

MPP

0

01 JAN 84 00:00:00 PAGE NO. 1
COMPASS ASSEMBLER VERSION 1.1A4

		IDENT	MPP.0
	000660	PROGRAM LENGTH	
		BLOCKS	
000000	000660	PROGRAM*	ABSOLUTE
			PERIPH

```
*  
*  
*  
0000011 INTCHAN EQU 9  
*  
0000014 CLOCKCHN EQU 14B  
*  
0000022 I.POINTS EQU 22B
```

MPP

0

01 JAN 84 00:00:00 PAGE NO. 3

0000
0000
0001
0020

0507

ORG
VFD
ORG0
12/SETUP-1
20B*
*
*
*
DIRECT CELL ASSIGNMENTS0020
0021
0022
0023
0024
0025
0026CM0
CM1
CM2
CM3
CM4
CM5BSSZ
BSSZ
BSSZ
BSSZ
BSSZ
BSSZ
BSSZ1
1
1
1
1
1
3

SPACE FOR WRITING OUT P COUNTER

0031
0032
0033
0034
0041
0045*
X1
X2
X3
SYSSTATE
INTSTATEBSSZ
BSSZ
BSSZ
BSSZ
BSSZ
DATA1
1
1
5
4
3

INTERUPT RUNNING

0100

ORG

100B

MASTER CONTRAL LOOP

(WILL HANG IN DOINT DURING AN INTERRUPT)

0100	0200 0121	ML00P	RJM	CHKUSER	
0102	0200 0156		RJM	GETCM	
0104	0200 0203		RJM	GETINT	
0106	0200 0221		RJM	MCLOCK	
0110	0200 0252		RJM	QCLOCK	
0112	0200 0303		RJM	CCLOCK	
0114	0200 0316		RJM	DOINT	
0116	2500		DATA	2500B	TURN OFF TRACE
0117	0360		UJN	ML00P	

0120	0100 0000	0000121	CHKUSER	LJM EQU	0 *-1	SEE IF USER HAS COME TO GRIEF
0122	2000 0000		USERRA1	LDC	0	
0124	6020			CRD	CM0	
0125	3023			LDD	CM3	
0126	1277			LPN	77B	
0127	1014			SRN	12	
0130	3124			ADD	CM4	
0131	0466			ZJN	CHKUSER-1	S.USERA = 0 SO DO NOT CHECK ANYTHING
0132	1601			ADN	1	
0133	6020			CRD	CM0	
0134	3024			LDD	CM4	
0135	3123			ADD	CM3	
0136	3122			ADD	CM2	
0137	3121			ADD	CM1	
0140	3120			ADD	CM0	
0141	0510			NJN	CHIP1	
0142	2700			RPN		
0143	0554			NJN	CHKUSER-1	
0144	2000 0000		ARITH1	LDC	0	P COUNTER = 0; SIGNAL ARITH ERROR
0146	2610			MAN		
0147	0100 0120			LJM	CHKUSER-1	
0151	2000 0000		CHIP1	LDC	0	(RA + 1) .NE. 0
0153	2610			MAN	0	SIGNAL CHIPPAWA
0154	0343			UJN	CHKUSER-1	

```

*
*
*
GET AN INTERRUPT, IF ANY, FROM CM

0155      0100 0000      0000156  GETCM      LJM      0
                                EQU      *-1
0157      2000 0000      WAKEUP1  LDC      0
0161      6020          CRD      CM0
0162      3024          LDD      CM4
0163      0471          ZJN      GETCM=1
0164      3431          STD      X1
0165      1720          SBN      NUMBINTS+1
0166      0666          PUN      GETCM=1
0167      1401          LDN      1
0170      5431 0640      STM      INTFLAGS,X1
0172      5400 0637      STM      INTFLAG
0174      1400          LDN      0
0175      3424          STD      CM4
0176      2000 0000      WAKEUP2  LDC      0
0200      6220          CWD      CM0
0201      0353          UJN      GETCM=1

