

ADDRESS	LENGTH
0	111
111	

BINARY CONTROL CARDS.

IDENT	CAPABLE
END	

BLOCKS	TYPE	ADDRESS	LENGTH
ABSOLUTE*	ABSOLUTE	0	170
PROGRAM*	LOCAL	0	111
ECAPAB	COMMON	0	65

ENTRY POINTS.

GETCAP	=	0	MOVEC	=	51	CAPOU	=	51	E.CRECL	=	34
PUTCAP	=	33	E.MOVEC	=	3	E.CAPOU	=	21	L.CRECL	=	17
ARBCAP	=	54	L.MOVEC	=	7	L.CAPOU	=	6	E.DELCL	=	53
DSCAP	=	51	CAPIN	=	51	CPZRO	=	51	L.DELCL	=	12
E.DSCAP	=	0	E.CAPIN	=	12	E.CPZRO	=	27			
L.DSCAP	=	3	L.CAPIN	=	7	L.CPZRO	=	5			

EXTERNAL SYMBOLS.

E.ECS	E.NOT	BLKAUR	CAPAB	DELOBJ
E.ERROR	SYSRET	MAKEUBJ	SYSFRET	

	RECS	IDENT	CAPABLE
		MACRO	OPERAND
		RE	OPERAND
		RJ	E.ECS
		ENDM	
	WECS	MACRO	OPERAND
		WE	OPERAND
		RJ	E.ECS
		ENDM	
	*		
	*		
0	INTSYS	XTEXT	
	*		
0	PROCSYM	XTEXT	
	*		
0	ECSMAC	XTEXT	
	CRLOCK	MICRO	1,*,/ECAPAB/*
		EXT	E.ECS,E.ERROR
		EXT	E.NOT

		66666	SB6	B6+B6	
11	0110000001		RECS	1	READ MOT ENTRY
12	54400		SA4	A0	
		43 47	MX0	39	
		13554	BX5	X5=X4	TEST MOT ENTRY
		11550	BX5	X5=X0	
13	0315000073 *		NZ	X5,ERRMOT	JP IF C-LIST GONE FROM MOT
		15040	BX0	=X0*A4	ECS ADDR OF PROPER C-LIST
14	7156000001		SX5	B6+1	SKIP FIRST WD OF C-LIST IN ECS
		36005	IX0	X0+X5	ECS ADDR OF DESIRED CAPABILITY
		63570	S85	X7	RETURN LINK
15	0110000002		RECS	2	READ CAPABILITY FROM ECS
16	0331000017 *		NG	X1,GETCAP2	JP IF INDIRECT C-LIST REFERENCE
		0250000000	JP	B5	RETURN
			*		
			*	INDIRECT CAPABILITY REFERENCE	
			*		
17	21136		GETCAP2	AX1	SHIFT OVER INDIRECT INDEX
		54500	SA5	A0	1ST WD OF CAPABILITY FOR A
		7255776400	SX5	X5=T,CLIST	C-LIST (WE HOPE)
20	0315000100 *		NZ	X5,ERR7	ERROR= NOT A C-LIST CAPABILITY
		5055000001	SA5	A5+1	
21	73050		SX0	X5	MOT INDEX OF CLIST
		73110	SX1	X1	
		5101000050	SA0	B1+P,SCR2	
22	0110000001		RECS	1	READ MOT ENTRY FOR C-LIST
23	0331000076 *		NG	X1,ERR5	ERROR= NEGATIVE C-LIST INDEX
		43047	MX0	39	
		54400	SA4	A0	TEST MOT ENTRY
24	13554		BX5	X5=X4	
		11550	BX5	X5=X0	
		15040	BX0	=X0*A4	ECS ADDR OF INDIRECT C-LIST
25	0110000001		RECS	1	READ LENGTH OF INDIRECT C-LIST
26	0315000073 *		NZ	X5,ERRMOT	ERROR= C-LIST GONE
		54500	SA5	A0	LENGTH OF INDIRECT C-LIST
		37515	IX5	X1=X5	
27	0325000077 *		PL	X5,ERR6	ERROR= INDIRECT INDEX TOO LARGE
		20101	LX1	1	
30	7211000001		SX1	X1+1	
		36001	IX0	X0+X1	ECS ADDR OF DESIRED CAPABILITY
31	0110000002		RECS	2	READ THE CAPABILITY
32	0250000000		JP	B5	RETURN
			*		
			*		

* PUTCAP PUTS A CAPABILITY INTO A SPECIFIED POSITION OF THE FULL C-LIST.
 * IT CREATES AN ERROR IF THE SPECIFIED INDEX IS NEGATIVE OR TOO LARGE.

