

IDENTIFICATION  
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PRODUCT CODE: MAINDEC-X8-01TCA-0-0  
PRODUCT NAME: DEC/X8 MODULE "TC010T"  
TC01/TC00 DECTAPE EXERCISER  
DATE CREATED: SEPTEMBER 7, 1972  
MAINTAINER: DIAGNOSTIC GROUP  
AUTHOR: LEONARD E. BEYERSDOORFER

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MAYNARD, MASS. 01754

1. MODULE DESCRIPTION  
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"TC01DT" IS A DEC/X8 SOFTWARE MODULE WHICH EXERCISES A TC01/TC00 DECATAPE SYSTEM WITH UP TO EIGHT TRANSPORTS. THE MAIN CHARACTERISTICS OF THIS MODULE ARE:

1. ALL READ/WRITE TRANSFERS CONSIST OF 777(8) WORDS AND UTILIZE EXTERNAL BUFFERS. THE FIRST LOCATION IN THE ASSIGNED BUFFER IS RESERVED FOR CURRENT BLOCK BREAK IN DURING SEARCH.
2. SEARCH OPERATIONS ARE IN NORMAL MODE, BOTH DIRECTIONS.
3. READ/WRITE OPERATIONS ARE IN CONTINUOUS MODE, BOTH DIRECTIONS.
4. ALL DRIVES WITHIN THE LIMITS OF THE LOWEST AND HIGHEST NUMBERED DRIVES (DRIVE "8" = "0" IS LOW) SPECIFIED ARE RANDOMLY UTILIZED.
5. ALL BLOCKS WITHIN THE LIMITS OF THE LOWEST\*3 AND HIGHEST\*3 BLOCKS SPECIFIED ARE SEQUENTIALLY USED.
6. THE OPERATIONS AT EACH BLOCK CONSIST OF WRITE/READ/CHECK FORWARD, THEN WRITE/READ/CHECK REVERSE.
7. THREE READS ARE DONE IN THE CASE OF A PARITY ERROR.

2. REQUIREMENTS  
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1. PROCESSORS: PDP-8, 8/1, 8/L, 8/E, 8/M AND PDP-12(1),
2. OPTIONS: TC01 OR TC00 DECATAPE CONTROL WITH UP TO EIGHT DRIVES (TU55 OR TU56).
3. SPECIAL: STANDARD PDP-8 FORMAT DECATAPE ARE RECOMMENDED (2702 BLOCKS, 201 WORDS EACH). NO GUARANTEE IS MADE FOR DECATAPE WITH ANY OTHER FORMAT.

3. RESTRICTIONS  
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WHEN OPERATING UNDER REVISION A OF THE DEC/X8 MONITOR/BUILDER, CHANGE TC01DT LOCATIONS 0417 AND 0420 FROM 7000 (NOP) TO 7240 AND 3456 RESPECTIVELY.

4. OPERATING INFORMATION  
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4.1 SPECIAL CONSIDERATIONS  
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THIS MODULE REQUIRES AND USES EXTERNAL BUFFERS.

4.2 BUILDING  
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1. JOB TYPE: INTERRUPT DRIVEN
2. PRIORITY: CRITICAL, MUST BE THE HIGHEST OR ONE OF THE HIGHEST PRIORITY MODULES DUE TO INHERENT HARDWARE DESIGN FEATURES.
3. JOB SLOTS: JF1 OR JF2 ONLY; 4 PAGES REQUIRED.
4. STANDARD DEVICE CODES: 0760, 0770
5. STANDARD WORD COUNT: 7754
6. STANDARD CURRENT ADDRESS: 7755

4.3 INITIALIZING  
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AFTER THE INDICATED CODE LETTER IS PRINTED RESPOND BY TYPING THE PARAMETER IN THE MANNER SHOWN BELOW.

CODE	DEFINITION	RESPONSE	LIMITS	PRESET
A	LOWEST DRIVE	N	0=7	0
B	HIGHEST DRIVE	N	0=7	0
C	LOWEST BLOCK	0 FOR NO CHANGE 1 NNNN FOR NEW	0003=2675	2600
D	HIGHEST BLOCK	0 FOR NO CHANGE 1 NNNN FOR NEW	0004=2676	2676
E	TYPE OF DATA	0 FOR RANDOM 1 NNNN FOR CONSTANT	ANY DATA WORD	RANDOM
F	BUFFER TO USE	0 FOR RANDOM 1 NNNN	LEGAL DESIGNATOR	RANDOM

IN ADDITION THE FOLLOWING MODULE LOCATIONS MAY BE CHANGED AS INDICATED TO ACHIEVE THE DESIRED RESULTS.

1. "REPORT" (0429) MAY BE CHANGED FROM 7700 TO XX00 WHERE ANY CLEAR BITS ARE NOT REPORTED AS ERRORS. BIT ASSIGNMENT IS THE SAME AS IN TC01/TC08 DECTAPE'S STATUS B REGISTER.
2. "PARITY" (0734) MAY BE CHANGED FROM 3500 TO 7700 TO INHIBIT CHECKING DATA AFTER A DECTAPE PARITY ERROR.

4.4 DEVICE SETUP  
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ALL DRIVES TO BE EXERCISED MUST BE SWITCHED TO REMOTE AND WRITE ENABLED WITH TAPE IN PLACE.

4.5 RUNNING  
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1. CNTR: UPDATED AFTER A WRITE/READ/CHECK OPERATION IS COMPLETED.  
SR10: WHEN SET TO A 1, THE BUFF CURRENTLY ASSIGNED IS RETAINED.