```

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*
*
*
0202      0100 0000      *
                        *
                        *
0204      6711 0202      GETINT  EQU 0
0206      7011          EQU *-1
0207      3432          IAN  GETINT-1,INTCHAN      NO REQUEST WAITING
0210      1720          STD  INTCHAN
0211      0670          SBN  X2
0212      1401          PJN  NUMBINTS+1
0213      5432 0640      LDN  GETINT-1
0215      5400 0637      STM  1
0217      0362          STM  INTFLAGS,X2
                        UCN  INTFLAG
                        GETINT-1

```

0220	0100 0000		LJM	0	
	0000221	MCLOCK	EQU	*-1	
0222	7014		IAN	CLOCKCHN	
0223	5400 0505		STM	CLOCKNEW	SAVE NEW VALUE OF CLOCK
0225	5200 0506		SBM	CLOCKOLD	COMPUTE ELAPSED TIME
0227	0603		PJN	*+3	
0230	2101 0000		ADC	10000B	CORRECT FOR WRAP AROUND
0232	5400 0507		STM	CLOCKINC	
0234	5000 0505		LDM	CLOCKNEW	
0236	5400 0506		STM	CLOCKOLD	
		*			
0240	2000 0000	CLOCKM1	LDC	0	
0242	6020		CRD	CM0	GET MASTER CLOCK
0243	0200 0464		RJM	STEPCLK	UPDATE MASTER CLOCK
0245	2000 0000	CLOCKM2	LDC	0	
0247	6220		CWD	CM0	WRITE BACK MASTER CLOCK
0250	0347		UJN	MCLOCK-1	


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*
*
*
*
*
0251      0100 0000      0000252  QLOCK  EQU 0
0253      2000 0000      QLOCKQ1 LDC *-1
0255      4020 0000      CRD 0
0256      3020 0000      LDD CM0 GET QUANTUM CLOCK
0257      2300 4000      LMC 4000B
0261      0467 0000      ZJN QLOCK=1 IGNORE ON HIGH BYTE = 4000B
0262      2200 4000      LPC 4000B
0264      0512 0000      NJN FSWAP1 WAS POS, SO DO NOT STEP
0265      0200 0464      RJM STEPCLK STEP CLOCK
0267      2000 0000      LDC 0
0271      6220 0000      CWD CM0 RE WRITE QUANTUM CLOCK
0272      3020 0000      LDD CM0
0273      2200 4000      LPC 4000B CHECK FOR NEGATIVE VALUE
0275      0553 0000      NJN QLOCK=1 WAS NEGATIVE
*
0276      2000 0000      FSWAP1 LDC 0 POSITIVE, SO TRY TO SIGNAL SYSTEM
0300      2610 0000      MAM 0
0301      0347 0000      UJN QLOCK=1

```

*
*
*
*
*

UPDATE CHARGE CLOCK
MUST ALWAYS BE SEPERATED FROM LAST CALL BY A
CALL TO MCLOCK

0302	0100 0000	0000303	CCLOCK	LUM	0	
				EQU	*-1	
0304	2000 0000		CLOCKC1	LDC	0	
0306	6020			CRD	CM0	GET CHARGE CLOCK
0307	0200 0464			RJM	STEPCLK	
0311	2000 0000		CLOCKC2	LDC	0	
0313	6220			CWD	CM0	RE WRITE CHARGE CLOCK
0314	0365			UJN	CCLOCK-1	