*
 * ENTRY: X1 CONTAINS CAPABILITY INDEX
 * B5 CONTAINS ABSOLUTE CM ADDRESS OF CAPABILITY
 * B6 CONTAINS RETURN LINK

*
 * CHANGES: A0=X0, A4=X4, A5=X5, A6=X6, X1

		ENTRY	PUTCAP	
	64	P.PUTTMP EQU	P.TEMP7	
		PUTCAP NG	X1,ERR5	
33	0331000076 *	SA5	B1+P.CLIST	
	5151000160	SA5	X5+BI	◦ LENGTH OF LOCAL C-LIST
34	53551	IX4	X1-X5	
	37475	PL	X4,PUTCAP1	◦ CAPABILITY NOT IN LOCAL C-LIST
	0324000041 *	SA4	B5	◦ FIRST WORD OF CAPABILITY
35	56455	SB5	B1+P.LOCALC	
	6151000170	BX6	X4	
36	36511	IX5	X1+X1	◦ OFFSET := 2 * INDEX
	10644	SA4	A4+1	◦ SECOND WORD OF CAPABILITY
	8044000001	SA6	X5+B5	
37	10644	BX6	X4	
	6054777776	SB5	A4-1	
40	5066000001	SA6	A6+1	
	0400000044 *	EQ	PUTCAP2	◦ NOW WRITE CAPABILITY TO ECS
41	5055000002	PUTCAP1 SA5	A5+2	◦ NEXT C-LIST LENGTH, OR...
	0305000077 *	ZR	X5,ERR6	◦ ERROR - INDEX TOO LARGE
42	37165	IX1	X4-X5	
	17411	BX4	X1	
	0321000041 *	PL	X1,PUTCAP1	◦ CAPABILITY NOT IN THIS C-LIST
43	36115	IX1	X1+X5	
44	5055000001	PUTCAP2 SA5	A5+1	◦ NOT POINTER TO C-LIST
	73050	SX0	X5	
45	5101000064	SA0	B1+P.PUTTMP	
	36111	IX1	X1+X1	◦ OFFSET
46	0110000001	RECS	1	◦ NOT ENTRY
47	54400	SA4	A0	
	13545	BX5	X4-X5	◦ COMPARE UNIQUE NAMES
	43047	MX0	39	
	11505	BX5	X0+X5	
50	0315000073 *	NZ	X5,ERRMOT	◦ UN-S DO NOT MATCH
	7211000001	SX1	X1+1	
51	15040	BX0	-X0+X4	◦ ECS ADDRESS OF C-LIST
	36001	IX0	X0+X1	
	56050	SA0	B5	
52	0120000002	WECS	2	
53	0260000000	JP	B6	◦ RETURN

* ARBCAP IS USED TO GET/PUT A CAPABILITY FROM/INTO AN ARBITRARY C-LIST.
 * IT CREATES AN ERROR IF A NEGATIVE OR TOO-LARGE C-LIST INDEX IS GIVEN.

