



COMPUTER CONTROL DIVISION (EUROPE)

PROGRAM DOCUMENTATION

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0002	*			11T10030
0003	*			11T10040
0004	* COMPUTERS: H316 AND DDP-516			11T10050
0005	*			11T10060
0006	*			11T10070
0007	* PROGRAM CATEGORY: TEST AND MAINTENANCE			11T10080
0008	*			11T10090
0009	*			11T10100
0010	* PROGRAM TITLE: 016-11T1			11T10110
0011	*			11T10120
0012	* ARITHMETIC OPTION TEST NO.1			11T10130
0013	*			11T10140
0014	*			11T10150
0015	*			11T10160
0016	*			11T10170
0017	*			11T10180
0018	*			11T10190
0019	*			11T10200
0020	*			11T10210
0021	*			11T10220
0022	*			11T10230
0023	*			11T10240
0024	*			11T10250
0025	*	APPROVAL	DATE	11T10260
0026	*			11T10270
0027	*			11T10280
0028	*	PROG-----	-----	11T10290
0029	*			11T10300
0030	*			11T10310
0031	*	SUPR-----	-----	11T10320
0032	*			11T10330
0033	*			11T10340
0034	*	QUAL <i>H. A. Dimmes</i>	<i>7 Oct. 70</i>	11T10350
0035	*			11T10360
0036	*			11T10370
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0038	*				11T10390
0039	*				11T10400
0040	*				11T10410
0041	*	REV. D	ECO		11T10420
0042	*	REV. C	ECO 6922	05-12-69	11T10430
0043	*	REV. B	ECO 4584	05-19-67	11T10440
0044	*	REV. A		10-17-66	11T10450
0045	*				11T10460
0046	*				11T10470
0047	*	AUTHOR			11T10480
0048	*				11T10490
0049	*	HONEYWELL, INC. - COMPUTER CONTROL DIVISION			11T10500
0050	*				11T10510
0051	*				11T10520
0052	*	PURPOSE			11T10530
0053	*				11T10540
0054	*	TO TEST THE ARITHMETIC OPTION ON THE H-316 AND DDP-516.			11T10550
0055	*				11T10560
0056	*				11T10570
0057	*	RESTRICTIONS			11T10580
0058	*				11T10590
0059	*	THIS PROGRAM WILL OPERATE ON ANY H-316 AND DDP-516 WHICH HAS			11T10600
0060	*	OPTION X16-11.			11T10610
0061	*				11T10620
0062	*				11T10630
0063	*	TIMING			11T10640
0064	*				11T10650
0065	*	THIS PROGRAM TAKES ABOUT 9.25 MILLISEC. PER PASS OR 6,483 PASSES			11T10660
0066	*	PER MINUTE OR 389,000 PASSES PER HOUR.			11T10670
0067	*				11T10680
0068	*				11T10690
0069	*	STORAGE			11T10700
0070	*				11T10710
0071	*	2712 (OCTAL)			11T10720
0072	*	1482 (DECIMAL)			11T10730
0073	*				11T10740
0074	*				11T10750



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0075	* SENSE SWITCH SETTINGS	11T10760
0076	*	11T10770
0077	* SS1 UP - STOP PROGRAM AT END OF EACH PASS.	11T10780
0078	*	11T10790
0079	*	11T10800
0080	* USE	11T10810
0081	*	11T10820
0082	*	11T10830
0083	* START PROGRAM AT LOCATION 1000 (OCTAL).	11T10840
0084	* THE PROGRAM WILL NOW CYCLE UNLESS IT DETECTS AN ERROR.	11T10850
0085	* TO ENSURE THAT THE PROGRAM IS CYCLING PROPERLY, RAISE SENSE	11T10860
0086	* SWITCH 1. THE PROGRAM SHOULD STOP AT 'EOPH'. EACH PUSH OF THE	11T10870
0087	* START BUTTON SHOULD CAUSE THE PROGRAM TO LOOP THROUGH ALL THE	11T10880
0088	* TESTS AND STOP AT 'EOPH'. IF IT DOES, SENSE SWITCH 1 MAY BE	11T10890
0089	* LOWERED SO THAT THE PROGRAM WILL CYCLE UNTIL STOPPED.	11T10900
0090	*	11T10910
0091	* AFTER THE PROGRAM HAS BEEN TRIED AT LEAST ONCE, IT MAY BE	11T10920
0092	* RESTARTED, AFTER MASTER CLEARING, FROM ANY POINT BEFORE ITS FIRST	11T10930
0093	* ERROR HALT (IF ANY) WHICH IS MARKED WITH AN ASTERISK IN THE 1ST	11T10940
0094	* SPACE OF THE COMMENTS FIELD (CARD COLUMN 30).	11T10950
0095	*	11T10960
0096	* A PASS COUNT WILL BE TYPED BY THE ASR EVERY 5000 PASSES.	11T10970
0097	* THIS WILL TAKE ONE MINUTE FOR THE DDP-516, SOMEWHAT LONGER FOR	11T10980
0098	* THE H316. IF THE PROGRAM IS RESTARTED FROM 1000 (OCTAL), THE	11T10990
0099	* ID MESSAGE WILL BE REPEATED AND THE PASS COUNTER RE-INITIALIZED.	11T11000
0100	*	11T11010
0101	* IF THE PROGRAM IS RUN FOR AN EXTENDED LENGTH OF TIME IT	11T11020
0102	* WILL HALT AFTER 1,000,000,000 PASSES.	11T11030
0103	*	11T11040
0104	* ERRORS	11T11050
0105	*	11T11060
0106	*	11T11070
0107	* THIS PROGRAM CONTAINS A FEATURE WHICH TRACES THE PATH OF THE	11T11080
0108	* PROGRAM USING JST INSTRUCTIONS. AFTER THE FIRST FEW TESTS HAVE	11T11090
0109	* BEEN EXECUTED, EACH TEST STARTS WITH A JST TO 'JSTL' (THE JST-	11T11100
0110	* REPORTING LOCATION) FOLLOWED BY A JST TO *+1 WHICH IN TURN IS	11T11110
0111	* FOLLOWED BY A PZE 2. LOCATION 'JSTL' IS MODIFIED AT THE BEGINNING	11T11120
	* OF EACH TEST AND EACH PZE 2 IS MODIFIED TO CONTAIN ITS OWN ADDRESS.	



