

# PDP11

UNIBUS TESTER  
MD-11-D8A-B

EP-D8A-B-DL-A  
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The left side of the page contains a grid of 40 small technical diagrams or test patterns, arranged in 10 rows and 4 columns. Each diagram appears to be a schematic or a test pattern related to the Unibus Tester. The diagrams are too small to read clearly but seem to consist of various symbols, lines, and text blocks. The right side of the page is mostly blank, with some faint, illegible markings.

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FOR IN-HOUSE USE ONLY

IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DBAB-L

PRODUCT NAME: UNIBUS TESTER (PRODUCTION)

DATE: FEBRUARY, 1976

MAINTAINER: DIAGNOSTIC GROUP

AUTHOR: JOHN RODENHISER

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UNIBUS TESTER (PRODUCTION) MAINDEC-11-DBAB-L

11:08:38.830 10/14/76 15:48:38.830

1. ABSTRACT

THIS PROGRAM TESTS THE UNIBUS TESTER WHICH IS USED FOR IN-HOUSE PRODUCTION LINE TESTING OF THE PDP-11 UNIBUS.

2. REQUIREMENTS

2.1 EQUIPMENT

PDP-11/20 WITH 4K OF MEMORY AND A UNIBUS TESTER.

2.2 STORAGE

2.2.1 PROGRAM STORAGE - ALL OF 4K OF MEMORY

3. LOADING PROCEDURE

3.1 METHOD

PROCEDURE FOR NORMAL BINARY TAPES SHOULD BE FOLLOWED

1. ABSOLUTE LOADER MUST BE IN MEMORY
2. PLACE BINARY TAPE IN READER
3. LOAD ADDRESS 17500
4. PRESS "START" (PROGRAM WILL LOAD)

4. STARTING PROCEDURE

4.1 CONTROL SWITCH SETTINGS

NOT APPLICABLE

4.2 STARTING ADDRESS

200

4.3 PROGRAM AND/OR OPERATOR ACTIONS

LOAD PROGRAM INTO MEMORY  
LOAD STARTING ADDRESS 200  
PRESS START  
PROGRAM WILL BEGIN TESTING

5. OPERATING PROCEDURE

5.1 OPERATIONAL SWITCH SETTINGS

NOT APPLICABLE

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6. ERRORS

6.1 ERROR PRINTOUT

NONE

6.2 ERROR RECOVERY

THE PROGRAM WILL HALT ON AN ERROR, TO REPEAT THE SEQUENCE THAT CAUSED THE FAILURE PRESS "CONTINUE" OR RESTART AT 200. IF IT IS DESIRED TO REPEAT THE ERROR SEQUENCE ON A CONTINUOUS BASIS THE OPERATOR CAN REPLACE THE HALT INSTRUCTION WITH A NOP (240).

6.3 ERROR DESCRIPTION

REFER TO THE PROGRAM LISTING FOR THE DESCRIPTION OF THE CAUSE OF THE ERROR.

7. RESTRICTIONS

7.1 STARTING RESTRICTIONS

NONE

7.2 OPERATING RESTRICTIONS

NONE

8. MISCELLANEOUS

THIS PROGRAM ASSUMES THE OPERATOR IS FAMILIAR WITH THE ENGINEERING SPECIFICATION OF THE PDP-11 BUS TESTER WRITTEN BY STEVE ROTHMAN.

9. PROGRAM DESCRIPTION

THE PROGRAM CONSISTS OF A SERIES OF SHORT STRAIGHT LINE TESTS THAT CHECK EACH OF THE OPERATIONAL FEATURES OF THE UNIBUS TESTER.

TEST NAME	DESCRIPTION
T0	TEST THAT CONTROL REGISTER MAY BE SET WITH ALL 1'S.
T1	TEST RUN (BIT 15) TO BE CLEARED IF DEVICE OFF
T2	TEST RUN (BIT 15) TO BE SET IF DEVICE ON
T3	TEST FOR PROPER VECTOR ADDRESS INTERRUPT

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- T4 TEST THAT DEVICE CANNOT INTERRUPT WITH  
PROCESSOR AT PRIORITY 7
- T5 TEST THAT DEVICE CANNOT INTERRUPT WITH SAME  
OR LOWER PRIORITY AS PROCESSOR
- T6 TEST THAT DEVICE MUST INTERRUPT WHEN PROCESSOR  
PRIORITY IS LOWER THAN DEVICE
- T7 TEST THAT DATA REGISTER MAY BE CLEARED
- T8 TEST THAT DATA REGISTER MAY BE SET TO ALL 1'S
- T9 TEST THAT DATA REGISTER WILL ACCEPT A COUNT  
PATTERN
- T10 TEST THAT ADDRESS REGISTER MAY BE CLEARED
- T11 TEST THAT ADDRESS REGISTER MAY BE SET WITH  
ALL 1'S
- T12 TEST THAT ADDRESS REGISTER WILL ACCEPT A COUNT  
PATTERN
- T13 TEST THAT BYTE COUNT MAY BE CLEARED
- T14 TEST THAT BYTE COUNT MAY BE SET TO ALL 1'S
- T15 TEST THAT BYTE COUNT WILL ACCEPT A COUNT PATTERN
- T16 DO A DATOB-NPR SEQUENCE TO CHECK THAT BYTE COUNT  
WILL DECREMENT BY 1 FROM 177777 TO 0
- T17 SAME AS T16 EXCEPT SEQUENCE IS A DATO-NPR AND  
EXPECT BYTE COUNT TO DECREMENT BY 2 FROM 177776  
TO 0.
- T18 DO A DATOB TO CHECK FOR PROPER DATA TRANSFER  
FROM BYTE COUNT
- T19 SAME AS T18 WITH A DATO SEQUENCE.
- T20 DO A DATOB TO CHECK FOR PROPER DATA TRANSFER  
FROM DATA REGISTER
- T21 SAME AS T20 WITH A DATO SEQUENCE

# F01

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206		
207		
208		
209	T22	DO A DATI TO CHECK FOR PROPER DATA TRANSFER TO DATA REGISTER
210		
211		
212	T23	DO A DATIP TO CHECK FOR A DATA SHIFT IN DATA REGISTER
213		
214		
215	T24	TEST MULTI DATA TRANSFERS
216		
217	T25	DO A BLOCK TRANSFER UNTIL BYTE COUNT EQUALS 0
218		
219	T26	DO A BLOCK TRANSFER UNTIL BC=0, THEN INTERRUPT
220		
221	T30	DO MULTI DATA TRANSFERS, ALTERNATING BETWEEN SECTIONS
222		
223		
224	T31	DO MULTI DATA TRANSFERS, ALTERNATING BETWEEN DEVICES
225		
226		
227		
228	FACTORY	THIS TESTS ALL FOUR DEVICES RUNNING AT THE SAME TIME UNDER INTERRUPT CONTROL
229	TEST	
230	%	

;PDP-11 BUS TESTER VALIDITY EXERCISER  
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231		000000	
232			. = 0
233			. + 2
234			HALT
235	000000	000002	. + 2
236	000002	000000	HALT
237	000004	000006	. + 2
238	000006	000000	HALT
239	000010	000012	. + 2
240	000012	000000	HALT
241	000014	000016	. + 2
242	000016	000000	HALT
243	000020	000022	. + 2
244	000022	000000	HALT
245	000024	000026	. + 2
246	000026	000000	HALT
247	000030	000032	. + 2
248	000032	000000	HALT
249	000034	000036	. + 2
250	000036	000000	HALT
251	000040	000042	. + 2
252	000042	000000	HALT
253	000044	000046	. + 2
254	000046	000000	HALT
255	000050	000052	. + 2
256	000052	000000	HALT
257	000054	000056	. + 2
258	000056	000000	HALT
259	000060	000062	. + 2
260	000062	000000	HALT
261	000064	000066	. + 2

262	000066	000000			HALT	
263	000070	000072			.+2	
264	000072	000000			HALT	
265	000074	00007E			.+2	
266	000076	000000			HALT	
267						
268		000046			=46	
269	000046	011426			\$ENDAD	
270		000052			.=52	
271	000052	040000			40000	
272						
273		000200			.=200	
274	000200	000167	000574		JMP	START
275						
276	000204	000510			DEV1A:	510
277	000206	000512			DS1A:	512
278	000210	000514			DEV1B:	514
279	000212	000516			DS1B:	516
280	000214	000520			DEV2A:	520
281	000216	000522			DS2A:	522
282	000220	000524			DEV2B:	524
283	000222	000526			DS2B:	526
284	000224	170000			DATA1:	170000 ;SECTION 1 DATA REGISTER
285	000226	170002			ADRS1:	170002 ;SECTION 1 ADDRESS REGISTER
286	000230	170004			BC1:	170004 ;SECTION 1 BYTE COUNTER
287	000232	170006			CR1A:	170006 ;SECTION 1 CONTROL DEVICE 1A
288	000234	170016			CR1B:	170016 ;SECTION 1 CONTROL DEVICE 1B
289	000236	170020			DATA2:	170020 ;SECTION 2 DATA REGISTER
290	000240	170022			ADRS2:	170022 ;SECTION 2 ADDRESS REGISTER
291	000242	170024			BC2:	170024 ;SECTION 2 BYTE COUNTER
292	000244	170026			CR2A:	170026 ;SECTION 2 CONTROL REGISTER DEVICE 2A
293	000246	170036			CR2B:	170036 ;SECTION 2 CONTROL REGISTER DEVICE 2B
294						
295		012034			BUFF1=LAST	;BUFFER STORAGE AREA 1
296		014034			BUFF2=LAST+2000	;BUFFER STORAGE AREA 2
297		177570			SWREG=177570	;SWITCH REGISTER
298		177776			CC=177776	;CONDITION CODES
299		000240			NOP=240	;NO OPERATION
300		000776			STACK=776	
301						
302		001000			.=1000	
303	001000	012706	000776		START: MOV	#STACK,%6
304	001004	012767	000340	176764	MOV	#340,CC ;SET PRIORITY 7
305	001012	005077	177170		CLR	@DS1A
306	001016	005077	177170		CLR	@DS1B
307	001022	005077	177170		CLR	@DS2A
308	001026	005077	177170		CLR	@DS2B
309	001032	000005			RESET	