3. SR11: WHEN SET TO A 1, THE DRIVE CURRENTLY IN USE IS RETAINED.

5. ERROR INFORMATION  
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ALL STATUS B ERRORS ARE REPORTED IN THE STANDARD STATUS ERROR FORMAT, DATA ERRORS IN THE DATA ERROR FORMAT. THE FIRST STATUS ERROR AFTER ROTATION OR 'C' IS NOT REPORTED SINCE A TIMING ERROR IS EXPECTED (DUE TO THE INTERRUPT SYSTEM BEING OFF FOR A PROLONGED TIME).

5.1 ERROR SYMBOL DEFINITIONS  
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CODE:	0000	SEARCH OPERATION
	0002	READ OPERATION
	0004	WRITE OPERATION
	0012	FALSE DATA ERROR (BAD SOFTWARE CHECKSUM BUT DATA LOOKED GOOD ON A WORD BY WORD CHECK.) THIS TYPE OF ERROR MAY BE REPORTED AFTER A PARITY ERROR AND INDICATES THE FOLLOWING: 1) THE PARITY ERROR STOPPED THE TRANSFER PRIOR TO COMPLETION AND THEREBY CAUSED A SOFTWARE SUMCHECK ERROR! 2) THE DATA THAT WAS TRANSFERRED WAS GOOD.
	003X	TRANSFER INCOMPLETE (WORD COUNT NON-ZERO BUT NO STATUS B ERROR BIT IS SET).
	0042	THIS ERROR MAY FOLLOW CODE 0032 REPORTS AND INDICATES THAT ALTHOUGH A TRANSFER WAS INCOMPLETE THE DATA THAT WAS TRANSFERRED WAS GOOD.

  

SA:	FINAL CONTENTS OF STATUS B REGISTER.
SB:	CURRENT BUFFER DESIGNATOR
SC:	INITIAL WORD COUNT
SD:	FINAL WORD COUNT
SE:	INITIAL CURRENT ADDRESS
SF:	FINAL CURRENT ADDRESS
SG:	CURRENT DRIVE IN BITS 0-2.
SH:	CURRENT BLOCK NUMBER AT WHICH TRANSFERS START.
SI:	FINAL CONTENTS OF STATUS A REGISTER
CA:	BUFFER ADDRESS
CB:	GOOD DATA WORD
CC:	BAD DATA WORD

5.2

TROUBLESHOOTING HINT

THE RECURRENCE OF SELECT ERRORS IS A PROBLEM WHICH MAY BE DIFFICULT TO DIAGNOSE. THE FOLLOWING STEPS MAY LEAD TO A SOLUTION.

1. KILL THE JOB.
  2. CHANGE MODULE LOCATIONS 1030 TO 7000 AND 1031 TO 6766.
  3. RUN THE JOB.
  4. IF THE PROBLEM "DISAPPEARS" CHECK OUT THE XSA BY TIME USING THE ORIGINAL CODE.
6. LISTING (ATTACHED)

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12

/DEC/X8 EXTERNAL SYMBOL TABLE "EXTSYN"  
/FOR USE IN ASSEMBLING DEC/X8 SOFTWARE MODULES,  
/COPYRIGHT 1972, DIGITAL EQUIPMENT CORP., MAYNARD, MASS.  
XLIST  
PAUSE

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/MAINDEC-X8-DITCA-B-L "DEC/X8" TC81DT  
/TC81/TC88 DECTAPE SYSTEM MODULE FOR DEC/X8  
/COPYRIGHT 1972, DIGITAL EQUIPMENT CORP., MAYNARD, MASS.  
/THIS MODULE OPERATIONAL ON PDP-8,8/1,8/L,8/E AND PDP-12 (WITH DECTAPE?1?);  
/PRG: LEN BEYERSDORFER (X2937)

/BUILDER INSTRUCTIONS:

/1.PRIORITY: CRITICAL, MUST BE ASSIGNED AT OR NEAR LEVEL 0 BECAUSE OF  
/INTERRUPT LATENCY TIME REQUIREMENTS,  
/2.JOB SLOT: 4 PAGES REQUIRED, SLOT JX1 OR JX2,

/INITIALIZER INSTRUCTIONS:

/CODE	DEFINED	RESPONSE	PRESET
/A1	LOWEST DRIVE TO USE	0=7	0
/B1	HIGHEST DRIVE TO USE	0=7	0
/C1	LOWEST BLOCK	0=NO CHANGE; 1 NNNN (0003=2076)	2600
/D1	HIGHEST BLOCK	0=NO CHANGE; 1 NNNN (0003=2076)	2676
/E1	TYPE OF DATA	0=RANDOM; 1 NNNN=CONSTANT	RANDOM
/F1	BUFFER ASSIGNMENT	0=RANDOM; 1 NNNN=CONSTANT	RANDOM

/SPECIAL USER MODIFICATIONS VIA RELATIVE "+0" FACILITY:

/1."REPORT" MAY BE CHANGED FROM 7700 TO XX00 WHERE ANY  
/CLEAR BITS INHIBIT AN ERROR REPORT FOR THAT CONDITION;  
/2."PARITY" MAY BE CHANGED FROM 3900 TO 7700 TO INHIBIT  
/DATA CHECKING AFTER A PARITY ERROR,

/REPORT SYMBOL DEFINITIONS:

/1.REFER TO MODULE TABLE IN THIS LISTING FOR DESCRIPTION  
/OF CNTR,SA1-SI1,AND DA1-DC1

/2."CODE" DEFINITIONS:

/CODE	DEFINED
/0000	SEARCH
/0002	READ
/0004	WRITE
/001X	FALSE DATA ERROR (BAD CHECKSUM BUT DATA LOOKED GOOD ON WORD BY WORD CHECK,)
/0012	THIS TYPE OF ERROR MAY BE REPORTED AFTER