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0112 * THE 'PZE 2' LOCATIONS ARE CHECKED FOR THEIR OWN ADDRESSES AT THE 11T11130
0113 * END OF EACH PASS. 11T11140
0114 * 11T11150
0115 * THE PROGRAM WILL HALT IF IT DETECTS AN ERROR. THE FOLLOWING 11T11160
0116 * PROCEDURE SHOULD BE FOLLOWED WHEN AN ERROR HALT IS ENCOUNTERED - 11T11170
0117 * 11T11180
0118 * WRITE DOWN THE CONTENTS OF ALL REGISTERS SO THAT THE 11T11190
0119 * INFORMATION IN THEM WILL NOT BE LOST. 11T11200
0120 * THE LOCATION OF THE ERROR HALT WILL BE DISPLAYED IN REG. Y. 11T11210
0121 * LOOK UP THIS LOCATION IN THE LISTING. 11T11220
0122 * THE BEGINNING OF THE TEST WHICH RESULTED IN THE ERROR HALT 11T11230
0123 * WILL BE IDENTIFIED BY AN ENTRY IN THE LOCATION FIELD USUALLY 11T11240
0124 * CONSISTING OF 3 LETTERS AND 1 NUMBER. THE THREE LETTERS ARE THE 11T11250
0125 * MNEMONIC CODE OF THE INSTRUCTION BEING TESTED AND THE NUMBER 11T11260
0126 * DENOTES THE NUMBER OF TIMES THIS INSTRUCTION HAS BEEN TESTED. THE 11T11270
0127 * INSTRUCTION IN THIS LOCATION, WILL BE 'JST JSTL' FOLLOWED BY 11T11280
0128 * 'JST *+1' AND 'JLXX PZE 2'. 11T11290
0129 * FIRST, CHECK TO SEE THAT LOCATION 'JSTL' CONTAINS THE 11T11300
0130 * ADDRESS OF THE LOCATION CONTAINING THE 'JST *+1' (CAUSED BY 'JST 11T11310
0131 * JSTL'). THEN CHECK THE 'JLXX PZE 2' TO SEE THAT IT CONTAINS ITS 11T11320
0132 * OWN ADDRESS (CAUSED BY 'JST *+1'). IF NOT, THE TEST WAS NOT 11T11330
0133 * ENTERED PROPERLY AND ONE OF THE JUMP INSTRUCTIONS MAY BE FAILING. 11T11340
0134 * IF LOCATION 'JSTL' AND THE 'JLXX PZE 2' CONTAIN THE PROPER 11T11350
0135 * ADDRESSES, EXECUTE THE TEST IN THE SINGLE INSTRUCTION MODE. IF 11T11360
0136 * THERE IS A * IN THE FIRST SPACE OF THE COMMENTS FIELD ON THE 'JST 11T11370
0137 * JSTL' LINE, THE TEST DOES NOT DEPEND ON THE RESULTS OF THE 11T11380
0138 * PREVIOUS TEST AND CAN BE PROPERLY EXECUTED BY STARTING EITHER WITH 11T11390
0139 * THE 'JST JSTL' OR AT THE LOCATION FOLLOWING THE 'JLXX PZE 2'. IF 11T11400
0140 * THE ERROR HALT IS ENCOUNTERED AGAIN, THE FAILURE IS PROBABLY SOLID. 11T11410
0141 * WHETHER THE FAILURE IS SOLID OR NOT, IT IS POSSIBLE TO LOOP 11T11420
0142 * ON MOST OF THE TESTS BY REPLACING THE ERROR HALT, AND THE 'SZE' 11T11430
0143 * JUST BEFORE IT, WITH JUMPS BACK TO THE BEGINNING OF THE TEST. IN 11T11440
0144 * A FEW CASES IT MAY ALSO BE NECESSARY TO CLEAR A REGISTER BEFORE 11T11450
0145 * RESTARTING THE TEST. 11T11460
0146 * 11T11470
0147 * 11T11480
0148 * METHOD 11T11490



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0149 *
0150 *      THIS PROGRAM TESTS THE ARITHMETIC OPTION INSTRUCTIONS IN THE
0151 *      FOLLOWING ORDER -
0152 *      MPY, DIV, SCA, NRM, DLD, DST, DAD, DSB.
0153 *      FINALLY, THE MPY AND DIV INSTRUCTIONS ARE EXTENSIVELY TESTED USING
0154 *      A TABLE CONSISTING OF 112 MOST-SIGNIFICANT ENTRIES AND 112 LEAST-
0155 *      SIGNIFICANT ENTRIES.
0156 *
0157 *
0158 * ABBREVIATIONS
0159 *
0160 *      A - REGISTER A
0161 *      B - REGISTER B
0162 *      M - MEMORY REGISTER
0163 *      ASR - TELETYPEWRITER (AUTOMATIC SEND-RECEIVE SET)
0164 *      ASCII-AMERICAN STANDARD CODE FOR INFORMATION INTERCHANGE
0165 *
0166 *
0167 *****
0168 *
0169      ORG      '1000
0170 01000      0 35 02711      LDX      =-9      SET INDEX FOR 9 LOCATIONS
0171 01001      0 02 02710      LDA      =-10     RESTORE PASS COUNTERS
0172 01002      1 04 02171      STA      NPAS+9,1
0173 01003      0 12 00000      IRS      0
0174 01004      0 01 01002      JMP      *-2
0175 01005      0 02 02707      LDA      =-5000   RESTORE TIMED PRINTOUT
0176 01006      0 04 02157      STA      CTR2
0177 01007      0 01 02566      STRT    JMP      TITL      PRINT TITLE
0178 *
0179 01010      0 10 01553      MPY1    JST      JSTL      * TESTING MPY (1) * (0)
0180 01011      0 10 01012      JST      *+1
0181 01012      0 00 00002      JL01    PZE      2
0182 01013      0 02 02706      LDA      =1      A=1, B=0
0183 01014      0 16 02705      MPY      =0      MPY BY 0
0184 01015      100040      SZE      A=0
0185 01016      000000      HLT
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0186	01017	000201	IAB			11T11870
0187	01020	100040	SZE		B=0	11T11880
0188	01021	000000	HLT			11T11890
0189			*			11T11900
0190	01022	0 10 01553	MPY2 JST	JSTL	* TESTING MPY (+) * (+)	11T11910
0191	01023	0 10 01024	JST	*+1		11T11920
0192	01024	0 00 00002	JL02 PZE	2		11T11930
0193	01025	0 02 02704	LDA	=-1		11T11940
0194	01026	000201	IAB		B='177777 (SHOULD HAVE NO EFFECT)	11T11950
0195	01027	0 02 02706	LDA	=1	A='000001	11T11960
0196	01030	0 16 02706	MPY	=1	MPY BY '000001	11T11970
0197	01031	100040	SZE		A=0	11T11980
0198	01032	000000	HLT			11T11990
0199	01033	000201	IAB			11T12000
0200	01034	0 05 02706	ERA	=1	B='000001	11T12010
0201	01035	100040	SZE			11T12020
0202	01036	000000	HLT			11T12030
0203			*			11T12040
0204	01037	0 10 01553	MPY3 JST	JSTL	* TESTING MPY (+) * (+)	11T12050
0205	01040	0 10 01041	JST	*+1		11T12060
0206	01041	0 00 00002	JL03 PZE	2		11T12070
0207	01042	0 02 02703	LDA	= '77777	A='077777, B=0	11T12080
0208	01043	0 16 02703	MPY	= '77777	MPY BY '077777	11T12090
0209	01044	0 05 02702	ERA	= '77776	A='077776	11T12100
0210	01045	100040	SZE			11T12110
0211	01046	000000	HLT			11T12120
0212	01047	000201	IAB			11T12130
0213	01050	0 05 02706	ERA	=1	B=1	11T12140
0214	01051	100040	SZE			11T12150
0215	01052	000000	HLT			11T12160
0216			*			11T12170
0217	01053	0 10 01553	MPY4 JST	JSTL	* TESTING MPY (-) * (+)	11T12180
0218	01054	0 10 01055	JST	*+1		11T12190
0219	01055	0 00 00002	JL04 PZE	2		11T12200
0220	01056	0 02 02701	LDA	=-3	A='177775, B=0	11T12210
0221	01057	0 16 02700	MPY	=4	MPY BY '000004	11T12220
0222	01060	0 05 02704	ERA	=-1	A='177777	11T12230



