

CB12

IDENTIFICATION

PRODUCT CODE: MAINDEC 12-D1DA-D(D)
PRODUCT NAME: PDP-12 CHECKERBOARD
DATE CREATED: OCTOBER 20, 1969
MAINTAINER: DIAGNOSTIC GROUP
AUTHOR: HAROLD LONG

RSW: 0007 for 2K core

8MODE

START 20

RSW 4-1 for pass count

WIPED OUT RIM & BIN

COPYRIGHT © 1969
DIGITAL EQUIPMENT CORPORATION

1. ABSTRACT

PDP-12 checkerboard is designed to test the operation of the PDP-12 memory, from 4 to 32K. It accomplishes this by using the L mode instructions LAM (link & AC added to memory, sum in AC and memory), ADM (AC added to memory, sum in AC and memory), and SAE (skip if accumulator is equal to designated memory register). The algorithm used for testing is to first set the memory cell under test to 5252; second, set the AC to 6525, and rotate it into the link one place, resulting in the AC = (1) 5252 (the (1) indicating the link is set); third, a LAM is performed into the test cell and two comparisons made; once for the AC = 2525, and once for memory equal to the AC. Fourth, an ADM is performed; since the AC is now equal to 2525, and memory equal to 2525, the sum will be 5252. Another test of the AC and memory is made. If any of the comparisons fail, an error routine is entered; otherwise, the memory target address is incremented and testing continued.

This test will cycle throughout all available memory, as determined by the right switches.

2. REQUIREMENTS

2.1 Equipment

- a) Any PDP-12 computer, (with or without EXT. memory)
- b) An ASR-33 teletype or equivalent.

2.2 Preliminary Programs

- a) Insure that the binary loader is operating properly.
- b) If this test will not run as indicated, verify processor operation with CP Test 1 (INSTST). No other programs are necessary.

3. LOADING PROCEDURES

3.1 Method

This program must be loaded with the binary loader. If you are unfamiliar with the proper binary loading procedures refer to "Appendix A" of this program, otherwise procede with the following:

- a) Set the teletype reader switch to FREE.
- b) Open the teletype reader and insert the program tape so that the arrows on the tape are visible to and pointing toward the operator.
- c) Close the reader and set the reader switch to START.
- d) Set the teletype front panel switch to ON LINE
- e) Set the LEFT switches to 7777.
- f) Set the RIGHT switches to 4000.
- g) Set the MODE switch to 8 mode.
- h) Depress I/O preset.
- i) Depress START LS.

- j) When the program tape has been read the ACCUMULATOR must be 0000 if it is not, a read-in error has occurred and one might try reloading the binary loader.
- k) Remove the program tape from the reader.

4. STARTING PROCEDURES

- a) Set the RIGHT Switches SR7 thru 11 to the amount of memory available, in 1K segments, within the range 0 to 37. (In a 4K machine this would be 0003).
- b) Set the MODE switch to 8 mode.
- c) Depress I/O preset.
- d) Depress START 20.
- e) The program, when properly running, will cause the data field lights to appear to be counting up, and the teletype bell to ring at intervals dependent upon the amount of memory being tested.
- f) Attempting to test non-existent memory may result in program destruction or false error printouts.

5. ERROR ROUTINE

5.1 Switch Settings

In general, SR0-3 allows selection of the error mode. With all switches equal to zero, the sequence would be:

(HLT) - OPERATOR SELECTS ANY ADDITIONAL ERROR OPTIONS AND
DEPRESSES THE CONTINUE SWITCH -

(ERROR PRINTOUT) - (NEXT CELL TESTED)

SR00 = 1 SUPPRESS HALT

SR01 = 1 SUPPRESS PRINTOUT

SR02 = 1 SCOPE LOOP ON FAILING CELL

SR03 = 1 LOOP ON SELECTED FIELD

With SR03 = 1, the right switches 07-11 must contain the field you wish to test, within the range 0 to 37. The diagnostic will cycle within this field, stopping only in the event of an error.

SR04 = 1 DUMP PASS COUNTER

Setting this switch to a one causes a type out of the contents of the pass counter. A start 20 will set the counter to 0000.

SR05 = 1 INHIBIT BELL RING AT END OF PASS.