# H01

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310
311
312 001034 012777 077776 177170 ;TEST THAT CONTROL REGISTER MAY BE SET WITH ALL 1'S
313 001042 022777 077776 177162 T0:  MOV  #77776, @CR1A
314 001050 001402          BEQ  TOA
315 001052 000000          HALT
316 001054 000767          BR   TO
317 001056 012777 077776 177150 TOA:  MOV  #77776, @CR1B
318 001064 022777 077776 177142          CMP  #77776, @CR1B
319 001072 001402          BEQ  TOB
320 001074 000000          HALT
321 001076 000767          BR   TOA
322 001100 012777 077776 177136 TOB:  MOV  #77776, @CR2A
323 001106 022777 077776 177130          CMP  #77776, @CR2A
324 001114 001402          BEQ  TOC
325 001116 000000          HALT
326 001120 000767          BR   TOB
327 001122 012777 077776 177116 TOC:  MOV  #77776, @CR2B
328 001130 022777 077776 177110          CMP  #77776, @CR2B
329 001136 001402          BEQ  T1
330 001140 000000          HALT
331 001142 000767          BR   TOC
332
333 001144 005077 177062 ;TEST RUN (BIT 15) TO BE CLEARED IF DEVICE OFF
334 001150 005777 177056 T1:  CLR  @CR1A
335 001154 001402          TST  @CR1A
336 001156 000000          BEQ  T1A
337 001160 000771          HALT
338 001162 005077 177046          BR   T1
339 001166 005777 177042          CLR  @CR1B
340 001172 001402          TST  @CR1B
341 001174 000000          BEQ  T1B
342 001176 000771          HALT
343 001200 005077 177040          BR   T1A
344 001204 005777 177034          CLR  @CR2A
345 001210 001402          TST  @CR2A
346 001212 000000          BEQ  T1C
347 001214 000771          HALT
348 001216 005077 177024          BR   T1B
349 001222 005777 177020          CLR  @CR2B
350 001226 001402          TST  @CR2B
351 001230 000000          BEQ  T2
352 001232 000771          HALT
353          BR   T1C
354 001234 012777 000031 176770 ;TEST RUN (BIT 15) TO BE SET IF DEVICE ON
355 001242 005777 176764 T2:  MOV  #31, @CR1A
356 001246 000005          TST  @CR1A
357 001250 100402          RESET
358 001252 000000          BMI  T2A
359 001254 000767          HALT
360 001256 012777 000031 176750 T2A:  BR   T2
361 001264 005777 176744          MOV  #31, @CR1B
362 001270 000005          TST  @CR1B
363 001272 100402          RESET
364 001274 000000          BMI  T2B
365 001276 000767          HALT
366          BR   T2A

```

;ERROR, CONTROL REGISTER 1A NOT SET

;ERROR, CONTROL REGISTER 1B NOT SET

;ERROR, CONTROL REGISTER 2A NOT SET

;ERROR, CONTROL REGISTER 2B NOT SET

;ERROR, DEVICE IS RUNNING - BIT 15 SET

;STOP DEVICE 1B

;ERROR, DEVICE IS RUNNING - BIT 15 SET

;STOP DEVICE 2A

;ERROR, DEVICE IS RUNNING - BIT 15 SET

;STOP DEVICE 2B

;ERROR, DEVICE IS RUNNING - BIT 15 SET

;START DEVICE 1A

;TEST FOR RUNNING

;STOP DEVICE

;ERROR, DEVICE NOT RUNNING - BIT 15 NOT SET

;LOOP ON TEST ;START DEVICE 1B

;ERROR, DEVICE NOT RUNNING - BIT 15 NOT SET



# I01

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366	001300	012777	000031	176736	T2B:	MOV	#31, @CR2A		;START DEVICE 2A
367	001306	005777	176732			TST	@CR2A		
368	001312	000005				RESET			
369	001314	100402				BMI	T2C		
370	001316	000000				HALT			;ERROR, DEVICE NOT RUNNING - 15 NOT SET
371	001320	000767				BR	T2B		
372	001322	012777	000031	176716	T2C:	MOV	#31, @CR2B		;START DEVICE 2B
373	001330	005777	176712			TST	@CR2B		
374	001334	000005				RESET			
375	001336	100402				BMI	T3		
376	001340	000000				HALT			;ERROR, DEVICE NOT RUNNING - BIT 15 NOT SET
377	001342	000767				BR	T2C		

# J01

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378
379          ;TEST FOR PROPER VECTOR ADDRESS INTERRUPT
380 001344 005067 176426          T3: CLR      CC          ;SET PROCESSOR PRIORITY TO 0
381 001350 012777 001412 176632      MOV      #T3A,@DEV1B ;INITIALIZE RETURN FOR INCORRECT VECTOR FOR DEVICE 1B
382 001356 012777 001412 176630      MOV      #T3A,@DEV2A ;INITIALIZE RETURN FOR INCORRECT VECTOR FOR DEVICE 2A
383 001364 012777 001412 176626      MOV      #T3A,@DEV2B ;INITIALIZE RETURN FOR INCORRECT VECTOR FOR DEVICE 2B
384 CJ1372 012777 001420 176604      MOV      #T3B,@DEV1A ;INITIALIZE RETURN FOR PROPER VECTOR FOR DEVICE 1A
385 001400 000005                      RESET
386 001402 012777 000021 176622      MOV      #21,@CR1A   ;INTERRUPT ON BECOMING BUS MASTER
387 001410 000001                      WAIT
388 001412 000000          T3A: HALT      ;ERROR, DEVICE 1A DID NOT VECTOR TO PROPER ADDRESS
389 001414 022626                      CMP      (6)+,(6)+
390 001416 000752                      BR       T3
391 001420 012777 001462 176556      T3B: MOV      #T3C,@DEV1A ;INITIALIZE RETURN FOR INCORRECT VECTOR FOR DEVICE 1A
392 001426 012777 001462 176560      MOV      #T3C,@DEV2A ;INITIALIZE RETURN FOR INCORRECT VECTOR FOR DEVICE 2A
393
394 001434 012777 001462 176556      MOV      #T3C,@DEV2B ;INITIALIZE RETURN FOR INCORRECT VECTOR FOR DEVICE 2B
395 001442 012777 001470 176540      MOV      #T3D,@DEV1B ;INITIALIZE RETURN FOR PROPER VECTOR FOR DEVICE 1B
396 001450 000005                      RESET
397 001452 012777 000021 176554      MOV      #21,@CR1B   ;INTERRUPT ON BECOMING BUS MASTER
398 001460 000001                      WAIT
399 001462 000000          T3C: HALT      ;ERROR, DEVICE 1B DID NOT VECTOR TO PROPER ADDRESS
400 001464 022626                      CMP      (6)+,(6)+
401 001466 000754                      BR       T3B
402 001470 012777 001532 176506      T3D: MOV      #T3E,@DEV1A ;INITIALIZE RETURN FOR INCORRECT VECTOR FOR DEVICE 1A
403 001476 012777 001532 176504      MOV      #T3E,@DEV1B ;INITIALIZE RETURN FOR INCORRECT VECTOR FOR DEVICE 1B
404 001504 012777 001532 176506      MOV      #T3E,@DEV2B ;INITIALIZE RETURN FOR INCORRECT VECTOR FOR DEVICE 2B
405 001512 012777 001540 176474      MOV      #T3F,@DEV2A ;INITIALIZE RETURN FOR PROPER VECTOR FOR DEVICE 2A
406 001520 000005                      RESET
407 001522 012777 000021 176514      MOV      #21,@CR2A   ;INTERRUPT ON BECOMING BUS MASTER
408 001530 000001                      WAIT
409 001532 000000          T3E: HALT      ;ERROR, DEVICE 2A DID NOT VECTOR TO PROPER ADDRESS
410 001534 022626                      CMP      (6)+,(6)+
411 001536 000754                      BR       T3D
412 001540 012777 001602 176436      T3F: MOV      #T3G,@DEV1A ;INITIALIZE RETURN FOR INCORRECT VECTOR FOR DEVICE 1A
413 001546 012777 001602 176434      MOV      #T3G,@DEV1B ;INITIALIZE RETURN FOR INCORRECT VECTOR FOR DEVICE 1B
414 001554 012777 001602 176432      MOV      #T3G,@DEV2A ;INITIALIZE RETURN FOR INCORRECT VECTOR FOR DEVICE 2A
415 001562 012777 001610 176430      MOV      #T4,@DEV2B  ;INITIALIZE RETURN FOR PROPER VECTOR FOR DEVICE 2B
416 001570 000005                      RESET
417 001572 012777 000021 176446      MOV      #21,@CR2B   ;INTERRUPT ON BECOMING BUS MASTER
418 001600 000001                      WAIT
419 001602 000000          T3G: HALT      ;ERROR, DEVICE 2B DID NOT VECTOR TO PROPER ADDRESS
420 001604 022626                      CMP      (6)+,(6)+
421 001606 000754                      BR       T3F
  
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## K01

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422
423
424 001610 012767 000340 176160 T4:  MOV #340,CC ;SET PROCESSOR PRIORITY TO 7
425 001616 012706 000776          MOV #STACK,%6
426 001622 012777 001642 176354  MOV #T4A,@DEV1A ;INITIALIZE VECTOR RETURN ADDRESS
427 001630 000005          RESET
428 001632 012777 000161 176372  MOV #161,@CR1A ;ENABLE DEVICE AT PRIORITY 7 TO ATTEMPT INTERRUPT
429 001640 000403          BR T4B
430 001642 000000          T4A:  HALT ;ERROR, DEVICE 1A SHOULD NOT HAVE INTERRUPTED
431 001644 022626          CMP (6)+,(6)+ ;KEEP STACK OUT OF THE WAY
432 001646 000760          BR T4
433 001650 000005          T4B:  RESET
434 001652 012767 000340 176116  MOV #340,CC ;SET PROCESSOR PRIORITY TO 7
435 001660 012777 001676 176322  MOV #T4C,@DEV1B ;INITIALIZE VECTOR RETURN
436 001666 012777 000161 176340  MOV #161,@CR1B ;ENABLE DEVICE AT PRIORITY 7 TO ATTEMPT INTERRUPT
437 001674 000403          BR T4D
438 001676 000000          T4C:  HALT ;ERROR, DEVICE 1B SHOULD NOT HAVE INTERRUPTED
439 001700 022626          CMP (6)+,(6)+ ;KEEP STACK OUT OF THE WAY
440 001702 000762          BR T4B
441 001704 000005          T4D:  RESET
442 001706 012767 000340 176062  MOV #340,CC ;SET PROCESSOR PRIORITY TO 7
443 001714 012777 001732 176272  MOV #T4E,@DEV2A ;INITIALIZE VECTOR RETURN
444 001722 012777 000161 176314  MOV #161,@CR2A ;ENABLE DEVICE AT PRIORITY 7 TO ATTEMPT INTERRUPT
445 001730 000403          BR T4F
446
447 001732 000000          T4E:  HALT ;ERROR, DEVICE 2A SHOULD NOT HAVE INTERRUPTED
448 001734 022626          CMP (6)+,(6)+ ;KEEP STACK OUT OF THE WAY
449 001736 000762          BR T4D
450 001740 000005          T4F:  RESET
451 001742 012767 000340 176026  MOV #340,CC ;SET PROCESSOR PRIORITY TO 7
452 001750 012777 001766 176242  MOV #T4G,@DEV2B ;INITIALIZE VECTOR RETURN
453 001756 012777 000161 176262  MOV #161,@CR2B ;ENABLE DEVICE AT PRIORITY LEVEL 7 TO ATTEMPT INTERRUPT
454 001764 000403          BR T5
455 001766 000000          T4G:  HALT ;ERROR, DEVICE 2B SHOULD NOT HAVE INTERRUPTED
456 001770 022626          CMP (6)+,(6)+ ;KEEP STACK OUT OF THE WAY
457 001772 000762          BR T4F

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# L01

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458
459 ;TEST THAT DEVICE CANNOT INTERRUPT WITH SAME OR LOWER PRIORITY AS PROCESSOR
460 ;PROCESSOR PRIORITY 7
461 001774 012706 000776 TS: MOV #STACK,%6
462 002000 012777 002546 176176 MOV #TSA,@DEV1A
463 002006 012777 002552 176174 MOV #TSB,@DEV1B
464 002014 012777 002556 176172 MOV #TSC,@DEV2A
465 002022 012777 002562 176170 MOV #TSD,@DEV2B
466 002030 000005 RESET
467 002032 012767 000340 175736 MOV #340,CC ;SET PROCESSOR PRIORITY 7
468 002040 012777 000161 176164 MOV #161,@CR1A ;SET DEVICE 1A PRIORITY 7
469 002046 012777 000161 176160 MOV #161,@CR1B ;SET DEVICE 1B PRIORITY 7
470 002054 012777 000161 176162 MOV #161,@CR2A ;SET DEVICE 2A PRIORITY 7
471 002062 012777 000161 176156 MOV #161,@CR2B ;SET DEVICE 2B PRIORITY 7
472 002070 000240 NOP
473 002072 000240 NOP
474 002074 000005 RESET ;CLEAR ALL INTERRUPT REQUESTS
475 002076 012777 000121 176126 MOV #121,@CR1A ;SET DEVICE 1A PRIORITY 6
476 002104 012777 000121 176122 MOV #121,@CR1B ;SET DEVICE 1B PRIORITY 6
477 002112 012777 000121 176124 MOV #121,@CR2A ;SET DEVICE 2A PRIORITY 6
478 002120 012777 000121 176120 MOV #121,@CR2B ;SET DEVICE 2B PRIORITY 6
479 002126 000240 NOP
480 002130 000240 NOP
481 002132 000005 RESET ;CLEAR ALL INTERRUPT REQUESTS
482 002134 012777 000061 176070 MOV #61,@CR1A ;SET DEVICE 1A PRIORITY 5
483 002142 012777 000061 176064 MOV #61,@CR1B ;SET DEVICE 1B PRIORITY 5
484 002150 012777 000061 176066 MOV #61,@CR2A ;SET DEVICE 2A PRIORITY 5
485 002156 012777 000061 176062 MOV #61,@CR2B ;SET DEVICE 2B PRIORITY 5
486 002164 000240 NOP
487 002166 000240 NOP
488 002170 000005 RESET ;CLEAR ALL INTERRUPT REQUESTS
489 002172 012777 000021 176032 MOV #21,@CR1A ;SET DEVICE 1A PRIORITY 4
490 002200 012777 000021 176026 MOV #21,@CR1B ;SET DEVICE 1B PRIORITY 4
491 002206 012777 000021 176030 MOV #21,@CR2A ;SET DEVICE 2A PRIORITY 4
492 002214 012777 000021 176024 MOV #21,@CR2B ;SET DEVICE 2B PRIORITY 4
493 002222 000240 NOP
494 002224 000240 NOP
495 002226 000005 RESET ;CLEAR ALL INTERRUPT REQUESTS
  
```

MO1

496							
497							
498	002230	012767	000300	175540			
499	002236	000005					
500	002240	012777	000121	175764			
501	002246	012777	000121	175760			
502	002254	012777	000121	175762			
503	002262	012777	000121	175756			
504	002270	000240					
505	002272	000240					
506	002274	000005					
507	002276	012777	000061	175726			
508	002304	012777	000061	175722			
509	002312	012777	000061	175724			
510	002320	012777	000061	175720			
511	002326	000240					
512	002330	000240					
513	002332	000005					
514	002334	012777	000021	175670			
515	002342	012777	000021	175664			
516	002350	012777	000021	175666			
517	002356	012777	000021	175662			
518	002364	000240					
519	002366	000240					
520	002370	000005					

;PROCESSOR PRIORITY 6

					MOV	#300,CC	;SET PROCESSOR PRIORITY 6
					RESET		
					MOV	#121,DCR1A	;SET DEVICE 1A PRIORITY 6
					MOV	#121,DCR1B	;SET DEVICE 1B PRIORITY 6
					MOV	#121,DCR2A	;SET DEVICE 2A PRIORITY 6
					MOV	#121,DCR2B	;SET DEVICE 2B PRIORITY 6
					NOP		
					NOP		
					RESET		
					MOV	#61,DCR1A	;SET DEVICE 1A PRIORITY 5
					MOV	#61,DCR1B	;SET DEVICE 1B PRIORITY 5
					MOV	#61,DCR2A	;SET DEVICE 2A PRIORITY 5
					MOV	#61,DCR2B	;SET DEVICE 2B PRIORITY 5
					NOP		
					NOP		
					RESET		
					MOV	#21,DCR1A	;SET DEVICE 1A PRIORITY 4
					MOV	#21,DCR1B	;SET DEVICE 1B PRIORITY 4
					MOV	#21,DCR2A	;SET DEVICE 2A PRIORITY 4
					MOV	#21,DCR2B	;SET DEVICE 2B PRIORITY 4
					NOP		
					NOP		
					RESET		

```

521
522
523 002372 012767 000240 175376 ;PROCESSOR PRIORITY 5
524 002400 000005 MOV #240,CC ;SET PROCESSOR PRIORITY 5
525 002402 012777 000061 175622 ;SET DEVICE 1A PRIORITY 5
526 002410 012777 000061 175616 ;SET DEVICE 1B PRIORITY 5
527 002416 012777 000061 175620 ;SET DEVICE 2A PRIORITY 5
528 002424 012777 000061 175614 ;SET DEVICE 2B PRIORITY 5
529 002432 000240 NOP
530 002434 000240 NOP
531 002436 000005 RESET
532 002440 012777 000021 175564 MOV #21,@CR1A ;SET DEVICE 1A PRIORITY 4
533 002446 012777 000021 175560 MOV #21,@CR1B ;SET DEVICE 1B PRIORITY 4
534 002454 012777 000021 175562 MOV #21,@CR2A ;SET DEVICE 2A PRIORITY 4
535 002462 012777 000021 175556 MOV #21,@CR2B ;SET DEVICE 2B PRIORITY 4
536 002470 000240 NOP
537 002472 000240 NOP
538 002474 000005 RESET
539
540 002476 012767 000200 175272 ;PROCESSOR PRIORITY 4
541 002504 000005 MOV #200,CC ;SET PROCESSOR PRIORITY 4
542 002506 012777 000021 175516 MOV #21,@CR1A ;SET DEVICE 1A PRIORITY 4
543 002514 012777 000021 175512 MOV #21,@CR1B ;SET DEVICE 1B PRIORITY 4
544 002522 012777 000021 175514 MOV #21,@CR2A ;SET DEVICE 2A PRIORITY 4
545 002530 012777 000021 175510 MOV #21,@CR2B ;SET DEVICE 2B PRIORITY 4
546 002536 000240 NOP
547 002540 000240 NOP
548 002542 000005 RESET
549 002544 000412 BR T6
550 002546 000000 TSA: HALT ;ERROR, DEVICE 1A INTERRUPTED WHEN PROCESSOR HAD PRIORIT
551 002550 000401 BR .+4
552 002552 000000 TSB: HALT ;ERROR, DEVICE 1B INTERRUPTED WHEN PROCESSOR HAD PRIORIT
553 002554 000401 BR .+4
554 002556 000000 TSC: HALT ;ERROR, DEVICE 2A INTERRUPTED WHEN PROCESSOR HAD PRIORIT
555 002560 000401 BR .+4
556 002562 000000 TSD: HALT ;ERROR, DEVICE 2B INTERRUPTED WHEN PROCESSOR HAD PRIORIT
557 002564 022626 CMP (6)+,(6)+
558 002566 000167 177202 JMP T5

```

```

559
560
561
562 002572 012706 000776
563 002576 012767 000300 175172
564 002604 012777 000300 175374
565 002612 012777 000300 175372
566 002620 012777 000300 175370
567 002626 012777 000300 175366
568 002634 000005
569 002636 012777 002660 175340
570 002644 012777 000161 175360
571 002652 000240
572 002654 000000
573 002656 000745
574 002660 012777 002702 175322
575 002666 012777 000161 175340
576 002674 000240
577 002676 000000
578 002700 000734
579 002702 012777 002724 175304
580 002710 012777 000161 175326
581 002716 000240
582 002720 000000
583 002722 000723
584 002724 012777 002746 175266
585 002732 012777 000161 175306
586 002740 000240
587 002742 000000
588 002744 000712

```

```

: TEST THAT DEVICE MUST INTERRUPT WHEN PROCESSOR PRIORITY IS LOWER THAN DEVICE
: PROCESSOR PRIORITY 6

```

```

T6: MOV #STACK,%5
MOV #300,CC
MOV #300,@DS1A
MOV #300,@DS1B
MOV #300,@DS2A
MOV #300,@DS2B
RESET
MOV #.+22,@DEV1A
MOV #161,@CR1A
NOP
HALT
BR T6
MOV #.+22,@DEV1B
MOV #161,@CR1B
NOP
HALT
BR T6
MOV #.+22,@DEV2A
MOV #161,@CR2A
NOP
HALT
BR T6
MOV #.+22,@DEV2B
MOV #161,@CR2B
NOP
HALT
BR T6