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0223	01061	100040	SIZE			11T12240
0224	01062	000000	HLT			11T12250
0225	01063	000201	IAB			11T12260
0226	01064	0 05 02677	ERA	= '77764	B = '077764	11T12270
0227	01065	100040	SIZE			11T12280
0228	01066	000000	HLT			11T12290
0229						11T12300
0230	01067	0 10 01553	MPY5 JST	JSTL	* TESTING MPY (+) * (-)	11T12310
0231	01070	0 10 01071	JST	*+1		11T12320
0232	01071	0 00 00002	JL05 PZE	2		11T12330
0233	01072	0 02 02676	LDA	=10922	A = '025252, B=0	11T12340
0234	01073	0 16 02675	MPY	=-10923	MPY BY '152525	11T12350
0235	01074	0 05 02674	ERA	= '170707	A = '170707	11T12360
0236	01075	100040	SIZE			11T12370
0237	01076	000000	HLT			11T12380
0238	01077	000201	IAB			11T12390
0239	01100	0 05 02673	ERA	= '16162	B = '016162	11T12400
0240	01101	100040	SIZE			11T12410
0241	01102	000000	HLT			11T12420
0242						11T12430
0243	01103	0 10 01553	MPY6 JST	JSTL	* TESTING MPY (-) * (-)	11T12440
0244	01104	0 10 01105	JST	*+1		11T12450
0245	01105	0 00 00002	JL06 PZE	2		11T12460
0246	01106	0 02 02672	LDA	=-15604	A = '141414, B=0	11T12470
0247	01107	0 16 02671	MPY	=-8	MPY BY '177770	11T12480
0248	01110	0 05 02670	ERA	=3	A = '000003	11T12490
0249	01111	100040	SIZE			11T12500
0250	01112	000000	HLT			11T12510
0251	01113	000201	IAB			11T12520
0252	01114	0 05 02667	ERA	= '63640	B = '063640	11T12530
0253	01115	100040	SIZE			11T12540
0254	01116	000000	HLT			11T12550
0255						11T12560
0256	01117	0 10 01553	DIV1 JST	JSTL	* TESTING ILLEGAL DIVISION	11T12570
0257	01120	0 10 01121	JST	*+1		11T12580
0258	01121	0 00 00002	JL07 PZE	2		11T12590
0259	01122	140040	CRA			11T12600



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0260	01123	000201	IAB	B=0	11T12610
0261	01124	140040	CRA	A=0	11T12620
0262	01125	0 17 02705	DIV =0	DIV BY 0	11T12630
0263	01126	100040	SZE	A=0	11T12640
0264	01127	000000	HLT		11T12650
0265	01130	000201	IAB		11T12660
0266	01131	100040	SZE	B=0	11T12670
0267	01132	000000	HLT		11T12680
0268	01133	101001	SSC	C BIT IS SET	11T12690
0269	01134	000000	HLT		11T12700
0270			*		11T12710
0271	01135	0 10 01553	DIV2 JST JSTL	* TESTING ILLEGAL DIVISION	11T12720
0272	01136	0 10 01137	JST **1		11T12730
0273	01137	0 00 00002	JL08 PZE 2		11T12740
0274	01140	140040	CRA		11T12750
0275	01141	000201	IAB	B=0	11T12760
0276	01142	0 02 02666	LDA =-32768	A='100000	11T12770
0277	01143	0 17 02666	DIV =-32768	DIV BY '100000	11T12780
0278	01144	0 05 02666	ERA ='100000	A='100000	11T12790
0279	01145	100040	SZE		11T12800
0280	01146	000000	HLT		11T12810
0281	01147	000201	IAB		11T12820
0282	01150	100040	SZE		11T12830
0283	01151	000000	HLT		11T12840
0284	01152	101001	SSC	C BIT IS SET	11T12850
0285	01153	000000	HLT		11T12860
0286			*		11T12870
0287	01154	0 10 01553	DIV3 JST JSTL	* TESTING DIV (+) / (+)	11T12880
0288	01155	0 10 01156	JST **1		11T12890
0289	01156	0 00 00002	JL09 PZE 2		11T12900
0290	01157	0 02 02665	LDA =27		11T12910
0291	01160	000201	IAB	B='000033	11T12920
0292	01161	140040	CRA	A=0	11T12930
0293	01162	0 17 02664	DIV =5	DIV BY '000005	11T12940
0294	01163	0 05 02664	ERA =5	A(QUOTIENT)='000005	11T12950
0295	01164	100040	SZE		11T12960
0296	01165	000000	HLT		11T12970



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0297	01166	000201	IAB			11T12980
0298	01167	0 05 02663	ERA	=2	B(REMAINDER)='000002	11T12990
0299	01170	100040	SZE			11T13000
0300	01171	000000	HLT			11T13010
0301	01172	100001	SRC			11T13020
0302	01173	000000	HLT			11T13030
0303			*			11T13040
0304	01174	0 10 01553	DIV4	JST	JSTL	11T13050
0305	01175	0 10 01176	JST	*+1	* TESTING DIV (-) / (-)	11T13060
0306	01176	0 00 00002	JL10	PZE	2	11T13070
0307	01177	0 02 02662	LDA	=-'400	A='177400, B=0	11T13080
0308	01200	0 17 02661	DIV	=-'1000	DIV BY '177000	11T13090
0309	01201	0 05 02660	ERA	= '40000	A='040000	11T13100
0310	01202	100040	SZE			11T13110
0311	01203	000000	HLT			11T13120
0312	01204	000201	IAB			11T13130
0313	01205	100040	SZE		B=0	11T13140
0314	01206	000000	HLT			11T13150
0315	01207	100001	SRC			11T13160
0316	01210	000000	HLT			11T13170
0317			*			11T13180
0318	01211	0 10 01553	DIV5	JST	JSTL	11T13190
0319	01212	0 10 01213	JST	*+1	* TESTING DIV (+) / (-)	11T13200
0320	01213	0 00 00002	JL11	PZE	2	11T13210
0321	01214	0 02 02657	LDA	= '7070		11T13220
0322	01215	000201	IAB		B='007070	11T13230
0323	01216	0 02 02656	LDA	= '70707	A='070707	11T13240
0324	01217	0 17 02655	DIV	=-31800	DIV BY '101710	11T13250
0325	01220	0 05 02654	ERA	= '105303	A='105303	11T13260
0326	01221	100040	SZE			11T13270
0327	01222	000000	HLT			11T13280
0328	01223	000201	IAB			11T13290
0329	01224	0 05 02653	ERA	= '56340	B='056340	11T13300
0330	01225	100040	SZE			11T13310
0331	01226	000000	HLT			11T13320
0332	01227	100001	SRC			11T13330
0333	01230	000000	HLT			11T13340