5.2 Error Printout

The error printout has the following general form:

LINC	CHKB		
FIELD	LOCN	CONT	ACUM
0007	0400	2524	2525
0007	0400	5202	5202

The message is interpreted as follows:

- FIELD - The data field being tested, within the range 0 to 37.
- LOCN - The 10 bit address within that field.
- CONT - The contents of that location; this should equal the AC.
- ACUM - The contents of the AC. This should equal either 2525 or 5252.

5.3 Error Analysis

Compare the memory contents against the contents of the AC. In the first example, it is apparent that the AC is correct, indicating proper data acquisition, but that memory is bad, indicating poor write response in memory - this could be either inhibit current, memory timing, or bad cores.

In the second example, both memory and the AC are the same, but the data is bad, indicating poor read response. This could be marginal sense amps, memory timing, or bad cores.

These are examples only, and are not to be taken as a hard & fast rule.

OK

```
00000 *20
00001 /PDP-12 CHECKERBOARD, MAINDEC 12-D1DA-L
00002 /COPYRIGHT DIGITAL EQUIPMENT CORP., MAYNARD, MASS.
00003 /
00004 /AUTHOR: HAROLD LONG
00005 /
00006 /THIS TEST IS DESIGNED TO CHECK THE OPERATION
00007 /OF THE PDP-12 INSTRUCTION "LAM".
00008 /IT MAKES USE OF THE "READ-MODIFY-WRITE
00009 /MEMORY CYCLE TO TEST MEMORY RELIABILITY.
00010 /THE PROGRAM OCCUPIES CELLS 0000 TO 0300
00011 /IN BANK 0. IT WILL CHECK ALL OTHER MEMORY
00012 /AVAILABLE.
00013 /THE ALGORITHM USED FOR TESTING IS TO SET
00014 /THE MEMORY CELL UNDER TEST TO 5252, AND THE AC TO 6525.
00015 /THE AC IS ROTATED INTO THE LINC ONE PLACE
00016 /AND A LAM TO THE TEST CELL EXECUTED
00017 /A SAE IS EXECUTED FOR TESTING PURPOSES AND THE
00018 /ROUTINE CONTINUED
00019 /AN ERROR WILL CAUSE ENTRY INTO THE
00020 /ERROR ROUTINE
00021 /
00022 /
00023 /SWITCH SETTINGS:
00024 /
00025 /RSW 00=1, INHIBIT ERROR HALT
00026 /RSW 01=1, INHIBIT ERROR TYPEOUT
00027 /RSW 02=1, SCOPE LOOP ON FAILING CELL
00028 /RSW 03=1, SCOPE LOOP ON SELECTED BANK
00029 /RSW 04=1, DUMP PASS COUNTER
00030 /RSW 05=1, INHIBIT BELL
00031 /
00032 /RSW 07 TO 11 ARE SET TO THE HIGHEST MEMORY BANK AVAILABLE,
00033 /WITHIN THE RANGE 0 TO 37. IN A 4K MACHINE, THIS WOULD BE
00034 /0003; WITH RSW 03=1, THE DESIRED BANK MUST BE IN THE SWITCHES.
00035 /
00036 /
00037 /I/O PRESET TO 8 MODE, START 20
00038 /
00039 EJECT
00040
00041
00042
00043
00044
00045
00046
00047
00048
00049
00050
```

0051	/	TAGS AND CONSTANTS	
0052	/		
0053			
0054			
0055			PMODE
0056			*0001
0057			
0058			
0059			
0060			
0061			
0062			
0063			
0064			
0065			
0066			
0067			
0068			
0069			
0070			
0071			
0072			
0073			
0074			
0075			
0076			

0001	0001	AUT01,	0000
0002	0002	AUT02,	0000
0003	0003	RSWB,	0000
0004	0004	AUT04,	0000
0005	0005	AUT05,	0000
0006	0006	ERROR1,	0000
0007	0007	MESSA,	K215-1
0008	0008	AUT010,	0000
0009	0009	TEMP,	0000
0010	0010	K1026,	1026
0011	0011	K7774,	7774
0012	0012	REG8,	0000
0013	0013	MASK,	0003
0014	0014	K0240,	0240
0015	0015	BANK,	0000
0016	0016		
0017	0017		