```

589						
590						:PROCESSOR PRIORITY 5
591	002746	012706	000776			T6A: MOV #STACK,%6
592	002752	012767	000240	175016		MOV #240,CC
593	002760	012777	000240	175220		MOV #240,DEV1A
594	002766	012777	000240	175216		MOV #240,DEV1B
595	002774	012777	000240	175214		MOV #240,DEV2A
596	003002	012777	000240	175212		MOV #240,DEV2B
597	003010	000005				RESET
598	003012	012777	003034	175164		MOV #.+22,DEV1A
599	003020	012777	000161	175204		MOV #161,CR1A
600	003026	000240				NOP
601	003030	000000				HALT
602	003032	000745				BR T6A
603	003034	012777	003056	175146		MOV #.+22,DEV1B
604	003042	012777	000161	175164		MOV #161,CR1B
605	003050	000240				NOP
606	003052	000000				HALT
607	003054	000734				BR T6A
608	003056	012777	003100	175130		MOV #.+22,DEV2A
609	003064	012777	000161	175152		MOV #161,CR2A
610	003072	000240				NOP
611	003074	000000				HALT
612	003076	000723				BR T6A
613	003100	012777	003122	175112		MOV #.+22,DEV2B
614	003106	012777	000161	175132		MOV #161,CR2B
615	003114	000240				NOP
616	003116	000000				HALT
617	003120	000712				BR T6A
618	003122	000005				RESET
619	003124	012777	003146	175052		MOV #.+22,DEV1A
620	003132	012777	000121	175072		MOV #121,CR1A
621	003140	000240				NOP
622	003142	000000				HALT
623	003144	000700				BR T6A
624	003146	012777	003170	175034		MOV #.+22,DEV1B
625	003154	012777	000121	175052		MOV #121,CR1B
626	003162	000240				NOP
627	003164	000000				HALT
628	003166	000667				BR T6A
629	003170	012777	003212	175016		MOV #.+22,DEV2A
630	003176	012777	000121	175040		MOV #121,CR2A
631	003204	000240				NOP
632	003206	000000				HALT
633	003210	000656				BR T6A
634	003212	012777	003234	175000		MOV #.+22,DEV2B
635	003220	012777	000121	175020		MOV #121,CR2B
636	003226	000240				NOP
637	003230	000000				HALT
638	003232	000645				BR T6A



639						
640						
641	003234	012706	000776			
642	003240	012767	000200	174530		
643	003246	012777	000200	174732		
644	003254	012777	000200	174730		
645	003262	012777	000200	174726		
646	003270	012777	000200	174724		
647	003276	000005				
648	003300	012777	003322	174676		
649	003306	012777	000161	174716		
650	003314	000240				
651	003316	000000				
652	003320	000745				
653						
654	003322	012777	003344	174660		
655	003330	012777	000161	174676		
656	003336	000240				
657	003340	000000				
658	003342	000734				
659	003344	012777	003366	174642		
660	003352	012777	000161	174664		
661	003360	000240				
662	003362	000000				
663	003364	000723				
664	003366	012777	003410	174624		
665	003374	012777	000161	174644		
666	003402	000240				
667	003404	000000				
668	003406	000712				
669	003410	000005				
670	003412	012777	003434	174564		
671	003420	012777	000121	174604		
672	003426	000240				
673	003430	000000				
674	003432	000700				
675	003434	012777	003456	174546		
676	003442	012777	000121	174564		
677	003450	000240				
678	003452	000000				
679	003454	000667				
680	003456	012777	003500	174530		
681	003464	012777	000121	174552		
682	003472	000240				
683	003474	000000				
684	003476	000656				
685	003500	012777	003522	174512		
686	003506	012777	000121	174532		
687	003514	000240				
688	003516	000000				
689	003520	000645				
690	003522	000005				
691	003524	012777	003546	174452		
692	003532	012777	000061	174472		
693	003540	000240				
694	003542	000000				

:PROCESSOR PRIORITY 4

```

T6B:  MOV      #STACK,%6
      MOV      #200,CC
      MOV      #200,@DS1A
      MOV      #200,@DS1B
      MOV      #200,@DS2A
      MOV      #200,@DS2B
      RESET
      MOV      #.+22,@DEV1A
      MOV      #161,@CR1A
      NOP
      HALT
      BR       T6B
;ERROR, DEVICE 1A FAILED TO INTERRUPT

      MOV      #.+22,@DEV1B
      MOV      #161,@CR1B
      NOP
      HALT
      BR       T6B
;ERROR, DEVICE 1B FAILED TO INTERRUPT

      MOV      #.+22,@DEV2A
      MOV      #161,@CR2A
      NOP
      HALT
      BR       T6B
;ERROR, DEVICE 2A FAILED TO INTERRUPT

      MOV      #.+22,@DEV2B
      MOV      #161,@CR2B
      NOP
      HALT
      BR       T6B
;ERROR, DEVICE 2B FAILED TO INTERRUPT

      MOV      #.+22,@DEV1A
      MOV      #121,@CR1A
      NOP
      HALT
      BR       T6B
;ERROR, DEVICE 1A FAILED TO INTERRUPT

      MOV      #.+22,@DEV1B
      MOV      #121,@CR1B
      NOP
      HALT
      BR       T6B
;ERROR, DEVICE 1B FAILED TO INTERRUPT

      MOV      #.+22,@DEV2A
      MOV      #121,@CR2A
      NOP
      HALT
      BR       T6B
;ERROR, DEVICE 2A FAILED TO INTERRUPT

      MOV      #.+22,@DEV2B
      MOV      #121,@CR2B
      NOP
      HALT
      BR       T6B
;ERROR, DEVICE 2B FAILED TO INTERRUPT

      MOV      #.+22,@DEV1A
      MOV      #61,@CR1A
      NOP
      HALT
;ERROR, DEVICE 1A FAILED TO INTERRUPT

```

E02

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DBAB.P11

695 003544 000633

BK T68

696	003546	012777	003570	174434	MOV	#.+22, @DEV1B	
697	003554	012777	000061	174452	MOV	#61, @CR1B	
698	003562	000240			NOP		
699	003564	000000			HALT		;ERROR, DEVICE 1B FAILED TO INTERRUPT
701	003566	000622			BR	T6B	
702	003570	012777	003612	174416	MOV	#.+22, @DEV2A	
703	003576	012777	000061	174440	MOV	#61, @CR2A	
704	003604	000240			NOP		
705	003606	000000			HALT		;ERROR, DEVICE 2A FAILED TO INTERRUPT
706	003610	000611			BR	T6B	
707	003612	012777	003636	174400	MOV	#T6C, @DEV2B	
708	003620	012777	000061	174420	MOV	#61, @CR2B	
709	003626	000240			NOP		
710	003630	000000			HALT		;ERROR, DEVICE 2B FAILED TO INTERRUPT
711	003632	000167	177376		JMP	T6B	
712							
713	003636	012706	000776		MOV	#STACK, %6	
714	003642	012767	000140	174126	MOV	#140, CC	
715	003650	012777	000140	174330	MOV	#140, @OS1A	
716	003656	012777	000140	174326	MOV	#140, @OS1B	
717	003664	012777	000140	174324	MOV	#140, @OS2A	
718	003672	012777	000140	174322	MOV	#140, @OS2B	
719	003700	000005			RESET		
720	003702	012777	003724	174274	MOV	#.+22, @DEV1A	
721	003710	012777	000161	174314	MOV	#161, @CR1A	
722	003716	000240			NOP		
723	003720	000000			HALT		;ERROR, DEVICE 1A FAILED TO INTERRUPT
724	003722	000745			BR	T6C	
725	003724	012777	003746	174256	MOV	#.+22, @DEV1B	
726	003732	012777	000161	174274	MOV	#161, @CR1B	
727	003740	000240			NOP		
728	003742	000000			HALT		;ERROR, DEVICE 1B FAILED TO INTERRUPT
729	003744	000734			BR	T6C	
730	003746	012777	003770	174240	MOV	#.+22, @DEV2A	
731	003754	012777	000161	174262	MOV	#161, @CR2A	
732	003762	000240			NOP		
733	003764	000000			HALT		;ERROR, DEVICE 2A FAILED TO INTERRUPT
734	003766	000723			BR	T6C	
735	003770	012777	004012	174222	MOV	#.+22, @DEV2B	
736	003776	012777	000161	174242	MOV	#161, @CR2B	
737	004004	000240			NOP		
738	004006	000000			HALT		;ERROR, DEVICE 2B FAILED TO INTERRUPT
739	004010	000712			BR	T6C	
740	004012	000005			RESET		
741	004014	012777	004036	174162	MOV	#.+22, @DEV1A	
742	004022	012777	000121	174202	MOV	#121, @CR1A	
743	004030	000240			NOP		
744	004032	000000			HALT		;ERROR, DEVICE 1A FAILED TO INTERRUPT
745	004034	000700			BR	T6C	
746	004036	012777	004060	174144	MOV	#.+22, @DEV1B	
747	004044	012777	000121	174162	MOV	#121, @CR1B	
748	004052	000240			NOP		
749	004054	000000			HALT		;ERROR, DEVICE 1B FAILED TO INTERRUPT
750	004056	000667			BR	T6C	
751	004060	012777	004102	174126	MOV	#.+22, @DEV2A	

:PROCESSOR PRIORITY 3  
 T6C:

G02

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752	004066	012777	000121	174150	MUV	#121,2CR2A
753	004074	000240			NOP	
754	004076	000000			HALT	

;ERROR, DEVICE 2A FAILED TO INTERRUPT

755					BR	T6C	
756	004100	000656			MOV	#.+22,@DEV2B	
757	004102	012777	004124	174110	MOV	#121,@CR2B	
758	004110	012777	000121	174130	NOP		
759	004116	000240			HALT		;ERROR, DEVICE 2B FAILED TO INTERRUPT
760	004120	000000			BR	T6C	
761	004122	000645			RESET		
762	004124	003005			MOV	#.+22,@DEV1A	
763	004126	012777	004150	174050	MOV	#51,@CR1A	
764	004134	012777	000061	174070	NOP		
765	004142	000240			HALT		;ERROR, DEVICE 1A FAILED TO INTERRUPT
766	004144	000000			BR	T6C	
767	004146	000633			MOV	#.+22,@DEV1B	
768	004150	012777	004172	174032	MOV	#61,@CR1B	
769	004156	012777	000061	174050	NOP		
770	004164	000240			HALT		;ERROR, DEVICE 1B FAILED TO INTERRUPT
771	004166	000000			BR	T6C	
772	004170	000622			MOV	#.+22,@DEV2A	
773	004172	012777	004214	174014	MOV	#61,@CR2A	
774	004200	012777	000061	174036	NOP		
775	004206	000240			HALT		;ERROR, DEVICE 2A FAILED TO INTERRUPT
776	004210	000000			BR	T6C	
777	004212	000611			MOV	#.+24,@DEV2B	
778	004214	012777	004240	173776	MOV	#61,@CR2B	
779	004222	012777	000061	174016	NOP		
780	004230	000240			HALT		;ERROR, DEVICE 2B FAILED TO INTERRUPT
781	004232	000000			JMP	T6C	
782	004234	000167	177376		RESET		
783	004240	000005			MOV	#.+24,@DEV1A	
784	004242	012777	004266	173734	MOV	#21,@CR1A	
785	004250	012777	000021	173754	NOP		
786	004256	000240			HALT		;ERROR, DEVICE 1A FAILED TO INTERRUPT
787	004260	000000			JMP	T6C	
788	004262	000167	177350		MOV	#.+24,@DEV1B	
789	004266	012777	004312	173714	MOV	#21,@CR1B	
790	004274	012777	000021	173732	NOP		
791	004302	000240			HALT		;ERROR, DEVICE 1B FAILED TO INTERRUPT
792	004304	000000			JMP	T6C	
793	004306	000167	177324		MOV	#.+24,@DEV2A	
794	004312	012777	004336	173674	MOV	#21,@CR2A	
795	004320	012777	000021	173716	NOP		
796	004326	000240			HALT		;ERROR, DEVICE 2A FAILED TO INTERRUPT
797	004330	000000			JMP	T6C	
798	004332	000167	177300		MOV	#.+24,@DEV2B	
799	004336	012777	004362	173654	MOV	#21,@CR2B	
800	004344	012777	000021	173674	NOP		
801	004352	000240			HALT		;ERROR, DEVICE 2B FAILED TO INTERRUPT
802	004354	000000			JMP	T6C	
803	004356	000167	177254				

```

804
805          ;TEST THAT DATA REGISTER MAY BE CLEARED
806 004362 005077 173636 T7: CLR  @DATA1
807 004366 005777 173632 T7: TST  @DATA1
808 004372 001402          BEQ   T7A
809 004374 000000          HALT                    ;ERROR, DATA REG 1 NOT CLEARED
810 004376 000771          BR    T7
811 004400 005077 173632 T7A: CLR  @DATA2
812 004404 005777 173626 T7A: TST  @DATA2
813 004410 001402          BEQ   T8
814 004412 000000          HALT                    ;ERROR, DATA REG 2 NOT CLEARED
815 004414 000771          BR    T7A
816          ;TEST THAT DATA REG CAN BE SET WITH ALL ONES
817 004416 012777 177777 173600 T8: MOV  #-1,@DATA1
818 004424 022777 177777 173572 T8: CMP  #-1,@DATA1
819 004432 001402          BEQ   T8A
820 004434 000000          HALT                    ;ERROR, DATA REG 1 NOT = -1
821 004436 000767          BR    T8
822 004440 012777 177777 173570 T8A: MOV  #-1,@DATA2
823 004446 022777 177777 173562 T8A: CMP  #-1,@DATA2
824 004454 001402          BEQ   T9
825 004456 000000          HALT                    ;ERROR, DATA REG 2 NOT = -1
826 004460 000767          BR    T8A
827          ;TEST THAT DATA REG WILL ACCEPT A COUNT PATTERN
828 004462 005077 173536 T9: CLR  @DATA1          ;INITIALIZE DATA REG
829 004466 005000          CLR  %0          ;INITIALIZE COMPARISON REGISTER
830 004470 005277 173530 T9A: INC  @DATA1          ;+1 TO DATA REG 1
831 004474 005200          INC  %0          ;+1 TO COMPARISON
832 004476 020077 173522          CMP  %0,@DATA1    ;DOES DATA REG 1 COMPARE FAVORABLY
833 004502 001402          BEQ   T9B
834 004504 000000          HALT                    ;ERROR, DATA REG 1 DIDN'T INCREMENT PROPERLY
835 004506 000765          BR    T9
836 004510 005700          T9B: TST  %0          ;COMPLETED COUNT PATTERN?
837 004512 001366          BNE  T9A          ;NO
838 004514 005077 173516 T9C: CLR  @DATA2          ;INITIALIZE DATA REG
839 004520 005000          CLR  %0          ;INITIALIZE COMPARISON REGISTER
840 004522 005277 173510 T9D: INC  @DATA2          ;+1 TO DATA REG2
841 004526 005200          INC  %0          ;+1 TO COMPARISON
842 004530 020077 173502          CMP  %0,@DATA2    ;DOES DATA REG 2 COMPARE FAVORABLY
843 004534 001402          BEQ   T9E
844 004536 000000          HALT                    ;ERROR, DATA REG 2 DIDN'T INCREMENT PROPERLY
845 004540 000765          BR    T9C
846 004542 005700          T9E: TST  %0          ;COMPLETED COUNT PATTERN?
847 004544 001366          BNE  T9D          ;NO