68 / A PARITY ERROR AND INDICATES THE FOLLOWING;  
69 / 1, THE PARITY ERROR STOPPED THE TRANSFER PRIOR TO  
70 / COMPLETION AND THEREBY CAUSED A SOFTWARE  
71 / SUMCHECK ERROR; 2, THE DATA THAT WAS READ IN  
72 / WAS GOOD,  
73 / 003X TRANSFER INCOMPLETE (WC NON-ZERO,  
74 / BUT NO STATUS ERROR BIT WAS SET.)  
75 / 0042 THIS ERROR CODE MAY FOLLOW CODE 0032 REPORTS  
76 / AND INDICATES THAT ALTHOUGH A TRANSFER WAS INCOMPLETE  
77 / THE DATA THAT WAS TRANSFERRED WAS GOOD,

/TC81/TC88 STANDARDS:

/WORD COUNT17754  
/CURRENT ADDRESS17755  
/DEVICE CODES176,77,

/TC81/TC88 IOT DEFINITIONS:

87  
88  
89 6761 DTRA=6761 /STA+AC->AC  
90  
91 6762 DYCA=6762 /B->STA  
92  
93 6764 DTXA=6764 /AC (X+) STA->STA, B->AC  
94  
95 6766 DTLA=6766 /AC->STA, B->AC  
96  
97 6771 DTSF=6771 /PC+1->PC IF DTF OR EF TRUE  
98  
99 6772 DTRB=6772 /AC+STB->AC  
100  
101 6774 DTLB=6774 /AC6-B->STB6=0, B->AC

/MODULE TABLE

102 \*200  
103 JOB, 0 /JOB NUMBER  
104 TEXT1, TEXT "TC81DT"  
105  
106 0200 0200  
107 0201 2403  
108 0202 6061  
0203 0424  
0204 0000  
109 0205 0411 TEXT "DITCA-B"  
0206 2403  
0207 0155  
0210 0200  
110 0211 0000 HOMEDF, 0 /DF=IF  
111 0212 7402 HLT/CFD  
112 0213 5611 JMP I HOMEDF  
113 0214 6202 INTACK, CIF 00 /ACKNOWLEDGE INTERRUPT,  
114 0215 4426 JMS I IHRETP  
115 0216 7777 -1 /PRIORITY  
116 0217 7777 KILL, -1 /COMHAND TO KILL JOB,

117 0220 7777 KILLED, -1 /MODULE SETS TO -1 WHEN JOB KILLED,  
118 0221 0000 CNTR, 0 /NUMBER OF EXERCISER LOOP PASSES,  
119 0222 0000 ERROR, 0 /ERROR CALL,  
120 0223 3234 DCA ,+11  
121 0224 7604 LAS  
122 0225 0073 AND E K4  
123 0226 7440 SEA  
124 0227 3217 DCA KILL  
125 0230 4211 JMS HOMEDF  
126 0231 6002 IOF  
127 0232 6202 CIF 00  
128 0233 4461 JMS I ERFP  
129 0234 0000 0  
130 0235 5622 JMP I ERROR  
131 0236 0000 CODE, 0 /ERROR CODE,  
132  
133 0237 7767 -11 /STATUS ERROR ENTRY TALLY,  
134 0240 0000 ERRSA, 0 /STATUS REG, B  
135 0241 0000 ERRSB, 0 /BUFFER WORD  
136 0242 7001 ERRSC, -777 /INIT WC  
137 0243 0000 ERRSD, 0 /FINAL WC  
138 0244 0000 ERRSE, 0 /INIT CA  
139 0245 0000 ERRSF, 0 /FINAL CA  
140 0246 0000 ERRSG, 0 /INIT STAT A (DRV SELECT BITS ONLY)  
141 0247 0000 ERRSH, 0 /STARTING BLOCK #  
142 0250 0000 ERRSI, 0 /FINAL STAT A  
143 0251 7775 -3 /DATA ERROR ENTRY TALLY,  
144 0252 0000 ERRDA, 0 /BUFFER ADDRESS  
145 0253 0000 ERRDB, 0 /0000 DATA  
146 0254 0000 ERRDC, 0 /BAD DATA  
147  
148 /END OF MODULE TABLE  
149  
150  
151  
152 /INTERRUPT SERVICE VECTOR:  
153  
154 0255 0000 INT, 0 /SKIP CHAIN DOES JMS TO HERE,  
155 0256 2275 ISE RENTRY /REENTRANT INTERRUPT?  
156 0257 5267 JMP ,+10 /YES  
157 0260 4211 JMS HOMEDF /DF=IF  
158 0261 5662 JMP I ,+1 /VECTOR  
159 0262 0000 INTRT, 0 /INTERRUPT RETURN VECTOR  
160 0263 6764 DC76A, DTXA /XOR STAT A  
161 0264 7240 CLA CHA /ALLOW ONE INTERRUPT  
162 0265 3275 DCA RENTRY  
163 0266 5214 JMP INTACK /ACKNOWLEDGE PREVIOUS INTERRUPT,  
164 0267 3275 DCA RENTRY  
165 0270 6214 ROF  
166 0271 1020 TAD E KCIFDF  
167 0272 3273 DCA ,+1  
168 0273 7402 HLT/CIF CFD  
169 0274 5655 JMP I INT  
170 0275 0000 RENTRY, 0