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*
*
*
THIS CODE CAUSES AN INTERRUPT IF ONE IS DESIRED
0315      0100 0000      0000316      DOINT      LJM      0
0317      5000 0637      EQU      *-1
0321      0473      ZJN      INTFLAG      SEE IF ANY PENDING
0322      1400      LDN      DOINT-1      NO
0323      5400 0637      STM      0
0325      3431      STD      INTFLAG
0326      3631      ADD      X1
DOINTL      ADD      X1      SCAN INT FLAGS
0327      1720      SBN      NUMBINTS+1
0330      0634      PJN      DOINT-1      NONE LEFT TO DO
0331      5031 0640      LDN      INTFLAGS,X1
0333      0472      ZJN      DOINTL
0334      5400 0637      STM      INTFLAG      FOUND ONE TO DO
*
0336      2000 0000      INTLIST1      LDC      0
0340      3131      ADD      X1
0341      6020      CRD      CM0      GET P COUNTER FOR INTERRUPT
0342      3023      LDD      CM3
0343      1006      SHN      6
0344      2200 7700      LPC      7700B
0346      3124      ADD      CM4
0347      0506      NJN      DOINTB
0350      1400      LDN      0
0351      5431 0640      STM      INTFLAGS,X1
0353      0100 0315      LJM      DOINT-1
*
0355      2700      0000355      DOINTB      EQU      *
0356      0776      RPN      0
0357      2000 0000      MJN      *-1
0361      6223      LDC      0
0362      2600      CWD      CM3      WRITE P COUNTER TO XJ BOX
EXN      0      GENERATE XJ FOR INTERRUPT
*
0363      7014      IAN      CLOCKCHN      GET CURRENT VALUE OF CLOCK
0364      5400 0505      STM      CLOCKNEW
0366      5200 0506      SBM      CLOCKOLD      ( ALSO ALLOW SOME TIME TO PASS
0370      0603      PJN      *-3      BEFORE TEST OF SUCCESSFULL INT )
0371      2101 0000      ADC      10000B
0373      5400 0462      STM      SPCLOCK      SAVE FOR POSSIBLE TIME CORRECTIONS
0375      1402      LDN      2
0376      6034      CRD      SYSSTATE      READ SYSTEM STATE
*
0377      2700      RPN
0400      0506      NJN      DOINTC
0401      2000 0000      LDC      0
0403      2600      EXN      0
0404      0100 0315      LJM      DOINT-1      THIS INTERRUPT ATTEMPT FAILED
*
0406      1400      DOINTC      LDN      0
0407      5431 0640      STM      INTFLAGS,X1      CLEAR THIS INT FLAG
0411      5000 0505      LDN      CLOCKNEW      CORRECT INCREMENTING OG MASTER CLOCK

```


STEP A 60 BIT CLOCK WORD IN CM0

NOTE, ON GOING FROM NEG TO POS VALUES, THERE WILL
BE A 1 MICROSECOND ERROR

0463	0100 0000		LJM	0
0465	5000 0507	0000464	EQU	*-1
0467	3524		LDM	CLOCKINC
0470	1063		RAD	CM4
0471	0471		SHN	-12
0472	3523		ZUN	STEPCLK-1
0473	1063		RAD	CM3
0474	0466		SHN	-12
0475	3522		ZUN	STEPCLK-1
0476	1063		RAD	CM2
0477	0463		SHN	-12
0500	3521		ZUN	STEPCLK-1
0501	1063		RAD	CM1
0502	0460		SHN	-12
0503	3520		ZUN	STEPCLK-1
0504	0356		RAD	CM0
			UUN	STEPCLK-1
0505				
0506			CLOCKNEW	BSSZ 1
0507			CLOCKOLD	BSSZ 1
			CLOCKINC	BSSZ 1

*
*
*
SET UP ABSOLUTE ADDRESSES

0510	7014		SETUP	IAN	CLOCKCHN	
0511	5400	0506		STM	CLOCKOLD	PREVENT HICKUP AT START
0513	2000	0022		LDC	1 POINTS	
0515	6020			CRD	CM0	
0516	3023			LDD	CM3	
0517	1277			LPN	77B	
0520	3423			STD	CM3	
0521	3024			LDD	CM4	
0522	5400	0552		STM	SETUP1+1	
0524	5000	0551		LDM	SETUP1	
0526	2200	7700		LPC	7700B	
0530	3123			ADD	CM3	
0531	5400	0551		STM	SETUP1	
0533	2000	7777		LDC	7777B	
0535	3431			STD	X1	
0536	2000	0037		LDC	PAIRCNT-2+1	
0540	3432			STD	X2	
0541	3732		SETUPL	SOD	X2	
0542	5032	0577		LDM	PAIRLIST,X2	
0544	3231			SBD	X1	
0545	0412			ZJN	SETUPL2	
0546	5032	0577		LDM	PAIRLIST,X2	
0550	3431			STD	X1	
0551	2100	0000	SETUP1	ADC	0	
0553	6020			CRD	CM0	
0554	3023			LDD	CM3	
0555	1277			LPN	77B	
0556	3423			STD	CM3	
0557	5032	0600	SETUPL2	LDM	PAIRLIST+1,X2	
0561	3433			STD	X3	
0562	4033			LDI	X3	
0563	2200	7700		LPC	7700B	
0565	3123			ADD	CM3	
0566	4433			STI	X3	
0567	3024			LDD	CM4	
0570	5433	0001		STM	1,X3	
0572	3732			SOD	X2	
0573	0645			PJN	SETUPL	
0574	7411			ACN	INTCHAN	
0575	0100	0100		LJM	ML00P	

1ST NUMBER IS LOCATION RELATIVE TO 1.MAST IN CM
OF THE DESIRED ABSOLUTE ADDRESS

```

0000577      PAIRLIST      EQU      *
0577      PAIR      0,CLOCKM1
0601      PAIR      0,CLOCKM2
0603      PAIR      1,CLOCKQ1
0605      PAIR      1,CLOCKQ2
0607      PAIR      2,CLOCKC1
0611      PAIR      2,CLOCKC2
0613      PAIR      3,ARITH1
0615      PAIR      4,CHIP1
0617      PAIR      5,FSWAP1
0621      PAIR      6,INTBOX1
0623      PAIR      6,INTBOX2
0625      PAIR      6,INTBOX3
0627      PAIR      7,USERRA1
0631      PAIR      8,WAKEUP1
0633      PAIR      8,WAKEUP2
0635      PAIR      9,INTLIST1

