of which must be in the same PDP-8 field as DISPLAY (field 0). The function of the initial call is to set up arguments for the refresh subroutines:

JMS I KIDORA

FIELD

CORE LOCATION

FIELD

CORE LOCATION

Y OFFSET

Y SCALE FACTOR

.

.

.

.

KIDORA, IDORA

The first four words are two 15-bit addresses that specify the beginning and end of the data buffer to be displayed, respectively. Any contiguous section of core is legal input to IDORA as long as the buffer is at least 1000_8 points long. The first address must be less than the second. DISPLAY treats the data buffer as a core ring so that the initial and terminal points are contiguously displayed.

The purpose of words 5 and 6 is to allow the calling programs flexibility in displaying data.¹ The fifth word is a Y offset and specifies a 12 bit number to be added (2's compliment) to the data before it is displayed; the sixth word is a SCR K instruction and indicates the amount of scaling to be done prior to display. IDORA exits to the SCR K location in PDP-8 mode with the data field set to 0 and the AC = 0.

The refresh call is simply

JMS I KRDORA

.

.

.

KRDORA, RDORA

The refresh call displays 1000₈ points, sets arguments for the next refresh and returns to the location following the call, in PDP-8 mode with the accumulator cleared and the data field DF and IF unchanged. Note that the initial call to DISPLAY must be to IDORA; RDORA always refreshes the buffer specified by the last call to IDORA

¹It should be noted that DISPLAY assumes the data to be in single word format.

4. FACTOR INTERACTION

The operator controls the position of the window with knob \emptyset : clockwise motion moves the window to the "right" or towards the end of the buffer; counter-clockwise, to the left. The midpoint reading on knob \emptyset causes the motion to stop.

Knobs 1 and 5 and Sense Switch (SSW) 5 control the cursor (an intensified dot). Depending on the setting of SSW 5, the cursor may either move along the curve or be displayed independently. When SSW 5 = \emptyset , the cursor moves along the curve and its position is controlled with Knob 1:

When Knob 1 is turned to its furthestmost clockwise position, the cursor sits upon the rightmost scope point; when Knob 1 is positioned to its furthestmost counter-clockwise position, the cursor sits on the leftmost scope point; intervening knob positions yield intervening cursor positions.

When SSW5 = 1, the cursor is displayed independently of the curve. For this case, Knob 1 controls the horizontal coordinate and Knob 5 the vertical coordinate. Horizontal displacement of the cursor via Knob 1 is identical to that described above. When Knob 5 is at its furthestmost clockwise position, the cursor is displayed at the top of the scope. When Knob 5 is at its furthestmost counter-clockwise position, the cursor is displayed at the bottom of the scope.

Associated with the cursor are four octal words displayed in the top left corner of the scope, one beneath the other¹. The first two words are the absolute 15-bit core address of the cursor point. The third word is the contents of the displayed core address, i.e., the actual 12-bit value in the data buffer of the data word that corresponds to the cursor point. The fourth word is the scope Y coordinate of the cursor point. The fourth word is a relative value and depends upon the Y scale factor and Y offset. If the data had been scaled to nine bits prior to display, the fourth word or Y coordinate would range from 0001 to 1000₈, where 0001 corresponds to the bottom of the scope and 1000 corresponds to the top.

To facilitate interaction with the calling program the four displayed words described above are maintained in page 0 and may be accessed after the refresh return.

<u>TAG</u>	<u>CONTENTS</u>
XCURHI	Fifteen bit address of the point
XCURLO	in memory reference by the cursor
CORVAL	Contents of memory
YCUR	Relative Y display coordinate

¹ The character size of the display depends upon the setting of the special functions register at the time the display is refreshed.