0075	/	EJECT
0076		

ADDRESS	INSTR	OPERAND	COMMENT
0077	/		
0100	PMODE		
0101	/		
0102	/MAJOR	START 8 MODE	
0103	/		
0104	*0020		
0105	START,	LINC	/GO TO LINC MODE
0106	LMODE		
0221	0220	5141	
0222	0221	0264	
0223	0222	0000	/RESET PASS COUNTER
0224	0223	0065	/RESET PASS MULTIPLIER
0225	0224	0000	/START WITH BANK 0
0226	0225	5112	/READ THE SWITCHES
0227	0226	0516	/SAVE BITS 07-11
0228	0227	1560	/SAVE FOR ITERATION
0229	0228	7740	/FIXED FIELD?
0230	0229	0003	/CHECK FOR SWITCH 03
0231	0230	0516	/WAS IT THERE?
0232	0231	0516	/SET FOR FIXED FIELD
0233	0232	00121	/SET LOWER LIMIT
0234	0233	7377	/READ THE SWITCHES
0235	0234	0450	/SAVE SW 04
0236	0235	6133	/IS IT SET?
0237	0236	0041	/YES, TYPE PASS COUNTER
0238	0237	0041	/PICK UP LDF
0239	0238	0002	/ADD NEW BANK NUMBER
0240	0239	0516	/RESET INTERNAL LDF
0241	0240	1560	
0242	0241	0043	
0243	0242	0131	
0244	0243	0450	
0245	0244	6333	
0246	0245	1020	
0247	0246	0540	
0248	0247	0217	
0249	0248	0136	
0250	0249	0137	
0251	0250	0200	
0252	0251	0141	
0253	0252	0207	
0254	0253	0054	
0255	0254	0055	
0256	0255	0056	
0257	0256	0143	
0258	0257	0144	
0259	0258	0145	
0260	0259	0146	
0261	0260	0147	
0262	0261	0148	
0263	0262	0149	
0264	0263	0150	
0265	0264	0151	
0266	0265	0152	
0267	0266	0153	
0268	0267	0154	
0269	0268	0155	
0270	0269	0156	
0271	0270	0157	
0272	0271	0158	
0273	0272	0159	
0274	0273	0160	
0275	0274	0161	
0276	0275	0162	
0277	0276	0163	
0278	0277	0164	
0279	0278	0165	
0280	0279	0166	
0281	0280	0167	
0282	0281	0168	
0283	0282	0169	
0284	0283	0170	
0285	0284	0171	
0286	0285	0172	
0287	0286	0173	
0288	0287	0174	
0289	0288	0175	
0290	0289	0176	
0291	0290	0177	
0292	0291	0178	
0293	0292	0179	
0294	0293	0180	
0295	0294	0181	
0296	0295	0182	
0297	0296	0183	
0298	0297	0184	
0299	0298	0185	
0300	0299	0186	
0301	0300	0187	
0302	0301	0188	
0303	0302	0189	
0304	0303	0190	
0305	0304	0191	
0306	0305	0192	
0307	0306	0193	

