

PRODUCT CODE: MA1NDEC-8E-D0QA-D-(D)
PRODUCT NAME: DR8-EA 12 CHANNEL
BUFFERED DIGITAL
INTERFACE
DATE CREATED: JUNE, 1971
MAINTAINER: DIAGNOSTIC GROUP
AUTHOR: MICHAEL DAVIS

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INST F. PLASMAE

66442

1 ; ABSTRACT

THIS PROGRAM IS A DIAGNOSTIC AND EXERCISER FOR THE DR8-EA 12 CHANNEL BUFFERED DIGITAL INTERFACE. ALL FUNCTIONS ARE TESTED AND ERRORS ARE REPORTED BY HALTS AND/OR ERROR TYPEOUTS.

2 ; REQUIREMENTS

2 ;1 EQUIPMENT

PDP8E STANDARD COMPUTER WITH 4K OF CORE
ASR-33 TELETYPE (OR EQUIVALENT)
DR8-EA WITH TEST CABLE

2 ;2 STORAGE

THE PROGRAM USES LOCATION 0000-3377

3 ; LOADING PROCEDURE

THE STANDARD PROCEDURE FOR LOADING BINARY TAPES SHOULD BE USED.

4 ; STARTING PROCEDURE

4 ;1 STARTING ADDRESS

200-INPUT DEVICE CONFIGURATION
201-START WITH STANDARD CONFIGURATION

4 ;2 SWITCH SETTINGS

FOR EITHER STARTING ADDRESS, NORMAL SETTING IS SR0-SR11= 0 (DOWN).

4 ;3 PROGRAM AND/OR OPERATOR ACTION

LOAD PROGRAM INTO MEMORY
SET SWITCH REGISTER TO DESIRED STARTING ADDRESS
LOAD ADDRESS
CLEAR SWITCHES
PRESS CLEAR AND CONTINUE

4.3.1

FOR STARTING ADDRESS 200

THE PROGRAM WILL TYPE "SET SR FOR DEVICE CODE AND CONT"
AND THEN HALT.

SET SWITCHES TO 00X WHERE X IS AN OCTAL
NUMBER CORRESPONDING TO THE 3 LSB OF THE DEVICE SELECTOR CODE.
PRESS CONTINUE.

PROGRAM WILL RESPOND BY TYPING

"SET SR FOR INTERRUPT JUMPERS AND CONT" AND THEN HALT.
SET SWITCHES FOR ALL INPUT REGISTER BITS JUMPED TO INTERRUPT.
PRESS CONTINUE.

PROGRAM WILL RESPOND BY TYPING

"SET SR FOR FLIPFLOP JUMPERS AND CONT" AND THEN HALT.
SET SWITCHES FOR ALL INPUT REGISTER FLIPFLOPS.
PRESS CONTINUE.

PROGRAM WILL RESPOND BY TYPING

"SET SR FOR RUN" AND THEN HALT.
SET SWITCHES AS IN 4.2 OR 5.1
PRESS CONTINUE.

PROGRAM WILL BEGIN TEST EXECUTION

4.3.2

FOR STARTING ADDRESS 201

SET SWITCHES AS IN 4.2 OR 5.1
PRESS CLEAR AND CONTINUE.

PROGRAM WILL BEGIN TEST EXECUTION

5. OPERATING PROCEDURE

5.1 OPERATIONAL SWITCH SETTINGS

SR0=1, SUPPRESS ERROR HALT
SR1=1, SUPPRESS ERROR TYPEOUT
SR2=1, LOOP ON CURRENT TEST
SR3=1, LOOP WITH CURRENT DATA
SR4=1, SUPPRESS BELL OR TYPEOUT AT END OF PASS
SR5=1, SUPPRESS ITERATIONS
SR6=1, ESCAPE TO NEXT TEST ON ERROR

5.2 PROGRAM AND/OR OPERATOR ACTION

5.2.1.1 WITH SWITCHES SET AS IN 4.2, THE PROGRAM WILL RUN ALL TESTS SEQUENTIALLY. EACH IOT TEST WILL BE REPEATED 4096 TIMES. EACH DATA TEST WILL BE REPEATED 50 TIMES. AFTER ALL TESTS HAVE BEEN COMPLETED, THE PROGRAM WILL TYPE "DR" AND START ALL TESTS AGAIN. IF AN ERROR OCCURS, THE PROGRAM WILL HALT AND TYPE AN APPROPRIATE ERROR MESSAGE (SEE SECTION 6 FOR DETAILS).

5.2.1.2 WITH SR0=1 (UP), PROGRAM ACTION WILL BE AS IN 5.2.1.1, EXCEPT NO TYPEOUT WILL OCCUR.

5.2.1.3 WITH SR2=1(UP) PROGRAM ACTION WILL BE AS IN 5.2.1.1, EXCEPT NO TYPEOUT WILL OCCUR. THE ADDRESS OF THE FAILING TEST WILL BE DISPLAYED IN THE COMPUTER AC.

5.2.1.4 WITH SR4=1(UP), PROGRAM ACTION WILL BE AS IN 5.2.1.1 EXCEPT NO END OF PASS TYPEOUT WILL OCCUR.

5.2.1.5 WITH SR5=1 (UP), EACH TEST WILL BE EXECUTED ONLY ONCE, INSTEAD OF TYPING "DR", THE PROGRAM WILL RING THE TTY BELL

5.2.1.6 WITH SR0=1 AND SR6=1, PROGRAM ACTION WILL BE AS IN 5.2.1.1 IF NO ERRORS OCCUR. IF AN ERROR OCCURS, THE PROGRAM WILL TYPE AN APPROPRIATE ERROR MESSAGE AND IMMEDIATELY TERMINATE ITERATIONS OF THE FAILING TEST. THE PROGRAM WILL THEN START THE NEXT TEST IN SEQUENCE.

6.
6.1
6.1.1
6.1.2
6.1.3
6.1.4
7.
7.1
7.2

ERRORS

NORMAL OPERATION

IF AN ERROR OCCURS WITH SWITCHES SET AS IN 4.2, THE PROGRAM WILL TYPE AN APPROPRIATE ERROR MESSAGE (WITH DATA IF APPLICABLE) AND HALT.

THE FORMAT OF THE ERROR TYPEOUT IS

XXXX MESSAGE
HEADER FOR DATA (IF APPLICABLE)
DATA (IF APPLICABLE)
XXX= ADDRESS OF JMS TO ERROR ROUTINE IN TEST THAT FAILED.

ERROR RECOVERY

SET SR6=1(UP) TO ESCAPE TO NEXT TEST, PRESS CONTINUE.

ERROR LOOP (10'S)

SET SR0=1 TO SUPPRESS HALT
SET SR1=1 TO SUPPRESS TYPEOUT
SET SR2=1 TO LOOP ON CURRENT FAILING TEST

ERROR LOOP (DATA)

SAME AS 6.3 EXCEPT USE SR3 INSTEAD OF SR2 TO LOOP WITH CURRENT DATA.

RESTRICTIONS

STARTING RESTRICTIONS

TEST JUMPER CABLE MUST BE INSTALLED;
ANY FLOATING INPUTS TO INPUT REGISTER SHOULD BE GROUNDED, OR ERRORS MAY OCCUR.

OPERATING RESTRICTIONS

NONE

8. MISCELLANEOUS

8.1 EXECUTION TIME

EXECUTION TIME IS APPROXIMATELY 3 MINUTES FOR FULL ITERATION AND APPROXIMATELY 10 SECONDS WITH ITERATIONS SUPPRESSED.

9. PROGRAM DESCRIPTION

THE DRB-EA IS A TEST OF ALL FUNCTIONS OF THE INTERFACE.

THE PROGRAM SEQUENCE IS AS FOLLOWS:

ALL BASIC IOT TESTS ARE EXECUTED 4096 TIMES.
ALL OUTPUT REGISTER FUNCTIONS ARE TESTED WITH BINARY COUNT PATTERNS.
ALL INPUT REGISTER FUNCTIONS ARE TESTED USING BINARY COUNT PATTERNS.
INTERACTION BETWEEN INPUT AND OUTPUT REGISTERS IS TESTED FOR
WITH BINARY COUNT PATTERNS.
ALL SKIPS AND INTERRUPTS ARE TESTED USING BINARY COUNT PATTERNS.

10. LISTING

```

/MAINDEC-8E-D00
/DR8=EA
/12 CHANNEL BUFFERED I/O DIAGNOSTIC
/COPYRIGHT 1970, 1971, DIGITAL EQUIPMENT CORP., MAYNARD, MASS. 01754
/
/STARTING ADDRESS1      200=INPUT DEVICE CONFIGURATION
/                          201=USE STANDARD CONFIGURATION
/
/SWITCH REGISTER OPTIONS
/
/SR00 =1; SUPPRESS HALT ON ERROR
/SR01 =1; SUPPRESS ERROR TYPEOUT
/SR02 =1; LOOP ON CURRENT TEST
/SR03 =1; LOOP WITH CURRENT DATA
/SR04 =1; SUPPRESS BELL AT END OF PASS
/SR05 =1; SUPPRESS ITERATIONS
/SR06 =1; ESCAPE TO NEXT TEST ON ERROR
/
/INSTRUCTION DEFINITIONS
/

```

```

7421 MQL=7421
7501 MQA=7501
7002 BSW=7002
6007 CAF=6007
6003 SRQ=6003
4432 DBDI=JMS
4433 DBEI=JMS
4434 DBSK=JMS
4435 DBCI=JMS
4436 DBRI=JMS
4437 DBCO=JMS
4440 DBSO=JMS
4441 DBRO=JMS
/
/LOCATION EQUIVALENCIES
/
MSTDGT=ERADR+1
LSTDGT=ERADR+2

```

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/GENERAL VARIABLES

```

0010 0000 *10 POINT1, 0
0020 0000 *20 CNTRI, 0
0021 0000 DATA1, 0
0022 0000 DATA2, 0
0023 0000 DATA3, 0
0024 0000 DATA4, 0
0025 0000 DATA5, 0
0026 7777 IJUMPE, 7777
0027 7777 FJUMPE, 7777

```

/IN INTERRUPT JUMPER JK
/FLIPFLOP JUMPER MASK

**TYPE LG,
LPCNT,**

/INDIRECT POINTERS

0032	0261	XDBDI,	DBDIX
0033	0266	XDBEI,	DBEIX
0034	0273	XDBCI,	DBSIX
0035	0300	XDBCI,	DBCIX
0036	0305	XDBRI,	DBRIX
0037	0312	XDBCO,	DBCIX
0040	0317	XDBSO,	DBSOX
0041	0324	XDBRO,	DBROX
0042	3200	XPRINT,	PRINT
0043	3251	XTYPE,	TYPE
0044	2600	XERROR,	ERROR
0045	2607	XLOOP1,	LOOP1
0046	2712	XLOOP2,	LOOP2