```

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848                                     ;TEST THAT ADDRESS REG MAY BE CLEARED
849 004546 005077 173454                †10: CLR      @ADRS1
850 004552 005777 173450                TST      @ADRS1
851 004556 001402                       BEQ      T10A
852 004560 000000                       HALT
853 004562 000771                       BR       T10
854 004564 005077 173450                T10A: CLR      @ADRS2
855 004570 005777 173444                TST      @ADRS2
856 004574 001402                       BEQ      T11
857 004576 000000                       HALT
858 004600 000771                       BR       T10A
859                                     ;TEST THAT ADDRESS REG CAN BE SET WITH ALL ONES
860 004602 012777 177777 173416        †11: MOV      #-1,@ADRS1
861 004610 022777 177777 173410        CMP      #-1,@ADRS1
862 004616 001402                       BEQ      T11A
863 004620 000000                       HALT
864 004622 000767                       BR       T11
865 004624 012777 177777 173406        T11A: MOV      #-1,@ADRS2
866 004632 022777 177777 173400        CMP      #-1,@ADRS2
867 004640 001402                       BEQ      T12
868 004642 000000                       HALT
869 004644 000767                       BR       T11A
870                                     ;TEST THAT ADDRESS REG WILL ACCEPT A COUNT PATTERN
871 004646 005077 173354                †12: CLR      @ADRS1
872 004652 005000                       CLR      %0
873 004654 005277 173346                T12A: INC      @ADRS1
874 004660 005200                       INC      %0
875 004662 020077 173340                CMP      %0,@ADRS1
876 004666 001402                       BEQ      T12B
877 004670 000000                       HALT
878 004672 000765                       BR       T12
879 004674 005700                T12B: TST      %0
880 004676 001366                       BNE     T12A
881 004700 005077 173334                T12C: CLR      @ADRS2
882 004704 005000                       CLR      %0
883 004706 005277 173326                T12D: INC      @ADRS2
884 004712 005200                       INC      %0
885 004714 020077 173320                CMP      %0,@ADRS2
886 004720 001402                       BEQ     T12E
887 004722 000000                       HALT
888 004724 000765                       BR       T12C
889 004726 005700                T12E: TST      %0
890 004730 001366                       BNE     T12D

```

```

;ERROR, ADDRESS REG 1 NOT CLEARED
;ERROR, ADDRESS REG 2 NOT CLEARED
;ERROR, ADDRESS REG 1 NOT = -1
;ERROR, ADDRESS REG 2 NOT = -1
;INITIALIZE ADDRESS REG
;INITIALIZE COMPARISON REGISTER
;+1 TO ADDRESS REG 1
;+1 TO COMPARISON
;DOES ADDRESS REG 1 COMPARE FAVORABLY
;ERROR, ADDRESS REG 1 DIDN'T INCREMENT PROPERLY
;COMPLETED COUNT PATTERN?
;NO
;INITIALIZE ADDRESS REG
;INITIALIZE COMPARISON REGISTER
;+1 TO ADDRESS REG 2
;+1 TO COMPARISON
;DOES ADDRESS REG 2 COMPARE FAVORABLY
;ERROR, ADDRESS REG 2 DIDN'T INCREMENT PROPERLY
;COMPLETED COUNT PATTERN?
;NO

```

```

891          :TEST THAT BYTE COUNTER MAY BE CLEARED
892 004732 005077 173272      †13: CLR      @BC1
893 004736 005777 173266      TST      @BC1
894 004742 001402              BEQ      T13A
895 004744 000000              HALT
896 004746 000771              BR      T13
897 004750 005077 173266      T13A: CLR      @BC2
898 004754 005777 173262      TST      @BC2
899 004760 001402              BEQ      T14
900 004762 000000              HALT
901 004764 000771              BR      T13A
902
903          :TEST THAT BYTE COUNTER CAN BE SET WITH ALL ONES
904 004766 012777 177777 173234 †14: MOV      #-1,@BC1
905 004774 022777 177777 173226      CMP      #-1,@BC1
906 005002 001402              BEQ      T14A
907 005004 000000              HALT
908 005006 000767              BR      T14
909 005010 012777 177777 173224 T14A: MOV      #-1,@BC2
910 005016 022777 177777 173216      CMP      #-1,@BC2
911 005024 001402              BEQ      T15
912 005026 000000              HALT
913 005030 000767              BR      T14A
914          :TEST THAT BYTE COUNTER WILL ACCEPT A COUNT PATTERN
915 005032 005077 173172      †15: CLR      @BC1
916 005036 005000              CLR      %0
917 005040 005277 173164      T15A: INC      @BC1
918 005044 005200              INC      %0
919 005046 020077 173156      CMP      %0,@BC1
920 005052 001402              BEQ      T15B
921 005054 000000              HALT
922 005056 000765              BR      T15
923 005060 005700      T15B: TST      %0
924 005062 001366              BNE     T15A
925 005064 005077 173152      T15C: CLR      @BC2
926 005070 005000              CLR      %0
927 005072 005277 173144      T15D: INC      @BC2
928 005076 005200              INC      %0
929 005100 020077 173136      CMP      %0,@BC2
930 005104 001402              BEQ      T15E
931 005106 000000              HALT
932 005110 000765              BR      T15C
933 005112 005700      T15E: TST      %0
934 005114 001366              BNE     T15D
935 005116 000005              RESET

```

;ERROR, BYTE COUNTER 1 NOT CLEARED

;ERROR, BYTE COUNTER 2 NOT CLEARED

;ERROR, BYTE COUNTER 1 NOT = -1

;ERROR, BYTE COUNTER 2 NOT = -1

;INITIALIZE BYTE COUNTER

;INITIALIZE COMPARISON REGISTER

;+1 TO BYTE COUNTER 1

;+1 TO COMPARISON

;DOES BYTE COUNTER 1 COMPARE FAVORABLY

;ERROR, BYTE COUNTER 1 DIDN'T INCREMENT PROPERLY

;COMPLETED COUNT PATTERN?

;NO

;INITIALIZE BYTE COUNTER

;INITIALIZE COMPARISON REGISTER

;+1 TO BYTE COUNTER 2

;+1 TO COMPARISON

;DOES BYTE COUNTER 2 COMPARE FAVORABLY

;ERROR, BYTE COUNTER 2 DIDN'T INCREMENT PROPERLY

;COMPLETED COUNT PATTERN?

;NO



```

936
937 ; DO A DATOB-NPR SEQUENCE TO CHECK THAT BYTE COUNTER WILL DECREMENT
938 ; BY ONE FROM 177777 TO 0 NOT EXPECTING NOR CHECKING FOR PROPER
939 ; DATA TRANSFER ADDRESS. REGISTER IS RE-INITIALIZED AFTER EACH
940 ; DECREMENT TO KEEP IT OUT OF THE WAY.
941 005120 012767 000200 172650 T16: MOV #200,CC ; SET PROCESSOR PRIORITY 4
942 005126 005077 173074 CLR @ADRS1 ; CLEAR ADDRESS REGISTER 1
943 005132 012777 177777 173070 MOV #-1,@BC1 ; SET BYTE COUNT 1 TO -1
944 005140 012700 177776 MOV #-2,%0 ; INITIALIZE BYTE COUNT COMPARISON
945 005144 012777 074341 173060 T16A1: MOV #74341,@CR1A ; DATOB-XFER FROM DATA REG-BLOCK XFER-PRIORITY 7-NPR-GO
946 005152 005777 173050 T16A: TST @ADRS1
947 005156 001775 BEQ T16A ; WAIT FOR ADDRESS REGISTER TO CHANGE
948 005160 020077 173044 CMP %0,@BC1 ; DID BYTE COUNT 1 DECREMENT?
949 005164 001402 BEQ T16B ; YES
950 005166 000000 HALT ; ERROR, BYTE COUNT 1 DIDN'T DECREMENT BY 1 ON NPR.
951 005170 000753 BR T16
952 005172 005077 173030 T16B: CLR @ADRS1 ; RE-INITIALIZE ADDRESS REGISTER
953 005176 005300 DEC %0 ; DECREMENT COMPARISON COUNTER
954 005200 005777 173024 TST @BC1 ; TEST FOR BYTE COUNT 1 EQUAL TO ZERO
955 005204 001357 BNE T16A1
956 005206 000005 RESET
957 005210 005077 173024 T16C: CLR @ADRS2 ; CLEAR ADDRESS REGISTER 2
958 005214 012777 177777 173020 MOV #-1,@BC2 ; SET BYTE COUNT 2 TO -1
959 005222 012700 177776 MOV #-2,%0 ; INITIALIZE BYTE COUNT COMPARISON
960 005226 012777 074341 173010 T16D1: MOV #74341,@CR2A ; DATOB-XFER FROM DATA REG-BLOCK XFER-PRIORITY 7-NPR-GO
961 005234 005777 173000 T16D: TST @ADRS2
962 005240 001775 BEQ T16D ; WAIT FOR ADDRESS REGISTER TO CHANGE
963 005242 020077 172774 CMP %0,@BC2 ; DID BYTE COUNT 2 DECREMENT?
964 005246 001402 BEQ T16E ; YES
965 005250 000000 HALT ; ERROR, BTYE COUNT 2 DIDN'T DECREMENT BY 1 ON NPR
966 005252 000756 BR T16C
967 005254 005077 172760 T16E: CLR @ADRS2 ; REINITIALIZE ADDRESS REGISTER
968 005260 005300 DEC %0 ; DECREMENT COMPARISON COUNT
969 005262 005777 172754 TST @BC2 ; TEST FOR BYTE COUNT 2 EQUAL TO ZERO
970 005266 001357 BNE T16D1
971 005270 000005 RESET

```

## M02

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972
973 ;DO A DATO-NPR SEQUENCE TO CHECK THAT BYTE COUNTER WILL DECREMENT BY
974 ;TWO FROM 177776 TO 0 NOT EXPECTING NOR CHECKING FOR PROPER DATA TRANSFER
975 ;ADDRESS REGISTER IS RE-INITIALIZED AFTER EACH DECREMENT TO KEEP IT OUT
976 ;OF THE WAY.
977 005272 012767 000200 172476 T17: MOV #200,CC ;SET PROCESSOR PRIORITY 4
978 005300 005077 172722 CLR @ADRS1 ;CLEAR ADDRESS REGISTER 1
979 005304 012777 177776 172716 MOV #-2,@BC1 ;SET BYTE COUNT 1 TO -2
980 005312 012700 177774 MOV #-4,%0 ;INITIALIZE BYTE COUNT COMPARISON
981 005316 012777 050341 172706 T17A1: MOV #50341,@CR1A ;DATO-XFER FROM DATA REG-BLOCK XFER-PRIORITY 7-NPR-GO
982 005324 005777 172676 T17A: TST @ADRS1
983 005330 001775 BEQ T17A ;WAIT FOR ADDRESS REGISTER TO CHANGE
984 005332 020077 172672 CMP %0,@BC1 ;DID BYTE COUNT 1 DECREMENT?
985 005336 001402 BEQ T17B ;YES
986 005340 000000 HALT ;ERROR, BYTE COUNT 1 DIDN'T DECREMENT BY 1 ON NPR.
987 005342 000753 BR T17
988 005344 005077 172656 T17B: CLR @ADRS1 ;RE-INITIALIZE ADDRESS REGISTER
989 005350 162700 000002 SUB #2,%0 ;DECREMENT COMPARISON COUNTER
990 005354 005777 172650 TST @BC1 ;TEST FOR BYTE COUNT 1 EQUAL TO ZERO
991 005360 001356 BNE T17A1
992 005362 000005 RESET
993 005364 005077 172650 T17C: CLR @ADRS2 ;CLEAR ADDRESS REGISTER 2
994 005370 012777 177776 172644 MOV #-2,@BC2 ;SET BYTE COUNT 2 TO -1
995 005376 012700 177774 MOV #-4,%0 ;INITIALIZE BYTE COUNT COMPARISON
996 005402 012777 050341 172634 T17D1: MOV #50341,@CR2A ;DATO-XFER FROM DATA REG-BLOCK-XFER-PRIORITY 7-NPR-GO
997 005410 005777 172624 T17D: TST @ADRS2
998 005414 001775 BEQ T17D ;WAIT FOR ADDRESS REGISTER TO CHANGE
999 005416 020077 172620 CMP %0,@BC2 ;DID BYTE COUNT 2 DECREMENT?
1000 005422 001402 BEQ T17E ;YES
1001 005424 000000 HALT ;ERROR, BYTE COUNT 2 DIDN'T DECREMENT BY 1 ON NPR
1002 005426 000756 BR T17C
1003 005430 005077 172604 T17E: CLR @ADRS2 ;REINITIALIZE ADDRESS REGISTER
1004 005434 162700 000002 SUB #2,%0 ;DECREMENT COMPARISON COUNT
1005 005440 005777 172576 TST @BC2 ;TEST FOR BYTE COUNT 2 EQUAL TO ZERO
1006 005444 001356 BNE T17D1
1007 005446 000005 RESET

```

```

1008
1009
1010 005450 012767 000200 172320
1011 005456 012777 177777 172544
1012 005464 012700 177777
1013 005470 012777 005614 172530
1014 005476 012777 076341 172526
1015 005504 005527 000000
1016 005510 126700 000100
1017 005514 001402
1018 005516 000000
1019 005520 000753
1020 005522 005300
1021 005524 005777 172500
1022 005530 001357
1023 005532 000005
1024 005534 012777 177777 172500
1025 005542 012700 177777
1026 005546 012777 005614 172464
1027 005554 012777 076341 172462
1028 005562 000240
1029 005564 000240
1030 005566 126700 000022
1031 005572 001402
1032 005574 000000
1033 005576 000756
1034 005600 005300
1035 005602 005777 172434
1036 005606 001357
1037 005610 000005
1038 005612 000401
1039 005614 000000

:DO A DATAB SEQUENCE TO CHECK FOR PROPER DATA TRANSFER FROM BYTE COUNT
T18:  MOV      #200,CC          ;SET PROCESSOR PRIORITY 4
      MOV      #-1,BC1        ;SET BYTE COUNT 1 TO -1.
      MOV      #-1,%0         ;INITIALIZE BYTE COUNT COMPARISON
T18A: MOV      #T18DAT,ADRS1   ;INITIALIZE ADDRESS POINTER
      MOV      #76341,ACR1A    ;DATAB-XFER FROM BC1-PRIORITY 7-NPR-GO
      ADC      #0
      CMPB     T18DAT,%0       ;DID DATA TRANSFER FROM BC1 TO DATA ADDRESS
      BEQ      T18B           ;YES
      HALT
      BR       T18            ;ERROR, DATA DIDN'T TRANSFER FROM BC1 PROPERLY
T18B: DEC      %0             ;DECREMENT COMPARISON COUNT
      TST      @BC1           ;TEST FOR BC=0
      BNE     T18A
      RESET
T18C: MOV      #-1,@BC2       ;SET BC1 TO -1
      MOV      #-1,%0         ;INITIALIZE BC COMPARISON
T18D: MOV      #T18DAT,ADRS2   ;INITIALIZE ADDRESS POINTER
      MOV      #76341,ACR2A    ;DATAB - XFER FROM BC2-PRIORITY 7-NPR-GO
      NOP
      NOP
      CMPB     T18DAT,%0       ;DID DATA TRANSFER FROM BC2 PROPERLY
      BEQ      T18E           ;YES
      HALT
      BR       T18C           ;ERROR, DATA DIDN'T TRANSFER FROM BC2 PROPERLY
T18E: DEC      %0             ;DECREMENT COMPARISON COUNT
      TST      @BC2           ;TEST FOR BC=0
      BNE     T18D
      RESET
      BR       T19
T18DAT: 0
    
```

```

1040
1041
1042
1043 005616 012767 000200 172152 :DO A DATA SEQUENCE TO CHECK FOR PROPER DATA TRANSFER FROM BYTE COUNT
1044 005624 012777 177776 172376 T19: MOV #200,CC ;SET PROCESSOR PRIORITY 4
1045 005632 012700 177776 : MOV #-2,BC1 ;SET BYTE COUNT 1 TO -1
1046 005636 012777 005766 172362 T19A: MOV #T19DAT,ADRS1 ;INITIALIZE BYTE COUNT COMPARISON
1047 005644 012777 052341 172360 MOV #52341,CR1A ;INITIALIZE ADDRESS POINTER
1048 005652 005527 000000 ADC #0 ;DATO-XFER FROM BC1-PRIORITY 7-NPR-GO
1049 005656 026700 000104 CMP T19DAT,%0 ;DID DATA TRANSFER FROM BC1 TO DATA ADDRESS
1050 005662 001402 BEQ T19B ;YES
1051 005664 000000 HALT ;ERROR, DATA DIDN'T TRANSFER FROM BC1 PRPERLY
1052 005666 000753 BR T19
1053 005670 162700 000002 T19B: SUB #2,%0 ;DECREMENT COMPARISON COUNT
1054 005674 005777 172330 TST BC1 ;TEST FOR BC=0
1055 005700 001356 BNE T19A
1056 005702 000005 RESET
1057 005704 012777 177776 172330 T19C: MOV #-2,BC2 ;SET BC1 TO -1
1058 005712 012700 177776 : MOV #-2,%0 ;INITIALIZE BC COMPARISON
1059 005716 012777 005766 172314 T19D: MOV #T19DAT,ADRS2 ;INITIALIZE ADDRESS POINTER
1060 005724 012777 052341 172312 MOV #52341,CR2A ;DATO-XFER FROM BC2-PRIORITY 7-NPR-GO
1061 005732 000240 NOP
1062 005734 000240 NOP
1063 005736 026700 000024 CMP T19DAT,%0 ;DID DATA TRANSFER FROM BC2 PROPERLY
1064 005742 001402 BEQ T19E ;YES
1065 005744 000000 HALT ;ERROR, DATA DIDN'T TRANSFER FROM BC2 PROPERLY
1066 005746 000756 BR T19C
1067 005750 162700 000002 T19E: SUB #2,%0 ;DECREMENT COMPARISON COUNT
1068 005754 005777 172262 TST BC2 ;TEST FOR BC=0
1069 005760 001356 BNE T19D
1070 005762 000005 RESET
1071 005764 000401 BR T20
1071 005766 000000 T19DAT: 0