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172
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177 0276 6772 SRNCON, DTRB /END DONE?
178 0277 7086 RTL
179 0300 7700 K7700A, 7700/SNA CLA
180 0301 5304 JMP ,+3
181 0302 1371 TAD K600A /YES, TURN AROUND
182 0303 5243 JMP INTRT+1
183 0304 6772 DC77A, DTRB /NO, ERROR?
184 0305 7710 SPA CLA
185 0306 5340 JMP DTERR /YES
186 0307 6741 DC76B, DTRA /NO, PUT DIR BIT IN LINK,
187 0310 7086 RTL
188 0311 7086 RTL
189 0312 7200 CLA
190 0313 7402 SRNCOF, HLT/COF /OF TO BUFFER FIELD
191 0314 1644 TAD I ERRSE /BLOCK FOUND?
192 0315 7041 CIA
193 0316 1247 TAD ERRSH
194 0317 7450 SNA
195 0320 5327 JMP LOCBED /YES
196 0321 7041 CIA /NO, DETERMINE TURN AROUND,
197 0322 7420 SNL
198 0323 1372 TAD K2A
199 0324 7420 SNL CLA /3 BEYOND?
200 0325 1121 TAD Z K400 /YES, TURN AROUND,
201 0326 5243 JMP INTRT+1
202 0327 7402 LOCBED, HLT/SNL CLA IF FND, SEL CLA IF REV, /BLOCK FOUND,
203 0330 5243 JMP INTRT+1 /WRONG DIRECTION, MOVE PASSES IT,
204 0331 1242 TAD ERRSC /GOOD, SET UP WC
205 0332 4201 COF 00
206 0333 3773 DCA I DTANC
207 0334 1017 AUA, TAD AUTO
208 0335 3236 DCA CODE /FILL CODE
209 0336 1292 TAD ERRDA /GET SWITCH TO READ OR WRITE,
210 0337 4202 JMS INTRT /00
211 0340 6761 DTERR, DTRA /CLEAR GO,
212 0341 0410 AND Z K200
213 0342 1072 TAD Z K3
214 0343 6764 DC76C, DTXA
215 0344 6772 DC77B, DTRB /SAVE B
216 0345 3240 DCA ERRSA
217 0346 1073 TAD Z K4 /CLEAR ENABLE AND FLAGS
218 0347 6764 DC76D, DTXA (+2
219 0350 1377 TAD /DEFER SERVICE
220 0351 5214 JMP INTACK
221 0352 6761 DC76E, DTRA /SAVE A
222 0353 3250 DCA ERRS1
223 0354 6201 COF 00
224 0355 1773 TAD I DTANC /GET FINAL WC AND CA
225 0356 3243 DCA ERRSD
226 0357 1774 TAD I DTACA
    
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227 0360 3245 DCA ERR0F
228 0361 1240 TAD ERRSA /ANY ERROR BIT SET?
229 0362 0300 AND K7700A
230 0363 7450 SNA
231 0364 5776 JMP I (G02 /NO, CHECK TRANSFER DONE,
232 0365 5775 JMP I (G01 /CHECK REPORT,
233
234 0366 0000 DATCON, 0
235 0367 1253 TAD ERR0B
236 0370 5766 JMP I DATCON
237 0371 0600 K600A, 000
238 0372 0002 K2A, 2
239 0373 7754 DTANC, 7754
240 0374 7755 DTACA, 7755
241
242 /END OF PAGE
243 0375 0413 *
244 0376 0400 *400
245 0377 0352
246 0400
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249
250 0400 4777 G02, JMS I (HOMEDF
251 0401 1776 TAD I (ERRSD /CHECK TRANSFER DONE
252 0402 7000 SNA CLA
253 0403 9210 JMP ,+5 /OK
254 0404 1775 TAD I (CODE /CHANGE CODE
255 0405 1103 TAD Z K30
256 0406 3775 DCA I (CODE
257 0407 5223 JMP G03 /REPORT
258 0410 2774 ISR I (GO
259 0411 2774 ISR I (GO
260 0412 5773 JMP I (GOOUT /GOOD EXIT
261 0413 0456 G01, AND I E (OFMSP /MASK FOR REPORT
262 0414 0225 AND REPORT
263 0415 7640 SEA CLA
264 0416 7120 STL
265 0417 7000 NOP /REPLACES STA TO OPERATE UNDER DX0MB REV B
266 0420 7000 NOP /REPLACES DCA I E (OFMSP TO OPERATE UNDER DX0MB REV B
267 0421 4777 JMS I (HOMEDF
268 0422 7430 SEL /REPORT?
269 0423 4772 G03, JMS I (ERROR /YES,
270 0424 5773 JMP I (GOOUT /BAD EXIT,
271 0425 7700 REPORT, 7700
272
273
274
275 /RANDOM NUMBER GENERATOR
276
277 0426 0000 RANDOM, 0
278 0427 2260 ISR RAN1
279 0430 7000 NOP
280 0431 1261 TAD RAN2
    
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281	0432	1264	TAD	K1111A		
282	0433	7104	CLL	RAL		
283	0434	7420	SNL			
284	0435	7001	IAC			
285	0436	3261	DCA	RAN2		
286	0437	1260	TAD	RAN1		
287	0440	1261	TAD	RAN2		
288	0441	5626	JMP	I	RANDOM	
289	0442	0000	SAVRAN,	0	/PRESET	
290	0443	3261	DCA	RAN2		
291	0444	4777	JMS	I	(HOMEDF	
292	0445	1260	TAD	RAN1		
293	0446	3262	DCA	SAV1		
294	0447	1261	TAD	RAN2		
295	0450	3263	DCA	SAV2		
296	0451	5642	JMP	I	SAVRAN	
297	0452	0000	RESRAN,	0	/RESTORE	
298	0453	1262	TAD	SAV1		
299	0454	3260	DCA	RAN1		
300	0455	1263	TAD	SAV2		
301	0456	3261	DCA	RAN2		
302	0457	5652	JMP	I	RESRAN	
303	0460	0000	RAN1,	0		
304	0461	0000	RAN2,	0		
305	0462	0000	SAV1,	0		
306	0463	0000	SAV2,	0		
307	0464	1111	K1111A,	1111		
308						
309						
310	0465	0000	RELEAS,	0	/ROUTINE TO RELEASE EXTERNAL BUFFER	
311	0466	1771	TAD	I	(ERRSB	
312	0467	6002	IOF			
313	0470	6202	CIF	00		
314	0471	4457	RLBUFF			
315	0472	5665	JMP	I	RELEAS	
316						
317						
318	0473	0000	DATCHK,	0	/CHECK DATA,	
319	0474	1776	TAD	I	(ERRSD	
320	0475	4770	JMS	I	(SUNCHK	
321	0476	7041	CIA			
322	0477	1767	TAD	I	(SUNSAV	
323	0500	7650	SNA	CLA		
324	0501	5673	JMP	I	DATCHK	
325	0502	4252	JMS		RESRAN	
326	0503	1776	TAD	I	(ERRSD	
327	0504	4334	JMS		DATSET	
328	0505	3312	DCA		,+5	
329	0506	1766	TAD	I	(DATGEV	
330	0507	3334	DCA		DATSET	
331	0510	4734	JMS	I	DATSET	
332	0511	3765	DCA	I	(ERRDB	
333	0512	7402	HLT/CFP			
334	0513	1417	AUB,	TAD	I	AUTO
335	0514	4777	JMS	I	(HOMEDF	