/MAINDEC=8E-D00 PAL10 V141 14-JUL-71 1155 PAGE 3

TEST INITIALIZATION

```

0200      JMP      START1
0201      JMP      START2
0202      CAP      XPRNT
0203      M1=1
0204      HLT
0205      LAS
0206      AND
0207      CLL      RTL
0210      RAL
0211      TAD
0212      DCA
0213      JMS      I
0214      M2=1
0215      HLT
0216      LAS
0217      DCA
0220      JMS      I
0221      M2A=1
0222      HLT
0223      LAS
0224      DCA
0225      TAD
0226      DCA
0227      TAD
0230      DCA
0231      TAD
0232      TAD
0233      0
0234      ISZ
0235      ISZ
0236      ISZ
0237      JMP
0240      JMS      I
0241      M3=1

*200      START1,
          JMP      I
          CAP      XPRNT
          M1=1
          HLT
          LAS
          AND
          CLL      RTL
          RAL
          TAD
          DCA
          JMS      I
          M2=1
          HLT
          LAS
          DCA
          JMS      I
          M2A=1
          HLT
          LAS
          DCA
          TAD
          DCA
          TAD
          DCA
          TAD
          PNTR1,
          0
          ISZ
          ISZ
          ISZ
          JMP
          JMS      I
          M3=1

          START1
          START2
          XPRNT
          ( ?
          (6300
          IOTS
          XPRNT
          IJUMPER
          XPRNT
          FJUMPER
          (=10
          CNTR1
          DIOT
          PNTR1
          IOTS
          PNTR1
          IOTS
          PNTR1
          IOTS
          CNTR1
          IOTS
          CNTR1
          PNTR1=1
          XPRNT
          /CLEAR ALL FLAGS
          /TYPE "SET SR FOR DEVICE
          /CODE AND CONTN"
          /HALT FOR SWITCHES
          /GET SWITCHES
          /MASK DEVICE CODE
          /POSITION BITS
          /GENERATE BASIC IOT
          /SAVE BASIC IOT
          /TYPE "SET SR FOR JUMPERS
          /AND CONTN"
          /HALT FOR SWITCHES
          /GET SWITCHES
          /SAVE JUMPER MASK
          /8 IOTS WILL BE
          /SET UP
          /STORE INSTRUCTION FOR
          /IOT SET UP
          /GET IOT
          /STORE IT
          /PREPARE TO STORE
          /NEXT IOT
          /TYPE "SET SR FOR RUN
          /AND CONTN

```

HALT FOR SWITCHES
/CLEAR ERROR FLAG
/GO TO FIRST TEST

HALT FOR SWITCHES

HALT FOR SWITCHES

0242 7402
0243 7300
0244 3030
0245 5646
0246 0400

START2,
CLA CLL
DCA
JMP I
INIT1

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/MAINDEC-0E-000 PAL10

/INITIALIZATION CONSTANTS AND VARIABLES

/BASIC IOT

0247 0000
0250 0262
0251 0267
0252 0274
0253 0301
0254 0306
0255 0313
0256 0320
0257 0325
0260 3650

IOTS,
TIOT,

DIOT,
DCA I TIOT

/IOT SUBROUTINES

/DISABLE DATA BUFFER INTERRUPT (DBDI.65X0)

0261 0000
0262 6500

DBDIX,

/TRAP FOR UNDESIREDB
/SKIPS

0263 7410
0264 7402
0265 5661

SKP
HLT
JMP I DBDI

/ENABLE DATA BUFFER INTERRUPTS (DBEI.65X1)

0266 0000
0267 6501

DBEIX,

/TRAP FOR UNDESIREDB
/SKIPS

0270 7410
0271 7402
0272 5666

SKP
HLT
JMP I DBEIX

/SKIP ON DATA BUFFER INPUT FLAG (DBSK.65X2)

0273 0000
0274 6502

DBSKX,

0275 7410
0276 2273
0277 5673

SKP
ISZ
JMP I DBSKX

/OS TO INPUT REGISTER CORRESPONDING
/TO IS IN AC (DBCI.65X3)

0300 0000
0301 6503

DBCI,

/TRAP FOR UNDESIREDB
/SKIPS

0302 7410
03 7402
03 5700

SKP
HLT
JMP I DBCIX

```

0305 0000 DBR1X,
0306 6504
/
/INPUT REGISTER TO AC (DBR1,65X4)
/
0307 7410 SKP /TRAP FOR UNDESIREB
0310 7402 HLT /SKIPS
0311 5705 JMP I DBR1X
/
/ZEROS TO OUTPUT REGISTER CORRESPONDING TO
/ONES IN AC (DBCO,65X5)
0312 0000 DBCOX,
0313 6505
/
0314 7410 SKP /TRAP FOR UNDESIREB
0315 7402 HLT /SKIPS
0316 5712 JMP I DBCOX
/
/IS TO OUTPUT REGISTER CORRESPONDING
/TO IS IN AC (DBSO,65X6)
0317 0000 DBSOX,
0320 6506
/
0321 7410 SKP /TRAP FOR UNDESIREB
0322 7402 HLT /SKIPS
0323 5717 JMP I DBSOX
/
/JAM TRANSFER OUTPUT REGISTER TO AC (DBRO,65X7)
0324 0000 DBROX,
0325 6507
/
0326 7410 SKP /TRAP FOR UNDESIREB
0327 7402 HLT /SKIPS
0330 5724 JMP I DBROX
0335 7770
0376 6500
0377 0007
0400 PAGE

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/IS OUTPUT REGISTER CLEARED BY INITIALIZE?
/
0400 3030 INITI,
0401 3031 DCA /CLEAR ERROR FLAG
0402 6007 DCA /SET ITERATION COUNT TO 4096 (DECIMAL)
0403 4441 CAF /INITIALIZE INTERFACE
0404 3021 DBRO /READ OUTPUT REGISTER
0405 1021 DCA /SAVE REGISTER DATA
0406 7650 TAD /GET REGISTER DATA
SNA CLA /HAS REGISTER CLEARED BY INITIALIZE

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0407	5214	JMP	1=5	/DATA CORRECT, CONTINUE
0410	4444	JMS I	XERROR	/NO, ERROR
0411	3645	INITIE=1		/OUTPUT REGISTER NOT CLEARED"
0412	3515	DHI=1		/REGISTER DATA"
0413	7777	-1		/NUMBER OF WORDS TO BE OUTPUT
0414	4445	JMS I	XLOOP1	/CHECK FOR LOOP ON CURRENT TEST
0415	5202	JMP	INIT1+2	/LOOP ON CURRENT TEST
/IS INPUT REGISTER CLEARED BY INITIALIZE?				
/				
INIT2,				
0416	3030	DCA	TYPEFLG	/CLEAR ERROR FLAG
0417	3031	DCA	LPCNT	/SET ITERATION COUNT TO 4096(DECIMAL)
0420	7410	SKP		
0421	6007	CAF		/INITIALIZE INTERFACE
0422	4436	DBRI		/READ INPUT REGISTER
0423	3021	DCA	DATA1	/SAVE REGISTER DATA
0424	1021	TAD	DATA1	/GET REGISTER DATA
0425	7600	SNA	CLA	/HAS REGISTER CLEARED
0426	5233	JMP	1=5	/DATA CORRECT, CONTINUE
0427	4444	JMS I	XERROR	/NO, ERROR
0430	3661	INIT2=1		/INPUT REGISTER NOT CLEARED"
0431	3515	DHI=1		/REGISTER DATA"
0432	7777	-1		/NUMBER OF WORDS TO BE OUTPUT
0433	4445	JMS I	XLOOP1	/CHECK FOR LOOP ON CURRENT TEST
0434	5221	JMP	INIT2+3	/LOOP ON CURRENT TEST
/IS SKIP FLAG SET AFTER INITIALIZE				
/				
INIT3,				
0435	3030	DCA	TYPEFLG	/CLEAR ERROR FLAG
0436	3031	DCA	LPCNT	/SET ITERATION COUNT TO 4096(DECIMAL)
0437	7410	SKP		
0440	6007	CAF		/INITIALIZE INTERFACE
0441	4433	DBRI		/ENABLE INTERFACE INTERRUPTS
0442	6003	SRQ		/TEST FOR INTERRUPT ACTIVE
0443	5200	JMP	1=5	/NO INTERRUPT, CONTINUE
0444	4444	JMS I	XERROR	/INTERRUPT ACTIVE, ERROR
0445	4042	INITIE=1		/INTERRUPT ACTIVE"
0446	3514	DHI=1		/NO DATA HEADER
0447	0000	0		/NO DATA
0450	4434	DBSK		/IS INTERFACE FLAG SET
0451	5296	JMP	1=5	/FLAG NOT SET, CONTINUE
0452	4444	JMS I	XERROR	/FLAG SET, ERROR
0453	3674	INIT3=1		/SKIP FLAG SET"
0454	3514	DHI=1		/NO DATA HEADER
/MAINDEC=8E-000 PAL10				
V141	14=JUL=71	1155	PAGE 6=1	
/NO DATA				
0455	0000	0		/CHECK FOR LOOP ON CURRENT TEST
0456	4445	JMS I	XLOOP1	/LOOP ON CURRENT TEST
0457	5240	JMP	INIT3+3	
/MAINDEC=8E-000 PAL10				
V141	14=JUL=71	1155	PAGE 7	
/DOES OUTPUT REGISTER JAM TRANSFER TO AC?				
/				
TRAN1,				
0460	3030	DCA	TYPEFLG	/CLEAR ERROR FLAG
0461	3031	DCA	LPCNT	/SET ITERATION COUNT TO 4096(DECIMAL)
0462	6007	CAF		/INITIALIZE INTERFACE
0463	7340	CLA	CLL	/SET AC =

0441	064	DBRO	DATA1	OUTPUT REGISTER
0466	065	DCA	DATA1	/SAVE CONTENTS
0467	066	TAD	DATA1	/GET AC CONTENTS
0470	067	SNA CLA		/HAS AC CLEARED BY TRANSFER
0471	068	JMP	1+5	/DATA CORRECT, CONTINUE
0472	069	JMS I	XERROR	/NO, ERROR
0473	070	TRAN1E=1		/DBRO DID NOT CLEAR AC
0474	071	DH2=1		/AC CONTENTS
0475	072	JMS I	XLOOP1	/NUMBER OF WORDS TO BE OUTPUT
0476	073	JMP	TRAN1+2	/CHECK FOR LOOP ON CURRENT TEST
				/LOOP ON CURRENT TEST
				/DOES INPUT REGISTER JAM TRANSFER TO AC
0477	074	TRAN2,	TYPEFLG	/CLEAR ERROR FLAG
0500	075	DCA	LPCNT	/SET ITERATION COUNT TO 4096(DECIMAL)
0501	076	CAF		/INITIALIZE INTERFACE
0502	077	CLA CLL CMA		/SET AC = 7777
0503	078	DBRI		/READ INPUT REGISTER
0504	079	DCA	DATA1	/SAVE AC CONTENTS
0505	080	TAD	DATA1	/GET AC CONTENTS
0506	081	SNA CLA		/HAS AC CLEARED BY TRANSFER
0507	082	JMP	1+5	/DATA CORRECT, CONTINUE
0510	083	JMS I	XERROR	/NO, ERROR
0511	084	TRAN2E=1		/DBRI DID NOT CLEAR AC
0512	085	DH2=1		/AC CONTENTS
0513	086	JMS I	XLOOP1	/NUMBER OF WORDS TO BE OUTPUT
0514	087	JMP	TRAN2+2	/CHECK FOR LOOP ON CURRENT TEST
0515	088			/LOOP ON CURRENT TEST
				/DOES TRANSFER TO OUTPUT REGISTER CHANGE AC (WITH AC=7777,0890)
0516	089	TRAN3,	TYPEFLG	/CLEAR ERROR FLAG
0517	090	DCA	LPCNT	/SET ITERATION COUNT TO 4096(DECIMAL)
0520	091	CAF		/INITIALIZE INTERFACE
0521	092	CLA CLL CMA		/SET AC = 7777
0522	093	DBRO		/BIT SET OUTPUT REGISTER
0523	094	DCA	DATA1	/SAVE AC CONTENTS
0524	095	TAD	DATA1	/GET AC CONTENTS
0525	096	CMA		/COMPLEMENT DATA TO TEST FOR 7777
0526	097	SNA CLA		/DID AC CHANGE
0527	098	JMP	1+5	/DATA CORRECT, CONTINUE
0530	099	JMS I	XERROR	/NO, ERROR
0531	100	TRAN3E=1		/DBRO CHANGED AC
0532	101	DH2=1		/AC CONTENTS
0533	102	JMS I	XLOOP1	/NUMBER OF WORDS TO BE OUTPUT
0534	103	JMP	TRAN3+2	/CHECK FOR LOOP ON CURRENT TEST
0535	104			/LOOP ON CURRENT TEST
				/DOES TRANSFER TO OUTPUT REGISTER CHANGE AC (WITH AC=7777, 08C0)
0536	105	TRAN4,	TYPEFLG	/CLEAR ERROR FLAG
0537	106	DCA	LPCNT	/SET ITERATION COUNT TO 4096(DECIMAL)
0540	107	CAF		/INITIALIZE INTERFACE
0541	108	CLA CLL CMA		/SET AC = 7777
0542	109	DBCO		/BIT CLEAR OUTPUT REGISTER
0543	110	DCA	DATA1	/SAVE AC CONTENTS

0544	1021	TAD	DATA1	/GET AC CONTENTS
0545	7040	CMA	CLA	/COMPLIMENT DATA TO TEST FOR 7777
0546	7650	SNA	CLA	/DID AC CHANGE
0547	5394	JMP	DATA1	/DATA CORRECT, CONTINUE
0550	4444	JMS	I	/NO, ERROR
0551	3741	TRAN4E=1		/DBCO CHANGED AC
0552	3525	DH2=1		/AC CONTENTS
0553	7777	-1		/NUMBER OF WORDS TO BE OUTPUT
0554	4445	JMS	I	/CHECK FOR LOOP ON CURRENT TEST
0555	5340	JMP	TRAN4+2	/LOOP ON CURRENT TEST
		/		/DOES TRANSFER TO INPUT REGISTER CHANGE AC (WITH AC=7777, DBCI)
		/		
0556	3030	TRAN5,	TYPELG	/CLEAR ERROR FLAG
0557	3031	DCA	LPCNT	/SET ITERATION COUNT TO 4096(DECIMAL)
0560	6007	DCA		/INITIALIZE INTERFACE
0561	7340	CAF		/SET AC =7777
0562	4435	CLA	CLL CMA	/BIT CLEAR INPUT REGISTER
0563	3021	DBCI		/SAVE AC CONTENTS
0564	1021	DCA	DATA1	/GET AC CONTENTS
0565	7040	TAD	DATA1	/COMPLIMENT DATA TO TEST FOR 7777
0566	7650	CMA	CLA	/DID AC CHANGE
0567	5394	SNA	CLA	/DATA CORRECT, CONTINUE
0570	4444	JMP	DATA1	/NO, ERROR
0571	3751	JMS	I	/DBCI CHANGED AC
0572	3525	TRAN5E=1		/AC CONTENTS
0573	7777	DH2=1		/NUMBER OF WORDS TO BE OUTPUT
0574	4445	-1		/CHECK FOR LOOP ON CURRENT TEST
0575	5360	JMS	I	/LOOP ON CURRENT TEST
0576	5777	JMP	TRAN6	/GO TO NEXT TEST
0577	0600	JMP		
0578	0600	JMP		
		PAGE		
/MAINDEC=8E-000 PAL10				
		V141	14-JUL-71	1155 PAGE 9
		/		/DOES TRANSFER TO OUTPUT REGISTER CHANGE AC (WITH AC=0,DBSO)
		/		
0600	3030	TRAN6,	TYPELG	/CLEAR ERROR FLAG
0601	3031	DCA	LPCNT	/SET ITERATION COUNT TO 4096 (DECIMAL)
0602	6007	DCA		/INITIALIZE INTERFACE
0603	4440	CAF		/BIT SET OUTPUT REGISTER
0604	3021	DCA	DATA1	/SAVE AC CONTENTS
0605	1021	TAD	DATA1	/GET AC CONTENTS
0606	7650	CMA	CLA	/WAS AC CHANGED
0607	5214	SNA	CLA	/DATA CORRECT, CONTINUE
0610	4444	JMP	DATA1	/AC CHANGED, ERROR
0611	3731	JMS	I	/DBSO CHANGED AC
0612	3525	TRAN3E=1		/AC CONTENTS
0613	7777	DH2=1		/NUMBER OF WORDS TO BE OUTPUT
0614	4445	-1		/CHECK FOR LOOP ON CURRENT TEST
0615	5202	JMS	I	/LOOP ON CURRENT TEST
		JMP	TRAN6+2	
		/		/DOES TRANSFER TO OUTPUT REGISTER CHANGE AC (WITH AC=0,DBCO)
		/		
0616	3030	TRAN7,	TYPELG	/CLEAR ERROR FLAG
0617	3031	DCA	LPCNT	/SET ITERATION COUNT TO 4096 (DECIMAL)
06	6007	DCA		/INITIALIZE INTERFACE
06.	4437	DBCO		/BIT CLEAR OUTPUT REGISTER


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1027 3515 /REGISTER DATA
1030 7777 /NUMBER OF WORDS TO BE OUTPUT
1031 4445 /CHECK FOR LOOP ON CURRENT TEST
1032 5202 /LOOP ON CURRENT TEST
/
/ CAN ALL BITS OF OUTPUT REGISTER BE CLEARED (DBCO)
/
OUT2,
1033 3030 /CLEAR ERROR FLAG
1034 3031 /SET ITERATION COUNT TO 4096(DECIMAL)
1035 7340 /SET AC = 7777
1036 4440 /2:IT SET OUTPUT REGISTER
1037 4437 /BIT CLEAR OUTPUT REGISTER
1040 7300 /
1041 4441 /READ OUTPUT REGISTER
1042 3021 /SAVE REGISTER DATA
1043 1021 /GET REGISTER DATA
1044 7650 /HAS OUTPUT REGISTER CLEARED
1045 5252 /DATA CORRECT, CONTINUE
1046 4444 /NO, ERROR
1047 3645 /"OUTPUT REGISTER NOT CLEARED"
1050 3515 /"REGISTER DATA"
1051 7777 /NUMBER OF WORDS TO BE OUTPUT
1052 4445 /CHECK FOR LOOP ON CURRENT TEST
1053 5235 /LOOP ON CURRENT TEST
/
/ CAN EACH BIT OF OUTPUT REGISTER BE SET
/INDEPENDENTLY (DBSO)
/
OUT3,
1054 3030 /CLEAR ERROR FLAG
1055 1177 /SET ITERATION COUNT
1056 3031 /TO 50(DECIMAL)
1057 3021 /CLEAR TEST DATA
1060 6007 /INITIALIZE INTERFACE
1061 1021 /GET TEST DATA
1062 4440 /BIT SET OUTPUT REGISTER
1063 7300 /
1064 4441 /READ OUTPUT REGISTER
1065 3022 /SAVE REGISTER DATA
1066 1021 /GET TEST DATA
1067 7041 /
1070 1022 /COMPARE TO REGISTER CONTENTS
1071 7650 /DO THEY COMPARE
1072 5277 /DATA CORRECT, CONTINUE
1073 4444 /NO, ERROR
1074 3761 /"DBSO ERROR"
1075 3560 /"EXPECTED RECEIVED"
1076 7776 /NUMBER OF WORDS TO BE OUTPUT
1077 4446 /TEST FOR LOOP ON SAME DATA, ESCAPE ON DATA ERROR
1080 5260 /LOOP WITH SAME DATA
1081 2021 /INCREMENT DATA PATTERN
1082 5260 /CONTINUE TEST
1083 4445 /CHECK FOR LOOP ON CURRENT TEST
1084 5257 /LOOP ON CURRENT TEST
/
/ CAN EACH BIT OF OUTPUT REGISTER BE CLEARED
/INDEPENDENTLY (DBC )
/