```

```

1072
1073
1074 005770 012767 000200 172000 :DO A DATOB SEQUENCE TO CHECK FOR PROPER DATA TRANSFER FROM DATA REG
1075 005776 012777 177777 172224 T2C: MOV #200,CC ;SET PROCESSOR PRIORITY 4
1076 006004 012777 177777 172212 MOV #-1,BC1 ;SET BYTE COUNT 1 TO -1
1077 006012 012700 177777 MOV #-1,DATA1 ;INITIALIZE DATA REGISTER 1
1078 006016 012777 006160 172202 T20A: MOV #T20DAT,ADR51 ;INITIALIZE BYTE COUNT COMPARISON
1079 006024 012777 074341 172200 MOV #74341,CR1A ;INITIALIZE ADDRESS POINTER
1080 006032 005527 000000 ADC #0 ;DATOB-XFER FROM DATA1-PRIORITY 7-NPR-GO
1081 006036 126700 000116 CMPB T20DAT,%0 ;DID DATA TRANSFER FROM DATA REG 1 TO DATA ADDRESS
1082 006042 001402 BEQ T20B ;YES
1083 006044 000000 HALT ;ERROR, DATA DIDN'T TRANSFER FROM DATA REG 1 PROPERLY
1084 006046 000750 BR T20
1085 006050 005300 T20B: DEC %0 ;DECREMENT COMPARISON COUNT
1086 006052 005377 172146 DEC DATA1 ;DECREMENT DATA REG
1087 006056 005777 172146 TST BC1 ;TEST FOR BC=0
1088 006062 001355 BNE T20A
1089 006064 000005 RESET
1090 006066 012777 177777 172146 T20C: MOV #-1,BC2 ;SET BC1 TO -1
1091 006074 012777 177777 172134 MOV #-1,DATA2 ;INITIALIZE DATA REGISTER 2
1092 006102 012700 177777 MOV #-1,%0 ;INITIALIZE BC COMPARISON
1093 006106 012777 006160 172122 T20D: MOV #T20DAT,ADR52 ;INITIALIZE ADDRESS POINTER
1094 006114 012777 074341 172122 MOV #74341,CR2A ;DATOB-XFER FROM DATA1-PRIORITY 7-NPR-GO
1095 006122 000240 NOP
1096 006124 000240 NOP
1097 006126 126700 000026 CMPB T20DAT,%0 ;DID DATA TRANSFER FROM DATA REG 2 PROPERLY
1098 006132 001402 BEQ T20E ;YES
1099 006134 000000 HALT ;ERROR, DATA DIDN'T TRANSFER FROM DATA REG 2 PROPERLY
1100 006136 000753 BR T20C
1101 006140 005300 T20E: DEC %0 ;DECREMENT COMPARISON COUNT
1102 006142 005377 172070 DEC DATA2 ;DECREMENT DATA REG
1103 006146 005777 172070 TST BC2 ;TEST FOR BC=0
1104 006152 001355 BNE T20D
1105 006154 000005 RESET
1106 006156 000401 BR T21
1107 006160 000000 T20DAT: 0
    
```

```

1108
1109          ;DO A DATO SEQUENCE TO CHECK FOR PROPER DATA TRANSFER FROM DATA REGISTER
1110 006162 012767 000200 171606 T21:  MOV      #200,CC          ;SET PROCESSOR PRIORITY 4
1111 006170 012777 177776 172032      MOV      #-2,BC1          ;SET BYTE COUNT 1 TO -2
1112 006176 012777 177776 172020      MOV      #-2,DATA1       ;INITIALIZE DATA REG 1
1113 006204 012700 177776          MOV      #-2,%0          ;INITIALIZE BYTE COUNT COMPARISON
1114 006210 012777 006362 172010 T21A: MOV      T21DAT,ADRS1    ;INITIALIZE ADDRESS POINTER
1115 006216 012777 050341 172006      MOV      #50341,ACR1A    ;DATAB-XFER FROM DATA1 PRIORITY 7-NPR-GO
1116 006224 005527 000000          ADC      #0
1117 006230 026700 000126          CMP      T21DAT,%0       ;DID DATA TRANSFER FROM DATA REG 1 TO DATA ADDRESS
1118 006234 001402          BEQ      T21B           ;YES
1119 006236 000000          HALT
1120 006240 000750          BR      T21
1121 006242 162700 000002          T21B: SUB      #2,%0          ;DECREMENT COMPARISON COUNT
1122 006246 162777 000002 171750      SUB      #2,DATA1
1123 006254 005777 171750          TST      BC1           ;TEST FOR BC=0
1124 006260 001353          BNE      T21A
1125 006262 000005          RESET
1126 006264 012777 177776 171750 T21C: MOV      #-2,BC2          ;SET BC1 TO -1
1127 006272 012777 177776 171736      MOV      #-2,DATA2       ;INITIALIZE DATA REG 2
1128 006300 012700 177776          MOV      #-2,%0          ;INITIALIZE BC COMPARISON
1129 006304 012777 006362 171726 T21C: MOV      T21DAT,ADRS2    ;INITIALIZE ADDRESS POINTER
1130 006312 012777 050341 171724      MOV      #50341,ACR2A    ;DATAB - XFER FROM DATA2 - PRIORITY 7 - NPR - 60
1131 006320 000240          NOP
1132 006322 000240          NOP
1133 006324 026700 000032          CMP      T21DAT,%0       ;DID DATA TRANSFER FROM DATA REG 2 PROPERLY
1134 006330 001402          BEQ      T21E           ;YES
1135 006332 000000          HALT
1136 006334 000753          BR      T21C
1137 006336 162700 000002          T21E: SUB      #2,%0          ;DECREMENT COMPARISON COUNT
1138 006342 162777 000002 171666      SUB      #2,DATA2
1139 006350 005777 171666          TST      BC2           ;TEST FOR BC=0
1140 006354 001353          BNE      T21D
1141 006356 000005          RESET
1142 006360 000401          BR      T22
1143 006362 000000          T21DAT: 0

```

```

1144
1145      ;DO A DATI SEQUENCE TO CHECK FOR PROPER DATA TRANSFER TO DATA REGISTER
1146 006364 012767 000200 171404 T22:  MOV      #200,CC      ;SET PROCESSOR PRIORITY 4
1147 006372 012777 177776 171630      MOV      #-2,BC1      ;SET BYTE COUNT 1 TO -2
1148 006400 012767 177776 000142      MOV      #-2,T22DAT   ;INITIALIZE DATA ADDRESS
1149 006406 012777 006550 171612 T22A:  MOV      #T22DAT,ADR1  ;INITIALIZE ADDRESS POINTER
1150 006414 012777 000341 171610      MOV      #341,ACR1A   ;DATI-XFER TO DATA1-PRIORITY 7-NPR-GO
1151 006422 000240      NOP
1152 006424 000240      NOP
1153 006426 026777 000116 171570      CMP      T22DAT,ADATA1 ;DID DATA TRANSFER FROM ADDRESS TO DATA REG 1
1154 006434 001402      BEQ      T22B
1155 006436 000000      HALT
1156 006440 000751      BR
1157 006442 162767 000002 000100 T22B:  SUB      #2,T22DAT     ;DECREMENT DATA PATTERN
1158 006450 005777 171554      TST      BC1          ;TEST FOR BC=0
1159 006454 001354      BNE
1160 006456 000005      RESET
1161 006460 012777 177776 171554 T22C:  MOV      #-2,BC2      ;SET BYTE COUNT 2 TO -2
1162 006466 012767 177776 000054      MOV      #-2,T22DAT   ;INITIALIZE DATA ADDRESS
1163 006474 012777 006550 171536 T22D:  MOV      #T22DAT,ADR2  ;INITIALIZE ADDRESS POINTER
1164 006502 012777 000341 171534      MOV      #341,ACR2A   ;DATI-XFER TO DATA2-PRIORITY 7-NPR-GO
1165 006510 000240      NOP
1166 006512 000240      NOP
1167 006514 026777 000030 171514      CMP      T22DAT,ADATA2 ;DID DATA TRANSFER FROM ADDRESS TO DATA REG 2
1168 006522 001402      BEQ      T22E
1169 006524 000000      HALT
1170 006526 000754      BR
1171 006530 162767 000002 000012 T22E:  SUB      #2,T22DAT     ;DECREMENT DATA PATTERN
1172 006536 005777 171500      TST      BC2          ;TEST FOR BC=0
1173 006542 001354      BNE
1174 006544 000005      RESET
1175 006546 000401      BR
1176 006550 000000      T22DAT: 0

```

```

1177
1178
1179 006552 012767 000340 171216 ;DO A DATIP TO CHECK FOR DATA SHIFT IN DATA REGISTER
1180 006560 012777 000002 171442 t23: MOV #340,CC ;SET PROCESSOR PRIORITY 7
1181 006566 012777 006706 171432 MOV #2,BC1 ;SET BYTE COUNT 1 FOR ONE WORD TRANSFER
1182 006574 012767 125252 000104 MOV #T23DAT,ADRS1 ;INITIALIZE ADDRESS POINTER
1183 006582 012777 045341 171422 MOV #125252,T23DAT ;INITIALIZE DATA TO BE TRANSFERRED
1184 006610 005777 171414 MOV #45341,CR1A ;DATIP-DATO-XFER UNTIL BC=0-PRIORITY 7-NPR-6
1185 006614 001375 TST BC1 ;WAIT FOR BC=0
1186 006616 026727 000064 052524 BNE -4
1187 006624 001402 CMP T23DAT,#52524 ;DID DATA REG SHIFT
1188 006626 000000 BEQ T23A
1189 006630 000750 HALT ;ERROR, DATA REG1 FAILED TO SHIFT ON A DATIP
1190 006632 000005 BR T23
1191 006634 012777 000002 171400 T23A: RESET
1192 006642 012777 006706 171370 MOV #2,BC2 ;SET BYTE COUNT 2 FOR ONE WORD TRANSFER
1193 006650 012767 125252 000030 MOV #T23DAT,ADRS2 ;INITIALIZE ADDRESS POINTER
1194 006656 012777 045341 171360 MOV #125252,T23DAT ;INITIALIZE DATA TO BE TRANSFERRED
1195 006664 005777 171352 MOV #45341,CR2A ;DATIP-DATO-XFER UNTIL BC=0-PRIORITY7-NPR-6
1196 006670 001375 TST BC2 ;WAIT FOR BC=0
1197 006672 026727 000010 052524 BNE -4
1198 006700 001403 CMP T23DAT,#52524 ;DID DATA REG SHIFT
1199 006702 000000 BEQ T24
1200 006704 000752 HALT ;ERROR, DATA REG2 FAILED TO SHIFT ON A DATIP
1201 006706 000000 BR T23A
T23DAT: 0
    
```



```

1202
1203
1204 006710 012767 000200 171060 :TEST MULTI DATA TRANSFERS
1205 006716 012700 012034 T24: MOV #200,CC ;SET PROCESSOR PRIORITY 4
1206 006722 010001 MOV #BUFF1,%0 ;INITIALIZE TO CLEAR BUFFER
1207 006724 010077 171276 MOV %0,%1 ;INITIALIZE DATA BUFFER POINTER
1208 006730 005020 CLR (0)+ ;CLEAR DATA BUFFER
1209 006732 020027 014034 CMP %0,#BUFF2
1210 006736 001374 BNE -6
1211 006740 012777 002000 171262 MOV #2000,ABC1 ;INITIALIZE BYTE COUNT
1212 006746 012702 002000 MOV #2000,%2 ;INITIALIZE EXPECTED DATA
1213 006752 012777 006770 171224 MOV #T24B,DEV1A ;INITIALIZE INTERRUPT RETURN
1214 006760 012777 052743 171244 MOV #52743,ACR1A ;DATO-XFER FROM BC-MULTI XFER-PRI 7-NPR-BR AFTER LAST-GO
1215 006766 000001 WAIT
1216 006770 021102 T24B: CMP @%1,%2 ;RETURN HERE AFTER INTERRUPT
1217 006772 001402 BEQ T24C
1218 006774 000000 HALT ;ERROR, DATA NOT TRANSFERRED PROPERLY
1219 006776 000744 BR T24
1220 007000 022142 T24C: CMP (1)+,-(2) ;JUST INCREMENTING DATA POINTER AND DATA
1221 007002 020127 014032 CMP %1,#BUFF2-2 ;DONE ALL OF BUFFER AREA
1222 007006 001370 BNE T24B ;NO
1223 007010 000005 T24C: RESET
1224 007012 012767 000200 170756 MOV #200,CC
1225
1226 007020 012700 012034 MOV #BUFF1,%0 ;INITIALIZE TO CLEAR BUFFER
1227 007024 010001 MOV %0,%1 ;INITIALIZE DATA BUFFER POINTER
1228 007026 010077 171174 MOV %0,ADRS1
1229 007032 005020 CLR (0)+ ;CLEAR DATA BUFFER
1230 007034 020027 014034 CMP %0,#BUFF2
1231 007040 001374 BNE -6
1232 007042 012777 002000 171160 MOV #2000,ABC1 ;INITIALIZE BYTE COUNT
1233 007050 012702 002000 MOV #2000,%2 ;INITIALIZE EXPECTED DATA
1234 007054 012777 007072 171126 MOV #T24F,DEV1B ;INITIALIZE INTERRUPT RETURN
1235 007062 012777 052743 171144 MOV #52743,ACR1B ;DATO-XFER FROM BC-MULTI XFER-PRI 7-NPR-BR AFTER LAST-GO
1236 007070 000001 WAIT
1237 007072 021102 T24F: CMP @%1,%2 ;RETURN HERE AFTER INTERRUPT
1238 007074 001402 BEQ T24G
1239 007076 000000 HALT ;ERROR, DATA NOT TRANSFERRED PROPERLY
1240 007100 000743 BR T24D
1241 007102 022142 T24G: CMP (1)+,-(2) ;JUST INCREMENTING DATA POINTER AND DATA
1242 007104 020127 014032 CMP %1,#BUFF2-2 ;DONE ALL OF BUFFER AREA
1243 007110 001370 BNE T24F ;NO