0145	0056	0000	0000	/TEST MEMORY WITH LAM, ADM, AND SAE
0146	0057	0011	CLR	/
0147	0058	0011	LDA I	/EXECUTE LDF
0150	0059	0020	6525	/CLEAR LINK
0151	0060	0020	ROL I	/PICK UP CONSTANT
0152	0061	0025	STA	
0153	0062	0026	LAM	1
0154	0063	0027	SAE I	AUTO1
0155	0064	0028	2525	AUTO1
0156	0065	0029	JMP	/SET LINK, JUSTIFY
0157	0066	0030	0067	/INDIRECT TO DF
0160	0067	0031	0070	/ADD (AC&N&LINK)=2525
0161	0068	0032	0071	/AC OK?
0162	0069	0033	0072	/NO, GO TYPE MESSAGE
0163	0070	0034	0073	/MEMORY OK?
0164	0071	0035	0074	/NO, GO TYPE MESSAGE
0165	0072	0036	0075	/ADD THEM TOGETHER AGAIN
0166	0073	0037	0076	/TEST
0167	0074	0038	0077	
0170	0075	0039	0078	/TEST MEMORY
0171	0076	0040	0079	
0172	0077	0041	0080	/INCREMENT TARGET
0173	0078	0042	0081	/TRY ANOTHER CELL
0174	0079	0043	0082	/WILL NEVER SKIP
0175	0080	0044	0083	/PICK UP BANK
0176	0081	0045	0084	
0177	0082	0046	0085	/COMPLEMENT
0200	0083	0047	0086	/COMPARE WITH RSW
0201	0084	0048	0087	
0202	0085	0049	0088	/LAST BANK?
0203	0086	0050	0089	/NEW BANK
0204	0087	0051	0090	
	0088	0052	0091	
	0089	0053	0092	
	0090	0054	0093	
	0091	0055	0094	
	0092	0056	0095	
	0093	0057	0096	
	0094	0058	0097	
	0095	0059	0098	
	0096	0060	0099	
	0097	0061	0100	
	0098	0062	0101	
	0099	0063	0102	
	0100	0064	0103	
	0101	0065	0104	
	0102	0066	0105	
	0103	0067	0106	
	0104	0068	0107	
	0105	0069	0108	
	0106	0070	0109	
	0107	0071	0110	
	0108	0072	0111	
	0109	0073	0112	
	0110	0074	0113	
	0111	0075	0114	
	0112	0076	0115	
	0113	0077	0116	
	0114	0078	0117	
	0115	0079	0118	
	0116	0080	0119	
	0117	0081	0120	
	0118	0082	0121	
	0119	0083	0122	
	0120	0084	0123	
	0121	0085	0124	
	0122	0086	0125	
	0123	0087	0126	
	0124	0088	0127	
	0125	0089	0128	
	0126	0090	0129	
	0127	0091	0130	
	0128	0092	0131	
	0129	0093	0132	
	0130	0094	0133	
	0131	0095	0134	
	0132	0096	0135	
	0133	0097	0136	
	0134	0098	0137	
	0135	0099	0138	
	0136	0100	0139	
	0137	0101	0140	
	0138	0102	0141	
	0139	0103	0142	
	0140	0104	0143	
	0141	0105	0144	
	0142	0106	0145	
	0143	0107	0146	
	0144	0108	0147	
	0145	0109	0148	
	0146	0110	0149	
	0147	0111	0150	
	0148	0112	0151	
	0149	0113	0152	
	0150	0114	0153	
	0151	0115	0154	
	0152	0116	0155	
	0153	0117	0156	
	0154	0118	0157	
	0155	0119	0158	
	0156	0120	0159	
	0157	0121	0160	
	0158	0122	0161	
	0159	0123	0162	
	0160	0124	0163	
	0161	0125	0164	
	0162	0126	0165	
	0163	0127	0166	
	0164	0128	0167	
	0165	0129	0168	
	0166	0130	0169	
	0167	0131	0170	
	0168	0132	0171	
	0169	0133	0172	
	0170	0134	0173	
	0171	0135	0174	
	0172	0136	0175	
	0173	0137	0176	
	0174	0138	0177	
	0175	0139	0178	
	0176	0140	0179	
	0177	0141	0180	
	0178	0142	0181	
	0179	0143	0182	
	0180	0144	0183	
	0181	0145	0184	
	0182	0146	0185	
	0183	0147	0186	
	0184	0148	0187	
	0185	0149	0188	
	0186	0150	0189	
	0187	0151	0190	
	0188	0152	0191	
	0189	0153	0192	
	0190	0154	0193	
	0191	0155	0194	
	0192	0156	0195	
	0193	0157	0196	
	0194	0158	0197	
	0195	0159	0198	
	0196	0160	0199	
	0197	0161	0200	
	0198	0162	0201	
	0199	0163	0202	
	0200	0164	0203	
	0201	0165	0204	
	0202	0166	0205	
	0203	0167	0206	
	0204	0168	0207	
	0205	0169	0208	
	0206	0170	0209	
	0207	0171	0210	
	0208	0172	0211	
	0209	0173	0212	
	0210	0174	0213	
	0211	0175	0214	
	0212	0176	0215	
	0213	0177	0216	
	0214	0178	0217	
	0215	0179	0218	
	0216	0180	0219	
	0217	0181	0220	
	0218	0182	0221	
	0219	0183	0222	
	0220	0184	0223	
	0221	0185	0224	
	0222	0186	0225	
	0223	0187	0226	
	0224	0188	0227	
	0225	0189	0228	
	0226	0190	0229	
	0227	0191	0230	
	0228	0192	0231	
	0229	0193	0232	
	0230	0194	0233	
	0231	0195	0234	
	0232	0196	0235	
	0233	0197	0236	
	0234	0198	0237	
	0235	0199	0238	
	0236	0200	0239	
	0237	0201	0240	
	0238	0202	0241	
	0239	0203	0242	
	0240	0204	0243	
	0241	0205	0244	
	0242	0206	0245	
	0243	0207	0246	
	0244	0208	0247	
	0245	0209	0248	
	0246	0210	0249	
	0247	0211	0250	
	0248	0212	0251	
	0249	0213	0252	
	0250	0214	0253	
	0251	0215	0254	
	0252	0216	0255	
	0253	0217	0256	
	0254	0218	0257	
	0255	0219	0258	
	0256	0220	0259	
	0257	0221	0260	
	0258	0222	0261	
	0259	0223	0262	
	0260	0224	0263	
	0261	0225	0264	
	0262	0226	0265	
	0263	0227	0266	
	0264	0228	0267	
	0265	0229	0268	
	0266	0230	0269	
	0267	0231	0270	
	0268	0232	0271	
	0269	0233	0272	
	0270	0234	0273	
	0271	0235	0274	
	0272	0236	0275	
	0273	0237	0276	
	0274	0238	0277	
	0275	0239	0278	
	0276	0240	0279	
	0277	0241	0280	
	0278	0242	0281	
	0279	0243	0282	
	0280	0244	0283	
	0281	0245	0284	
	0282	0246	0285	
	0283	0247	0286	
	0284	0248	0287	
	0285	0249	0288	
	0286	0250	0289	
	0287	0251	0290	
	0288	0252	0291	
	0289	0253	0292	
	0290	0254	0293	
	0291	0255	0294	
	0292	0256	0295	
	0293	0257	0296	
	0294	0258	0297	
	0295	0259	0298	
	0296	0260	0299	
	0297	0261	0300	
	0298	0262	0301	
	0299	0263	0302	
	0300	0264	0303	
	0301	0265	0304	
	0302	0266	0305	
	0303	0267	0306	
	0304	0268	0307	
	0305	0269	0308	
	0306	0270	0309	
	0307	0271	0310	
	0308	0272	0311	
	0309	0273	0312	
	0310	0274	0313	
	0311	0275	0314	
	0312	0276	0315	