```

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```

1054 3030 /CLEAR ERROR FLAG
1055 1177 /SET ITERATION COUNT
1056 3031 /TO 50(DECIMAL)
1057 3021 /CLEAR TEST DATA
1060 6007 /INITIALIZE INTERFACE
1061 1021 /GET TEST DATA
1062 4440 /BIT SET OUTPUT REGISTER
1063 7300 /
1064 4441 /READ OUTPUT REGISTER
1065 3022 /SAVE REGISTER DATA
1066 1021 /GET TEST DATA
1067 7041 /
1070 1022 /COMPARE TO REGISTER CONTENTS
1071 7650 /DO THEY COMPARE
1072 5277 /DATA CORRECT, CONTINUE
1073 4444 /NO, ERROR
1074 3761 /"DBSO ERROR"
1075 3560 /"EXPECTED RECEIVED"
1076 7776 /NUMBER OF WORDS TO BE OUTPUT
1077 4446 /TEST FOR LOOP ON SAME DATA, ESCAPE ON DATA ERROR
1080 5260 /LOOP WITH SAME DATA
1081 2021 /INCREMENT DATA PATTERN
1082 5260 /CONTINUE TEST
1083 4445 /CHECK FOR LOOP ON CURRENT TEST
1084 5257 /LOOP ON CURRENT TEST
/
/ CAN EACH BIT OF OUTPUT REGISTER BE CLEARED
/INDEPENDENTLY (DBC )
/

```

1105	3030	OUT4,	DCA	TYPFLG	/CLR ERROR FLAG
1106	1177		TAD	C=62	/SET ITERATION COUNT
1107	3031		DCA	LPCNT	/TO 50 (DECIMAL)
1110	3021		DCA	DATA1	/CLEAR TEST DATA
1111	6007	OUT4A,	CAF	DATA1	/INITIALIZE INTERFACE
1112	1021		TAD	DATA1	/GET MASK
1113	7040		CMA	DATA2	/COMPLEMENT TO GET EXPECTED RESULT
1114	3022		DCA	DATA2	/SAVE EXPECTED RESULT
1115	7040		CMA		/SET OUTPUT REGISTER TO 7777
1116	4440		DBSO		/BIT SET OUTPUT REGISTER
1117	7300		CLA CLL		
1120	1021		TAD	DATA1	/GET PATTERN TO CLEAR OUTPUT REGISTER
1121	4437		DBCO		/BIT CLEAR OUTPUT REGISTER
1122	4441		DBRO		/READ OUTPUT REGISTER
1123	3023		DCA	DATA3	/SAVE REGISTER DATA
1124	1022		TAD	DATA2	/GET EXPECTED RESULT
1125	7041		CIA	DATA3	
1126	1023		TAD	DATA3	/COMPARE TO RECEIVED DATA
1127	7650		SNA CLA		/WERE CORRECT BITS IN OUTPUT REGISTER CLEARED
1130	5335		JMP	.+5	/DATA CORRECT, CONTINUE
1131	4444		JMS I	XERROR	/NO, ERROR
1132	3767		OUT4E=1		/"DBCO ERROR"
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1133	3534		V141	14-JUL-71	1195 PAGE 1101
1134	7795		DH3=1		/MASK EXPECTED RECEIVED
1135	4446		JMS I	XLOOP2	/NUMBER OF WORDS TO BE OUTPUT
1136	5311		JMP	OUT4A	/TEST FOR LOOP ON SAME DATA.ESCAPE ON DATA ERROR
1137	2021		ISE	DATA1	/LOOP WITH SAME DATA
1140	5311		JMP	OUT4A	/INCREMENT DATA PATTERN
1141	4445		JMS I	XLOOP1	/CONTINUE TEST
1142	5310		JMP	OUT4+3	/CHECK FOR LOOP ON CURRENT TEST
1143	5777/		JMP	OUT5	/LOOP ON CURRENT TEST
1177	1200				
1178	1200				
PAGE					
1200	3030	OUT5,	DCA	TYPFLG	/CLEAR ERROR FLAG
1201	1177		TAD	C=62	/SET ITERATION COUNT
1202	3031		DCA	LPCNT	/TO 50 (DECIMAL)
1203	3021		DCA	DATA1	/CLEAR TEST DATA
1204	3022		DCA	DATA2	/CLEAR EXPECTED RESULT
1205	6007	OUT5A,	CAF	DATA1	/INITIALIZE INTERFACE
1206	1021		TAD	DATA1	/GET TEST DATA
1207	4437		DBCO		/BIT CLEAR OUTPUT REGISTER
1210	7300		CLA CLL		
1211	4441		DBRO		/READ OUTPUT REGISTER
1212	3023		DCA	DATA3	/SAVE REGISTER DATA
1213	1023		TAD	DATA3	/GET REGISTER DATA
1214	7650		SNA CLA		/IS OUTPUT REGISTER 0
1215	5222		JMP	.+5	/DATA CORRECT, CONTINUE
1216	4444		JMS I	XERROR	/NO, ERROR
1217	3767		OUT4E=1		/"DBCO ERROR"
1220	3534		DH3=1		/"MASK EXPECTED RECEIVED"
1221	7775		JMS I	XLOOP2	/NUMBER OF DATA WORDS
1222	4446		JMP	OUT5A	/TEST FOR LOOP ON SAME DATA
1223	5205				/LOOP WITH SAME DATA