*
 * ENTRY: X5 CONTAINS MOT POINTER (WITH UNIQUE NAME)
 * X1 CONTAINS INDEX TO C-LIST POINTED TO BY X5
 * B4 CONTAINS ZERO/NONZERO FOR READ/WRITE RESPECTIVELY
 * B5 IS ABSOLUTE CM ADDRESS OF 2 WORDS FOR CAPABILITY
 * B6 IS RETURN LINK

* EXIT: IN READ MODE, B5 NOW POINTS TO CAPABILITY

* CHANGES: A0-X0, A4-X4, X1, X5

* ENTRY ARBCAP

		64	P.ARBTMP EQU	P.TEMP7	
54	0331000076 +		ARBCAP NG	X1,ERR5	. ERROR = INDEX NEGATIVE
	5101000064		SA0	B1+P.ARBTMP	
55	73050		SX0	X5	
56	0110000001		RECS	1	. MOT ENTRY
57	54400		SA4	A0	
	13545		BX5	X4-X5	. COMPARE UNIQUE NAMES
	43047		MX0	39	
	11505		BX5	X0*X5	
60	0305000062 +		ZR	X5, NEXTARB	.. CLIST WAS OK
	6142000000		SB3	B2+0	
61	0400000073 +		EQ	ERRMOT	
62	15040		NEXTARB BX0	-X0*AX	
63	0110000001		RECS	1	. C-LIST LENGTH
64	54400		SA4	A0	
	37414		IX4	X1-X4	
	0324000077 +		PL	X4,ERR6	.ERROR = INDEX TOO LARGE
65	56050		SA0	B5	
	36111		IX1	X1+X1	. OFFSET := 2 * INDEX
	7211000001		SX1	X1+1	
66	36001		IX0	X0+X1	. ADDRESS OF CAPABILITY
	0540000071 +		NZ	B4,ARBCAP1	. SELECT READ OR WRITE
67	0110000002		RECS	2	
70	0260000000		JP	B6	. RETURN
71	0120000002		ARBCAP1 WECS	2	
72	0260000000		JP	B6	. RETURN

```

*
* DSCAP  E DISPLAY A CAPABILITY FROM THE FULL C-LIST
*
      EXT      SYSRET
      ENTRY    DSCAP
      ECSCODE  DSCAP
L 51 5111000066 5021000001 DSCAP SA1 B1+P.PARAM
      SA2 A1+1
L 52 11611 15722 BX6 X1
      15722 BX7 X2
      5161000156 SA6 B1+P.XPACK+14
L 53 5171000157 0400000000 X SA7 B1+P.XPACK+15
      EQ SYSRET
L 54 ENDECS DSCAP
*
*
* MOVEC  .. MASK OPTIONS AND MOVE CAPABILITY WITHIN FULL C-LIST
*
      ENTRY    MOVEC
      P.CPLTMP EQU P.TEMP1
*
      ECSCODE  MOVEC
L 51 5121000071 43022 MOVEC SA2 B1+P.PARAM+3 .. FETCH OPTION BITS MASK
      MX0 18
L 52 12102 15220 BX2 0X1+X2 .. GUARANTEE 8 42 OPTIONS
      BX0 X0+X2 .. MASK MUST TRANSMIT TYPE
      29022 LX0 18
      5111000066 SA1 B1+P.PARAM .. FETCH OPTION BITS, TYPE
L 53 5021000001 11601 SA2 A1+1 .. FETCH UNIQUE NAME, MOT
      BX6 X0+X1 .. DOWNGRADE OPTIONS
L 54 6151000056 56650 SB5 B1+P.CPLTMP
      SA6 B5
L 55 5111000070 10722 BX7 X2
      SA1 B1+P.PARAM+2 .. TARGET CAPABILITY INDEX
L 56 6130000002 5076000001 SA7 A6+1
      SB3 2 .. ERROR MODIFIER
L 57 0400000033 X SB6 SYSRET .. RETURN LINK
      EQ PUTCAP .. STORE CAPABILITY
L 60 ENDECS MOVEC
*