```

1244									
1245	007112	000005				T24H:	RESET		
1246	007114	012767	000200	170654			MOV	#200,CC	
1247	007122	012700	012034				MOV	#BUFF1,%0	; INITIALIZE TO CLEAR BUFFER
1248	007126	010001					MOV	%0,%1	; INITIALIZE DATA BUFFER POINTER
1249	007130	010077	171104				MOV	%0,@ADRS2	
1250	007134	005020					CLR	(0)+	; CLEAR DATA BUFFER
1251	007136	020027	014034				CMP	%0,#BUFF2	
1252	007142	001374					BNE	.-6	
1253	007144	012777	002000	171070			MOV	#2000,@BC2	; INITIALIZE BYTE COUNT
1254	007152	012702	002000				MOV	#2000,%2	; INITIALIZE EXPECTED DATA
1255	007156	012777	007174	171030			MOV	#T24K,@DEV2A	; INITIALIZE INTERRUPT RETURN
1256	007164	012777	052743	171052			MOV	#52743,@CR2A	; DATO-XFER FROM BC-MULTI XFER-PRI 7-NPR-BR AFTER LAST-GO
1257	007172	000001					WAIT		
1258	007174	021102				T24K:	CMP	@%1,%2	; RETURN HERE AFTER INTERRUPT
1259	007176	001402					BEQ	T24L	
1260	007200	000000					HALT		; ERROR, DATA NOT TRANSFERRED PROPERLY
1261	007202	000743					BR	T24H	
1262	007204	022142				T24L:	CMP	(1)+ -(2)	; JUST INCREMENTING DATA POINTER AND DATA
1263	007206	020127	014032				CMP	%1,#BUFF2-2	; DONE ALL OF BUFFER AREA
1264	007212	001370					BNE	T24K	; NO
1265	007214	000005				T24M:	RESET		
1266	007216	012767	000200	170552			MOV	#200,CC	
1267	007224	012700	012034				MOV	#BUFF1,%0	; INITIALIZE TO CLEAR BUFFER
1268	007230	010001					MOV	%0,%1	; INITIALIZE DATA BUFFER POINTER
1269	007232	010077	171002				MOV	%0,@ADRS2	
1270	007236	005020					CLR	(0)+	; CLEAR DATA BUFFER
1271	007240	020027	014034				CMP	%0,#BUFF2	
1272	007244	001374					BNE	.-6	
1273	007246	012777	002000	170766			MOV	#2000,@BC2	; INITIALIZE BYTE COUNT
1274	007254	012702	002000				MOV	#2000,%2	; INITIALIZE EXPECTED DATA
1275	007260	012777	007276	170732			MOV	#T24P,@DEV2B	; INITIALIZE INTERRUPT RETURN
1276	007266	012777	052743	170752			MOV	#52743,@CR2B	; DATO-XFER FROM BC-MULTI XFER-PRI 7-NPR-BR AFTER LAST-GO
1277	007274	000001					WAIT		
1278	007276	021102				T24P:	CMP	@%1,%2	; RETURN HERE AFTER INTERRUPT
1279	007300	001402					BEQ	T24R	
1280	007302	000000					HALT		; ERROR, DATA NOT TRANSFERRED PROPERLY
1281	007304	000743					BR	T24M	
1282	007306	022142				T24R:	CMP	(1)+ -(2)	; JUST INCREMENTING DATA POINTER AND DATA
1283	007310	020127	014032				CMP	%1,#BUFF2-2	; DONE ALL OF BUFFER AREA
1284	007314	001370					BNE	T24P	; NO
1285	007316	000005					RESET		

```

1286
1287
1288 007320 012767 000340 170450 ;BLOCK TRANSFER UNTIL BYTE COUNT=0
1289 007326 012700 012034 T25: MOV #340,CC ;SET PROCESSOR PRIORITY 7
1290 007332 010001 MOV #BUFF1,%0 ;INITIALIZE TO CLEAR BUFFER
1291 007334 010077 170666 MOV %0,%1 ;INITIALIZE DATA BUFFER POINTER
1292 007340 005020 CLR (0)+ ;CLEAR DATA BUFFER
1293 007342 020027 014034 CMP %0,#BUFF2
1294 007346 001374 BNE .-6
1295 007350 012777 002000 170652 MOV #2000,@BC1 ;INITIALIZE BYTE COUNT
1296 007356 012702 002000 MOV #2000,%2 ;INITIALIZE EXPECTED DATA
1297 007362 012777 053341 170642 MOV #53341,@CR1A ;DATO-BLK XFER FROM BC-PRIORITY 7-NPR-GO
1298 007370 005777 170634 TST @BC1
1299 007374 001375 BNE .-4 ;WAIT FOR BC=0
1300 007376 021102 T25B: CMP @%1,%2
1301 007400 001402 BEQ T25C
1302 007402 000000 HALT ;ERROR, DATA NOT TRANSFERRED PROPERLY
1303 007404 000745 BR T25
1304 007406 022142 T25C: CMP (1)+,-(2) ;JUST INCREMENTING DATA POINTER AND DATA
1305 007410 020127 014032 CMP %1,#BUFF2-2 ;DONE ALL BUFFER AREA
1306 007414 001370 BNE T25B ;NO
1307 007416 000005 T25D: RESET
1308 007420 012700 012034 MOV #BUFF1,%0 ;INITIALIZE TO CLEAR BUFFER
1309 007424 010001 MOV %0,%1 ;INITIALIZE DATA BUFFER POINTER
1310 007426 010077 170574 MOV %0,@ADRS1
1311 007432 005020 CLR (0)+ ;CLEAR DATA BUFFER
1312 007434 020027 014034 CMP %0,#BUFF2
1313 007440 001374 BNE .-6
1314 007442 012777 002000 170560 MOV #2000,@BC1 ;INITIALIZE BYTE COUNT
1315 007450 012702 002000 MOV #2000,%2 ;INITIALIZE EXPECTED DATA
1316 007454 012777 053341 170552 MOV #53341,@CR1B ;DATO-BLK XFER FROM BC-PRIORITY 7-NPR-GO
1317 007462 005777 170542 TST @BC1
1318 007466 001375 BNE .-4 ;WAIT FOR BC=0
1319 007470 021102 T25F: CMP @%1,%2
1320 007472 001402 BEQ T25G
1321 007474 000000 HALT ;ERROR, DATA NOT TRANSFERRED PROPERLY
1322 007476 000747 BR T25D
1323 007500 022142 T25G: CMP (1)+,-(2) ;JUST INCREMENTING DATA POINTER AND DATA
1324 007502 020127 014032 CMP %1,#BUFF2-2 ;DONE ALL BUFFER AREA
1325 007506 001370 BNE T25F ;NO

```

1326	007510	000005			T25H:	RESET		
1327	007512	012700	012034			MOV	#BUFF1,%0	; INITIALIZE TO CLEAR BUFFER
1328	007516	010001				MOV	%0,%1	; INITIALIZE DATA BUFFER POINTER
1329	007520	010077	170514			MOV	%0,%ADRS2	
1330								
1331	007524	005020				CLR	(0)+	; CLEAR DATA BUFFER
1332	007526	020027	014034			CMP	%0,#BUFF2	
1333	007532	001374				BNE	.-6	
1334	007534	012777	002000	170500		MOV	#2000,%BC2	; INITIALIZE BYTE COUNT
1335	007542	012702	002000			MOV	#2000,%2	; INITIALIZE EXPECTED DATA
1336	007546	012777	053341	170470		MOV	#53341,%CR2A	; DATO-BLK XFER FROM BC-PRIORITY 7-NPR-GO
1337	007554	005777	170462			TST	%BC2	
1338	007560	001375				BNE	.-4	; WAIT FOR BC=0
1339	007562	021102			T25K:	CMP	%1,%2	
1340	007564	001402				BEQ	T25L	
1341	007566	000000				HALT		; ERROR, DATA NOT TRANSFERRED PROPERLY
1342	007570	000747				BR	T25H	
1343	007572	022142			T25L:	CMP	(1)+,-(2)	; JUST INCREMENTING DATA POINTER AND DATA
1344	007574	020127	014032			CMP	%1,#BUFF2-2	; DONE ALL BUFFER AREA
1345	007600	001370				BNE	T25K	; NO
1346	007602	000005			T25M:	RESET		
1347	007604	012700	012034			MOV	#BUFF1,%0	; INITIALIZE TO CLEAR BUFFER
1348	007610	010001				MOV	%0,%1	; INITIALIZE DATA BUFFER POINTER
1349	007612	010077	170422			MOV	%0,%ADRS2	
1350	007616	005020				CLR	(0)+	; CLEAR DATA BUFFER
1351	007620	020027	014034			CMP	%0,#BUFF2	
1352	007624	001374				BNE	.-6	
1353	007626	012777	002000	170406		MOV	#2000,%BC2	; INITIALIZE BYTE COUNT
1354	007634	012702	002000			MOV	#2000,%2	; INITIALIZE EXPECTED DATA
1355	007640	012777	053341	170400		MOV	#53341,%CR2B	; DATO-BLK XFER FROM BC-PRIORITY 7-NPR-GO
1356	007646	005777	170370			TST	%BC2	
1357	007652	001375				BNE	.-4	; WAIT FOR BC=0
1358	007654	021102			T25P:	CMP	%1,%2	
1359	007656	001402				BEQ	T25Q	
1360	007660	000000				HALT		; ERROR, DATA NOT TRANSFERRED PROPERLY
1361	007662	000747				BR	T25M	
1362	007664	022142			T25Q:	CMP	(1)+,-(2)	; JUST INCREMENTING DATA POINTER AND DATA
1363	007666	020127	014032			CMP	%1,#BUFF2-2	; DONE ALL BUFFER AREA
1364	007672	001370				BNE	T25P	; NO
1365	007674	000005				RESET		

```

1366
1367
1368 007676 000005
1369 007700 012767 000200 170070
1370 007706 012706 000776
1371 007712 012700 012034
1372 007716 010001
1373 007720 010077 170302
1374 007724 005020
1375 007726 020027 014034
1376 007732 001374
1377 007734 012777 002000 170266
1378 007742 012702 002000
1379 007746 012777 007764 170230
1380 007754 012777 053541 170250
1381 007762 000001
1382 007764 021102 T26A:
1383 007766 001402
1384 007770 000000
1385 007772 000741
1386 007774 022142 T26B:
1387 007776 020127 014032
1388 010002 001370
1389 010004 000005 T26C:
1390 010006 012767 000200 167762
1391 010014 012706 000776
1392 010020 012700 012034
1393 010024 010001
1394 010026 010077 170174
1395 010032 005020
1396 010034 020027 014034
1397 010040 001374
1398 010042 012777 002000 170160
1399 010050 012702 002000
1400 010054 012777 010072 170126
1401 010062 012777 053541 170144
1402 010070 000001
1403 010072 021102 T26D:
1404 010074 001402
1405 010076 000000
1406 010100 000741
1407 010102 022142 T26E:
1408 010104 020127 014032
1409 010110 001370

```

;BLOCK TRANSFER UNTIL BC=0, THEN INTERRUPT

```

T26: RESET
MOV #200,CC ;SET PROCESSOR PRIORITY 4
MOV #STACK,%6 ;INITIALIZE STACK
MOV #BUFF1,%0 ;INITIALIZE TO CLEAR BUFFER
MOV %0,%1 ;INITIALIZE DATA
MOV %0,%ADRS1
CLR (0)+
CMP %0,#BUFF2
BNE .-6
MOV #2000,%BC1 ;INITIALIZE BVTE COUNT
MOV #2000,%2 ;INITIALIZE EXPECTED DATA
MOV #T26A,%DEVIA ;INITIALIZE INTERRUPT RETURN
MOV #53541,%CR1A ;DATA-XFER TIL BC=0 INTERRUPT-PRI 7-NPR-GO

T26A: CMP %1,%2 ;COMPARE DATA
BEQ T26B
HALT ;ERROR, DATA NOT TRANSFERRED PROPERLY
BR T26
T26B: CMP (1)+,-(2) ;JUST INCREMENTING
CMP %1,#BUFF2-2 ;TEST FOR DONE ALL BUFFER AREA
BNE T26A ;NO

T26C: RESET
MOV #200,CC ;SET PROCESSOR PRIORITY 4
MOV #STACK,%6 ;INITIALIZE STACK
MOV #BUFF1,%0 ;INITIALIZE TO CLEAR BUFFER
MOV %0,%1 ;INITIALIZE DATA
MOV %0,%ADRS1
CLR (0)+
CMP %0,#BUFF2
BNE .-6
MOV #2000,%BC1 ;INITIALIZE BVTE COUNT
MOV #2000,%2 ;INITIALIZE EXPECTED DATA
MOV #T26D,%DEVIB ;INITIALIZE INTERRUPT RETURN
MOV #53541,%CR1B ;DATA-XFER TIL BC=0 INTERRUPT-PRI 7-NPR-GO

T26D: CMP %1,%2 ;COMPARE DATA
BEQ T26E
HALT ;ERROR, DATA NOT TRANSFERRED PROPERLY
BR T26C
T26E: CMP (1)+,-(2) ;JUST INCREMENTING
CMP %1,#BUFF2-2 ;TEST FOR DONE ALL BUFFER AREA
BNE T26D ;NO