```

1224 2021      DATA1      /INCREMENT DATA PATTERN
1225 5205      OUT5A       /CONTINUE
1226 4445      XLOOP1     /CHECK FOR LOOP ON CURRENT TEST
1227 5203      OUT5+3     /LOOP ON CURRENT TEST

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```

```

/DOES SETTING OUTPUT REGISTER TWICE WITH SAME
/ DATA CHANGE OUTPUT REGISTER
/
DCA      TYPFLG      /CLEAR ERROR FLAG
TAD      C=62        /SET ITERATION COUNT
DCA      LPCNT       /TO 50 (DECIMAL)
DCA      DATA1     /CLEAR TEST DATA
CAF      DATA1     /INITIALIZE INTERFACE
TAD      DATA1     /GET TEST DATA
DBSO     /BIT SET OUTPUT REGISTER
DBSO     /BIT SET OUTPUT REGISTER

CLA CLL
DBRO
DCA      DATA2     /READ OUTPUT REGISTER
TAD      DATA1     /SAVE REGISTER DATA
CIA      /GET TEST DATA

TAD      DATA2     /COMPARE TO REGISTER DATA
SNA CLA   /ARE THEY THE SAME
JMS I     /DATA CORRECT, CONTINUE
XERROR
OUT4E=1
DH4=1
-2
JMS I     /DBSO ERROR
XLOOP2    /EXPECTED RECEIVED
OUT6A     /NUMBER OF DATA WORDS
DATA1     /TEST FOR LOOP ON SAME DATA
OUT6A     /LOOP WITH SAME DATA
XLOOP1    /INCREMENT DATA PATTERN
XLOOP1    /CONTINUE
XLOOP1    /CHECK FOR LOOP ON CURRENT TEST
XLOOP1    /LOOP ON CURRENT TEST

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```

```

/DOES READING OUTPUT REGISTER TWICE CHANGE
/ OUTPUT REGISTER
/
DCA      TYPFLG      /CLEAR ERROR FLAG
TAD      C=62        /SET ITERATION COUNT
DCA      LPCNT       /TO 50 (DECIMAL)
DCA      DATA1     /CLEAR TEST DATA
CAF      DATA1     /INITIALIZE INTERFACE
TAD      DATA1     /GET TEST DATA
DBSO     /BIT SET OUTPUT REGISTER

CLA CLL
DBRO
DCA      DATA2     /READ OUTPUT REGISTER
TAD      DATA1     /SAVE REGISTER DATA
CIA      /GET TEST DATA

TAD      DATA2     /COMPARE REGISTER DATA
SNA CLA   /ARE THEY THE SAME

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```

```

1302 JMP I+5
1303 JMS I XERROR
1304 OUT7E=1
1305 DH4=1
1306 -2
1307 JMS I XLOOP2
1308 JMP OUT7A
1309 ISZ DATA1
1310 JMP OUT7A
1311 JMS I XLOOP1
1312 JMP OUT7+3
1313
1314
/NO7 CORRECT, CONTINUE
/NO, ROR
/DBCO ERROR
/EXPECTED RECEIVED"
/NUMBER OF DATA WORDS
/TEST FOR LOOP WITH SAME DATA
/LOOP WITH SAME DATA
/INCREMENT DATA PATTERN
/CONTINUE
/CHECK FOR LOOP ON CURRENT TEST
/LOOP ON CURRENT TEST

```

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/DOES CLEARING OUTPUT REGISTER TWICE
/CHANGE ANY BIT IN OUTPUT REGISTER

```

1315 OUT0,
1316 3030
1317 1177
1318 3031
1319 DCA TYPELG
1320 DCA L=62
1321 DCA LPCNT
1322 DCA DATA1
1323 DCA DATA2
1324 DCA DATA1
1325 DB80
1326 DBCO
1327 DBCO
1328 CLA CLL
1329 DB80
1330 DCA
1331 DCA
1332 TAD
1333 SNA CLA
1334 JMP
1335 JMS I XERROR
1336 OUT4E=1
1337 DH3=1
1338 -3
1339 JMS I XLOOP2
1340 JMP OUT8A
1341 ISZ DATA1
1342 JMP OUT8A
1343 JMS I XLOOP1
1344 JMP OUT8+3
1345 JMP
1346
1347
1377
1400
1400
/DOES CLEARING OUTPUT REGISTER TWICE
/CHANGE ANY BIT IN OUTPUT REGISTER
/CLEAR ERROR FLAG
/SET ITERATION COUNT
/TO 50 (DECIMAL)
/CLEAR TEST DATA
/CLEAR EXPECTED RESULT
/INITIALIZE INTERFACE
/GET TEST DATA
/BIT SET OUTPUT REGISTER
/BIT CLEAR OUTPUT REGISTER
/BIT CLEAR OUTPUT REGISTER
/READ OUTPUT REGISTER
/SAVE REGISTER DATA
/GET REGISTER DATA
/IS REGISTER 0
/DATA CORRECT, CONTINUE
/NO, ERROR
/DBCO ERROR
/MASK EXPECTED RECEIVED"
/NUMBER OF DATA WORDS
/TEST FOR LOOP WITH SAME DATA
/LOOP WITH SAME DATA
/INCREMENT DATA PATTERN
/CONTINUE
/CHECK FOR LOOP ON CURRENT TEST
/LOOP ON CURRENT TEST

```

PAGE

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/CAN ALL BITS IN INPUT REGISTER BE SET
/DOES INITIALIZE CLEAR INPUT REGISTER

```

1400 IN1,
1401 3030
1402 3031
1403 6007
1404 7340
1405 7340
1406 7300
1407
1408
1409
1410
1411
1412
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1414
1415
1416
1417
1418
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1471
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1480
1481
1482
1483
1484
1485
1486
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1492
1493
1494
1495
1496
1497
1498
1499
/DOES INITIALIZE CLEAR INPUT REGISTER
/CLEAR ERROR FLAG
/SET ITERATION COUNT TO 4000 (DECIMAL)
/INITIALIZE INTERFACE
/SET AC = 7777
/BIT SET OUTPUT REGISTER

```

```

1406 4436 DBRI /READ INPUT REGISTER
1407 3021 DCA /SAVE REGISTER DATA
1410 1021 TAD /GET REGISTER DATA
1411 7040 CHA /COMPLIMENT TO TEST FOR 777
1412 7650 SNA CLA /WAS INPUT REGISTER SET TO 777?
1413 5220 JMP .+5 /DATA CORRECT, CONTINUE
1414 4444 JMS I XERROR /NO, ERROR
1415 4011 INSE=1 /"INPUT REGISTER NOT CORRECT"
1416 3515 DH1=1 /"REGISTER DATA"
1417 7777 -1 /NUMBER OF WORDS TO BE OUTPUT
1420 6007 CAP /INITIALIZE INTERFACE
1421 4436 DBRI /READ INPUT REGISTER
1422 3021 DCA /SAVE REGISTER DATA
1423 1021 TAD
1424 7650 SNA CLA
1425 5232 JMP .+5 /DATA CORRECT, CONTINUE
1426 4444 JMS I XERROR /NO, ERROR
1427 3661 INIT2E=1 /"INPUT REGISTER NOT CLEARED"
1430 3515 DH1=1 /"REGISTER DATA"
1431 7777 -1 /NUMBER OF WORDS TO BE OUTPUT
1432 4445 JMS I XLOOP1 /CHECK FOR LOOP ON CURRENT TEST
1433 5203 JMP INIA /LOOP ON CURRENT TEST

```

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/CAN ALL BITS IN INPUT REGISTER BE CLEARED (DBCI)

```

1434 3030 IN2, /CLEAR ERROR FLAG
1435 3031 DCA /SET ITERATION COUNT TO 4096(DECIMAL)
1436 6007 DCA /INITIALIZE INTERFACE
1437 7340 CAP /SET AC = 7777
1440 0027 AND /MASK TO TEST ONLY FLIPFLOP BITS
1441 3021 CLA CLL CHA /SAVE MASK
1442 1021 TAD /GET MASK
1443 7040 CHA /COMPLIMENT TO GET EXPECTED RESULT
1444 3022 DCA /SAVE EXPECTED RESULT
1445 1021 TAD /GET MASK
1446 4440 DBSO /BIT SET OUTPUT REGISTER
1447 4435 DBCI /BIT CLEAR INPUT REGISTER
1450 7300 CLA CLL
1451 4436 DBRI /READ INPUT REGISTER
1452 3023 DCA /SAVE REGISTER DATA
1453 1022 TAD /GET EXPECTED RESULT
1454 7041 CIA
1455 1023 TAD DATA3
1456 7650 SNA CLA /COMPARE TO REGISTER DATA
1457 5264 JMP .+5 /WERE CORRECT BITS CLEARED
1460 4444 JMS I XERROR /DATA CORRECT, CONTINUE
1461 4003 IN2E=1 /NO, ERROR
1462 3534 DH3=1 /"DBCI ERROR"
1463 7775 -3 /"MASK EXPECTED RECEIVED"
1464 4445 JMS I XLOOP1 /NUMBER OF WORDS TO BE OUTPUT
1465 5236 JMP IN2+2 /CHECK FOR LOOP ON CURRENT TEST

```

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/CAN EACH BIT OF INF) REGISTER BE) INDEPENDENTLY)

```

1466      3030      1NS,
1467      1177      DCA
1470      3031      TAD
1471      3021      DCA
1472      6007      DCA
1473      1021      CAP
1474      4440      TAD
1475      7300      DBSO
1476      4436      CLA CLL
1477      3022      DBRI
1478      1021      DCA
1479      7041      TAD
1480      1021      CIA
1481      7041      TAD
1482      1022      SNA CLA
1483      7650      JMP
1484      5311      JMS I
1485      4444      IN3E-1
1486      4011      DH4-1
1487      3500      -2
1488      7776      JMS I
1489      4446      JMP
1490      5272      ISZ
1491      2031      JMP
1492      5272      IN3A
1493      4435      JMS I
1494      5271      JMP
1495      5777      JMP
1496      1600      PAGE
1497      1600