Standard Parameters

The six locations on page 0 can be anywhere and they do not have to be contiguous. The standard version of DISPLAY assumes locations 20 - 25; the locations are defined via direct assignment statements at the end of the DISPLAY source.

```
YSHFT = 20          CONTAINS Y OFFSET
XCURHI = YSHFT + 1
XCURLO = XCURHI + 1
CORVAL = XCURLO + 1
YCUR = CORVAL + 1
COUNT = YCUR + 1
```

} SEE ABOVE

The following symbols (also defined at the end of the DISPLAY source) may be redefined if the user wishes to use Knobs other than 0, 1, and 5:

```
WINSAM = SAM 0
CURSAM = SAM 1
FRESAM = SAM 5
```

As coded, DISPLAY occupies locations 5400 through 5777, with IDORA = 5400 and RDORA = 5544. The origin statement at line 10 and/or the PAGE pseudo-op at line 223 may be altered to relocate part or all of DISPLAY. (N.B. if using the page of the segment containing the beta registers, place the origin at the fourth location of the page since DISPLAY uses beta registers 0, 1, and 2; i.e. * 2003; or * 4003; or * 6003).

Example

If Segments 4 and 5 contain 12 bit, unsigned data, the following would display 512 points (as controlled by knob 0) until a keyboard input is detected:

JMS I KIDORA	/N.B. PDP-8 MODE
1	/LOCATION 10,000.
0	/START OF BUFFER
1	/LOCATION 13,777 IS
3777	/END OF BUFFER
4000	/VERTICAL COORDINATOR
	/377 1000
SCALE 3	/ 0 TO 400
JMS I KRDORA	/400 1
KSF	/FROM 12 BITS TO 9
JMP LOOP	/REFRESH SCOPE
.	/KEY STRUCK ?
.	/NO, CONTINUE DISPLAY
.	
.	The program might now do something with the datum indicated by the cursor exit, or
KIDORA,IDORA	/INITIALIZE POINTER
KRDORA,RDORA	/REFRESH POINTER

5. INTERNAL DESCRIPTION

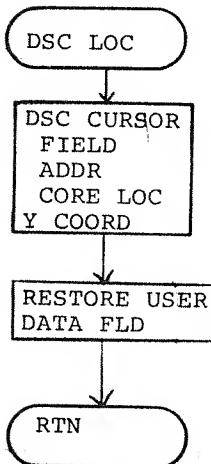
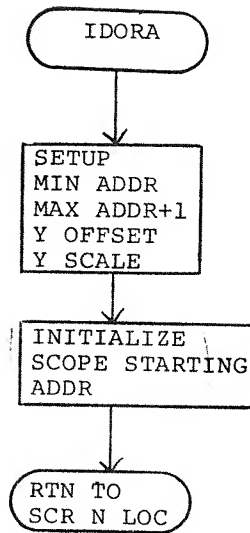
5.1 IDORA

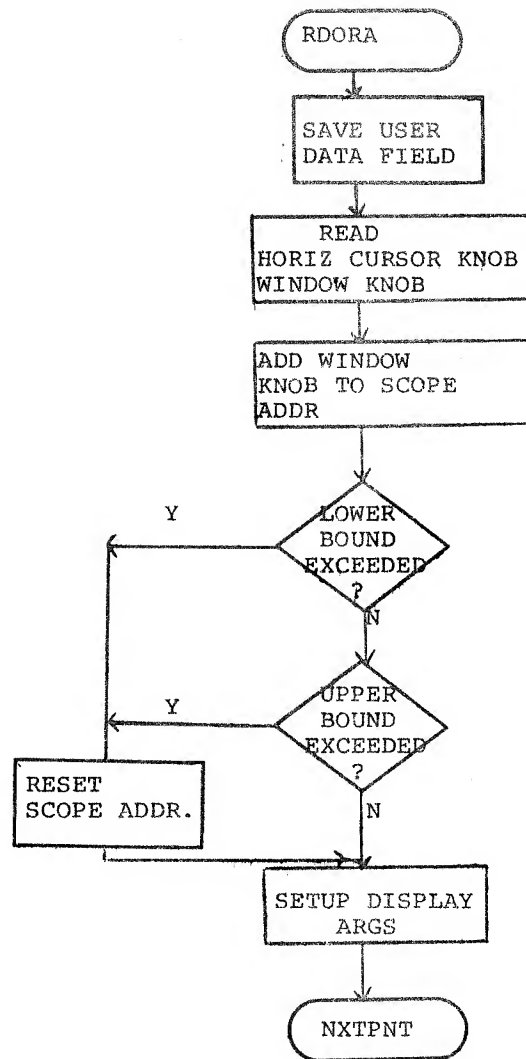
The function of IDORA is to retrieve the arguments from the initial call and set them up for RDORA. The lower bound is stored at MINFLD. MINADR, the upper bound + 1, is stored at MAXFLD, MAXADR. The Y offset is stored at YSHFT (page 0) and the scale factor is stored at YSCAL.