0205	0112	0277	RESET,	SET I	BANK	/RESE, BANK
0206	0113	0200		0000		/TO ZEROS
0207	0114	0225		XSK I	AUT05	/PASS MULTIPLIER
0210	0115	0216		NOP		/NO SKIP WANTED
0211	0116	0516		RSW		/READ THE SWITCHES
0212	0117	1560		BCL I		/SAVE SW 05
0213	0120	7677		7677		
0214	0121	0450		ARE		/IS IT SET?
0215	0122	6226		JMP	START+6	/YES, INHIBIT BELL
0216	0123	1320		LDA I		/PICK UP CONSTANT
0217	0124	0207		0207		/BELL CODE
0220	0125	0500		108		
0221	0126	6246	PMODE	TLS		/RING IT
0223	0127	0500	LMODE	108		
0224	0130	5341	PMODE	TSF		/WAIT
0225	0131	6127	LMODE	JMP	-2	
0226	0132	6026		JMP	START+6	/NEXT PASS
0227			EJECT			
0230						
0231						
0232						

0233	0133	0516	FILD1.	RSW	/READ SWITCHES AGAIN
0234	0134	1560		BCL I	
0235	0135	7740		7740	/IN FIELD 0?
0236	0136	0261		SET I	/TRY FOR WHOLE FIELD
0237	0137	3777		3777	
0240	0140	2470		AZE I	/NOW SEE IF FIELD 0
0241	0141	6146		JMP	/IT WAS
0242	0142	1040		STA	
0243	0143	2017		BANK	/SET UP LIMIT
0244	0144	4003		SIC	/INTO BUFFER
0245	0145	5246		JMP	/BACK TO MAINLINE
0246	0146	2041	SET2.	SET	/FIELD 0
0247	0147	0022		AUTO2	
0250	0150	6020		JMP	/BACK TO FIELD
0251				EJECT	