```

```

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```

```

/VERIFY THAT ALL LATCHING INPUT LINES HOLD DATA

```

```

1600      3030      1NS,
1601      1177      DCA
1602      3031      TAD
1603      3023      DCA
1604      6007      DCA
1605      1023      CAP
1606      0027      TAD
1607      3021      AND
1608      1021      DCA
1609      7490      TAD
1610      5233      SNA
1611      4440      JMP
1612      4437      DBSO
1613      7300      DBCO
1614      4436      CLA CLL
1615      3022      DBRI
1616      1021      DCA
1617      7041      TAD
1618      1021      CIA
1619      1022      TAD
1620      7650      SNA CLA
1621      5231      JMP
1622      4444      JMS I
1623      4026      IN4E-1
1624      3560      DH4-1
1625      7776      -2

```

```

/CLF ERROR FLAG
/SET ITERATION COUNT
/TO 50(DECIMAL)
/CLEAR TEST DATA
/INITIALIZE INTERFACE
/GET TEST DATA
/SET OUTPUT REGISTER

/READ INPUT REGISTER
/SAVE REGISTER DATA
/GET TEST DATA

/COMPARE TO RECEIVED DATA
/ARE THEY THE SAME
/NO, ERROR
/INPUT REGISTER DATA ERROR
/EXPECTED RECEIVED
/NUMBER OF WORDS TO BE OUTPUT
/TEST FOR LOOP ON SAME DATA, ESCAPE ON DATA ERROR
/LOOP WITH SAME DATA
/INCREMENT DATA PATTERN
/CONTINUE TEST
/CHECK FOR LOOP ON CURRENT TEST
/LOOP ON CURRENT TEST

```

```

/CLEAR ERROR FLAG
/SET ITERATION COUNT
/TO 50(DECIMAL)
/CLEAR TEST DATA
/INITIALIZE INTERFACE
/GET TEST DATA
/MASK OFF NON LATCHING BITS
/SAVE AS EXPECTED RESULT
/GET TEST DATA
/ARE ANY BITS TO BE TESTED
/NO, GET NEXT DATA WORD
/SET OUTPUT REGISTER
/SET CLEAR OUTPUT REGISTER

/READ INPUT REGISTER
/SAVE REGISTER DATA
/GET EXPECTED RESULT

/COMPARE TO RECEIVED DATA
/ARE THEY THE SAME
/NO, ERROR
/NO, LATCH ERROR
/EXPECTED RECEIVED
/NUMBER OF WORDS TO BE OUTPUT

```

```

1631 4446 JMS I XLOOP2 /TEST FOR LOOP ON SAME DATA,ESCAPE ON DATA ERROR
1632 5204 JMP IN5A /LOOP WITH SAME DATA
1633 2023 ISZ DATA3 /INCREMENT DATA PATTERN
1634 5204 JMP IN5A /CONTINUE TEST
1635 4445 JMS I XLOOP1 /CHECK FOR LOOP ON CURRENT TEST
1636 5203 JMP IN5+3 /LOOP ON CURRENT TEST

```

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/VERIFY ALL NON LATCHING DATA BITS DO NOT HOLD DATA

```

1637 3030 DCA TYPFLG /CLEAR ERROR FLAG
1640 1177 TAD C=62 /SET ITERATION COUNT
1641 3031 DCA LPCNT /TO 50(DECIMAL)
1642 3024 DCA DATA4 /CLEAR TEST DATA
1643 3022 DCA DATA2 /CLEAR EXPECTED RESULT
1644 6007 CAF FJUMPER /INITIALIZE INTERFACE
1645 1027 TAD IN6A, /GET MASK FOR NON LATCHING BITS
1646 7040 CMA /CHANGE TO MASK OFF LATCHING BITS
1647 0024 AND /SAVE FOR TRANSMISSION
1650 3021 DCA DATA1 /GET TEST DATA
1651 1021 TAD DATA1 /ARE ANY BITS TO BE TESTED
1652 7450 SNA IN6C /NO GET NEXT DATA WORD
1653 5272 JMP DB90 /BIT SET OUTPUT REGISTER
1654 4440 DB90 /BIT CLEAR OUTPUT REGISTER
1655 4437 DBCO
1656 7300 CLA CLL
1657 4436 DBR1
1660 3023 DCA DATA3 /READ INPUT REGISTER
1661 1023 TAD DATA3 /SAVE REGISTER DATA
1662 7650 SNA CLA /GET RECEIVED DATA
1663 5270 JMP IN6 /DID ANY BITS HOLD DATA
1664 4444 JMS I XERROR /DATA CORRECT, CONTINUE
1665 4026 IN4E-1 /YES, ERROR
1666 3534 DB3-1 /LATCH ERROR
1667 7775 -3 /MASK EXPECTED RECEIVED"
1670 4446 JMP IN6A /NUMBER OF WORDS TO BE OUTPUT
1671 5244 ISZ DATA4 /TEST FOR LOOP ON SAME DATA,ESCAPE ON DATA ERROR
1672 2024 JMP IN6A /LOOP WITH SAME DATA
1673 5244 JMS I XLOOP1 /INCREMENT DATA PATTERN
1674 4445 JMP IN6+3 /CONTINUE TEST
1675 5242 /CHECK FOR LOOP ON CURRENT TEST
/LOOP ON CURRENT TEST

```

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/VERIFY THAT ALL LATCHING LINES CAN BE CLEARED INDEPENDENTLY

```

1676 3030 DCA TYPFLG /CLEAR ERROR FLAG
1677 1177 TAD C=62 /SET ITERATION COUNT
1678 3031 DCA LPCNT /TO 50(DECIMAL)
1679 3024 DCA DATA4 /CLEAR TEST
1680 6007 CAF FJUMPER /INITIALIZE INTERFACE
1681 1027 TAD IN7A, /GET MASK FOR LATCHING BITS
1682 7040 CMA /MASK OFF NON LATCHING BITS
1683 5272 JMP DB90 /SAVE FOR TRANSMISSION
1684 4440 DB90 /GET TEST
1685 4437 DBCO /COMPLIMENT GET
1686 7300 CLA CLL
1687 4436 DBR1
1690 3023 DCA DATA3 /READ INPUT REGISTER
1691 1023 TAD DATA3 /SAVE REGISTER DATA
1692 7650 SNA CLA /GET RECEIVED DATA
1693 5270 JMP IN6 /DID ANY BITS HOLD DATA
1694 4444 JMS I XERROR /DATA CORRECT, CONTINUE
1695 4026 IN4E-1 /YES, ERROR
1696 3534 DB3-1 /LATCH ERROR
1697 7775 -3 /MASK EXPECTED RECEIVED"
1700 4446 JMP IN6A /NUMBER OF WORDS TO BE OUTPUT
1701 5244 ISZ DATA4 /TEST FOR LOOP ON SAME DATA,ESCAPE ON DATA ERROR
1702 2024 JMP IN6A /LOOP WITH SAME DATA
1703 5244 JMS I XLOOP1 /INCREMENT DATA PATTERN
1704 4445 JMP IN6+3 /CONTINUE TEST
1705 5242 /CHECK FOR LOOP ON CURRENT TEST
1706 5242 /LOOP ON CURRENT TEST

```

1710	3022	DCA	DATA2	/E1	TEST RESULT
1711	7040	CMA		/SE	OUTPUT REGISTER=7777
1712	4440	DBSO		/BIT	SET OUTPUT REGISTER
1713	4437	DBCO		/BIT	CLEAR OUTPUT REGISTER
1714	7300	CLA CLL	DATA1	/GET	TEST DATA
1715	1021	TAD		/BIT	CLEAR INPUT REGISTER
1716	4435	DBCI			
1717	7300	CLA CLL		/READ	INPUT REGISTER
1720	4436	DBRI		/SAVE	REGISTER DATA
1721	3023	DCA	DATA3	/GET	EXPECTED RESULT
1722	1022	TAD	DATA2		
1723	7041	CIA		/COMPARE	TO RECEIVED DATA
1724	1023	TAD	DATA3	/ARE	THEY THE SAME
1725	7650	SNA CLA		/DATA	CORRECT, CONTINUE
1726	5333	JMP	+5	/NO,	ERROR
1727	4444	JMS I	XERROR	/LATCH	ERROR
1730	4026	IN4E-1		/MASK	EXPECTED RECEIVED
1731	3534	DH3-1		/NUMBER	OF WORDS TO BE OUTPUT
1732	7775	-3		/TEST	FOR LOOP ON SAME DATA, ESCAPE ON DATA ERROR
1733	4446	JMS I	XLOOP2	/LOOP	WITH SAME DATA
1734	5302	JMP	IN7A	/INCREMENT	DATA PATTERN
1735	2024	ISE	DATA4	/CONTINUE	TEST
1736	5302	JMP	IN7A	/CHECK	FOR LOOP ON CURRENT TEST
1737	4445	JMS I	XLOOP1	/LOOP	ON CURRENT TEST
1740	5301	JMP	IN7+3	/GO	TO NEXT TEST
1741	5777	JMP	IN8		
1777	2000				

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/WITH THE INPUT REGISTER CLEARED, DOES CLEARING
/THE INPUT REGISTER SET ANY BIT IN INPUT

2000	3030	DCA	IN8,	/CLEAR	ERROR FLAG
2001	1177	TAD		/SET	ITERATION COUNT
2002	3031	DCA		/TO	50 (DECIMAL)
2003	3021	DCA	DATA1	/CLEAR	TEST DATA
2004	3022	DCA	DATA2	/CLEAR	EXPECTED RESULT
2005	6007	CAF		/INITIALIZE	INTERFACE
2006	1021	TAD	DATA1	/GET	TEST DATA
2007	4435	DBCI		/BIT	CLEAR INPUT REGISTER
2010	7300	CLA CLL			
2011	4436	DBRI		/READ	INPUT REGISTER
2012	3023	DCA	DATA3	/SAVE	REGISTER DATA
2013	1023	TAD	DATA3	/GET	REGISTER DATA
2014	7650	SNA CLA		/IS	INPUT REGISTER 0
2015	5222	JMP	+5	/DATA	CORRECT, CONTINUE
2016	4444	JMS I	XERROR	/NO,	ERROR
2017	4003	IN2E-1		/DBCI	ERROR
2020	3534	DH3-1		/MASK	EXPECTED RECEIVED
2021	7775	-3		/NUMBER	OF DATA WORDS
2022	4446	JMS I	XLOOP2	/TEST	FOR LOOP WITH SAME DATA
2023	5205	JMP	IN8A	/LOOP	WITH SAME DATA
2024	2021	ISE	DATA1	/INCREMENT	DATA PATTERN
2025	5205	JMP	IN8A	/CONTINUE	
2026	4445	JMS I	XLOOP1	/CHECK	FOR LOOP ON CURRENT TEST
2027	5203	JMP	IN8+3	/LOOP	ON CURRENT TEST

```

/DOES READING THE INPUT REGISTER TWICE
/CHANGE THE INPUT REGISTER
/
DCA          TYPELG
TAD          C=62
DCA          LPCNT
DCA          DATA1
CAF          DATA1
TAD          DATA1
DBSO         DATA1
CLA CLL
DBRI         DATA1
CLA CLL
DBRI         DATA1
DCA          DATA2
TAD          DATA1
CIA          DATA2
SNA CLA
JMP          +5
JMS I        XERROR
IN9E=1
DH4=1
-2
JMS I        XLOOP2
JMP          IN9A
ISZ          DATA1
JMP          IN9A
JMS I        XLOOP1
JMP          IN9+3
IN9,
2030 3030
2031 1177
2032 3031
2033 3021
2034 6007
2035 1021
2036 4440
2037 7300
2040 4436
2041 7300
2042 4436
2043 3022
2044 1021
2045 7041
2046 1022
2047 7650
2050 5255
2051 4444
2052 4034
2053 3560
2054 7776
2055 4446
2056 5234
2057 2021
2060 5234
2061 4445
2062 5233

```