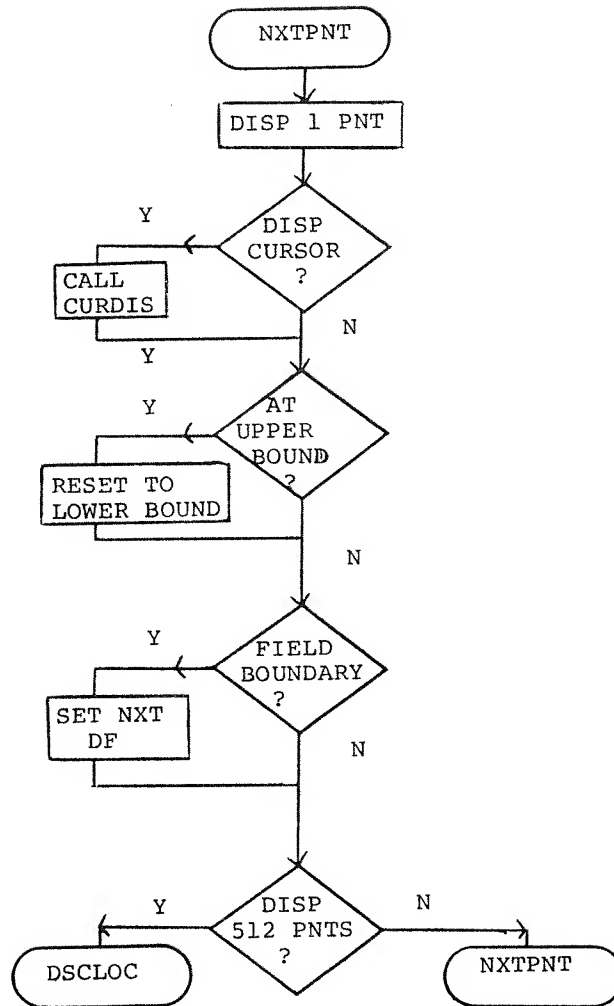
5.2 RDORA

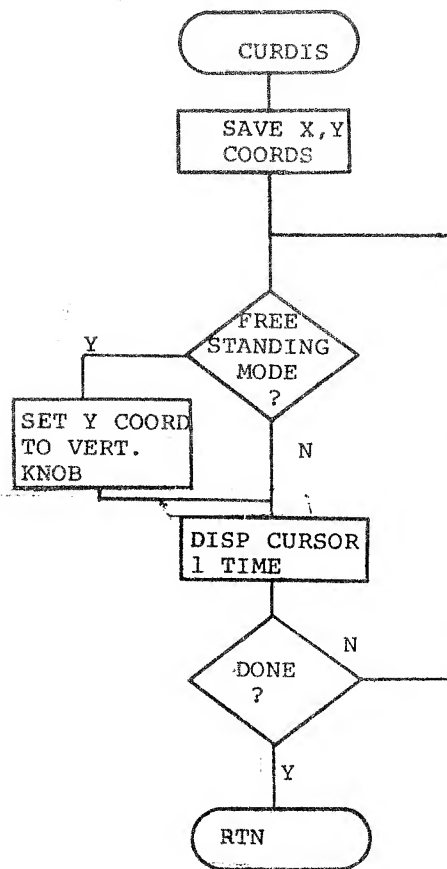
The function of RDORA is to display 1000_8 points relative to the window knob and a scope starting address and return. RDORA first reads the horizontal cursor knob and sets it to a value between -1 and -1000_8 ; this is the cursor count. RDORA then reads the window knob and updates the initial scope address (BUFHI, BUFLO) maintaining that address modulo the upper and lower bounds. RDORA then displays the buffer one point at a time. After each point is displayed, RDORA checks (ISZ) the cursor count; when it goes to 0, the cursor is displayed. RDORA also checks for the end of the display buffer and the end of a field, resetting to the start of the display buffer or to the next field respectively, as the case may be. After all points have been displayed, the routine DSCLOC is called to display the four words in the upper left corner of the scope. RDORA then restores the user's data field and returns.