336	0515	3764	AUC,	DCA	I	(ERRDC	/SAVE IN BAD,
337	0516	1017	TAD		AUTO		/GET ADDR AND SAVE,
338	0517	3763	DCA	I	(ERRDA		
339	0520	1764	TAD	I	(ERRDC		/GOOD=BAD?
340	0521	7041	CIA				
341	0522	1765	TAD	I	(ERRDB		
342	0523	7440	SRA				
343	0524	4772	JMS	I	(ERROR		/NO, DATA ERROR (AG NOT 0)
344	0525	2762	ISE	I	(BUFTAL		/DONE?
345	0526	5310	JMP		,=16		/NO,
346	0527	1775	TAD	I	(CODE		/YES, SET CODE=001X
347	0530	1076	TAD	Z	K10		
348	0531	3775	DCA	I	(CODE		
349	0532	4772	JMS	I	(ERROR		/CLOSE ERROR ROUTINE,
350	0533	5673	JMP	I	DATCHK		/OUT,
351	0534	0000	DATSET,	0			/SET UP FOR DATA GENERATE OR CHECK,
352	0535	7041	CIA				/COMPUTE LENGTH TO FILL OR CHECK,
353	0536	1761	TAD	I	(ERRSC		
354	0537	7450	SNA				
355	0540	5673	JMP	I	DATCHK		/SAVE IT,
356	0541	3762	DCA	I	(BUFTAL		/PUT CA IN AUTO INDEX,
357	0542	1760	TAD	I	(ERRSE		
358	0543	3017	AUD,	DCA		AUTO	/COMPUTE CDF TO BUFFER FIELD,
359	0544	1771	TAD	I	(ERRSB		
360	0545	0105	AND	Z	K70		
361	0546	1064	TAD	Z	KCDF		
362	0547	5734	JMP	I	DATSET		
363	0550	0000	INISR1,	0			/EXIT WITH IT IN AG,
364	0551	4757	JMS	I	(INISR3		/INITIALIZE SERVICE 1,
365	0552	7112	CLL	RTR			/SERVICE 3
366	0553	7012	RTR				/MOVE TO BITS 1-3
367	0554	7010	RAR				
368	0555	7041	CIA				
369	0556	5750	JMP	I	INISR1		/NEGATE
370			/END OF PAGE				/OUT
371							
372		0557					
373	0557	1136					
374	0560	0244					
375	0561	0242					
376	0562	0731					
377	0563	0252					
378	0564	0254					
379	0565	0253					
380	0566	0760					
381	0567	0732					
382	0570	0743					
383	0571	0241					
384	0572	0222					
385	0573	1034					
386	0574	1000					
387	0575	0236					
388	0576	0243					
389	0577	0211					
		0600					

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395 0600 3777 RUN, DCA I (ERRSB /"RUN" IS THE RUNNING ADDRESS
396 0601 3776 DCA I (CNTR
397
398
399
400 0602 7240 EXERA, CLA CMA /SET START BLOCK TO LOBLOK=1
401 0603 1336 TAD LOBLOK
402 0604 3775 DCA I (ERRSM
403 0605 7344 EXERB, CLA CLL CMA RAL /SET UP DIR REVERSAL CNTR
404 0606 3335 DCA DIRCNT
405 0607 7001 IAG /+1 TO STARTING BLOCK
406 0610 1775 TAD I (ERRSM
407 0611 3775 DCA I (ERRSM
408 0612 1775 TAD I (ERRSM /CHECK IN LIMITS
409 0613 1337 TAD HIBLOK
410 0614 7700 SMA CLA
411 0615 9202 JMP EXERA /BACK TO BLOCK 18
412 0616 1342 TAD SNLCLA /SET UP FOR FWD DIR
413 0617 7410 SKP
414 0620 1224 EXERC, TAD SELCLA /SET FOR REV DIR
415 0621 3774 DCA I (LOCBE
416 0622 7604 LAS /CHANGE DRIVES?
417 0623 7010 RAR
418 0624 7630 SELCLA, SEL CLA
419 0625 9231 JMP ,+4 /NO
420 0626 4773 JMP I (RANDOM
421 0627 0313 AND K7000A
422 0630 3772 DCA I (ERRSG
423 0631 1772 TAD I (ERRSG /CHECK IN LIMITS
424 0632 7110 CLL RAR
425 0633 1340 TAD LODRV
426 0634 7710 SPA CLA
427 0635 9226 JMP ,=7 /OUT OF LIMITS
428 0636 1772 TAD I (ERRSG
429 0637 7110 CLL RAR
430 0640 1341 TAD HIODRV
431 0641 7740 SMA SEA CLA
432 0642 9226 JMP ,=14 /OUT OF LIMITS
433 0643 4757 BUFGEN, JMS I BUFGEV /GET BUFFER
434 0644 1777 TAD I (ERRSB /FIGURE CA
435 0645 0131 AND E K7000
436 0646 3771 DCA I (ERRSE
437 0647 0201 DATGEN, CDF 00
438 0650 1466 TAD I E K0
439 0651 4770 JMS I (SAVRAN /PRESET RANGEN
440 0652 4767 JMS I (DATSET
441 0653 3256 DCA ,+3
442 0654 1256 TAD BUFCDF
443 0655 3766 DCA I (SRHCDF
444 0656 7402 BUFCDF, HLT/CDF /FILL BUFFER