```

* CAPIN = COPY CAPABILITY FROM ARBITRARY C-LIST TO THE FULL C-LIST

```

*
*
* ENTRY      CAPIN
* ECSCODE    CAPIN
*
L  51  5151000067      5111000070  CAPIN  SA5      B1+P.PARAM+1  . MOT POINTER
L  52  6160000055      6151000056  SB6     CPYTOFL1     . RETURN LINK
L  53  6640000000      6130000002  SB5     B1+P.CPLTMP  . RESULT ARE
L  54  6120000001      0400000054  SB4     B0           . READ DESIRED
L  55  5111000071      6160000000  SB3     2           .. ERROR MODIFIER
L  56  6151000056      6130000003  SB2     1           .. ERROR MODIFIER (BAD CLIST)
L  57  0400000033      *           EQ      ARRCAP   . MOVE CAPABILITY
L  60  *               *           ENDECS  CAPIN   . INDEX OF TARGET POSITION
*               *           SB6     SYSRET     . RETURN LINK
*               *           SB5     B1+P.CPLTMP  . CAPABILITY LOCATION
*               *           SB3     3           .. ERROR MODIFIER
*               *           EQ      PUTCAP   . ADD TO FULL C-LIST
*               *           ENDECS  CAPIN

```

* CAPOU COPY CAPABILITY FROM THE FULL C-LIST TO ARBITRARY C-LIST

```

*
*
* ENTRY      CAPOU
* ECSCODE    CAPOU
*
L  51  5111000071      6130000003  CAPOU  SA1      B1+P.PARAM+3  . INDEX OF SOURCE CAPABILITY
L  52  6160000053      0400000000  SB3     3           .. ERROR MODIFIER: INDX IN FULL CLIST
L  53  5151000067      5111000070  SB6     CPYFMFL1     . RETURN LINK
L  54  6140000001      6050000000  EQ      GETCAP   . GET CM ADDRESS IN A0
L  55  6130000002      6120000001  CPYFMFL1 SA5     B1+P.PARAM+1  . MOT POINTER
L  56  6160000000      0400000054  SA1     B1+P.PARAM+2  . CAPABILITY INDEX FOR TARGET
L  57  *               *           SB4     1           . WRITE DESIRED
*               *           SB5     A0+0       . CAPABILITY LOCATION
*               *           SB3     2           .. ERROR MODIFIER: INDEX IN ARB CLIST
*               *           SB2     1           .. ERROR MODIFIER: ARB CLIST
*               *           SB6     SYSRET     . RETURN LINK
*               *           EQ      ARRCAP   . MOVE CAPABILITY
*               *           ENDECS  CAPOU

```

* CPZRO ZERO A CAPABILITY

* IP1: D. INDEX IN FULL CLIST OF THE CAPABILITY

```

*
L 27
L 51 5111000066 10211 CPZRO SA1 B1+P.PARAM .. GET INDEX
    10211 BX2 X1 .. SAVE CAPABILITY INDEX
L 52 6160000053 0400000000 + SB6 CPZRO1 .. SET RETURN
    0400000000 + EQ GETCAP .. GETCAP RETURNS ABS CM ADDR OF CAP IN A0
L 53 76600 CPZRO1 SX6 R0
    76700 SX7 R0
    6160000000 X SB6 SYSRET .. SET B7 FOR RETURN FROM ^PUTCAP^
L 54 54600 SA6 A0 .. ZERO THE CAPABILITY
    5070000001 SA7 A+1
L 55 10122 64500 SB5 A0 .. ABS CM ADDR OF CAPBILITY
    0400000033 + BX1 X2 .. RESET CAPABILITY INDEX FOR ^PUTCAP^
L 56 EQ PUTCAP .. PUT ZEROED CAPABILITY INTO CLIST
    ENDECS CPZRO

```

*
* CREACL = CREATE A C-LIST
*

```

*
L 34 EXT BLKAUR
    EXT MAKEOBJ
    EXT CAPAB
    ECSCODE CRECL
*
L 51 TYPES XTEXT
    P.CPLTMP EQU P.TEMPI
*
L 51 6130000002 CREACL SB3 2 .. ERROR MODIFIER
    5111000070 SA1 B1+P.PARAM+2 .. TEST CAPABILITY INDEX
L 52 0331000076 + NG X1,ERR5 .. ERROR..INDEX NEGATIVE
    5121000160 SA2 B1+P.CLIST
L 53 53225 SA2 B1+X2
    37112 IX1 X1-X2
    0331000056 NG X1,CREACL0 ..JP IF INDEX OK
L 54 5022000002 CREACL5 SA2 A2+2
    0302000077 + ZR X2,ERR6 .. ERROR..INDEX TOO LARGE
L 55 37112 IX1 X1-X2
    0321000054 PL X1,CREACL5
*
L 56 5151000067 CREACL0 SA5 B1+P.PARAM+1 ..MOT POINTER FOR ALLOCATION BLOCK
    5111000071 SA1 B1+P.PARAM+3 .. LENGTH OF DESIRED C-LIST
L 57 46000 NO
L 60 0301000106 + SB3 3 .. ERROR MODIFIER
    0331000106 + ZR X1,ER20 .. ERROR IF LENGTH 0 OR LESS
    NG X1,ER20