```

1410										
1411	010112	000005				T26F:	RESET			
1412	010114	012767	000200	167654			MOV	#200,CC	;SET PROCESSOR PRIORITY 4	
1413	010122	012706	000776				MOV	#STACK,%6	;INITIALIZE STACK	
1414	010126	012700	012034				MOV	#BUFF1,%0	;INITIALIZE TO CLEAR BUFFER	
1415	010132	010001					MOV	%0,%1	;INITIALIZE DATA	
1416	010134	010077	170100				MOV	%0,%ADRS2		
1417	010140	005020					CLR	(0)+		
1418	010142	020027	014034				CMP	%0,#BUFF2		
1419	010146	001374					BNE	.-6		
1420	010150	012777	002000	170064			MOV	#2000,%BC2	;INITIALIZE BYTE COUNT	
1421	010156	012702	002000				MOV	#2000,%2	;INITIALIZE EXPECTED DATA	
1422	010162	012777	010200	170024			MOV	#T26G,%DEV2A	;INITIALIZE INTERRUPT RETURN	
1423	010170	012777	053541	170046			MOV	#53541,%CR2A	;DATO-XFER TIL BC=0 INTERRUPT-PRI 7-NPR-GO	
1424	010176	000001					WAIT			
1425	010200	021102				T26G:	CMP	%1,%2	;COMPARE DATA	
1426	010202	001402					BEQ	T26H		
1427	010204	000000					HALT		;ERROR, DATA NOT TRANSFERRED PROPERLY	
1428	010206	000741					BR	T26F		
1429	010210	022142				T26H:	CMP	(1)+,-(2)	;JUST INCREMENTING	
1430	010212	020127	014032				CMP	%1,#BUFF2-2	;TEST FOR DONE ALL BUFFER AREA	
1431	010216	001370					BNE	T26G	;NO	
1432	010220	000005				T26J:	RESET			
1433	010222	012767	000200	167546			MOV	#200,CC	;SET PROCESSOR PRIORITY 4	
1434	010230	012706	000776				MOV	#STACK,%6	;INITIALIZE STACK	
1435	010234	012700	012034				MOV	#BUFF1,%0	;INITIALIZE TO CLEAR BUFFER	
1436	010240	010001					MOV	%0,%1	;INITIALIZE DATA	
1437	010242	010077	167772				MOV	%0,%ADRS2		
1438	010246	005020					CLR	(0)+		
1439	010250	020027	014034				CMP	%0,#BUFF2		
1440	010254	001374					BNE	.-6		
1441	010256	012777	002000	167756			MOV	#2000,%BC2	;INITIALIZE BYTE COUNT	
1442	010264	012702	002000				MOV	#2000,%2	;INITIALIZE EXPECTED DATA	
1443	010270	012777	010306	167722			MOV	#T26K,%DEV2B	;INITIALIZE INTERRUPT RETURN	
1444	010276	012777	053541	167742			MOV	#53541,%CR2B	;DATO-XFER TIL BC=0 INTERRUPT-PRI 7-NPR-GO	
1445	010304	000001					WAIT			
1446	010306	021102				T26K:	CMP	%1,%2	;COMPARE DATA	
1447	010310	001402					BEQ	T26L		
1448	010312	000000					HALT		;ERROR, DATA NOT TRANSFERRED PROPERLY	
1449	010314	000741					BR	T26J		
1450	010316	022142				T26L:	CMP	(1)+,-(2)	;JUST INCREMENTING	
1451	010320	020127	014032				CMP	%1,#BUFF2-2	;TEST FOR DONE ALL BUFFER AREA	
1452	010324	001370					BNE	T26K	;NO	

```

1453
1454
1455 010326 000005
1456 010330 012767 000300 167440
1457 010336 012700 012034
1458 010342 010001
1459 010344 010077 167656
1460 010350 005020
1461 010352 020027 014034
1462 010356 001374
1463 010360 012777 001776 167642
1464 010366 012702 001776
1465 010372 012777 010424 167604
1466 010400 012777 010430 167602
1467 010406 012777 052605 167616
1468 010414 012777 052745 167612
1469 010422 000001
1470 010424 000000
1471 010426 000737
1472 010430 021102
1473 010432 001402
1474 010434 000000
1475 010436 000733
1476 010440 022142
1477 010442 020127 014032
1478 010446 001370
1479 010450 000005
1480 010452 012767 000300 167316
1481 010460 012700 012034
1482 010464 010001
1483 010466 010077 167546
1484 010472 005020
1485 010474 020027 014034
1486 010500 001374
1487 010502 012777 001776 167532
1488 010510 012702 001776
1489 010514 012777 010546 167472
1490 010522 012777 010552 167470
1491 010530 012777 052605 167506
1492 010536 012777 052745 167502
1493 010544 000001
1494 010546 000000
1495 010550 000737
1496 010552 021102
1497 010554 001402
1498 010556 000000
1499 010560 000662
1500 010562 022142
1501 010564 020127 014032
1502 010570 001370

;DO MULTI DATA TRANSFERS, ALTERNATING BETWEEN SECTIONS
T30: RESET
MOV #300,CC ;SET PRIORITY 6
MOV #BUFF1,%0 ;INITIALIZE TO CLEAR BUFFER
MOV %0,%1 ;INITIALIZE DATA BUFFER POINTER
MOV %0,@ADRS1
CLR (0)+ ;CLEAR DATA BUFFER
CMP %0,#BUFF2
BNE -6
MOV #1776,@BC1 ;INITIALIZE BYTE COUNT
MOV #1776,%2 ;INITIALIZE EXPECTED DATA
MOV #T30A,@DEV1A ;INITIALIZE DEVICE 1A INTERRUPT RETURN
MOV #T30B,@DEV1B ;INITIALIZE DEVICE 1B INTERRUPT RETURN
MOV #52605,@CR1A ;DATO-MULTI XFER FROM BC-PRIORITY 4-NPR-BR AFTER OTHER-G
MOV #52745,@CR1B ;DATO-MULTI XFER FROM BC-PRIORITY 7-NPR-BR AFTER OTHER-G
WAIT
T30A: HALT ;ERROR, DEVICE 1A SHOULDN'T HAVE INTERRUPTED
BR T30
T30B: CMP @%1,%2 ;WAS DATA TRANSFERED
BEQ T30C
HALT
BR T30 ;ERROR, DATA NOT TRANSFERRED PROPERLY
T30C: CMP (1)+,-(2) ;INCREMENT DATA POINTER-DECREMENT EXPECTED DATA
CMP %1,#BUFF2-2 ;DONE ALL OF BUFFER AREA?
BNE T30B ;NO
T30D: RESET
MOV #300,CC ;SET PRIORITY 6
MOV #BUFF1,%0 ;INITIALIZE TO CLEAR BUFFER
MOV %0,%1 ;INITIALIZE DATA BUFFER POINTER
MOV %0,@ADRS2
CLR (0)+ ;CLEAR DATA BUFFER
CMP %0,#BUFF2
BNE -6
MOV #1776,@BC2 ;INITIALIZE BYTE COUNT
MOV #1776,%2 ;INITIALIZE EXPECTED DATA
MOV #T30E,@DEV2A ;INITIALIZE DEVICE 2A INTERRUPT RETURN
MOV #T30F,@DEV2B ;INITIALIZE DEVICE 2B INTERRUPT RETURN
MOV #52605,@CR2A ;DATO-MULTI XFER FROM BC-PRIORITY 4-NPR-BR AFTER OTHER-G
MOV #52745,@CR2B ;DATO-MULTI XFER FROM BC-PRIORITY 7-NPR-BR AFTER OTHER-G
WAIT
T30E: HALT ;ERROR, DEVICE 2A SHOULDN'T HAVE INTERRUPTED
BR T30D
T30F: CMP @%1,%2 ;WAS DATA TRANSFERED
BEQ T30G
HALT
BR T30 ;ERROR, DATA NOT TRANSFERRED PROPERLY
T30G: CMP (1)+,-(2) ;INCREMENT DATA POINTER-DECREMENT EXPECTED DATA
CMP %1,#BUFF2-2 ;DONE ALL OF BUFFER AREA?
BNE T30F ;NO

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```

1503
1504      ;DO MULTI DATA TRANSFERS, ALTERNATING BETWEEN DEVICES
1505 010572 000005      T31: RESET
1506 010574 012767 000200 167174      MOV      #200,CC      ;SET PRIORITY 4
1507 010602 012700 012034      MOV      #BUFF1,%0      ;INITIALIZE TO CLEAR BUFFERS
1508 010606 010001      MOV      %0,%1      ;INITIALIZE DATA BUFFER POINTER
1509 010610 010077 167412      MOV      %0,@ADRS1
1510 010614 012777 014034 167416      MOV      #BUFF2,@ADRS2
1511 010622 005020      CLR      (0)+      ;CLEAR BUFFER
1512 010624 020027 016034      CMP      %0,#BUFF2+2000
1513 010630 001374      BNE      .-6
1514 010632 012777 002000 167370      MOV      #2000,@BC1      ;INITIALIZE BYTE COUNT 1
1515 010640 012777 002000 167374      MOV      #2000,@BC2      ;INITIALIZE BYTE COUNT 2
1516 010646 012702 002000      MOV      #2000,%2
1517 010652 012777 010704 167324      MOV      #T31A,@DEV1A      ;INITIALIZE FIRST INTERRUPT RETURN
1518 010660 012777 010706 167326      MOV      #T31B,@DEV2A      ;INITIALIZE SECOND INTERRUPT RETURN
1519 010666 012777 052743 167336      MOV      #52743,@CR1A      ;DATO-MULTI XFER FROM BC-PRI 7-NPR-BR AFTER LAST-GO
1520 010674 012777 052743 167342      MOV      #52743,@CR2A      ;DATO-MULTI XFER FROM BC-PRI 7-NPR-BR AFTER LAST-GO
1521 010702 000001      WAIT
1522 010704 000001      T31A: WAIT
1523 010706 021102      T31B: CMP      @%1,%2      ;WAIT FOR FIRST DEVICE TO INTERRUPT
1524 010710 001402      BEQ      T31C      ;WAIT FOR SECOND DEVICE TO INTERRUPT
1525 010712 000000      HALT      ;WAS DATA TRANSFERRED
1526 010714 000726      BR      T31      ;ERROR, DEVICE 1 DATA NOT TRANSFERRED PROPERLY
1527 010716 022142      T31C: CMP      (1)+,-(2)      ;INCREMENT DATA POINTER-DECREMENT EXPECTED DATA
1528 010720 020127 014032      CMP      %1,#BUFF2-2      ;DONE ALL OF FIRST BUFFER AREA?
1529 010724 001370      BNE      T31B      ;NO
1530 010726 012702 002000      MOV      #2000,%2
1531 010732 005721      TST      (1)+      ;JUST INCREMENT BUFFER POINTER
1532 010734 021102      T31D: CMP      @%1,%2      ;WAS DATA TRANSFERRED
1533 010736 001402      BEQ      T31E
1534 010740 000000      HALT      ;ERROR, DEVICE 2 DATA NOT TRANSFERRED PROPERLY
1535 010742 000713      BR      T31
1536 010744 022142      T31E: CMP      (1)+,-(2)      ;INCREMENT DATA POINTER-DECREMENT EXPECTED DATA
1537 010746 020127 016032      CMP      %1,#BUFF2+1776      ;DONE ALL OF SECOND BUFFER AREA
1538 010752 001370      BNE      T31D      ;NO

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1539					T31F:	RESET		
1540	010754	000005				MOV	#200,CC	;SET PRIORITY 4
1541	010756	012767	00C200	167012		MOV	#BUFF1,%0	;INITIALIZE TO CLEAR BUFFERS
1542	010764	012700	012034			MOV	%0,%1	;INITIALIZE DATA BUFFER POINTER
1543	010770	010001				MOV	%0,@ADR51	
1544	010772	010077	167230			MOV	#BUFF2,@ADR52	
1545	010776	012777	014034	167234		CLR	(0)+	;CLEAR BUFFER
1546	011004	005020				CMP	%0,#BUFF2+2000	
1547	011006	020027	016034			SNE	.-6	
1548	011012	001374				MOV	#2000,@BC1	;INITIALIZE BYTE COUNT 1
1549	011014	012777	002000	167206		MOV	#2000,@BC2	;INITIALIZE BYTE COUNT 2
1550	011022	012777	002000	167212		MOV	#2000,%2	
1551	011030	012702	002000			MOV	#T31G,@DEV1B	;INITIALIZE FIRST INTERRUPT RETURN
1552	011034	012777	011066	167146		MOV	#T31H,@DEV2B	;INITIALIZE SECOND INTERRUPT RETURN
1553	011042	012777	011070	167150		MOV	#52743,@CR1B	;DATA-MULTI XFER FROM BC-PRI 7-NPR-BR AFTER LAST-GO
1554	011050	012777	052743	167156		MOV	#52743,@CR2B	;DATA-MULTI XFER FROM BC-PRI 7-NPR-BR AFTER LAST-GO
1555	011056	012777	052743	167162		WAIT		;WAIT FOR FIRST DEVICE TO INTERRUPT
1556	011064	000001				WAIT		;WAIT FOR SECOND DEVICE TO INTERRUPT
1557	011066	000001			T31G:	WAIT		;WAS DATA TRANSFERRED
1558	011070	021102			T31H:	CMP	@%1,%2	
1559	011072	001402				BEQ	T31J	
1560	011074	000000				HALT		;ERROR, DEVICE 1 DATA NOT TRANSFERRED PROPERLY
1561	011076	000726				BR	T31F	
1562	011100	022142			T31J:	CMP	(1)+,-(2)	;INCREMENT DATA POINTER-DECREMENT EXPECTED DATA
1563	011102	020127	014032			CMP	%1,#BUFF2-2	;DONE ALL OF FIRST BUFFER AREA?
1564	011106	001370				BNE	T31H	;NO
1565	011110	012702	002000			MOV	#2000,%2	
1566	011114	005721				TST	(1)+	;JUST INCREMENT BUFFER POINTER
1567	011116	021102			T31K:	CMP	@%1,%2	;WAS DATA TRANSFERRED
1568	011120	001402				BEQ	T31L	
1569	011122	000000				HALT		;ERROR, DEVICE 2 DATA NOT TRANSFERRED PROPERLY
1570	011124	000713				BR	T31F	
1571	011126	022142			T31L:	CMP	(1)+,-(2)	;INCREMENT DATA POINTER-DECREMENT EXPECTED DATA
1572	011130	020127	016032			CMP	%1,#BUFF2+1776	;DONE ALL OF SECOND BUFFER AREA
1573	011134	001370				BNE	T31K	;NO

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1574
1575
1576
1577
1578
1579 011136 000005
1580 011140 012767 000340 166630
1581 011146 012767 011442 167334
1582 011154 012767 000240 167330
1583 011162 012767 011546 167324
1584 011170 012767 000340 167320
1585 011176 012767 011564 167314
1586 011204 012767 000300 167310
1587 011212 012767 011674 167304
1588 011220 012767 000200 167300
1589 011226 012777 000002 166774
1590 011234 012777 011542 166764
1591 011242 005067 000274
1592 011246 005067 000266
1593 011252 005067 000266
1594 011256 012777 045451 166746
1595 011264 005067 000270
1596 011270 005067 000266
1597 011274 012777 000173 166732
1598 011302 012777 000200 166732
1599 011310 012777 014034 166722
1600 011316 012767 014034 000502
1601 011324 012767 177600 000476
1602 011332 016777 000472 000466 ST9A:
1603 011340 062767 000002 000460
1604 011346 062767 000002 000454
1605 011354 001366
1606 011356 005077 000444
1607 011362 005067 000444
1608 011366 012777 000511 166650
1609 011374 012777 012613 166644
1610 011402 042767 000340 166366
1611 011410 005000
1612 011412 005200
1613 011414 001376
1614 011416 013700 000042
1615 011422 001405
1616 011424 000005
1617 011426 004710 SENDAD:
1618 011430 000240
1619 011432 000240
1620 011434 000240
1621 011436 000167 167336
1622
1623 011442 005777 166564
1624 011446 100001
1625 011450 000000
1626 011452 026767 000064 000064
1627 011460 001401
1628 011462 000000
1629 011464 005267 000050

;FACTORY TEST PROGRAM
;JOHN HITTELL
RESET
MOV #340,CC ;SET PRIORITY 7
MOV #BDEV1A,510
MOV #240,512
MOV #BDEV1B,514
MOV #340,516
MOV #BDEV2A,520
MOV #300,522
MOV #BDEV2B,524
MOV #200,526
MOV #2,28C1 ;BUS TESTER 1
MOV #REC1A,2ADRS1 ;DEVICE 1 TAPES WORD IN REC1A
CLR REC1A ;AND MULTIPLIES IT BY TWO
CLR SEND1A
EXP1A
MOV #45451,2CR1A ;DEVICE 1-NPR-DATIP-DATO-PRIORITY 5-DELAY 1 MSEC