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445 0657 4760 JMS I DATGEV
446 0660 3417 AUE, DCA I AUTO
447 0661 2331 ISE BUFTAL
448 0662 9257 JMP ,=3
449 0663 4765 JMS I (HOMEDF
450 0664 4343 JMS SUMCHK
451 0665 3332 DCA SUMSAV
452 0666 1141 TAD Z M3 /SET FOR 3 REREADS ON PARITY ERROR
453 0667 3333 DCA PARTAL
454 0670 3764 DCA I (CODE
455 0671 1073 TAD Z K4
456 0672 4763 JMS I (GO
457 0673 0130 0130 /SWITCH TO WRITE
458 0674 5314 JMP K7000A+1 /ERROR
459 0675 4767 DTRO, JMS I (DATSET /CLEAR BUFFER
460 0676 3277 DCA ,+1
461 0677 7402 HLT/CDF
462 0700 3417 AUF, DCA I AUTO
463 0701 2331 ISE BUFTAL
464 0702 5300 JMP ,=2
465 0703 4765 JMS I (HOMEDF
466 0704 3764 DCA I (CODE
467 0705 7126 STL RTL /READ
468 0706 4763 JMS I (GO
469 0707 0130 0130 /SWITCH TO READ
470 0710 5317 JMP ,=7 /ERROR
471 0711 4762 JMS I (DATCHK /CHECK DATA
472 0712 2776 DTOUT, ISE I (CNTR
473 0713 7000 K7000A, 7000/NOP
474 0714 2335 ISE DIRCNT /NEXT FWD OR REV?
475 0715 9220 JMP EXERC /REV
476 0716 5205 JMP EXERB /FWD
477 0717 1761 TAD I (ERRSA
478 0720 0334 AND PARITY /CHECK DATA AFTER PARITY ERROR
479 0721 7650 SMA CLA
480 0722 4762 JMS I (DATCHK /YES
481 0723 1761 TAD I (ERRSA /PARITY ERROR
482 0724 0110 AND Z K200
483 0725 7440 SEA CLA
484 0726 2333 ISE PARTAL /3 REREADS
485 0727 5275 JMP DTRO
486 0730 5312 JMP DTOUT
487 0731 0000 BUFTAL, 0
488 0732 0000 SUMSAV, 0
489 0733 0000 PARTAL, 0
490 0734 3500 PARITY, 3500
491 0735 0000 DIRCNT, 0
492 0736 2600 LOBLOK, 2600
493 0737 5102 HIBLOK, -2676
494 0740 0000 LODRV, 0
495 0741 0000 HIODRV, 0
496 0742 7420 SNLCLA, SNL CLA
497 0743 0000 SUMCHK, 0
498 0744 4767 JMS I (DATSET /SUMCHECK BUFFER
499 0745 3346 DCA ,+1

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500 0746 7402 HLT/CDP
501 0747 7100 CLL
502 0750 1417 AUG, TAD I AUTO
503 0751 7430 SEL
504 0752 7001 IAC
505 0753 2331 ISB BUFTAL
506 0754 5347 JMP ,+5
507 0755 4765 JMS I (HOMEDF)
508 0756 5743 JMP I SUMCHK
509
510
511 /END OF PAGE
512
513 0757 *
514 /NOTE: THESE LOC'S ARE SPECIFIED BELOW THE *, SO THAT THE ADDRESSES
515 /INDICATED ARE MODIFIED PROPERLY BY THE DEC-X8 LOADER,
516 0757 1047 BUFGEV, BUFRAN /BUFGON
517 0760 0426 DATGEV, RANDOM /DATCON
518 0761 0240
519 0762 0473
520 0763 1000
521 0764 0236
522 0765 0211
523 0766 0313
524 0767 0534
525 0770 0442
526 0771 0244
527 0772 0246
528 0773 0426
529 0774 0327
530 0775 0247
531 0776 0221
532 0777 0241
533 1000 *1000
534
535
536 /ROUTINE TO SET UP TC01/TC08 TO READ OR WRITE (UNLESS "KILL" =01)
537 /CALL MUST BE:
538 /1. SET UP ERRSB,ERRSC,ERRSE,ERRSG AND ERRSH
539 /2. ENSURE DF=IF
540 /3. PUT 0002 IN AC FOR READ, 0004 FOR WRITE
541 /4. JMS I (GO)
542 /5. 0130 FOR READ, 0150 FOR WRITE
543 /6. EFFECTIVELY RETURNS HERE IF STATUS ERROR (ALREADY REPORTED)
544 /7. RETURNS HERE IF NO STATUS ERRORS
545
546 1000 0000 GO, B
547 1001 3017 AUH, DCA AUTO /SAVE CODE;
548 1002 1777 TAD I (KILL) /KILL JOB IF KILL NON ZERO
549 1003 7450 SNA
550 1004 5210 JMP ,+4
551 1005 3776 DCA I (KILLED)
552 1006 4775 JMS I (RELEASE)
553 1007 5004 SERVEX