5.3 FLOW DIAGRAM









5.4 LISTING

```

0000      *20
0001      /DISPLAY (MINI MAGSPY )
0002      /COPYRIGHT 1970
0003      /DIGITAL EQUIPMENT CORPORATION, MAYNARD, MASS.
0004      /MOVING WINDOW DISPLAY SUBROUTINE
0005      /CURSOR READ OUT
0006      /CORE OR TAPE FILE
0007      PMODE
0010      *5400
0011
0012
0013      /INITIAL CALL GET PARAM LIST
0014      /SET ARGS FOR RDORA
0015
0016
0017      5400 0000 IDORA, 0 /GET BOUNDS
0020      5401 7300 CLA CLL
0021      5402 0201 ACDF0, CDF 0
0022      5403 1600 TAD I IDORA /DATA BUFFER
0023      5404 3635 DCA I KMNFLD /15 BIT
0024      5405 2200 ISZ IDORA /LOWER BOUND
0025      5406 1600 TAD I IDORA /AT P+1, P+2
0026      5407 3636 DCA I KMNADR /MINFLO, MINADR
0027      5410 2200 ISZ IDORA
0030      5411 1600 TAD I IDORA /UPPER BOUND
0031      5412 3637 DCA I KMXFLD /AT P+3, P+4
0032      5413 2200 ISZ IDORA
0033      5414 7001 IAC /RDORA USES
0034      5415 1600 TAD I IDORA /MAX+1
0035      5416 3640 DCA I KMXADR
0036      5417 7004 RAL
0037      5420 1637 TAD I KMXFLD
0040      5421 3637 DCA I KMXFLD
0041      5422 2200 ISZ IDORA
0042      5423 1600 TAD I IDORA /Y SHIFT
0043      5424 3020 DCA YSHFT
0044      5425 2200 ISZ IDORA
0045      5426 1600 TAD I IDORA /Y SCALE
0046      5427 3643 DCA I KYSCAL
0047      5430 1635 TAD I KMNFLD /INITIALIZE
0050      5431 3641 DCA I KBUFHI /WINDOW
0051      5432 1636 TAD I KMNADR /STARTING ADDR
0052      5433 3642 DCA I KBUFLO
0053      5434 5600 JMP I IDORA /RTN TO SCR N
0054      5435 5615 KMNFLD, MINFLO
0055      5436 5616 KMNADR, MINADR
0056      5437 5674 KMXFLD, MAXFLD
0057      5440 5675 KMXADR, MAXADR
0060      5441 5774 KBUFHI, BUFHI
0061      5442 5775 KBUFLO, BUFLO
0062      5443 5644 KYSCAL, YSCAL
0063      5444 0401 P401, 401