```

L	61	36111		IX1	X1+X1	
		6221000001		SB2	X1+1	
		21120		AX1	15	° ERROR IF LENGTH 2**15 OR MORE
L	62	0311000105 +		NZ	X1,ER21	
		6140000064		SB4	CREACLI	° RETURN LINK
L	63	7170000002		SX7	AT,CLIST	° TYPE OF OBJECT TO ALLOCATE
		0400000000 X		EQ	MAKEOBJ	° ALLOCATE C-LIST
L	64	5101000071	CREACLI	SA0	B1+P,PARAM+3	
		10055		BX0	X5	° ECS ADDR OF C-LIST
L	65	0120000001		WE	1	° LENGTH OF C-LIST
		0100000000 X		RJ	E,EC5	
L	66	6150000000 X		SB5	CAPAB	
		6160000000 X		SB6	SYSRET	
L	67	5111000070		SA1	B1+P,PARAM+2	° INDEX FOR CAPABILITY IN FULL C-LIST
		0400000033 *		EQ	PUTCAP	
L	70			ENDECS	CRECL	
			*			
			*			
			*			
			*			
	53			ECSCODE	DELCL	
				EXT	SYSFRET	
				EXT	DELOBJ	
L	51	6120000001	DELCL	SB2	1	
		5151000067		SA5	B1+P,PARAM+1	NOY AND UNIQUE NAME OF C-LIST
L	52	5121000160		SA2	B1+P,CLIST	POINTER TO FULL C-LIST TABLE
		53221		SA2	X2+B1	
L	53	54322	DCLOOP	SA3	A2+B2	
		0302000056		ZR	X2,DC2	END OF TABLE
		13335		BX3	X3-X5	
L	54	54232		SA2	A3+B2	
		0312000053		NZ	X3,DCLOOP	
L	55	0400000000 X		EQ	SYSFRET	C-LIST MATCHES WITH ENTRY
L	56	6170000000 X	DC2	SB7	SYSRET	RETURN FROM DELOBJ
		73050		SX0	X5	
		56010		SA0	B1	
L	57	0110000001		RECS	1	
L	60	56110		SA1	B1	
		43047		MX0	60-21	
		13151		BX1	X5-X1	
		11101		BX1	X0-X1	
L	61	0301000000 X		ZR	X1,DELOBJ	UNIQUE NAMES MATCH
		6130000001		SB3	1	° ERROR MODIFIER
L	62	0400000073 *		EQ	ERRMOT	
L	63			ENDECS	DELCL	

		ERRNUMS	XTEXT	
72				
73	76130	* ERRMOT	SX1	B3
	20122		LX1	18
	7160000010		SX6	E.MISCE
74	7170000000		SX7	E.CLMOT
	12771		BX7	X7+X1
75	0400000000 X		EQ	E.ERROR
76	7170000004	ERR5	SX7	E.NEGIX
	0400000103 +		EQ	CL2
77	7170000005	ERR6	SX7	E.BIGIX
	0400000103 +		EQ	CL2
100	76130	ERR7	SX1	B3
	20122		LX1	18
	7170000006		SX7	E.NOTCL
101	12771		BX7	X7+X1
	7160000002		SX6	E.PARMS
102	0200000000 X		JP	E.ERROR
103	76130	CL2	SX1	B3 .. ERROR MODIFIER
	20122		LX1	18
	12717		BX7	X1+X7
104	7160000002	ER2	SX6	E.PARMS
	0400000000 X		EQ	E.ERROR
105	7160000001	ER21	SX6	E.BIGPAR .. CLIST TOO LONG
	0400000107 +		EQ	ER20Y
106	7170000000	ER20	SX7	E.NEGPAR .. CLIST TOO SMALL
	0400000103 +		EQ	CL2
107	76130	ER20P	SX1	B3
	20122		LX1	18 .. SHIFT
	7170000001		SX7	E.BIGPAR
110	12771		BX7	X7+X1
	0400000104 +		EQ	ER2
111			END	