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554 1010 1600 TAD I GO /GET SWITCH TO READ OR WRITE
555 1011 3774 DCA I (ERRDA)
556 1012 1773 TAD I (ERRSE) /SET UP CA
557 1013 6201 CDF 00
558 1014 3633 DCA I (DTACA1)
559 1015 4772 JMS I (HOMEDF)
560 1016 1771 TAD I (ERRSB) /GET FIELD AND LOAD STAAT B
561 1017 0105 AND Z K70
562 1020 6774 DC77C, DTLS
563 1021 1370 TAD (SRHCON) /PRESET INTERRUPT RETURN
564 1022 3767 DCA I (INTRY)
565 1023 7240 CLA CHA /ALLOW ONE INTERRUPT
566 1024 6002 IOF
567 1025 3766 DCA I (RENTRY)
568 1026 1765 TAD I (ERRSG) /GET DRIVE
569 1027 1235 TAD K614A /SEARCH,REV,NORM,ENABLE
570 1030 6762 DC76F, DTCA /CLEAR A
571 1031 6764 DC76G, DTXA /XOR A
572 1032 5004 SERVEX
573 1033 7755 DTACA1, 7755
574 1034 5600 GOODT, JMP I GO
575 1035 0614 K614A, 614
576
577
578
579
580
581 /ROUTINE TO ASSIGN AND HOLD A SPECIFIED BUFFER WHICH MUST BE
582 /LEGALLY SPECIFIED IN CONBUF (STANDARD BUFFER DESIGNATOR)
583
584 1036 0000 BUFGON, 0
585 1037 1771 TAD ERRSB /GET CURRENT BUFFER WORD,
586 1040 7041 CIA
587 1041 1246 TAD CONBUF
588 1042 7650 SNA CLA /SPECIFIED BUFFER ASSIGNED?
589 1043 5636 JMP I BUFGON /YES, EXIT,
590 1044 4247 JMS BUFRAN /NO, GET NEW BUFFER,
591 1045 5257 JMP BUFGON+1 /CHECK IT
592 1046 0000 CONBUF, 0 /MUST CONTAIN LEGAL BUFFER DESIGNATOR,
593
594 /ROUTINE TO ASSIGN A BUFFER OBSERVING SR 10.
595
596 1047 0000 BUFRAN, 0
597 1050 7604 LAS /PUT SR 10 (NOT) IN LINK,
598 1051 7012 RTR
599 1052 7220 CLA CHL
600 1053 1771 TAD ERRSB /BUFFER WORD IN AC,
601 1054 7460 SNL SZA
602 1055 5263 JMP ,+6 /EXIT IF AC NON ZERO AND LINK SET,
603 1056 7640 SZA CLA
604 1057 4775 JMS RELEASE /RELEASE BUFFER IF AC NON ZERO,
605 1060 6002 IOF /ASSIGN A BUFFER
606 1061 6202 CIF 00
607 1062 4460 ASBUFF
608 1063 3771 DCA ERRSB /SAVE BUFFER DESIGNATOR,

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609 1064 5647      JMP I  BUFRAN      /EXIT,
610
611
612
613              /INITIALIZER
614
615 1065 1364      INIT,  TAD  (TEXT1
616 1066 3270      DCA  LTRCOD
617 1067 4444      MESSAGE
618 1070 0000      LTRCOD, 0
619 1071 1117      INITLP, TAD Z  K301      /SET CODE TO "A"
620 1072 3270      DCA  LTRCOD
621 1073 4763      JMS I  (INISR1
622 1074 3762      DCA I  (LODRV
623 1075 4763      JMS I  (INISR1
624 1076 3761      DCA I  (MIDRV
625 1077 4325      JMS  INISR2
626 1100 7410      SKP
627 1101 3760      DCA I  (LOBLOK
628 1102 4325      JMS  INISR2
629 1103 9306      JMP
630 1104 7041      CIA
631 1105 3757      DCA I  (HIBLOK
632 1106 4325      JMS  INISR2
633 1107 5313      JMP
634 1110 3756      DCA I  (ERRDB
635 1111 1399      TAD  (DATCON
636 1112 7410      SKP
637 1113 1394      TAD  (RANDOM
638 1114 3793      DCA I  (DATGEV
639 1115 4325      JMS  INISR2
640 1116 5322      JMP
641 1117 3246      DCA  CONBUF
642 1120 1392      TAD  (BUFCON
643 1121 7410      SKP
644 1122 1301      TAD  (BUFRAN
645 1123 3750      DCA I  (BUFGEV
646 1124 5020      INITEX
647 1125 0000      INISR2, 0
648 1126 4336      JMS  INISR3
649 1127 7050      SNA CLA
650 1130 5725      JMP I  INISR2
651 1131 2325      ISE  INISR2
652 1132 4455      SPACE2
653 1133 4443      FROCT
654 1134 9271      JMP  INITLP
655 1135 5725      JMP I  INISR2
656
657 1136 0000      INISR3, 0
658 1137 4454      CRLF
659 1140 1270      TAD  LTRCOD
660 1141 4450      TYPE
661 1142 4455      SPACE2
662 1143 4442      ONEOCT
663 1144 9271      JMP  INITLP

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664 1145 2270      ISE  LTRCOD      /UPDATE LETTER CODE,
665 1146 5736      JMP I  INISR3    /OUT,
666
667
668              /END OF PAGE AND END OF PROGRAM CODE
669
670 1150 0757
671 1151 1047
672 1152 1036
673 1153 0760
674 1154 0426
675 1155 0366
676 1156 0253
677 1157 0737
678 1160 0736
679 1161 0741
680 1162 0740
681 1163 0590
682 1164 0201
683 1165 0246
684 1166 0275
685 1167 0262
686 1170 0276
687 1171 0241
688 1172 0211
689 1173 0244
690 1174 0292
691 1175 0465
692 1176 0220
693 1177 0217

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0000  
0100

0200 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111  
0300 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111

0400 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111  
0500 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111

0600 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111  
0700 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111

1000 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111  
1100 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111