```

0064	5445	1244	DSCLOC,	TAD P401	/DSC X,Y COORD
0065	5446	3275		DCA VCOORD	
0066	5447	1021		TAD XCURHI	/FIELD
0067	5450	4262		JMS DSCWD	
0070	5451	1022		TAD XCURLO	/ADDRESS
0071	5452	4262		JMS DSCWD	
0072	5453	1023		TAD CORVAL	/CONTENTS OF
0073	5454	4262		JMS DSCWD	/CURSR CORE LOC
0074	5455	1024		TAD YCUR	/Y COORD OF
0075	5456	1244		TAD P401	
0076	5457	4262		JMS DSCWD	/CURSOR POINT
0077	5460	0000	RTNCDP,	0	/RESTORE USER
0100					/DATA FLD
0101	5461	5744		JMP I RDORA	/RTN
0102	5462	0000	DSCWD,	0	/DSC C(AC)
0103	5463	6141		LINE	
0104				LMODE	
0105	1464	5477		STC TEMP	/SAVE VALUE
0106	1465	4001		STC XCORD	/CHAN 1
0107	1466	0024		SPA	/VC FOR FULL
0110	1467	0265		ROL I 5	/SIZE IS -40
0111	1470	1020		LDA I	/=20 FOR HALF
0112	1471	7757		=20	
0113	1472	0452		LZE	/FULL CHARS ?
0114	1473	0241		ROL 1	/NO VC-40
0115	1474	1160		ADM I	/UPDATE VC
0116	1475	0000	VCOORD,	0	
0117	1476	1020	DSCLOP,	LDA I	
0120	1477	0000	TEMP,	0	
0121	1500	0243		ROL 3	/1 DIGIT
0122	1501	1040		STA	/AT A TIME
0123	1502	1477		TEMP	/UPDATE
0124	1503	1560		BCL I	/LOW 3 BITS
0125	1504	7770		7770	/ONLY
0126	1505	0241		ROL 1	/+2 AND REL
0127	1506	1120		ADA I	/TO GRID TAB
0130	1507	1524		TAB&1777	
0131	1510	4002		STC 2	
0132	1511	3475		ADD VCOORD	
0133	1512	1742		DSC 2	
0134	1513	1762		DSC I 2	
0135	1514	0221		XSK I 1	/MAKE GAP
0136	1515	0221		XSK I 1	/BETWEEN CHARS
0137	1516	1520		SRO I	/DSC 4 CHARS ?
0140	1517	3567		3567	
0141	1520	7476		JMP DSCLOP	/NO CONT
0142	1521	0002		PDP	
0143				PMODE	
0144	5522	7300		CLA CLL	
0145	5523	5662		JMP I DSCWD	/RTN
0146	5524	4536	TAB,	4536 /60,0	
0147	5525	3651		3651	
0150	5526	2101		2101 /61,1	

0151	5527	0177	0177	
0152	5530	4523	4523	/62,2
0153	5531	2151	2151	
0154	5532	4122	4122	/63,3
0155	5533	2651	2651	
0156	5534	2414	2414	/64,4
0157	5535	0477	0477	
0160	5536	5172	5172	/65,5
0161	5537	0651	0651	
0162	5540	1506	1506	/66,6
0163	5541	4225	4225	
0164	5542	4443	4443	/67,7
0165	5543	6050	6050	
0166	5544	0000	RDORA, 0	
0167	5545	7300	CLA CLL	/SAVE USER DF
0170	5546	6214	RDF	
0171	5547	1202	TAD ACDF0	
0172	5550	3260	DCA RTNCF	
0173	5551	6141	LINC	
0174			LMODE	
0175	1552	0101	CURSAM	/CURSOR
0176	1553	0341	SCR 1	/9 BITS COVERS
0177	1554	0002	POP	/SCOPE
0200			PMODE	/MAKE RANGE
0201	5555	1244	TAD P401	/-1 TO -1000
0202	5556	7141	CIA CLL	
0203	5557	6141	LINC	
0204			LMODE	
0205	1560	5773	STC CURCNT&1777	
0206	1561	0100	WSAM, WINSAM	/WINDOW
0207	1562	0344	SCR 4	/75 CENTS WORTH
0210	1563	0061	SET I XCORD	
0211	1564	6777	-1000	/512 PNTS
0212	1565	7600	JMP CONT&1777	
0213	1566	0105	FREE, PRESAM	
0214	1567	0341	SCR 1	
0215	1570	0002	POP	
0216			PMODE	
0217	5571	3024	DCA YCUR	
0220	5572	1024	TAD YCUR	
0221	5573	6141	LINC	
0222	5574	6000	6000	/JMP 0
0223			PAGE	
0224	5600	0002	CONT, 2	
0225	5601	6201	CDF0,	
0226	5602	3347	CDF 0	
0227	5603	1347	DCA DBLLO	/PUT KNOB VAL
0230	5604	7710	TAD DBLLO	/IN DAC
0231	5605	7040	SPA CLA	/PROPAGATE SIGN
0232	5606	3341	CMA	/BIT HI ORD
0233	5607	4304	DCA DBLHI	
0234	5610	1347	JMS DADD	
0235	5611	3375	TAD DBLLO	/UPDATE WIN ADDR
			DCA BUFLO	