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STORAGE USED
6600 ASSEMBLY

766 STATEMENTS
5.929 SECONDS

310 SYMBOLS
197 REFERENCES

ROUTINES TO ACCESS A C-LIST
SYMBOLIC REFERENCE TABLE.

ARBCAP	54	PROGRAM*	6/14 E	6/18 L	8/13	8/42				
ARBCAP1	71	PROGRAM*	6/38	6/41 L						
AT,CLIST	2		10/06							
BLKADR	0	EXTERNAL*								
CAPAR	0	EXTERNAL*	10/12							
CAPIN	51		8/03 E	8/06 L						
CAPOU	51		8/28 E	8/31 L						
CL2	103	PROGRAM*	11/10	11/12	11/19 L	11/27				
CMBUFF	50		7/08	7/31	8/05	8/30	9/04	9/30	10/22	
			7/16	7/48	8/20	8/44	9/18	10/17	10/46	
CPYFMFLI	53		8/33	8/35 L						
CPYTOFLI	55		8/08	8/14 L						
CPZRO	51		9/02 E	9/04 L						
CPZRO1	53		9/06	9/09 L						
CREACL	51		9/36 L							
CREACL0	56		9/42	9/48 L						
CREACL1	64		10/05	10/08 L						
CREACL5	54		9/43 L	9/46						
DCLOOP	53		10/28 L	10/32						
DC2	56		10/29	10/34 L						
DELCL	51		10/24 L							
DELOBJ	0	EXTERNAL*	10/42							
DSCAP	51		7/06 E	7/08 L						
ERRMOT	73	PROGRAM*	4/07	4/34	5/46	6/28	10/44	11/03 L		
ERR5	76	PROGRAM*	3/30	4/27	5/14	6/18	9/38	11/09 L		
ERR6	77	PROGRAM*	3/48	4/37	5/32	6/33	9/44	11/11 L		
ERR7	100	PROGRAM*	4/21	11/13 L						
ERR2	104	PROGRAM*	11/22 L	11/32						
ERR3	106	PROGRAM*	9/52	9/53	11/26 L					
ERR4	107	PROGRAM*	11/25	11/28 L						
ERR1	105	PROGRAM*	10/04	11/24 L						
E.BIGIX	5		11/11							
E.BIGPAR	1		11/24	11/30						
E.CAPIN	12	ECAPAB	8/04 L							
E.CAPOU	21	ECAPAB	8/29 L							
E.CLNOT	0		11/06							
E.CPZRO	27	ECAPAB	9/03 L							
E.CRECL	24	ECAPAB	9/29 L							
E.DELCL	53	ECAPAB	10/21 L							
E.DSCAP	0	ECAPAB	7/07 L							
E.ECS	0	EXTERNAL*	4/03	4/27	4/42	5/52	6/31	6/42	10/38	
			4/13	4/34	5/42	6/22	6/40	10/11		
E.ERROR	0	EXTERNAL*	11/08	11/18	11/23					
E.MISCE	10		11/05							
E.MOT	0	EXTERNAL*								
E.MOVEC	3	ECAPAB	7/30 L							
E.NEGIX	4		11/09							
E.NEGPAR	0		11/26							
E.NOTCL	6		11/15							
E.PARMS	2		11/17	11/22						
GETCAP	0	PROGRAM*	3/25 E	3/28 L	8/34	9/07				
GETCAP1	5	PROGRAM*	3/34	3/45 L	3/49					
GETCAP2	17	PROGRAM*	3/40	4/13	4/18 L					