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1500

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3100

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3700

4000  
4100

4200  
4300

4400  
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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

```

0001 FIELD 1
694
695 /LOADER CALL
696
697 1200 1065 INIT:RUN:INT
698 1201 0680
699 1202 0255
700
701 1203 6771 DTBF:0:1:HLT:HLT:HLT
    1204 0000
    1205 0001
702 1206 7402
703 1207 7402
704 1210 7402
705
706 1211 7770 -10:IAU:IAU:IAUC:IAUD:IAUE:IAUF:IAU0:IAU
707 1212 0334
708 1213 0913
709 1214 0916
710 1215 0943
711 1216 0660
712 1217 0700
713 1220 0750
714 1221 1001
715
716 1222 7776 -2
717
718 1223 0760 0760:-10:DC76A:DC76B:DTERR:DC76C:DC76D:DC76E:DC76F:DC76G
    1224 7770
719 1225 0263
720 1226 0307
721 1227 0340
722 1230 0343
723 1231 0347
724 1232 0392
725 1233 1030
726 1234 1031
727
728 1235 0770 0770:-9:1:SRHGN:DC77A:DC77B:DC77C
    1236 7773
    1237 0001
729 1240 0276
730 1241 0304
731 1242 0344
732 1243 1020
733
734 1244 7777 -1:7754:-1:DTANG
    1245 7754
    1246 7777
735 1247 0373
736
737 1250 7777 -1:7755:-2:DTACA:DTACA1
    1251 7755
    1252 7776
738 1253 0374

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739 1254 1033
740
741

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0000  
0100  
  
0200  
0300  
  
0400  
0500  
  
0600  
0700

1000  
1100

1200 11111111 11111111 11111111 11111111 11111111 11111000 00000000 00000000  
1300 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000

1400  
1500  
  
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1700

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2100

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2500

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3100

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3700

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7500

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7700

ASBUFF	4460	ERRDB	0253	K2000	0122	M20	0135
ASBUFP	0060	ERRDC	0254	K212	0111	M200	0131
AUA	0334	ERRDR	0222	K215	0112	M240	0127
AUD	0513	ERRP	0061	K240	0113	M260	0126
AUC	0516	ERRSA	0240	K260	0114	M270	0125
AUD	0543	ERRSD	0241	K272	0115	M3	0141
AUE	0660	ERRSC	0242	K277	0116	M30	0134
AUF	0700	ERRSD	0243	K2A	0372	M4	0140
AUG	0750	ERRSE	0244	K3	0072	M40	0133
AUH	1001	ERRSF	0245	K30	0103	M43	0132
AUTO	0017	ERRSG	0246	K301	0117	M5	0137
BUPCDF	0656	ERRSH	0247	K32	0067	M7	0136
BUPCON	1036	ERRSI	0250	K323	0120	MESSAGE	4444
BUPGEN	0643	EXERA	0602	K4	0073	MSADP	0044
BUPGEV	0757	EXERB	0605	K40	0104	MUL26P	0065
BUPRAN	1047	EXERC	0620	K400	0121	ONEOCP	0042
BUPRAL	0731	EXINIT	0020	K0	0074	ONEOCT	4442
CNTR	0221	EXSERV	0004	K0000	0103	PARITY	0734
CODE	0236	EXTMEM	0161	K040	0124	PARTAL	0733
CONBUF	1046	FORDCT	0043	K0002	0003	PRNT1	4451
CRLF	4454	FORDCT	4443	K000A	0371	PRNT1P	0051
CRLEP	0054	GO	1000	K614A	1035	PRNT2	4452
DATCHK	0473	G01	0413	K64	0070	PRNT2P	0052
DATCON	0366	G02	0400	K7	0075	PRNT4	4453
DATGEN	0647	G03	0423	K70	0105	PRNT4P	0053
DATGEV	0760	GOOUT	1034	K7000A	0713	RAN1	0460
DATSET	0534	HIBLOK	0737	K7010	0125	RAN2	0461
DC76A	0243	HIDRV	0741	K7020	0126	RANDOM	0426
DC76B	0307	HOMEDF	0211	K7040	0127	RELEASE	0465
DC76C	0343	INRSTP	0026	K7000	0131	RENTRY	0275
DC76D	0347	INISR1	0350	K77	0106	REPORT	0425
DC76E	0352	INISR2	1125	K7700A	0300	REBRAN	0452
DC76F	1030	INISR3	1136	K7735	0132	RLBUFF	4457
DC76G	1031	INIT	1065	K7740	0133	RLBUFF	0057
DC77A	0304	INITEX	0020	K7750	0134	RUN	0600
DC77B	0344	INITLP	1071	K7760	0135	SAV1	0462
DC77C	1020	INT	0055	K7771	0136	SAV2	0463
DICRNT	0735	INTACK	0214	K7773	0137	SAVRAN	0442
DTACA	0374	INTRT	0262	K7774	0140	SERVEX	0004
DTACA1	1033	IOFMSF	0056	K7775	0141	SNLCLA	0742
DTANC	0373	JOB	0200	KCDF	0044	SPACE2	4455
DTCA	0742	K0	0066	KCIF	0005	SPACEP	0055
DTERR	0340	K10	0076	KCIFDF	0000	SRHCOF	0313
DTLA	0766	K100	0107	KILL	0217	SRHCON	0276
DTLB	0774	K11	0077	KILLED	0220	SUMCHK	0743
DTOUT	0712	K1111A	0464	KIOF	0004	SUMSAV	0732
DTRA	0761	K110	0071	LIRN	4440	SCLCLA	0624
DTRB	0772	K13	0100	LIRNP	0040	TEXT1	0201
DTRD	0675	K17	0101	LOBLOK	0736	THOOCF	0041
DTSF	0771	K177	0130	LOGGED	0307	THOOCY	4441
DTXA	0764	K20	0102	LODRV	0740	TYPE	4450
ERRDA	0252	K200	0110	LTRCOD	1070	TYPEP	0050

ERRORS DETECTED: 0  
 LINKS GENERATED: 4  
 RUN-TIME: 7 SECONDS  
 3K CORE USED