```

/DOES CLEARING INPUT REGISTER TWICE SET ANY BIT
/IN INPUT REGISTER
/
DCA          TYPELG
TAD          C=62
DCA          LPCNT
DCA          DATA2
DCA          DATA1
CAF          DATA1
TAD          DATA1
DBSO         DATA1
DBCO         DATA3
DBCI         DATA3
CLA CLL
DBRI         DATA3
DCA          DATA3
TAD          DATA3
SNA CLA
JMP          +5
JMS I        XERROR
IN10A,
2063 3030
2064 1177
2065 3031
2066 3022
2067 3021
2070 6007
2071 1021
2072 4440
2073 4437
2074 4435
2075 4435
2076 7300
2077 4436
2100 3023
2101 1023
2102 7650
2103 5310
2104 4444
2 4003
2 3534

```

/"DBCI r" r" /"MASK L /CTED RECEIVED"

```

)07 7775 /NUMP OF DATA WORDS
)10 4446 /TEST R LOOP WITH SAME DATA
2111 5270 /LOOP WITH SAME DATA
2112 2021 /INCREMENT DATA PATTERN
2113 5270 /CONTINUE
2114 4445 /CHECK FOR LOOP ON CURRENT TEST
2115 5266 /LOOP ON CURRENT TEST
2116 5777 /GO TO NEXT TEST
2177 2200
2200

```

/MAINDEC-8E-000 PAL10 PAGE 24

```

-3 JMS I XLOOP2 /CLEAR ERROR FLAG
JMS I IN10A /SET ITERATION COUNT
ISZ DATA1 /TO 50 (DECIMAL)
JMS I IN10A /CLEAR TEST DATA
JMS I XLOOP1 /CLEAR EXPECTED RESULT
JMP IN10+3 /INITIALIZE INTERFACE
JMP INOU1 /GET TEST DATA
/GO TO NEXT TEST /BIT CLEAR OUTPUT REGISTER

/READ INPUT REGISTER
/SAVE REGISTER DATA
/GET REGISTER DATA
/IS OUTPUT REGISTER 0
/NO, ERROR
/DBCO ERROR
/MASK EXPECTED RECEIVED"
/NUMBER OF DATA WORDS
/TEST FOR LOOP WITH SAME DATA
/LOOP WITH SAME DATA
/INCREMENT DATA PATTERN
/CONTINUE
/CHECK FOR LOOP ON CURRENT TEST
/LOOP ON CURRENT TEST

```

/MAINDEC-8E-000 PAL10 PAGE 25

```

-3 JMS I XLOOP2 /CLEAR ERROR FLAG
JMS I IN10A /SET ITERATION COUNT
ISZ DATA1 /TO 50 (DECIMAL)
JMS I IN10A /CLEAR TEST DATA
JMS I XLOOP1 /CLEAR EXPECTED RESULT
JMP IN10+3 /INITIALIZE INTERFACE
JMP INOU1 /GET TEST DATA
/GO TO NEXT TEST /BIT CLEAR INPUT REGISTER

/READ INPUT REGISTER
/SAVE REGISTER DATA
/GET REGISTER DATA
/IS OUTPUT REGISTER 0
/NO, ERROR
/DBCO ERROR
/MASK EXPECTED RECEIVED"
/NUMBER OF DATA WORDS
/TEST FOR LOOP WITH SAME DATA
/LOOP WITH SAME DATA
/INCREMENT DATA PATTERN
/CONTINUE
/CHECK FOR LOOP ON CURRENT TEST
/LOOP ON CURRENT TEST

```

```

2243 1023      TAD      DATA3
2244 7650      SNA CLA
2245 5252      JMP      I+5
2246 4444      JMS I    XERROR
2247 4003      IN2E=1
2250 3534      DB3=1
2251 7775      -3
2252 4446      JMS I    XLOOP2
2253 5235      JMP      INOU2A
2254 2021      ISZ      DATA1
2255 5235      JMP      INOU2A
2256 4445      JMS I    XLOOP1
2257 5233      JMP      INOU2+3
/
/GET REGISTER DATA
/IS OUTPUT REGISTER 0
/IS DATA CORRECT, CONTINUE
/NO, ERROR
/"DBCI ERROR"
/"MASK EXPECTED RECEIVED"
/NUMBER OF DATA WORDS
/TEST FOR LOOP WITH CURRENT DATA
/LOOP WITH SAME DATA
/INCREMENT DATA PATTERN
/CONTINUE
/CHECK FOR LOOP ON CURRENT TEST
/LOOP ON CURRENT TEST
/
/WITH THE OUTPUT REGISTER SET TO ALL 1S, AND
/THE INPUT REGISTER CLEARED, DOES SELECTIVELY
/CLEARING THE OUTPUT REGISTER SET ANY BIT IN
/THE INPUT REGISTER
/
INOU3,      DCA      TYPFLG
2260 3030      TAD      I=62
2261 1177      DCA      LPCNT
2262 3031      DCA      DATA1
2263 3021      DCA      DATA2
2264 3022      CAP
2265 6007      CMA
2266 7040      DBSO
2267 4440      DBCI
2270 4435      CLA CLL
2271 7300      TAD      FJUMPER
2272 1027      CMA
2273 7040      DCA
2274 3022      DATA2
2275 1021      DATA1
2276 7040      AND
2277 0022      DATA2
2278 3022      DCA
2279 1021      TAD
2280 4437      DBCO
2281 7300      CLA CLL
2282 4436      DBRI
/
INOU3A,
2260 3030      /CLEAR ERROR FLAG
2261 1177      /SET ITERATION COUNT
2262 3031      /TO 50 (DECIMAL)
2263 3021      /CLEAR TEST DATA
2264 3022      /CLEAR EXPECTED RESULT
2265 6007      /INITIALIZE INTERFACE
2266 7040      /SET AC=7777
2267 4440      /BIT SET OUTPUT REGISTER
2270 4435      /BIT CLEAR INPUT REGISTER
2271 7300      /GET FLIPFLOP JUMPER MASK
2272 1027
2273 7040
2274 3022
2275 1021
2276 7040
2277 0022
2278 3022
2279 1021
2280 4437
2281 7300
2282 4436
/GET TEST DATA2
/COMPLEMENT
/AND WITH COMPLEMENT OF JUMPER MASK
/TO GET EXPECTED RESULT
/GET TEST DATA
/BIT CLEAR OUTPUT REGISTER
/READ INPUT REGISTER
/
1155      PAGE 25=1
/SAVE REGISTER DATA
/GET REGISTER DATA
/COMPARE TO EXPECTED RESULT
/ARE THEY THE SAME
/NO, ERROR
/"DBCO ERROR"
/"MASK EXPECTED RECEIVED"
/NUMBER OF DATA WORDS
/TEST FOR LOOP WITH SAME DATA
/LOOP WITH SAME DATA
/INCREMENT DATA PATTERN
/CONTINUE
/CHECK FOR LOOP ON CURRENT TEST
/LOOP 0 )CURRENT TEST
/
V141      14=JUL=71
DCA      DATA3
TAD      DATA3
CIA
TAD      DATA2
SNA CLA
JMP      I+5
JMS I    XERROR
OUT4E=1
DB3=1
-3
JMS I    XLOOP2
JMP      INOU3A
ISZ      DATA1
JMP      INOU3A
JMS I    XLOOP1
JMP      INOU3+3
/
/MAINDEC=8E=000 PAL10
2305 3023
2306 1023
2307 7041
2310 1022
2311 7650
2312 5317
2313 4444
2314 3767
2315 3534
2316 7775
2317 4446
2320 5265
2321 2021
2322 5265
2323 4445
2324 5263

```

```

)
/ WITH THE INPUT REGISTER SET / ALL IS DOES SELECTIVE
/ CLEARING THE OUTPUT REGISTER / CLEAR ANY BITS IN THE IN
/ REGISTER (EXCEPT THOSE NOT FLIPFLOPS)
/
INOU4, 3030 /CLEAR ERROR FLAG
2325 3030 /SET ITERATION COUNT
2326 1177 /TO 50 (DECIMAL)
2327 3031 /CLEAR TEST DATA
2330 3021 /INITIALIZE INTERFACE
2331 6007 /SET AC TO 7777
2332 7040 /BIT SET OUTPUT REGISTER
2333 4440
2334 7300 /GET FLIPFLOP JUMPER MASK
2335 1027 /COMBINE WITH MASK
2336 7040
2337 0021
2340 7040
2341 3022 /TO GET EXPECTED RESULT
2342 1021 /GET TEST DATA
2343 4437 /BIT CLEAR OUTPUT REGISTER
2344 7300
2345 4436
2346 3023 /READ INPUT REGISTER
2347 1022 /SAVE REGISTER DATA
2350 7041 /GET EXPECTED RESULT
2351 1023 /COMPARE TO RECEIVED DATA
2352 7650 /ARE THEY THE SAME
2353 5360 /DATA CORRECT, CONTINUE
2354 4444 /NO, ERROR
2355 3767 /"DBCO ERROR"
2356 3534 /"MASK EXPECTED RECEIVED"
2357 7775 /NUMBER OF DATA WORDS
2360 4446 /TEST FOR LOOP WITH CURRENT DATA
2361 5331 /LOOP WITH SAME DATA
2362 2021 /INCREMENT DATA PATTERN
2363 5331 /CONTINUE
2364 4445 /CHECK FOR LOOP ON CURRENT TEST
2365 5330 /LOOP ON CURRENT TEST
2366 5777 /GO TO NEXT TEST
2377 2400

```

/MAINDEC-8E-000 PAL10 V141 14-JUL-71 1155 PAGE 25-2

2400 PAGE

/MAINDEC-8E-000 PAL10 V141 14-JUL-71 1155 PAGE 26