0252	0151	4006	ERROR,	STC	ERROR1	/SAVE AC
0253	0152	0516		RSW		/READ THE SWITCHES
0254	0153	0471		AP0 I		/SWITCH 0 SET?
0255	0154	0000		HLT	1	/NO, STOP
0256	0155	0241		ROL		/ROTATE
0257	0156	0471		AP0 I		/SWITCH 1 SET?
0260	0157	6164		JMP	TYPE	/NO, TYPE ERROR
0261	0160	0241	CHECK,	ROL	1	/ROTATE
0262	2161	0471		AP0 I		/SWITCH 2 SET?
0263	0162	6100		JMP	INCRN	/NO, TRY NEW CELL
0264	0163	6057		JMP	BACK	/YES, USE SAME CELL
0265	0164	1000	TYPE,	LDA		/CHECK FOR HEADING
0266	0165	0010		AUTO10		/MESSAGE POINTER
0267	0166	0470		AZE I		/WAS IT TYPED?
0270	0167	6213		JMP	HEAD	/NO, GO TYPE IT
0271	0170	1000		LDA		/GET BANK UNDER TEST
0272	0171	0017		BANK		
0273	0172	6226		JMP	OUTYP	/TYPE IT
0274	0173	1000		LDA		
0275	0174	0001		AUTO1		
0276	0175	1560		BCL I		/10 BIT ADDR
0277	0176	6000		6000		/TYPE CELL LOCATION
0300	0177	6226	CHANGE,	JMP	OUTYP	/CHANGE DATA FIELD
0301	0200	0000		0000		/GET CELL CONTENTS
0302	0201	1001		LDA	AUTO1	/TYPE IT
0303	0202	6226		JMP	OUTYP	
0304	0203	1000		LDA		
0305	0204	0006		ERROR1		/TYPE CONTENTS OF AC
0306	0205	6226		JMP	OUTYP	/RETURN AND LINEFEED
0307	0206	6316	CHANG2,	JMP	CRLF	/CHANGE DATA FIELD
0310	0207	0000		0000		/READ SWITCHES AGAIN
0311	0210	0516		RSW	1	/JUSTIFY
0312	0211	0241		ROL	CHECK	/CHECK WITH MONITOR
0313	0212	6160	/	JMP		
0314			EJECT			
0315						

0316	/	TYPEOUT ROUTINES		
0317	/	HEAD, PDP		/GO TO PMODE
0320	PMODE			/DATA FIELD 1
0321	0213 0002			/SET UP HEADER
0322	0214 6201	CDF 00		/GET FIRST CHARACTER
0323	0215 1007	TAD		/DONE YET?
0324	0216 3010	DCA	MESSA	/YES
0325	0217 1410	TAD I	AUTO10	/NO, PRINT CHARACTER
0326	0220 7450	SNA		/GET NEXT CHARACTER
0327	0221 5224	JMP	.*3	/BACK TO LMODE
0330	0222 4325	JMS	PRINT	/RETURN
0331	0223 5217	JMP	.-4	/BACK TO PMODE
0332	0224 6141	LINC		/SAVE DATA
0333				/SET REGISTER
0334		LMODE		/TO -4
0335	0225 6000	JMP	0	/GET CONSTANT
0336	0226 0002	OUTYP, PDP		/SAVE
0337		PMODE		/GET DATA
0340	0227 3011	DCA	TEMP	/ROTATE
0341	0230 1013	TAD	K7774	/SAVE IT
0342	0231 3014	DCA	REG8	/GET CONSTANT
0343	0232 1012	TAD	K1026	/ROTATE
0344	0233 3010	DCA	AUTO10	/OK TO PRINT?
0345	0234 1011	TAD	TEMP	/NO, ROTATE SOME MORE
0346	0235 7004	RAL		/YES, TYPE IT
0347	0236 3011	DCA	TEMP	/DONE?
0350	0237 1010	TAD	AUTO10	/NO
0351	0240 7004	RAL		/PICK UP SPACE CODE
0352	0241 7420	SNL		/TYPE IT
0353	0242 5233	JMP	REDO	/BACK TO LMODE
0354	0243 4325	JMS	PRINT	/RETURN
0355	0244 2014	ISZ	REG8	
0356	0245 5232	JMP	HERE	
0357	0246 1016	TAD	K0240	
0360	0247 4325	JMS	PRINT	
0361	0250 6141	LINC		
0362		LMODE		
0363	0251 6000	JMP	0	
0364		PMODE		
0365	0252 0001	K0001, EJECT	0001	
0366				