0236	5612	1341	TAD DBLHI	
0237	5613	3374	DCA BUFHI	
0240				/MUST CHK
0241				/WINDOW SA
0242				/WITH BOUNDS
0243				/TO MAINTAIN
0244				/BUFFER RING
0245				
0246	5614	4316	JMS BOUND	/LOWER BOUND
0247	5615	0001	MINFLD, 1	
0250	5616	0000	MINADR, 0	
0251	5617	7700	SMA CLA	/LOW END WRAP?
0252	5620	5273	JMP CHKHI	/NO
0253	5621	1274	TAD MAXFLD	/RESET TO
0254	5622	3374	DCA BUFHI	/UPPER BOUND
0255	5623	1275	TAD MAXADR	
0256	5624	3375	DCA BUFLO	
0257	5625	4304	JMS DADD	/CORRECT WRAP
0260	5626	1347	TAD DBLLO	/CORRECTED
0261	5627	3375	DCA BUFLO	/WINDOW SA
0262	5630	1341	TAD DBLHI	
0263	5631	3374	DCA BUFHI	
0264	5632	1375	SETFLD, TAD BUFLO	/SET DISPLAY
0265	5633	3304	DCA BUFPTR	/ARGS
0266	5634	1327	TAD M1000	
0267	5635	3025	DCA COUNT	
0270	5636	1374	TAD BUFHI	
0271	5637	3316	DCA BOUND	
0272	5640	4341	JMS SETDF	
0273	5641	1704	NXTPNT, TAD I BUFPTR	
0274	5642	1020	TAD YSHFT	/OFF SET
0275	5643	6141	LINC	
0276			LMODE	
0277	1644	0341	YSCAL, SCR 1	/SCALE FACTOR
0300	1645	0161	DIS I XCORD	
0301	1646	0002	POP	
0302			PMODE	
0303	5647	2373	ISZ CURCNT	/READY TO DIS
0304				/CURSOR ?
0305	5650	7610	CURRTN, SKP CLA	/NO
0306	5651	5351	JMP CURDIS	
0307	5652	2376	ISZ ENDLO	/CHK FOR HI
0310	5653	5263	JMP OKEND	/END WRAP
0311	5654	2377	ISZ ENDHI	
0312	5655	5263	JMP OKEND	
0313	5656	1216	TAD MINADR	/RESET TO
0314	5657	3304	DCA BUFPTR	/LOWER BOUND
0315	5660	1215	TAD MINFLD	
0316	5661	3316	DCA BOUND	
0317	5662	5266	JMP NXTDF	
0320	5663	2304	OKEND, ISZ BUFPTR	/CHK FOR FIELD
0321				/BOUNDARY
0322	5664	5267	JMP OKFLD	/ITS OK