```

/ VERIFY THAT EACH BIT SET UP TO SKIP DOES
/
INT1, 3030 /CLEAR ERROR FLAG
2400 3030 /SET ITERATION COUNT
2401 1177 /TO 50(DECIMAL)
2402 3031 /INITIALIZE INTERFACE
2403 3022
2404 6007
2405 1022
2406 0026
2407 7450
2410 5241
2411 3021 /SAVE TEST DATA

```

2412	TAD	DATA1	/BIT SET OUTPUT REGISTER
2413	DBSO		
2414	CLA CLL		
2415	SRQ		/IS INTERRUPT ACTIVE =
2416	JMP	+5	/NO, CONTINUE
2417	JMS I	XERROR	/YES, ERROR
2420	INT1E=1		/INTERRUPT ACTIVE
2421	DH1=1		
2422	-1		/NUMBER OF DATA WORDS TO BE OUTPUT
2423	DBEI		/ENABLE INTERFACE
2424	SRQ		/IS INTERRUPT ACTIVE
2425	JMP	INT1AE	/NO, ERROR
2426	DBSK		/IS FLAG SET
2427	JMP	INT1BE	/NO, ERROR
2430	JMP	INT1OK	/INTERRUPT ACTIVE, FLAG SET
2431	DBSK		/IS INTERFACE FLAG SET
2432	JMP	INT1CE	
2433	JMS I	XERROR	/NO, ERROR
2434	INT1E=1		
2435	DH1=1		
2436	-1		/NUMBER OF WORDS TO BE OUTPUT
2437	JMS I	XLOOP2	/TEST FOR LOOP ON SAME DATA, ESCAPE ON DATA ERROR
2440	JMP	INT1A	/LOOP WITH SAME DATA
2441	ISZ	DATA2	/INCREMENT DATA PATTERN
2442	JMP	INT1A	/CONTINUE
2443	JMS I	XLOOP1	/CHECK FOR LOOP ON CURRENT TEST
2444	JMP	INT1+3	/LOOP ON CURRENT TEST
2445	JMP	INT3	/GO TO NEXT TEST
2446	JMS I	XERROR	/NO, ERROR
2447	INT3E=1		
2450	DH1=1		
2451	-1		/NUMBER OF WORDS TO BE OUTPUT
2452	JMP	INT1OK	
2453	JMS I	XERROR	/NO, ERROR
2454	INT4E=1		
2455	DH1=1		
2456	-1		/NUMBER OF WORDS TO BE OUTPUT
2457	JMP	INT1OK	

2460	INT3,	TYPFLG	/CLEAR ERROR FLAG
2461	TAD	C=62	/SET ITERATION COUNT
2462	DCA	LPCNT	/TO 50 (DECIMAL)
2463	DCA	DATA2	/CLEAR TEST DATA
2464	CAF	IJUMPER	/INITIALIZE INTERFACE
2465	TAD	CMA	/GET JUMPER MASK
2466	AND	DATA2	/COMPLEMENT FOR NO SKIP BITS
2467	SNA	INT3C	/GET BITS TO BE TESTED
2470	JMP	DATA1	/ARE ANY BITS TO BE TESTED
2471	DCA	DATA1	/NO, GET NEXT DATA PATTERN
2472	TAD	DBSO	/SAVE FOR OUTPUT
2473	DBSK		/GET TEST DATA
2474	CLA CLL		/BIT SET OUTPUT REGISTER
2475	DBSK		
2476	JMP	+5	/IS FLAG
2477			/NO, CONT

2480	INT3,	TYPFLG	/CLEAR ERROR FLAG
2481	TAD	C=62	/SET ITERATION COUNT
2482	DCA	LPCNT	/TO 50 (DECIMAL)
2483	DCA	DATA2	/CLEAR TEST DATA
2484	CAF	IJUMPER	/INITIALIZE INTERFACE
2485	TAD	CMA	/GET JUMPER MASK
2486	AND	DATA2	/COMPLEMENT FOR NO SKIP BITS
2487	SNA	INT3C	/GET BITS TO BE TESTED
2490	JMP	DATA1	/ARE ANY BITS TO BE TESTED
2491	DCA	DATA1	/NO, GET NEXT DATA PATTERN
2492	TAD	DBSO	/SAVE FOR OUTPUT
2493	DBSK		/GET TEST DATA
2494	CLA CLL		/BIT SET OUTPUT REGISTER
2495	DBSK		
2496	JMP	+5	/IS FLAG
2497			/NO, CONT

/VERIFY THAT EACH BIT NOT JUMPERD TO SKIP DOES NOT

```

000 4444 JMS I XERROR /YES, /ROR
001 3674 INIT3E=1 /MSK1 /LAG SET*
2502 3515 DH1=1 /"REGISTER DATA"
2503 7777 -1
2504 4446 JMS I XLOOP2
2505 5264 JMP INT3A
2506 2022 ISZ DATA2
2507 5264 JMP INT3A
2510 4445 JMS I XLOOP1
2511 5263 JMP INT3+3
2512 5777 JMP EPASS

/MAINDEC=8E-D00 PAL10 V141 14-JUL-71 1155 PAGE 28

/ERROR HANDLER
/

PAGE
ERROR,
2577 3257
2600 2600 CLA CLL
2601 7300 TAD I ERROR
2602 1600 DCA MSG
2603 3234 ISZ ERROR
2604 2200 TAD I ORDER
2605 1600 DCA ORDER
2606 3236 ISZ ERROR
2607 2200 TAD I DATCNT
2610 1600 DCA ERROR
2611 3264 TAD (-3)
2612 1200 DCA LSTOGT
2613 1377 TAD LSTOGT
2614 3776 DCA ERRAD
2615 1776 DCA LAS
2616 3266 LAS
2617 7604 AND SR01
2620 0334 SZA CLA
2621 7640 JMP EHALL
2622 5254 TAD TYPFLG
2623 1030 SZA CLA
2624 7640 JMP DATOUT
2625 5241 CMA
2626 7040 DCA TYPFLG
2627 3030 DCA OCTASC
2630 4775 JMS I XPRINT
2631 4442 JMS I XPRINT
2632 3024 ERADR=i
2633 4442 JMS I XPRINT
2634 0000 JMS I XPRINT
2635 4442 JMS I XPRINT
2636 0000 JMS I XPRINT
2637 4442 CRLF-1
2640 3512 SNA CLA
2641 1264 TAD DATCNT
2642 7650 JMP EHALL
2643 5254 TAD DATAP
2644 1265 DCA POINT1
2645 3010 TAD I POINT1
2646 1410 JMS BITOUT
2647 4774 JMS BITOUT
2650 2264 ISZ DATCNT

/NUMBER OF WORDS TO BE OUTPUT

```

```

2651 5246 JMP BITS
2652 4442 JMS I XPRINT
2653 3512 CRLF-1
2654 7604 LAS
2655 0333 AND SR00
2656 7640 SZA CLA
2657 5262 JMP I+3
2660 1266 TAD ERRAD
2661 7402 HLT

```

/MAINDEC-8E-000 PAL10 V141 14-JUL-71 1155 PAGE 28-1

```

2662 2200 ISZ ERROR
2663 5600 JMP I ERROR
2664 0000 DATCNT, 0
2665 0020 DATAP, DATA1-1
2666 0000 ERRAD, 0

```

/TEST FOR LOOP ON CURRENT TEST

```

2667 0000 LOOP1, 0
2670 1030 TAD TYPFLG
2671 7650 SNA CLA
2672 5277 JMP LPIEXA
2673 7604 LAS
2674 0341 AND SR06
2675 7640 SZA CLA
2676 5310 JMP LPIEXX-1
2677 7604 LAS
2678 0340 AND SR05
2679 7640 SZA CLA
2680 5305 JMP LPIEXT
2681 2031 ISZ LPCNT
2682 5311 JMP LPIEXX
2683 7604 LAS
2684 0335 AND SR02
2685 7650 SNA CLA
2686 2267 ISZ LOOP1
2687 5667 JMP I LOOP1

```

/TEST FOR LOOP ON CURRENT DATA

```

2712 0000 LOOP2, 0
2713 1030 TAD TYPFLG
2714 7650 SNA CLA
2715 5326 JMP LP2EXT
2716 7604 LAS
2717 0341 AND SR06
2718 7650 SNA CLA
2719 5326 JMP I+5
2720 1312 TAD LOOP2
2721 1373 TAD (5
2722 3312 DCA LOOP2
2723 5712 JMP I LOOP2
2724 7604 LAS
2725 0336 AND SR03
2726 7650 SNA CLA
2727 2312 ISZ LOOP2
2728 5712 JMP I LOOP2
2729 4000 SR00, 4000

```

/DATA CORRECT, CONTINUE

2734 2000 SR01.
35 1000 SR02.
36 0400 SR03.
2737 0200 SR04.
2740 0100 SR05.
2741 0040 SR06.
40

/OCTAL TO PACKED ASCII CONVERSION

2773 0005
2774 3031
2775 3000
2776 3027
2777 7775
3000
3000 OCTASC, 0
3001 CLA CLL
3002 TAD LSTOGT
3003 BSW
3004 JMS
3005 DCA
3006 TAD
3007 JMS
3010 DCA
3011 JMP I
3012 0
3013 AND
3014 MQL
3015 MQA
3016 7106
3017 7004
3020 0376
3021 7501
3022 0376
3023 1375
3024 5612
3025 3736
3026 4040
3027 4040
3030 4000

SPLIT,
/GET WORD TO BE CONVERTED
/SWAP HALVES, SEPARATE DIGITS,
/CONVERT MOST SIGNIFICANT
/DIGITS TO ASCII
/CONVERT LEAST SIGNIFICANT
/DIGITS TO ASCII
/RETURN

ERADR, TEXT /
/OUTPUT 12 BIT BINARY WORD

3031 0000
3032 7421
3033 1374
3034 3020
3035 7501
3036 7104
3037 7421
3040 1373
3041 7420
3042 0372
3043 4443
3044 2020
3045 5235
3046 1371

BITOUT, 0
MQL
TAD
DCA
MQL
CLL RAL
MQL
TAD
SNL
AND
JMS I
ISZ
JMP
TAD

/SAVE DATA IN MQ
/SET UP TO OUTPUT
/12 BITS
/GET DATA
/GET MSB INTO LINK
/SAVE REST OF WORD
/GET ASCII 1 INTO AC
/IS BIT=1
/NO, CHANGE TO ASCII 0
/OUTPUT BIT
/CONTINUE
/TYPE 2 SPACES

3047	4443	JMS I	XTYPE	/AFTER LAST BIT HAS BEEN
3050	1371	TAD	(240	/OUTPUTED
3051	4443	JMS I	XTYPE	
3052	5631	JMP I	BITOUT	/RETURN
/MAINDEC-8E-000 PAL10			V141	14-JUL-71
				155
				PAGE 30

/CHARACTER STRING OUTPUT ROUTINE

[illegible]

/UNPACK, DECODE, OUTPUT