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0334			*						11T13350
0335	01231	0 10 01553	DIV6	JST	JSTL			* TESTING (-) / (+)	11T13360
0336	01232	0 10 01233		JST	**+1				11T13370
0337	01233	0 00 00002	JL12	PZE	2				11T13380
0338	01234	0 02 02652		LDA	= '70077				11T13390
0339	01235	000201		IAB		B= '070077			11T13400
0340	01236	0 02 02651		LDA	= - '771	A= '177007			11T13410
0341	01237	0 17 02650		DIV	= 4032	DIV BY '007700			11T13420
0342	01240	0 05 02647		ERA	= - '10001	A= '167777			11T13430
0343	01241	100040		SZE					11T13440
0344	01242	000000		HLT					11T13450
0345	01243	000201		IAB					11T13460
0346	01244	0 05 02704		ERA	= - 1	B= '177777			11T13470
0347	01245	100040		SZE					11T13480
0348	01246	000000		HLT					11T13490
0349	01247	100001		SRC					11T13500
0350	01250	000000		HLT					11T13510
0351			*						11T13520
0352	01251	0 10 01553	SCA1	JST	JSTL			* TESTING SCA (ONES TO A)	11T13530
0353	01252	0 10 01253		JST	**+1				11T13540
0354	01253	0 00 00002	JL13	PZE	2				11T13550
0355	01254	0 02 02704		LDA	= - 1				11T13560
0356	01255	000201		IAB					11T13570
0357	01256	000201		IAB		A= '177777			11T13580
0358	01257	000041		SCA					11T13590
0359	01260	0 05 02646		ERA	= '77	A= '000077			11T13600
0360	01261	100040		SZE					11T13610
0361	01262	000000		HLT					11T13620
0362			*						11T13630
0363	01263	0 10 01553	SCA2	JST	JSTL			* TESTING SCA (ZEROS TO A)	11T13640
0364	01264	0 10 01265		JST	**+1				11T13650
0365	01265	0 00 00002	JL14	PZE	2				11T13660
0366	01266	0 02 02704		LDA	= - 1				11T13670
0367	01267	000201		IAB					11T13680
0368	01270	140040		CRA					11T13690
0369	01271	0402 60		LRR	16	A= '177777			11T13700
0370	01272	000041		SCA					11T13710



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0371	01273	100040		SZE		A=0		11T13720
0372	01274	000000		HLT				11T13730
0373			*					11T13740
0374	01275	0 10 01553	NRM1	JST	JSTL	* TESTING NRM (29 SHIFTS)		11T13750
0375	01276	0 10 01277		JST	*+1			11T13760
0376	01277	0 00 00002	JL15	PZE	2			11T13770
0377	01300	0 02 02706		LDA	=1			11T13780
0378	01301	000201		IAB		B='000001		11T13790
0379	01302	140040		CRA		A=0		11T13800
0380	01303	000101		NRM				11T13810
0381	01304	0 05 02660		ERA	= '040000			11T13820
0382	01305	100040		SZE				11T13830
0383	01306	000000		HLT				11T13840
0384	01307	000041		SCA				11T13850
0385	01310	0 05 02645		ERA	= '000035			11T13860
0386	01311	100040		SZE				11T13870
0387	01312	000000		HLT				11T13880
0388	01313	000201		IAB				11T13890
0389	01314	100040		SZE				11T13900
0390	01315	000000		HLT				11T13910
0391			*					11T13920
0392	01316	0 10 01553	NRM2	JST	JSTL	* TESTING NRM (30 SHIFTS)		11T13930
0393	01317	0 10 01320		JST	*+1			11T13940
0394	01320	0 00 00002	JL16	PZE	2			11T13950
0395	01321	0 02 02704		LDA	=-1			11T13960
0396	01322	000201		IAB		B='177777		11T13970
0397	01323	0 02 02704		LDA	=-1	A='177777		11T13980
0398	01324	000101		NRM				11T13990
0399	01325	0 05 02666		ERA	= '100000			11T14000
0400	01326	100040		SZE				11T14010
0401	01327	000000		HLT				11T14020
0402	01330	000041		SCA				11T14030
0403	01331	0 05 02644		ERA	= '36			11T14040
0404	01332	100040		SZE				11T14050
0405	01333	000000		HLT				11T14060
0406	01334	000201		IAB				11T14070
0407	01335	0 05 02666		ERA	= '100000			11T14080



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0408	01336	100040		SZE			11T14090
0409	01337	000000		HLT			11T14100
0410			*				11T14110
0411	01340	0 10 01553	NRM3	JST	JSTL	* TESTING NRM (3 SHIFTS)	11T14120
0412	01341	0 10 01342		JST	++1		11T14130
0413	01342	0 00 00002	JL17	PZE	2		11T14140
0414	01343	0 02 02666		LDA	= '100000		11T14150
0415	01344	000201		IAB		B = '100000	11T14160
0416	01345	0 02 02643		LDA	= '5000	A = '005000	11T14170
0417	01346	000101		NRM			11T14180
0418	01347	0 05 02642		ERA	= '50000		11T14190
0419	01350	100040		SZE			11T14200
0420	01351	000000		HLT			11T14210
0421	01352	000041		SCA			11T14220
0422	01353	0 05 02670		ERA	= 3		11T14230
0423	01354	100040		SZE			11T14240
0424	01355	000000		HLT			11T14250
0425	01356	000201		IAB			11T14260
0426	01357	0 05 02666		ERA	= '100000		11T14270
0427	01360	100040		SZE			11T14280
0428	01361	000000		HLT			11T14290
0429			*				11T14300
0430	01362	0 10 01553	NRM4	JST	JSTL	* TESTING NRM (32 SHIFTS)	11T14310
0431	01363	0 10 01364		JST	++1		11T14320
0432	01364	0 00 00002	JL18	PZE	2		11T14330
0433	01365	140040		CRA			11T14340
0434	01366	000201		IAB		B = 0	11T14350
0435	01367	140040		CRA		A = 0	11T14360
0436	01370	000101		NRM			11T14370
0437	01371	100040		SZE			11T14380
0438	01372	000000		HLT			11T14390
0439	01373	000041		SCA			11T14400
0440	01374	100040		SZE			11T14410
0441	01375	000000		HLT			11T14420
0442	01376	000201		IAB			11T14430
0443	01377	100040		SZE			11T14440
0444	01400	000000		HLT			11T14450