0000040      *      PAIRCNT      EQU      *-PAIRLIST

```

0637 0000
0640 0000
0641

*
*
*
INTFLAG DATA 0
INTFLAGS DATA 0
BSSZ 15

LIST OF INTERRUPT FLAGS

0000017

*
*
NUMBINTS EQU *-INTFLAGS-1
*
END

0660

431 STATEMENTS 59 SYMBOLS

ARITH1	0000144	15-00614
CCLOCK	0000303	4-00112, 10-00314
CHIP1	0000151	5-00141, 15-00616
CHKUSER	0000121	4-00100, 5-00131, 5-00143, 5-00147, 5-00154
CLOCKCHN	0000014	8-00222, 11-00363, 14-00510
CLOCKC1	0000304	15-00610
CLOCKC2	0000311	15-00612
CLOCKINC	0000507	8-00232, 13-00465
CLOCKM1	0000240	15-00600
CLOCKM2	0000245	15-00602
CLOCKNEW	0000505	8-00223, 8-00234, 11-00364, 11-00411
CLOCKOLD	0000506	8-00225, 8-00236, 11-00366, 12-00413, 12-00445, 12-00454, 14-00511
CLOCKQ1	0000253	15-00604
CLOCKQ2	0000267	15-00606
CM0	0000020	5-00124, 5-00133, 5-00140, 6-00161, 6-00200, 8-00242, 8-00247, 9-00255, 9-00256,
		9-00271, 9-00272, 10-00306, 10-00313, 11-00341, 13-00503, 14-00515, 14-00553
CM1	0000021	5-00137, 13-00500
CM2	0000022	5-00136, 13-00475
CM3	0000023	5-00125, 5-00135, 11-00342, 11-00361, 13-00472, 14-00516, 14-00520, 14-00530, 14-00554,
		14-00556, 14-00565
CM4	0000024	5-00130, 5-00134, 6-00162, 6-00175, 11-00346, 13-00467, 14-00521, 14-00567
DOINT	0000016	4-00114, 11-00321, 11-00330, 11-00353, 11-00404, 12-00460
DOINTA	0000417	12-00437
DOINTA1	0000421	12-00432
DOINTA2	0000425	12-00421
DOINTB	0000355	11-00347
DOINTC	0000406	11-00400
DOINTL	0000326	11-00333
DOINTX	0000440	12-00427
FSWAP1	0000276	9-00264, 15-00620
GETCM	0000156	4-00102, 6-00163, 6-00166, 6-00201, 12-00433
GETINT	0000203	4-00104, 7-00204, 7-00211, 7-00217, 12-00423
INTBOX1	0000357	15-00622
INTBOX2	0000440	15-00624
INTBOX3	0000401	15-00626
INTCHAN	0000011	7-00204, 7-00206, 12-00421, 14-00574
INTFLAG	0000637	6-00172, 7-00215, 11-00317, 11-00323, 11-00334
INTFLAGS	0000640	6-00170, 7-00213, 11-00331, 11-00351, 11-00407, 16-00660
INTLIST1	0000336	15-00636
INTSTATE	0000041	12-00416
I.POINTS	0000022	14-00513
MCLOCK	0000221	4-00106, 8-00250, 12-00435, 12-00443
MLOOP	0000100	4-00117, 14-00575
NUMBINTS	0000017	6-00165, 7-00210, 11-00327
PAIRCNT	0000040	14-00536
PAIRLIST	0000577	14-00542, 14-00546, 14-00557, 15-00637
QCLOCK	0000252	4-00110, 9-00261, 9-00275, 9-00301
SETUP	0000510	3-00000
SETUPL	0000541	14-00573
SETUPL2	0000557	14-00545
SETUP1	0000551	14-00522, 14-00524, 14-00531
SPCLOCK	0000462	11-00373, 12-00447
STEPCLK	0000464	8-00243, 9-00265, 10-00307, 13-00471, 13-00474, 13-00477, 13-00502, 13-00504

SYMBOLIC REFERENCE TABLE (PAGE-LOCATION)

SVSSTATE	0000034	11-00376, 12-00457
USERRA1	0000122	15-00630
WAKEUP1	0000157	15-00632
WAKEUP2	0000176	15-00634
X1	0000031	6-00164, 6-00170, 11-00325, 11-00326, 11-00331, 11-00340, 11-00351, 11-00407, 12-00420, 12-00431, 14-00535, 14-00544, 14-00550
X2	0000032	7-00207, 7-00213, 14-00540, 14-00541, 14-00542, 14-00546, 14-00557, 14-00572
X3	0000033	14-00561, 14-00562, 14-00566, 14-00570