```

TYPESET, 0      K0077      /MASK UNWANTED BITS
AND             /IS AC=0
SNA             /YES, END OF MESSAGE, EXIT
JMP I          /SUBTRACT 40
TAD            /IS PACKED CHARACTER >40
SPA           /NO
JMP           /YES, CONVERT TO ASCII
JMP           /OUTPUT
TAD           /ADD 1 TO AC
JMP           /IS CHARACTER=37
TAD           /NO,
JMP           /GET CODE FOR CARRIAGE RETURN
TAD           /OUTPUT
JMP           /ADD 1 TO AC
JMP           /IS CHARACTER=37
TAD           /NO
JMP           /GET CODE FOR LINE FEED
TAD           /OUTPUT
JMP           /PACKED CHARACTER >40, CONVERT TO ASCII
TAD           /OUTPUT
JMS I          MTP,
JMP I          JMP I XTYPE
JMP I          TYPSET
77
K0077,
M40, -40
K215, 215
K212, 212

```

247 0336 K336, 336
50 0240 K240, 240
/MAINDEC=8E-D00 PAL10 V141 14-JUL-71 1155 PAGE 30-I

/OUTPUT ONE CHARACTER TO TTY

3251 0000 TYPE,
3252 6046
3253 6041 TLS
3254 5253 TSF
3255 7200 CLA
3256 5651 JMP I TYPE

3257 7604 EPASS,
3260 0777 LAS
3261 7640 AND SR04
3262 5776 SZA CLA
3263 7604 JMP
3264 0775 LAS
3265 7640 AND SR05
3266 5272 SZA CLA
3267 4442 JMP
3270 3274 JMS I
3271 5776 MEP-1
3272 1374 JMP
3273 4251 EPASI,
3274 5776 TAD
3275 3736 JMS
3276 0422 JMP
3277 0000 MEP, TEXT

/MAINDEC=8E-D00 PAL10 V141 14-JUL-71 1155 PAGE 31

/TELETYPE MESSAGES

3374 0207
3375 2740
3376 0400
3377 2737
3400 3736
3401 2305
3402 2440
3403 2322
3404 4006
3405 1722
3406 4004
3407 0526
3410 1103
3411 0540
3412 0317
3413 0405
3414 4001
3415 1604
PAGE
M1,
TEXT /-SET SR FOR DEVICE CODE AND CONTY

M2,	TEXT	/*SET SR FOR INTERRUPT JUMPERS AND CONT/
3416 4003		
3417 1716		
3420 2400		
3421 3736		
3422 2305		
3423 2440		
3424 2322		
3425 4006		
3426 1722		
3427 4011		
3430 1624		
3431 0522		
3432 2225		
3433 2024		
3434 4012		
3435 2515		
3436 2005		
3437 2223		
3440 4001		
3441 1604		
3442 4003		
3443 1716		
3444 2400		
3445 3736		
3446 2305		
3447 2440		
3450 2327		
3451 1124		
3452 0310		
3453 0523		
3454 4006		
3455 1722		
/MAINDEC=8E-D00 PAL10 V141 14-JUL-71 1155 PAGE 31-1		
M2A,	TEXT	/*SET SWITCHES FOR FLIPFLOP JUMPERS AND CONTINUE/
3456 4006		
3457 1411		
3460 2006		
3461 1417		
3462 2040		
3463 1225		
3464 1520		
3465 0522		
3466 2340		
3467 0116		
3470 0440		
3471 0317		
3472 1624		
3473 1116		
3474 2505		
3475 0000		
3476 3736		
3477 2305		
M3,	TEXT	/*SET SR FOR RUN AND CONT/
3500 2440		
3501 2322		
3502 4006		
3503 1722		
3504 4022		
2516		
4001		

3507 1604
3508 4003
3511 1716
3512 2400
3513 3736
3514 0000

CRLF, TEXT /*/
/ DATA HEADERS
/

3515 0000
3516 3736
3517 2205
3520 0711
3521 2324
3522 0522
3523 4004
3524 0124
3525 0100
3526 3736
3527 0103
3530 4003
3531 1716
3532 2405
3533 1624
3534 2300
3535 3736
3536 1501
3537 2313
3540 4040
3541 4040

DH0, 0
DH1, TEXT /*REGISTER DATA/
/

DH2, TEXT /*AC CONTENTS/
/

DH3, TEXT /*MASK EXPECTED RECEIVED/
/

/MAINDEC-8E-000 PAL10 V141 14-JUL-71 1155 PAGE 31-2

3542 4040
3543 4040
3544 4040
3545 0530
3546 2005
3547 0324
3550 0504
3551 4040
3552 4040
3553 4040
3554 2205
3555 0305
3556 1126
3557 0504
3560 0000
3561 3736
3562 0530
3563 2005
3564 0324
3565 0504
3566 4040
3567 4040
3570 4040
3571 2205
3572 0305
3573 1126
3574 0504

DH4, TEXT /*EXPECTED RECEIVED/
/

DM5,	TEXT	/AC REGISTER	DATA OUT	DATA IN/
3575	0000			
3576	3736			
3577	2205			
3600	0711			
3601	2324			
3602	0522			
3603	4040			
3604	4040			
3605	4040			
3606	4004			
3607	0124			
3610	0140			
3611	1725			
3612	2440			
3613	4040			
3614	4040			
3615	4040			
3616	0401			
3617	2401			
3620	4011			
3621	1600			
3622	3736			
3623	0103			
3624	4003			
3625	1716			
3626	2405			
3627	1624			
3630	2340			

/MAINDEC-8E-D00 PAL10 V141 14-JUL-71 1155 PAGE 31-3

DM6,	TEXT	/AC CONTENTS	DATA OUT	DATA IN/
3631	4040			
3632	4004			
3633	0124			
3634	0140			
3635	1725			
3636	2440			
3637	4040			
3640	4040			
3641	4040			
3642	0401			
3643	2401			
3644	4011			
3645	1600			

/ERROR MESSAGE

INITIE, TEXT /OUTPUT REG NOT CLEARED/

3646	1725			
3647	2420			
3650	2524			
3651	4022			
3652	0507			
3653	4016			
3654	1724			
3655	4003			
3656	1405			
3657	0122			
3660	0504			
3	0000			
3	1116			

INIT2E, TEXT /INPUT REG NOT CLEARED/

3663 2025
3664 2440
3665 2205
3666 2740
3667 1617
3670 2440
3671 0314
3672 0501
3673 2205
3674 0400
3675 2313
3676 1120
3677 4006
3700 1401
3701 0740
3702 2305
3703 2400
3704 0402
3705 2217
3706 4004
3707 1104
3710 4016
3711 1724
3712 4003
3713 1405
3714 0122

INIT3E, TEXT /SKIP FLAG SET/

TRAN1E, TEXT /DBRO DID NOT CLEAR AC/

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3715 4001
3716 0300
3717 0402
3720 2211
3721 4004
3722 1104
3723 4016
3724 1724
3725 4003
3726 1405
3727 0122
3730 4001
3731 0300
3732 0402
3733 2317
3734 4003
3735 1001
3736 1607
3737 0504
3740 4001
3741 0300
3742 0402
3743 0317
3744 4003
3745 1001
3746 1607
3747 0504
3750 4001
3751 0300
3752 0402
3753 0311

TRAN2E, TEXT /DBRI DID NOT CLEAR AC/

TRAN3E, TEXT /DBSO CHANGED AC/

TRAN4E, TEXT /DBC0 CHANGED AC/

TRAN5E, TEXT /DBC1 CHANGED AC/

3754 4003
3755 1001
3756 1607
3757 0504
3760 4001
3761 0300
3762 0402
3763 2317
3764 4005
3765 2222
3766 1722
3767 0000
3770 0402
3771 0317
3772 4005
3773 2222
3774 1722
3775 0000
3776 0402
3777 2217
4000 4005
4001 2222
4002 1722
4003 0000

OUT1E, TEXT /DBSO ERROR/

OUT4E, TEXT /DBCO ERROR/

OUT7E, TEXT /DBRO ERROR/

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4004 0402
4005 0311
4006 4005
4007 2222
4010 1722
4011 0000
4012 1116
4013 2025
4014 2440
4015 2205
4016 0711
4017 2324
4020 0522
4021 4004
4022 0124
4023 0140
4024 0522
4025 2217
4026 2200
4027 1401
4030 2403
4031 1040
4032 0522
4033 2217
4034 2200
4035 0402
4036 2211
4037 4005
4040 2222
4041 1722
4042 0000
4 1116
4 2405

IN2E, TEXT /DBCI ERROR/

IN3E, TEXT /INPUT REGISTER DATA ERROR/

IN4E, TEXT /LATCH ERROR/

IN9E, TEXT /DBRI ERROR/

INT1E, TEXT /INTERRUPT ACTIVE/

4045 2222
4046 2520
4047 2440
4050 0103
4051 2411
4052 2605
4053 0000
4054 1617
4055 4011
4056 1624
4057 0522
4060 2225
4061 2024
4062 5440
4063 2313
4064 1120
4065 0000
4066 1116
4067 2405
4070 2222
4071 2520
4072 2454

INT2E, TEXT /NO INTERRUPT, SKIP/

INT3E, TEXT /INTERRUPT, NO SKIP/

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4073 4016
4074 1740
4075 2313
4076 1120
4077 0000
4100 1617
4101 4011
4102 1624
4103 0522
4104 2225
4105 2024
4106 5440
4107 1617
4110 4023
4111 1311
4112 2000
4113 1617
4114 4023
4115 1311
4116 2000
4117 2313
4120 1120
4121 0000

INT4E, TEXT /NO INTERRUPT, NO SKIP/

INT5E, TEXT /NO SKIP/

INT6E, TEXT /SKIP/

S

0177 7716

/MAINDEC=8E-D00 PAL10 V141 14-JUL-71 1155 PAGE 31-7

0000 00000000 10000000 11111111 11111111 11111110 00000000 00000000 00000000
0100 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000

[illegible]

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4 7 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040

11-11-41

TTTTT
/MAINDE

2000

4600
4700

5000
5100
5200
5300

5400
5500

5600
5700

6000
6100
6200
6300

6400
6500

6600
6700

7000
7100
7200
7300

7400
7500

7600
7700

/MAINDEC=8E-000 PAL10	V141	14=JUL=71	1155	PAGE 31=9	
BIT01 3035	IN1B	1420	K0077	3243	SR06 2741
BITOUT 3031	IN2	1434	K212	3246	SRO 6003
BITS 2646	IN2E	4004	K215	3245	START1 0202
BSW 7002	IN3	1466	K240	3250	START2 0244
CAF 6007	IN3A	1472	K336	3247	TR01 0250
CNTR1 0020	IN3E	4012	LOOP1	2667	TRAN1 0400
CRLF 0513	IN4E	4027	LOOP2	2712	TRAN1E 3704
DATA1 0021	IN5	1600	LP1EXA	2677	TRAN2 0477
DATA2 0022	IN5A	1604	LP1EXT	2705	TRAN2E 3717
DATA3 0023	IN5C	1633	LP1EXX	2711	TRAN3 0516
DATA4 0024	IN6	1637	LP2EXT	2726	TRAN3E 3732
DATA5 0025	IN6A	1644	LPCNT	0031	TRAN4 0536
DATAP 2665	IN6C	1672	LSTDGT	3027	TRAN4E 3742
DATCNT 2664	IN7	1676	M1	3400	TRAN5 0556
DATOUT 2641	IN7A	1702	M2	3421	TRAN5E 3752
DBC1 4435	IN7C	1735	M2A	3445	TRAN6 0600

DBCI	0300	IN8	2000	M3	3496	TRAN	0016
DBCO	4437	IN8A	2005	M40	3244	TRAN	0034
DBCOX	0312	IN9	2030	MEP	3295	TYPE	3291
DBDI	4432	IN9A	2034	MESG	2634	TYPE	0030
DBDI	0261	IN9E	4035	MGA	7501	TYPE	3215
DBEI	4433	INIT1	0400	ML	7421	XOBCI	0035
DBEIX	0266	INIT1E	3646	MSTDT	3026	XOBCO	0037
DBRI	4436	INIT2	0416	MTP	3241	XOBDI	0032
DBRIX	0305	INIT2E	3662	OCTASC	3000	XOBEI	0033
DBRO	4441	INIT3	0435	OUT1	1000	XOBR1	0036
DBROX	0324	INIT3E	3675	OUT1E	3762	XOBR0	0041
DBSK	4434	INOU1	2200	OUT2	1033	XOBSK	0034
DBSKX	0273	INOU1A	2205	OUT3	1054	XOBSO	0040
DBSO	4440	INOU2	2230	OUT3A	1060	XERROR	0044
DBSOX	0317	INOU2A	2235	OUT4	1105	XLOOP1	0045
DM0	3515	INOU3	2260	OUT4A	1111	XLOOP2	0046
DM1	3516	INOU3A	2265	OUT4E	3770	XPRINT	0042
DM2	3526	INOU4	2325	OUT5	1200	XTYPE	0043
DM3	3535	INOU4A	2331	OUT5A	1205		
DM4	3561	INT1	2400	OUT6	1230		
DM5	3576	INT1A	2404	OUT6A	1234		
DM6	3622	INT1AE	2431	OUT7	1262		
DMOER	2636	INT1BE	2446	OUT7A	1266		
DIOT	0260	INT1CE	2453	OUT7E	3776		
EHALT	2634	INT1D	2441	OUT8	1315		
EPAS1	3272	INT1E	4043	OUT8A	1322		
EPASS	3257	INT1OK	2437	PNT1	0233		
ERADR	3025	INT2E	4054	POINT1	0010		
ERRAD	2666	INT3	2460	PRINT	3200		
ERROR	0027	INT3A	2464	SPLIT	3012		
FJUMPE	0027	INT3C	2506	SR00	2733		
IJUMPE	0026	INT3E	4066	SR01	2734		
IN1	1400	INT4E	4100	SR02	2735		
IN10	2063	INT5E	4113	SR03	2736		
IN10A	2070	INT6E	4117	SR04	2737		
IN1A	1403	IOTS	0247	SR05	2740		
/MAINDEC-8E-000 PAL10				V141	14-JUL-71	1155	PAGE 31-10

ERRORS DETECTED: 0
 LINKS GENERATED: 18
 RUN-TIME: 18 SECONDS
 3K CORE USED