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0445			*					11T14460
0446	01401	0 10 01553	DLD1	JST	JSTL	*	TESTING DOUBLE PRECISION LDA	11T14470
0447	01402	0 10 01403		JST	*+1			11T14480
0448	01403	0 00 00002	JL19	PZE	2			11T14490
0449	01404	000007		OCT	7	DBL		*11T14500
0450	01405	140040		CRA				11T14510
0451	01406	000201		IAB				11T14520
0452	01407	140040		CRA				11T14530
0453	01410	0 02 01560		LDA	DPC0	(DLD)		11T14540
0454	01411	0 05 02704		ERA	=-1			11T14550
0455	01412	100040		SZE				11T14560
0456	01413	000000		HLT				11T14570
0457	01414	000201		IAB				11T14580
0458	01415	0 05 02704		ERA	=-1			11T14590
0459	01416	100040		SZE				11T14600
0460	01417	000000		HLT				11T14610
0461	01420	000005		OCT	5	SGL		*11T14620
0462	01421	0 02 01560		LDA	DPC0			11T14630
0463	01422	0 05 02704		ERA	=-1			11T14640
0464	01423	100040		SZE				11T14650
0465	01424	000000		HLT				11T14660
0466	01425	000201		IAB				11T14670
0467	01426	100040		SZE				11T14680
0468	01427	000000		HLT				11T14690
0469			*					11T14700
0470	01430	0 10 01553	DLD2	JST	JSTL	*	TESTING DOUBLE PRECISION LDA	11T14710
0471	01431	0 10 01432		JST	*+1			11T14720
0472	01432	0 00 00002	JL20	PZE	2			11T14730
0473	01433	0 02 02704		LDA	=-1			11T14740
0474	01434	000201		IAB				11T14750
0475	01435	0 02 02641		LDA	= '177600			11T14760
0476	01436	000007		OCT	7	DBL		*11T14770
0477	01437	0 02 01562		LDA	DPC1	(DLD)		11T14780
0478	01440	0 05 02640		ERA	= '252			11T14790
0479	01441	100040		SZE				11T14800
0480	01442	000000		HLT				11T14810
0481	01443	000201		IAB				11T14820



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0482	01444	100040		SZE			11T14830
0483	01445	000000		HLT			11T14840
0484	01446	000005		OCT	5	SGL	*11T14850
0485			*				11T14860
0486	01447	0 10 01553	DST1	JST	JSTL	* TESTING DOUBLE PRECISION STA	11T14870
0487	01450	0 10 01451		JST	*+1		11T14880
0488	01451	0 00 00002	JL21	PZE	2		11T14890
0489	01452	0 02 02704		LDA	--1		11T14900
0490	01453	000201		IAB			11T14910
0491	01454	0 02 02704		LDA	--1		11T14920
0492	01455	000007		OCT	7	DBL	*11T14930
0493	01456	0 04 01556		STA	DPT0	(DST)	11T14940
0494	01457	000005		OCT	5	SGL	*11T14950
0495	01460	140040		CRA			11T14960
0496	01461	0 02 01556		LDA	DPT0		11T14970
0497	01462	0 05 02704		ERA	--1		11T14980
0498	01463	100040		SZE			11T14990
0499	01464	000000		HLT			11T15000
0500	01465	0 02 01557		LDA	DPT0+1		11T15010
0501	01466	0 05 02704		ERA	--1		11T15020
0502	01467	100040		SZE			11T15030
0503	01470	000000		HLT			11T15040
0504			*				11T15050
0505	01471	0 10 01553	DST2	JST	JSTL	TESTING DOUBLE PRECISION STA	11T15060
0506	01472	0 10 01473		JST	*+1		11T15070
0507	01473	0 00 00002	JL22	PZE	2		11T15080
0508	01474	140040		CRA			11T15090
0509	01475	000201		IAB			11T15100
0510	01476	140040		CRA			11T15110
0511	01477	000007		OCT	7	DBL	*11T15120
0512	01500	0 04 01556		STA	DPT0	(DST)	11T15130
0513	01501	000005		OCT	5	SGL	*11T15140
0514	01502	0 02 01556		LDA	DPT0		11T15150
0515	01503	100040		SZE			11T15160
0516	01504	000000		HLT			11T15170
0517	01505	0 02 01557		LDA	DPT0+1		11T15180
0518	01506	100040		SZE			11T15190



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0519	01507	000000		HLT			11T15200
0520			*				11T15210
0521	01510	0 10 01553	DAD1	JST	JSTL	* TESTING DOUBLE PRECISION ADD	11T15220
0522	01511	0 10 01512		JST	*+1		11T15230
0523	01512	0 00 00002	JL23	PZE	2		11T15240
0524	01513	0 02 02703		LDA	= '77777		11T15250
0525	01514	000201		IAB			11T15260
0526	01515	0 02 02702		LDA	= '77776		11T15270
0527	01516	000007		OCT	7	DBL	*11T15280
0528	01517	0 06 01564		ADD	DPC2	(DAD)	11T15290
0529	01520	000005		OCT	5	SGL	*11T15300
0530	01521	0 05 02666		ERA	= '100000		11T15310
0531	01522	100040		SZE			11T15320
0532	01523	000000		HLT			11T15330
0533	01524	000201		IAB			11T15340
0534	01525	100040		SZE			11T15350
0535	01526	000000		HLT			11T15360
0536	01527	101001		SSC			11T15370
0537	01530	000000		HLT			11T15380
0538			*				11T15390
0539	01531	0 10 01553	DAD2	JST	JSTL	* TESTING DOUBLE PRECISION ADD	11T15400
0540	01532	0 10 01533		JST	*+1		11T15410
0541	01533	0 00 00002	JL24	PZE	2		11T15420
0542	01534	000007		OCT	7	DBL	*11T15430
0543	01535	0 02 01574		LDA	DPC6	(DLB)	11T15440
0544	01536	0 06 01566		ADD	DPC3	(DAD)	11T15450
0545	01537	000005		OCT	5	SGL	*11T15460
0546	01540	0 05 02704		ERA	= -1		11T15470
0547	01541	100040		SZE			11T15480
0548	01542	000000		HLT			11T15490
0549	01543	000201		IAB			11T15500
0550	01544	0 05 02703		ERA	= '77777		11T15510
0551	01545	100040		SZE			11T15520
0552	01546	000000		HLT			11T15530
0553	01547	100001		SRC			11T15540
0554	01550	000000		HLT			11T15550
0555			*				11T15560