0323	5665	2316	ISZ BOUND	/SET NXT FLD
0324	5666	4341	NXTDF, JMS SETDF	
0325	5667	2025	OKFLD, ISZ COUNT	/512 PNTS ?
0326	5670	5241	JMP NXTPNT	/NO
0327	5671	5672	JMP I ,+1	/DSC READ OUT
0330	5672	5445	DSCLOC	
0331	5673	4316	CHKHI, JMS BOUND	/CHK UPR BOUND
0332	5674	0002	MAXFLD, 2	
0333	5675	0000	MAXADR, 0	
0334	5676	7710	M70, SPA CLA	/HI WRAP ?
0335	5677	5232	JMP SETFLD	
0336	5700	1215	TAD MINFLD	/YES
0337	5701	3374	DCA BUFHI	/RESET TO
0340	5702	1216	TAD MINADR	/LOWER BOUND
0341	5703	5224	JMP WRAP	
0342			/DOUBLE PRECISION ADD	
0343			/(DBLHI,DBLLO)+(BUFHI,BUFLO)	
0344			/RESULT IN (DBLHI,DBLLO)	
0345			/(BUFHI,BUFLO)=INITIAL SCORE ADDRESS	
0346				
0347	5704	0000	DADD, 0	
0350	5705	7300	CLA CLL	
0351	5706	1347	TAD DBLLO	
0352	5707	1375	TAD BUFLO	
0353	5710	3347	DCA DBLLO	
0354	5711	7004	RAL	
0355	5712	1341	TAD DBLHI	
0356	5713	1374	TAD BUFHI	
0357	5714	3341	DCA DBLHI	
0360	5715	5704	JMP I DADD	
0361				
0362			/ADD =UPPER OR =LOWER BOUND	
0363			/TO (BUFHI,BUFLO)	
0364			/BOUND IS AT P+1,P+2 OF CALL	
0365				
0366	5716	0000	BOUND, 0	
0367	5717	1716	TAD I BOUND	/2S COM OF ARG
0370	5720	7140	CMA CLL	/TO DAC
0371	5721	3341	DCA DBLHI	
0372	5722	2316	ISZ BOUND	
0373	5723	1716	TAD I BOUND	
0374	5724	7041	CIA	
0375	5725	7430	SZL	
0376	5726	2341	ISZ DBLHI	
0377	5727	7000	M1000, NOP	
0400	5730	3347	DCA DBLLO	
0401	5731	4304	JMS DADD	
0402	5732	1341	TAD DBLHI	
0403	5733	3377	DCA ENDHI	/DAC HOLDS =NUM
0404	5734	1347	TAD DBLLO	/TO END OF BUF
0405	5735	3376	DCA ENDLO	/NO MATTER FOR
0406				/LOW END WRAP
0407	5736	1341	TAD DBLHI	/TO CHK FOR