CLR CNT1B1 ;DEVICE 2 INTERRUPTS, A COUNT IS KEPT
CLR CNT1B2 ;OF NUMBER OF TIMES
MOV #173,2CR1B ;DEVICE 2-PRIORITY7-DELAY 100 USEC
MOV #200,28C2 ;BUS TESTER 2
MOV #BUFF2,2ADRS2
MOV #BUFF2,DEV2B3 ;SET UP BUFFER
MOV #-200,DEV2B4 ;SO IT LOOKS LIKE
MOV DEV2B4,2DEV2B3 ;INTERRUPT SERVICE ROUTINE
ADD #2,DEV2B3 ;HAS ALREADY RUN
ADD #2,DEV2B4 ;THIS IS NECESSARY FOR
BNE ST9A ;DEVICE 3
CLR 2DEV2B3
CLR DEV2B5
MOV #511,2CR2A ;DEVICE 3-NPR-DATI-PRIORITY 6-DELAY 1 MSEC
MOV #12613,2CR2B ;DEVICE 4-NPR-DATO-PRIORITY 4-DELAY 50 USEC
BIC #340,CC
CLR %0
INC %0
BNE -2
MOV 2#42,%0
BEQ $DOAGN
RESET
SENDAD: JSR %7,(%0)
NOP
NOP
NOP
NOP
$DOAGN: JMP START
;DEVICE ONE NPR-DATIP-DATO-PRIORITY 5-DELAY 1 MSEC
BDEV1A: TST 2CR1A ;TEST FOR BUSY
BPL .+4
HALT ;BUSY NOT DOWN
CMP REC1A,EXP1A ;TRANSFER DONE CORRECTLY?
BEQ .+4
HALT ;DATIP-DATO ERROR
INC SEND1A ;NEW DATA

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1630	011470	016767	000044	000044	MOV	SENDIA,REC1A	
1631	011476	016767	000036	000040	MOV	SENDIA,EXPIA	;SET UP DATA
1632	011504	006367	000034		ASL	EXPIA	;EXPECTED BACK
1633	011510	012777	000002	166512	MOV	#2,ABC1	;SET UP BYTE COUNT
1634	011516	012777	011542	166502	MOV	#REC1A,@ADRS1	
1635	011524	005077	166502		CLR	@CR1A	
1636	011530	012777	045451	166474	MOV	#45451,@CR1A	
1637	011536	000002			RTI		
1638	011540	000000				SENDIA: 0	;SENT
1639	011542	000000				REC1A: 0	;RECEIVED
1640	011544	000000				EXPIA: 0	;EXPECTED

# E04

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1641
1642
1643 011546 005267 000006 ;DEVICE TWO-PRIORITY 7-DELAY 100 USEC
1644 011552 005567 000004 BDEV18: INC CNT181 ;DOUBLE WORD COUNTS OF
1645 011556 000002 ADC CNT182 ;NUMBER OF INTERRUPTS
1646 011560 000000 RTI
1647 011562 000000 CNT181: 0
1648 CNT182: 0
1649
1650 ;DEVICE THREE-NPR-DATI-PRIORITY 6-DELAY 1 MSEC
1651
1652 011564 005777 166454 BDEV2A: TST @CR2A ;TEST FOR BUSY DOWN
1653 011570 100001 BPL .+4
1654 011572 000000 HALT ;BUSY NOT DOWN
1655 011574 005077 166444 CLR @CR2A
1656 011600 005767 000226 TST DEV2B5
1657 011604 001401 BEQ .+4 ;RETURN IF DEV 4 BEING SERVICED
1658 011606 000002 RTI
1659 011610 017767 166422 000054 MOV @DATA2,DEV2A2 ;FIND OUT WHERE DATA
1660 011616 062767 014234 000046 ADD #BUFF2+200,DEV2A2 ;SHOULD HAVE COME FROM
1661 011624 027777 000042 166404 CMP @DEV2A2,@DATA2 ;AND CHECK IT
1662 011632 001401 BEQ .+4
1663 011634 000000 HALT ;DATI FAILURE
1664 011636 005477 000030 NEG @DEV2A2 ;SET UP FOR DEVICE 4
1665 011642 027727 166370 177776 CMP @DATA2,#-2
1666 011650 001405 BEQ DEV2A3 ;BRANCH IF 4 DONE
1667 011652 100003 BPL DEV2A4 ;BRANCH IF 4 IS WAITING TO BE SERVICED
1668 011654 012777 000511 166362 MOV #511,@CR2A ;RESTART 3
1669 011662 000002 DEV2A4: RTI ;TO MAINLINE
1670 011664 005077 166356 DEV2A3: CLR @CR2B ;TURN OFF 4
1671 011670 000405 BR DEV2B1 ;SERVICE 4
1672 011672 000000 DEV2A2: 0
1673 ;DEVICE 4-NPR-DATO-PRIORITY 4-DELAY=50 USEC
1674 011674 005777 166346 BDEV2B: TST @CR2B ;TEST FOR BUSY DOWN
1675 011700 100001 BPL .+4
1676 011702 000000 HALT ;BUSY NOT DOWN
1677 011704 005167 000122 DEV2B1: COM DEV2B5 ;FLAG FOR DEVICE 3
1678 011710 012767 014034 000110 MOV #BUFF2,DEV2B3 ;CHECK COMPLETE
1679 011716 012767 000200 000104 MOV #200,DEV2B4 ;COUNT PATTERN
1680 011724 027767 000076 000076 DEV2B2: CMP @DEV2B3,DEV2B4
1681 011732 001401 BEQ .+4
1682 011734 000000 HALT ;DATA ERROR
1683 011736 005477 000064 NEG @DEV2B3 ;CHANGE DATA
1684 011742 062767 000002 000056 ADD #2,DEV2B3
1685 011750 162767 000002 000052 SUB #2,DEV2B4
1686 011756 001362 BNE DEV2B2
1687 011760 005077 000042 CLR @DEV2B3
1688 011764 012777 000200 166250 MOV #200,@BC2 ;SET UP DEVICE AGAIN
1689 011772 012777 014034 166240 MOV #BUFF2,@ADRS2
1690 012000 012777 000511 166236 MOV #511,@CR2A ;RESTART DEVICE 3
1691 012006 005077 166234 CLR @CR2B
1692 012012 012777 012613 166226 MOV #12613,@CR2B
1693 012020 005067 000006 CLR DEV2B5
1694 012024 000002 RTI
1695 012026 000000 DEV2B3: 0
1696 012030 000000 DEV2B4: 0

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1697 012032 000000  
1698 012034 000000  
1699 000001

DEV285: 0  
LAST: 0  
.END





T17B	005344	985	988#							
T17C	005364	993#	1002							
T17D	005410	997#	998							
T17D1	005402	996#	1006							
T17E	005430	1000	1003#							
T18	005450	1010#	1019							
T18A	005470	1013#	1022							
T18B	005522	1017	1020#							
T18C	005534	1024#	1033							
T18D	005546	1026#	1036							
T18DAT	005614	1013	1016	1026	1030	1039#				
T18E	005600	1031	1034#							
T19	005616	1038	1042#	1051						
T19A	005636	1045#	1054							
T19B	005670	1049	1052#							
T19C	005704	1056#	1065							
T19D	005716	1058#	1068							
T19DAT	005766	1045	1048	1058	1062	1071#				
T19E	005750	1063	1066#							
T2	001234	350	354#	359						
T2A	001256	357	360#	365						
T2B	001300	363	366#	371						
T2C	001322	369	372#	377						
T2D	005770	1070	1074#	1084						
T2DA	006016	1078#	1088							
T2DB	006050	1082	1085#							
T2DC	006066	1090#	1100							
T2DD	006106	1093#	1104							
T2DDAT	006160	1078	1081	1093	1097	1107#				
T2DE	006140	1098	1101#							
T21	006162	1106	1110#	1120						
T21A	006210	1114#	1124							
T21B	006242	1118	1121#							
T21C	006264	1126#	1136							
T21D	006304	1129#	1140							
T21DAT	006362	1114	1117	1129	1133	1143#				
T21E	006336	1134	1137#							
T22	006364	1142	1146#	1156						
T22A	006406	1149#	1159							
T22B	006442	1154	1157#							
T22C	006460	1161#	1170							
T22D	006474	1163#	1173							
T22DAT	006550	1148#	1149	1153	1157#	1162#	1163	1167	1171#	1176#
T22E	006530	1168	1171#							
T23	006552	1175	1179#	1189						
T23A	006632	1187	1190#	1200						
T23DAT	006706	1181	1182#	1186	1192	1193#	1197	1201#		
T24	006710	1198	1204#	1219						
T24B	006770	1213	1216#	1222						
T24C	007000	1217	1220#							
T24D	007010	1223#	1240							
T24F	007072	1234	1237#	1243						
T24G	007102	1238	1241#							
T24H	007112	1245#	1261							
T24K	007174	1255	1258#	1264						
T24L	007204	1259	1262#							



T24M	007214	1265#	1281		
T24P	007276	1275	1278#	1284	
T24R	007306	1279	1282#		
T25	007320	1288#	1303		
T25B	007376	1300#	1306		
T25C	007406	1301	1304#		
T25D	007416	1307#	1322		
T25F	007470	1319#	1325		
T25G	007500	1320	1323#		
T25H	007510	1326#	1342		
T25K	007562	1339#	1345		
T25L	007572	1340	1343#		
T25M	007602	1346#	1361		
T25P	007654	1358#	1364		
T25Q	007664	1359	1362#		
T26	007676	1368#	1385		
T26A	007764	1379	1382#	1388	
T26B	007774	1383	1386#		
T26C	010004	1389#	1406		
T26D	010072	1400	1403#	1409	
T26E	010102	1404	1407#		
T26F	010112	1411#	1428		
T26G	010200	1422	1425#	1431	
T26H	010210	1426	1429#		
T26J	010220	1432#	1449		
T26K	010306	1443	1446#	1452	
T26L	010316	1447	1450#		
T3	001344	375	380#	390	
T3A	001412	381	382	383	388#
T3B	001420	384	391#	401	
T3C	001462	391	392	394	399#
T3D	001470	395	402#	411	
T3E	001532	402	403	404	409#
T3F	001540	405	412#	421	
T3G	001602	412	413	414	419#
T3H	010326	1455#	1471	1475	1499
T3A	010424	1465	1470#		
T3B	010430	1466	1472#	1478	
T3C	010440	1473	1476#		
T3D	010450	1479#	1495		
T3E	010546	1489	1494#		
T3F	010552	1490	1496#	1502	
T3G	010562	1497	1500#		
T3I	010572	1505#	1526	1535	
T3IA	010704	1517	1522#		
T3IB	010706	1518	1523#	1529	
T3IC	010716	1524	1527#		
T3ID	010734	1532#	1538		
T3IE	010744	1533	1536#		
T3IF	010754	1540#	1561	1570	
T3IG	011066	1552	1557#		
T3IH	011070	1553	1558#	1564	
T3IJ	011100	1559	1562#		
T3IK	011116	1567#	1573		
T3IL	011126	1568	1571#		
T4	001610	415	424#	432	



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DBAB.P11 CROSS REFERENCE TABLE -- MACRO NAMES

COMMEN	1#
ENDCOM	1#
ESCAPE	1#
GETPRI	1#
GETSWR	1#
MULT	1#
NEWTST	1#
POP	1#
PUSH	1#
REPORT	1#
SETPRI	1#
SETUP	1#
SKIP	1#
SLASH	1#
STARS	1#
SWRSU	1#
TYPBIN	1#
TYPDEC	1#
TYPNAM	1#
TYPNUM	1#
TYPOCS	1#
TYPOCT	1#
TYPTXT	1#
\$\$ESCA	1#
\$\$NEWT	1#
\$\$SKIP	1#
.EQUAT	1#
.HEADE	1#
.KT11	1#
.SETUP	1#
.SWRHI	1#
.SACT1	1#
.SAPT8	1#
.SAPTH	1#
.SAPTY	1#
.SASTA	1#
.SCATC	1#
.SCHTA	1#
.SDB2D	1#
.SDB20	1#
.SDIV	1#
.SEOP	1#
.SERRO	1#
.SERRT	1#
.SPILT	1#
.SPOKE	1#
.SRAND	1#
.SRODE	1#
.SRODC	1#
.SREAD	1#
.SR2AZ	1#
.\$\$SAVE	1#
.\$\$B2D	1#
.\$\$B20	1#
.\$\$COP	1#
.\$\$SIZE	1#

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DBAB.P11 CROSS REFERENCE TABLE -- MACRO NAMES

.SSUPR	1*
.STRAP	1*
.STYPB	1*
.STYPD	1*
.STYPE	1*
.STYPO	1*
.S4OCA	1*
.1170	1*

ADC	1015	1047	1080	1116	1644										
ADD	1603	1604	1660	1684											
ASL	1632														
BEQ	314	319	324	329	335	340	345	350	808	813	819	824	833	843	851
	856	862	867	876	886	894	899	906	911	920	930	947	949	962	964
	983	985	998	1000	1017	1031	1049	1063	1082	1098	1118	1134	1154	1168	1187
	1198	1217	1238	1259	1279	1301	1320	1340	1359	1383	1404	1426	1447	1473	1497
	1524	1533	1559	1568	1615	1627	1657	1662	1666	1681					
BIC	1610														
BMI	357	363	369	375											
BNE	837	847	880	890	924	934	955	970	991	1006	1022	1036	1054	1068	1088
	1104	1124	1140	1159	1173	1185	1196	1210	1222	1231	1243	1252	1264	1272	1284
	1294	1299	1306	1313	1318	1325	1333	1338	1345	1352	1357	1364	1376	1388	1397
	1409	1419	1431	1440	1452	1462	1478	1486	1502	1513	1529	1538	1548	1564	1573
	1605	1613	1686												
EPL	1624	1653	1667	1675											
BR	316	321	326	331	337	342	347	352	359	365	371	377	390	401	411
	421	429	432	437	440	445	449	454	457	549	551	553	555	573	578
	583	588	602	607	612	617	623	628	633	638	652	658	663	668	674
	679	684	689	695	701	706	724	729	734	739	745	750	756	761	767
	772	777	810	815	821	826	835	845	853	858	864	869	878	888	896
	901	908	913	922	932	951	966	987	1002	1019	1033	1038	1051	1065	1070
	1084	1100	1106	1120	1136	1142	1156	1170	1175	1189	1200	1219	1240	1261	1281
	1303	1322	1342	1361	1385	1406	1428	1449	1471	1475	1495	1499	1526	1535	1561
	1570	1671													
CLR	305	306	307	308	333	338	343	348	380	806	811	828	829	838	839
	849	854	871	872	881	882	892	897	915	916	925	926	942	952	957
	967	978	988	993	1003	1208	1229	1250	1270	1292	1311	1331	1350	1374	1395
	1417	1438	1460	1484	1511	1546	1591	1592	1593	1595	1596	1606	1607	1611	1635
	1655	1670	1687	1691	1693										
CMP	313	318	323	328	389	400	410	420	431	439	448	456	557	818	823
	832	842	861	866	875	885	905	910	919	929	948	963	984	999	1048
	1062	1117	1133	1153	1167	1186	1197	1209	1216	1220	1221	1230	1237	1241	1242
	1251	1258	1262	1263	1271	1278	1282	1283	1293	1300	1304	1305	1312	1319	1323
	1324	1332	1339	1343	1344	1351	1358	1362	1363	1375	1382	1386	1387	1396	1403
	1407	1408	1418	1425	1429	1430	1439	1446	1450	1451	1461	1472	1476	1477	1485
	1496	1500	1501	1512	1523	1527	1528	1532	1536	1537	1547	1558	1562	1563	1567
	1571	1572	1626	1661	1665	1680									
CMPB	1016	1030	1081	1097											
COM	1677														
DEC	953	968	1020	1034	1085	1086	1101	1102							
HALT	236	238	240	242	244	246	248	250	252	254	256	258	260	262	264
	266	315	320	325	330	336	341	346	351	358	364	370	376	388	399
	409	419	430	438	447	455	550	552	554	556	572	577	582	587	601
	606	611	616	622	627	632	637	651	657	662	667	673	678	683	688
	694	699	705	710	723	728	733	738	744	749	754	760	766	771	776
	781	787	792	797	802	809	814	820	825	834	844	852	857	863	868
	877	887	895	900	907	912	921	931	950	965	986	1001	1018	1022	1050
	1064	1083	1099	1119	1135	1155	1169	1188	1199	1218	1239	1260	1280	1302	1321
	1341	1360	1384	1405	1427	1448	1470	1474	1494	1498	1525	1534	1560	1569	1625
	1628	1654	1663	1676	1682										
INC	830	831	840	841	873	874	883	884	917	918	927	928	1612	1629	1643
JMP	274	558	711	782	788	793	798	803	1621						
JSR	1617														
MOV	303	304	312	317	322	327	354	360	366	372	381	382	383	384	386
	391	392	394	395	397	402	403	404	405	407	412	413	414	415	417



.MAIN. MACY11 27(732) 14-OCT-76 15:48 PAGE 58  
DBAB.P11 CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

ERRORS DETECTED: 0  
DEFAULT GLOBALS GENERATED: 0

\*.DBAB.SEO/SOL/CRF/NL:TOC/PAGNUM=SYSMAC.CO,DBAB.P11  
RUN-TIME: 23 29 3 SECONDS  
RUN-TIME RATIO: 144/56=2.5  
CORE USED: 32K (63 PAGES)