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0556	01551	-0 01 01552	JMP*	**1	GO TO	11T15570
0557	01552	0 001617	DAC	DSB1	NEXT SECTOR	11T15580
0558			*			11T15590
0559	01553	0 000000	JSTL	DAC	JST-REPORTING LOCATION (ENTRY)	11T15600
0560	01554	-0 01 01553	JMP*	JSTL	EXIT	11T15610
0561			*			11T15620
0562			*			11T15630
0563	01556	000001	D&P	1	PREVENTS ODD WORD LOCATION	11T15640
	01557	000000				
0564			ORG	*-2	BACK UP TO LAST EVEN LOCATION	11T15650
0565	01556	0 00 00000	DPT0	PZE	DOUBLE PREC. TEMP. LOC.	11T15660
0566	01557	0 00 00000		PZE	*	11T15670
0567	01560	177777	DPC0	OCT	DOUBLE PREC. CONSTANTS	11T15680
0568	01561	177777		OCT		11T15690
0569	01562	000252	DPC1	OCT		11T15700
0570	01563	000000		OCT		11T15710
0571	01564	000001	DPC2	OCT		11T15720
0572	01565	000001		OCT		11T15730
0573	01566	052525	DPC3	OCT		11T15740
0574	01567	025252		OCT		11T15750
0575	01570	000000	DPC4	OCT		11T15760
0576	01571	000001		OCT		11T15770
0577	01572	161535	DPC5	OCT		11T15780
0578	01573	015343		OCT		11T15790
0579	01574	125252	DPC6	OCT		11T15800
0580	01575	052525		OCT		11T15810
0581	01576	000272	0272	OCT		11T15820
0582	01577	0 00 00000	T1	PZE	TEMP. STORAGE	11T15830
0583	01600	0 00 00000	CNST	PZE	CONSTANT	11T15840
0584	01601	0 00 00000	TOTL	PZE	TOTAL	11T15850
0585	01602	0 00 00000	MSP	PZE	MOST SIGNIFICANT PART	11T15860
0586	01603	0 00 00000	LSP	PZE	LEAST SIGNIFICANT PART	11T15870
0587	01604	0 00 00000	MCND	PZE	MULTIPLICAND	11T15880
0588	01605	0 00 00000	MPLR	PZE	MULTIPLIER	11T15890
0589	01606	0 00 00000	QTNT	PZE	QUOTIENT	11T15900
0590	01607	0 00 00000	DVSR	PZE	DIVISOR	11T15910
0591	01610	0 001605	MPLD	DAC		11T15920



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0592	01611	0 001607	DVSD	DAC	DVSR		11T15930
0593	01612	101010	K1	OCT	101010		11T15940
0594	01613	110101	K2	OCT	110101		11T15950
0595	01614	107070	KT1	OCT	107070		11T15960
0596	01615	170707	KT2	OCT	170707		11T15970
0597		*					11T15980
0598	01616	000000	BSZ	1	FOR 8-8 LOADER		11T15990
0599		*					11T16000
0600	01617	0 10 01553	DSB1	JST	JSTL	* TESTING DOUBLE PRECISION SUB	11T16010
0601	01620	0 10 01621		JST	*+1		11T16020
0602	01621	0 00 00002	JL25	PZE	2		11T16030
0603	01622	140040		CRA			11T16040
0604	01623	000201		IAB			11T16050
0605	01624	0 02 02666	LDA	= '100000			11T16060
0606	01625	000007	OCT	7	DBL	*11T16070	
0607	01626	0 07 01570	SUB	DPC4	(DSB)		11T16080
0608	01627	0 05 02703	ERA	= '77777			11T16090
0609	01630	100040	SZE				11T16100
0610	01631	000000	HLT				11T16110
0611	01632	000201	IAB				11T16120
0612	01633	0 05 02703	ERA	= '77777			11T16130
0613	01634	100040	SZE				11T16140
0614	01635	000000	HLT				11T16150
0615	01636	101001	SSC				11T16160
0616	01637	000000	HLT				11T16170
0617	01640	000005	OCT	5	SGL	*11T16180	
0618		*					11T16190
0619	01641	0 10 01553	DSB2	JST	JSTL	* TESTING DOUBLE PRECISION SUB	11T16200
0620	01642	0 10 01643		JST	*+1		11T16210
0621	01643	0 00 00002	JL26	PZE	2		11T16220
0622	01644	000007	OCT	7	DBL	*11T16230	
0623	01645	0 02 01566	LDA	DPC3	(DLD)		11T16240
0624	01646	0 07 01572	SUB	DPC5	(DSB)		11T16250
0625	01647	000005	OCT	5	SGL	*11T16260	
0626	01650	0 05 02637	ERA	= '70770			11T16270
0627	01651	100040	SZE				11T16280
0628	01652	000000	HLT				11T16290

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0629	01653	000201	IAB			11T16300
0630	01654	0 05 02636	ERA	= '7707		11T16310
0631	01655	100040	SZE			11T16320
0632	01656	000000	HLT			11T16330
0633	01657	100001	SRC			11T16340
0634	01660	000000	HLT			11T16350
0635			*			11T16360
0636	01661	0 10 01553	MPY7	JST	JSTL	* EXTENDED MULTIPLY TEST
0637	01662	0 10 01663		JST	*+1	11T16370
0638	01663	0 00 00002	JL27	PZE	2	11T16380
0639	01664	0 35 02635		LDX	=-224	11T16390
0640	01665	0 02 01612		LDA	K1	11T16400
0641	01666	0 04 01600		STA	CNST	11T16410
0642	01667	0 02 01614		LDA	KT1	11T16420
0643	01670	0 04 01601		STA	TOTL	11T16430
0644	01671	0 02 02634	MY1	LDA	=-56	11T16440
0645	01672	0 04 01577		STA	T1	11T16450
0646	01673	140040		CRA		11T16460
0647	01674	0 04 01604		STA	MCND	MULTIPLICAND
0648	01675	0 02 01600		LDA	CNST	11T16480
0649	01676	0 04 01605		STA	MPLR	MULTIPLIER
0650	01677	0 02 01604	MY2	LDA	MCND	11T16500
0651	01700	-0 16 01610		MPY*	MPLD	11T16510
0652	01701	1 11 02566		CAS	MDTB+224,1	11T16520
0653	01702	000000		HLT		11T16530
0654	01703	0 01 01705		JMP	*+2	ERROR
0655	01704	000000		HLT		11T16540
0656	01705	000201		IAB		11T16550
0657	01706	1 11 02567		CAS	MDTB+225,1	11T16560
0658	01707	000000		HLT		11T16570
0659	01710	0 01 01712		JMP	*+2	ERROR
0660	01711	000000		HLT		11T16580
0661	01712	0 02 01604		LDA	MCND	11T16590
0662	01713	0 11 01601		CAS	TOTL	11T16600
0663	01714	0 01 01716		JMP	*+2	11T16610
0664	01715	0 01 01721		JMP	MY3	11T16620
0665	01716	0 06 01600		ADD	CNST	11T16630
						11T16640
						11T16650
						11T16660