0367
0370
0371
0372
0373
0374
0375
0376
0377
0400
0401
0402
0403
0404
0405
0406
0407
0410
0411
0412
0413
0414
0415
0416
0417
0420
0421
0422
0423
0424
0425
0426
0427
0430
0431
0432
0433
0434
0435

/MESSAGE TABLE
/
/

0253
0254
0255
0256
0257
0260
0261
0262
0263
0264
0265
0266
0267
0270
0271
0272
0273
0274
0275
0276
0277
0300
0301
0302
0303
0304
0305
0306
0307
0310
0311
0312
0313
0314
0315

0215
0212
0314
0311
0316
0303
0240
0303
0310
0313
0302
0215
0212
0301
0316
0313
0240
0314
0317
0303
0316
0240
0303
0317
0316
0324
0240
0301
0303
0325
0315
0215
0212
0000

EJECT

/LINC CHKB
/BANK LOCN CONT ACUM

/END

0436	/	/TYPE CARRIAGE RETURN AND LINE FEED	
0437	/		
0440			
0441			
0442			
0443			
0444			
0445			
0446			
0447			
0450			
0451			
0452			
0453			
0454			
0455			
0456			
0457			
0460			
0461			
0462			
0463			
0464			
0465			
0466			
0467			
0470			
0471			
0472			
0473			
0474			
0475			
0476			
0477			
0500			
0501			
0502			
0503			
0504			

0316	0002	PDP	/BACK TO PMODE
0317	1253	TAD K215	
0320	4325	JMS PRINT	
0321	1254	TAD K212	
0322	4325	JMS PRINT	
0323	6141	LINC	
0324	6000	JMP 0	/RETURN
0325	0000	PRINT, 0000	/PRINT CHARACTER
0326	6046	TLS	/WAIT
0327	5041	TSF	
0330	5327	JMP --1	
0331	7300	CLA CLL	
0332	5725	JMP I PRINT	
0333	0044	SET AUT04	/SAVE RETURN
0334	0000	0	/GET PASS COUNTER
0335	1000	LDA AUT05	
0336	0005	JMP	/GO TYPE PASS COUNTER
0337	6226	JMP OUTYP	/GO CR-LF
0340	6316	JMP CRLF	/CLEAR AUT010 TO ALLOW HEADER TYPEOUT
0341	0070	SET I AUT010	
0342	0000	0000	/RETURN TO MAINLINE
0343	6004	JMP AUT04	
0470		LMODE	
0471		DUMP,	
0472			
0473			
0474			
0475			
0476			
0477			
0500			
0501			
0502			
0503			
0504			

0470		/PASS COUNTER DUMP ROUTINE
0471		
0472		
0473		
0474		
0475		
0476		
0477		
0500		
0501		
0502		
0503		
0504		

0470		/LINCK80 MODEL C
0471		
0472		
0473		
0474		
0475		
0476		
0477		
0500		
0501		
0502		
0503		
0504		

AUTO1 0001
AUTO10 0010
AUTO2 0002
AUTO4 0004
AUTO5 0005
BACK 0057
BANK 0017
CHANGE 0200
CHANGE2 0207
CHECK 0160
CRLF 0316
DUMP 0333
ERROR 0151
ERROR1 0006
FILD1 0133
GO 0046
HEAD 0213
HERE 0232
INCRN 0100
K0001 0252
K0240 0016

K1026 012
K212 0254
K215 0253
K7774 0013
MASK 0015
MESSA 0007
OUTYP 0226
PRINT 0325
REDU 0233
NEGB 0014
RECON 0012
CONDN 0001
ORVA 9992
RDSA 9940
SET2 0146
START 0020
TEMP 0011
TYPE 0164