0410	5737	2316	ISZ BOUND	/UPON RTN
0411	5740	5716	JMP I BOUND	
0412	5741	0000	SETDF, 0	/SET 8 FIELD
0413	5742	1316	TAD BOUND	/REL TO BOUND
0414	5743	7106	CLL RTL	
0415	5744	7004	RAL	
0416	5745	1201	TAD CDF0	
0417	5746	3347	DCA ,+1	
0420	5747	0000	DBLLO, 0	
0421	5750	5741	JMP I SETDF	
0422	5751	3024	CURDIS, DCA YCUR	/DISP CURSOR
0423	5752	1316	TAD BOUND	/SAVE X,Y
0424	5753	3021	DCA XCURHI	/COORDINATES
0425	5754	1304	TAD BUFPTR	
0426	5755	3022	DCA XCURLC	
0427	5756	1704	TAD I BUFPTR	
0430	5757	3023	DCA CORVAL	
0431	5760	1276	TAD M70	
0432	5761	3347	DCA DBLLO	
0433	5762	1024	TAD YCUR	
0434	5763	6141	CURLOP, LINC	
0435			LMODE	
0436	1704	0465	SN8 I 5	
0437	1705	7566	JMP FREE	/FREE CURSOR
0440	1760	0141	DIS XCORD	
0441	1767	0002	PDP	
0442			PHODE	
0443	5770	2347	ISZ DBLLO	
0444	5771	5363	JMP CURLOP	
0445	5772	5250	JMP CURRTN	
0446	5773	0000	CURCNT, 0	
0447			/THESE 5 GUYS MAY BE PAGE 0	
0450	5774	0001	BUFHI, 1	
0451	5775	0000	BUFLO, 0	
0452	5776	0000	ENDLO, 0	
0453	5777	0000	ENDHI, 0	
0454			DBLHI=SETDF	
0455			BUFPTR=DADD	
0456			XCORD=1	
0457			LMODE	
0460			CURSAM=SAM 1	/CURSOR KNOB
0461			WINSAM=SAM 0	/WINDOW KNOB
0462			FRESAM=SAM 5	/FREE CURSOR
0463			SCALE=SCR	
0464			SC12BU=SCR 3	/SCALE FACTOR
0465				/12 BIT UNSIGNED
0466			OF12BU=4000	/Y OFFSET FOR
0467				/12 BIT UNSIGNED
0470			/THESE 6 GUYS MUST BE PAGE 0	
0471			/THEY ARE ALL CONTIGUOUS AND DEFINED	
0472			/RELATIVE TO YSHFT BUT THIS IS NOT	
0473			/A REQUIREMENT	
0474			YSHFT=20	


```

0475      /THE 4 SCOPE READ OUT VALUES
0476      XCURHI=YSHFT+1
0477      XCURLO=XCURHI+1
0500      CORVAL=XCURLO+1
0501      YCUR=CORVAL+1
0502      COUNT=YCUR+1
0503      /AN EXAMPLE TO DISPLAY ALL OF FIELD 1
0504      /12 BIT UNSIGNED DATA
0505      /PMODE
0506      /*SOMEWHERE
0507      /JMS I KIDORA      /INITIAL CALL
0510      /1              /FLD
0511      /0000           /ADDR
0512      /1              /FLD
0513      /7777           /ADDR
0514      /OF12BU         /Y OFF SET
0515      /SC12BU         /Y SCALE FAC
0516      /JMS I KRDORA   /REFRESH CALL
0517      /JMP .-1
0520      /KIDORA,IDORA
0521      /KRDORA,RDORA
0522
0523      /DISPLAY 3 AUG 70

```

NO ERRORS

ACDF0 5402
BOUND 5716
BUFHI 5774
BUFLO 5775
BUFPTR 5704
CDF0 5601
CHKHI 5673
CONT 5600
CORVAL 0023
COUNT 0025
CSAM 5552
CURCNT 5773
CURDIS 5751
CURL0P 5763
CURRTN 5650
CURSAM 0101
DADD 5704
DBLHI 5741
DBLLO 5747
DSCLOC 5445
DSCLOP 5476
DSCWD 5462
ENDHI 5777
ENDLO 5776
FREE 5566
FRESAM 0105
IDORA 5400
KBUFHI 5441
KBUFLO 5442
KMNADR 5436
KMNFLD 5435
KMXADR 5440
KMXFLD 5437
KYSCAL 5443

ACDF0 5402
BOUND 5716
BUFHI 5774
BUFLO 5775
BUPPTR 5704
CDF0 5601
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CORVAL 0023
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CSAM 5552
CURCNT 5773
CURDIS 5751
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DADD 5704
OBLHI 5741
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DSCLOC 5445
DSCLOP 5476
DSCWD 5462
ENDHI 5777
ENDLO 5776
FREE 5566
FRESAM 0105
IDORA 5400
KBUFH 5441
KBUFL0 5442
KMNADR 5436
KMNFLD 5435
KMXADR 5440
KMXFLD 5437
KYSICAL 5443