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0666	01717	0 04 01604	STA	MCND		11T16670
0667	01720	0 01 01726	JMP	MY4		11T16680
0668	01721	140040 MY3	CRA			11T16690
0669	01722	0 04 01604	STA	MCND		11T16700
0670	01723	0 02 01605	LDA	MPLR		11T16710
0671	01724	0 06 01600	ADD	CNST		11T16720
0672	01725	0 04 01605	STA	MPLR		11T16730
0673	01726	0 12 00000 MY4	IRS	0	(XR)	11T16740
0674	01727	0 12 00000	IRS	0		11T16750
0675	01730	0 01 01732	JMP	*+2		11T16760
0676	01731	0 01 01741	JMP	DIV7		11T16770
0677	01732	0 12 01577	IRS	T1		11T16780
0678	01733	0 01 01677	JMP	MY2		11T16790
0679	01734	0 02 01613	LDA	K2		11T16800
0680	01735	0 04 01600	STA	CNST		11T16810
0681	01736	0 02 01615	LDA	KT2		11T16820
0682	01737	0 04 01601	STA	TOTL		11T16830
0683	01740	0 01 01671	JMP	MY1		11T16840
0684		*				11T16850
0685	01741	0 10 01553 DIV7	JST	JSTL	* EXTENDED DIVIDE TEST	11T16860
0686	01742	0 10 01743	JST	*+1		11T16870
0687	01743	0 00 00002 JL28	PZE	2		11T16880
0688	01744	0 35 02635	LDX	=-224		11T16890
0689	01745	0 02 01612	LDA	K1		11T16900
0690	01746	0 04 01600	STA	CNST		11T16910
0691	01747	0 02 01614	LDA	KT1		11T16920
0692	01750	0 04 01601	STA	TOTL		11T16930
0693	01751	0 02 02634 DV1	LDA	=-56		11T16940
0694	01752	0 04 01577	STA	T1		11T16950
0695	01753	140040	CRA			11T16960
0696	01754	0 04 01606	STA	QTNT	QUOTIENT	11T16970
0697	01755	0 02 01600	LDA	CNST		11T16980
0698	01756	0 04 01607	STA	DVSR	DIVISOR	11T16990
0699	01757	000007 DV2	OCT	7	DBL	11T17000
0700	01760	1 02 02566	LDA	MDTB+224.1	(DLD)	11T17010
0701	01761	000005	OCT	5	SGL	11T17020
0702	01762	100400	SPL			11T17030



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0703	01763	0 01 02015	JMP	NG1		11T17040
0704	01764	000201	IAB			11T17050
0705	01765	0 06 02706	ADD	=1		11T17060
0706	01766	000201	DV21 IAB			11T17070
0707	01767	-0 17 01611	DIV*	DVSD		11T17080
0708	01770	0 11 01606	CAS	QTNT		11T17090
0709	01771	000000	HLT		ERROR	11T17100
0710	01772	0 01 01774	JMP	*+2		11T17110
0711	01773	000000	HLT		ERROR	11T17120
0712	01774	1 02 02566	LDA	MDTB+224,1		11T17130
0713	01775	100400	SPL			11T17140
0714	01776	0 01 02020	JMP	NG2		11T17150
0715	01777	000201	IAB			11T17160
0716	02000	0 11 02706	CAS	=1	REMAINDER =+1 IF DIVIDEND WAS POSITIVE	11T17170
0717	02001	000000	HLT		ERROR	11T17180
0718	02002	0 01 02004	JMP	*+2		11T17190
0719	02003	000000	HLT		ERROR	11T17200
0720	02004	100001	DV22 SRC			11T17210
0721	02005	000000	HLT			11T17220
0722	02006	0 02 01606	LDA	QTNT		11T17230
0723	02007	0 11 01601	CAS	TOTL		11T17240
0724	02010	0 01 02012	JMP	*+2		11T17250
0725	02011	0 01 02026	JMP	DV3		11T17260
0726	02012	0 06 01600	ADD	CNST		11T17270
0727	02013	0 04 01606	STA	QTNT		11T17280
0728	02014	0 01 02033	JMP	DV4		11T17290
0729	02015	000201	NG1 IAB			11T17300
0730	02016	0 07 02706	SUB	=1		11T17310
0731	02017	0 01 01766	JMP	DV21		11T17320
0732	02020	000201	NG2 IAB			11T17330
0733	02021	0 11 02704	CAS	=-1	REMAINDER =-1 IF DIVIDEND WAS NEGATIVE	11T17340
0734	02022	000000	HLT		ERROR	11T17350
0735	02023	0 01 02025	JMP	*+2		11T17360
0736	02024	000000	HLT		ERROR	11T17370
0737	02025	0 01 02004	JMP	DV22		11T17380
0738	02026	140040	DV3 CRA			11T17390
0739	02027	0 04 01606	STA	QTNT		11T17400



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0740	02030	0 02 01607	LDA	DVSR		11T17410
0741	02031	0 06 01600	ADD	CNST		11T17420
0742	02032	0 04 01607	STA	DVSR		11T17430
0743	02033	0 12 00000 DV4	IRS	0		11T17440
0744	02034	0 12 00000	IRS	0		11T17450
0745	02035	0 01 02037	JMP	*+2		11T17460
0746	02036	0 01 02046	JMP	JLCK		11T17470
0747	02037	0 12 01577	IRS	T1		11T17480
0748	02040	0 01 01757	JMP	DV2		11T17490
0749	02041	0 02 01613	LDA	K2		11T17500
0750	02042	0 04 01600	STA	CNST		11T17510
0751	02043	0 02 01615	LDA	KT2		11T17520
0752	02044	0 04 01601	STA	TOTL		11T17530
0753	02045	0 01 01751	JMP	DV1		11T17540
0754						11T17550
0755			*	ROUTINE WHICH CHECKS ADDRESSES IN 'JLXX' LOCATIONS DUE TO 'JST *+1'		11T17560
0756			*	INSTRUCTIONS.		11T17570
0757			*			11T17580
0758	02046	0 35 02633	JLCK	LDX	=-28	11T17590
0759	02047	-1 02 02225	CHK2	LDA*	CKTB+28,1	11T17600
0760	02050	1 11 02225	CAS	CKTB+28,1		11T17610
0761	02051	000000	HLT			11T17620
0762	02052	0 01 02054	JMP	*+2		11T17630
0763	02053	000000	HLT			11T17640
0764	02054	0 12 00000	IRS	0		11T17650
0765	02055	0 01 02047	JMP	CHK2		11T17660
0766			*			11T17670
0767			*	PASS-COUNTING ROUTINE		11T17680
0768			*			11T17690
0769	02056	0 12 02170	IRS	NPAS+8	INCREMENT ONES COUNTER	11T17700
0770	02057	0 01 02113	JMP	END	IF NOT =0, EXIT	11T17710
0771	02060	0 02 02710	LDA	=-10	IF =0,	11T17720
0772	02061	0 04 02170	STA	NPAS+8	RESTORE TO -10,	11T17730
0773	02062	0 12 02167	IRS	NPAS+7	INCREMENT TENS COUNTER, ETC.	11T17740
0774	02063	0 01 02113	JMP	END		11T17750
0775	02064	0 04 02167	STA	NPAS+7		11T17760
0776	02065	0 12 02166	IRS	NPAS+6		11T17770



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0777	02066	0 01 02113	JMP	END		11T17780
0778	02067	0 04 02166	STA	NPAS+6		11T17790
0779	02070	0 12 02165	IRS	NPAS+5		11T17800
0780	02071	0 01 02113	JMP	END		11T17810
0781	02072	0 04 02165	STA	NPAS+5		11T17820
0782	02073	0 12 02164	IRS	NPAS+4		11T17830
0783	02074	0 01 02113	JMP	END		11T17840
0784	02075	0 04 02164	STA	NPAS+4		11T17850
0785	02076	0 12 02163	IRS	NPAS+3		11T17860
0786	02077	0 01 02113	JMP	END		11T17870
0787	02100	0 04 02163	STA	NPAS+3		11T17880
0788	02101	0 12 02162	IRS	NPAS+2		11T17890
0789	02102	0 01 02113	JMP	END		11T17900
0790	02103	0 04 02162	STA	NPAS+2		11T17910
0791	02104	0 12 02161	IRS	NPAS+1		11T17920
0792	02105	0 01 02113	JMP	END		11T17930
0793	02106	0 04 02161	STA	NPAS+1		11T17940
0794	02107	0 12 02160	IRS	NPAS		11T17950
0795	02110	0 01 02113	JMP	END		11T17960
0796	02111	0 04 02160	STA	NPAS		11T17970
0797	02112	000000	HLT		1,000,000,000 PASSES	11T17980
0798						11T17990
0799	02113	0 12 02157	END IRS	CTR2	BUMP TIMED PRINTOUT	11T18000
0800	02114	0 01 02145	JMP	END2	CHECK FOR HALT REQUEST	11T18010
0801	02115	0 02 02707	LDA	=-5000	RESTORE TIMED PRINTOUT	11T18020
0802	02116	0 04 02157	STA	CTR2		11T18030
0803	02117	0 01 02121	JMP	TY0T	TYPE PASS COUNT	11T18040
0804	02120	0 01 02145	JMP	END2	RESET, SKIP TYPEOUT	11T18050
0805						11T18060
0806			*	END-OF-PASS TYPEOUT ROUTINE		11T18070
0807			*			11T18080
0808	02121	34 0104	TY0I SKS	'104	ASR BUSY	11T18090
0809	02122	0 01 02121	JMP	*-1	LOOP	11T18100
0810	02123	14 0104	OCP	'104	IF NOT BUSY, ENABLE ASR IN OUTPUT MODE	11T18110
0811	02124	0 35 02631	LDX	=-7	SET INDEX REG. FOR 7 COMPUTER WORDS	11T18120
0812	02125	1 02 02157	TY02 LDA	TY0B+7,1	GET ONE WORD	11T18130
0813	02126	0406 70	ARR	8		11T18140



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0814	02127	74 0004	OTA	4	OUTPUT LEFT HALF OF WORD	11T18150
0815	02130	0 01 02127	JMP	*-1		11T18160
0816	02131	0416 70	ALR	8		11T18170
0817	02132	74 0004	OTA	4	OUTPUT RIGHT HALF OF WORD	11T18180
0818	02133	0 01 02132	JMP	*-1		11T18190
0819	02134	0 12 00000	IRS	0	INCREMENT INDEX REGISTER	11T18200
0820	02135	0 01 02125	JMP	TY02	GO BACK FOR NEXT WORD	11T18210
0821	02136	0 35 02711	LDX	=-9	SET INDEX REGISTER FOR 9 DIGITS	11T18220
0822	02137	1 02 02171	TYN2 LDA	NPAS+9,1	GET ONE NUMBER	11T18230
0823	02140	0 06 01576	ADD	0272	CONVERT IT TO ASCII	11T18240
0824	02141	74 0004	OTA	4	OUTPUT	11T18250
0825	02142	0 01 02141	JMP	*-1	IT	11T18260
0826	02143	0 12 00000	IRS	0	INCREMENT INDEX REGISTER	11T18270
0827	02144	0 01 02137	JMP	TYN2	GO BACK FOR NEXT DIGIT	11T18280
0828		*				11T18290
0829	02145	100020	END2 SR1		IF SENSE SWITCH 1 IS -	11T18300
0830	02146	000000	EOPH HLT		SET, STOP AT END-OF-PASS HALT	11T18310
0831	02147	0 01 01010	JMP	MPY1	RESET, RESTART	11T18320
0832		*				11T18330
0833	02150	106612	TY08 OCT	106612	CARRIAGE RETURN + LINE FEED	11T18340
0834	02151	142716	BCI	6,END OF PASS		11T18350
	02152	142240				
	02153	147706				
	02154	120320				
	02155	140723				
	02156	151640				
0835	02157	166170	CTR2 DEC	-5000		11T18360
0836		*				11T18370
0837		*				11T18380
0838	02160	177766	NPAS DEC	-10	NUMBER OF PASSES	11T18390
0839	02161	177766	DEC	-10	*	11T18400
0840	02162	177766	DEC	-10	*	11T18410
0841	02163	177766	DEC	-10	*	11T18420
0842	02164	177766	DEC	-10	*	11T18430
0843	02165	177766	DEC	-10	*	11T18440
0844	02166	177766	DEC	-10	*	11T18450
0845	02167	177766	DEC	-10	*	11T18460



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0846	02170	177766	DEC	-10	*	11T18470
0847			*			11T18480
0848	02171	0 001012	CKTB	DAC	JL01	11T18490
0849	02172	0 001024		DAC	JL02	11T18500
0850	02173	0 001041		DAC	JL03	11T18510
0851	02174	0 001055		DAC	JL04	11T18520
0852	02175	0 001071		DAC	JL05	11T18530
0853	02176	0 001105		DAC	JL06	11T18540
0854	02177	0 001121		DAC	JL07	11T18550
0855	02200	0 001137		DAC	JL08	11T18560
0856	02201	0 001156		DAC	JL09	11T18570
0857	02202	0 001176		DAC	JL10	11T18580
0858	02203	0 001213		DAC	JL11	11T18590
0859	02204	0 001233		DAC	JL12	11T18600
0860	02205	0 001253		DAC	JL13	11T18610
0861	02206	0 001265		DAC	JL14	11T18620
0862	02207	0 001277		DAC	JL15	11T18630
0863	02210	0 001320		DAC	JL16	11T18640
0864	02211	0 001342		DAC	JL17	11T18650
0865	02212	0 001364		DAC	JL18	11T18660
0866	02213	0 001403		DAC	JL19	11T18670
0867	02214	0 001432		DAC	JL20	11T18680
0868	02215	0 001451		DAC	JL21	11T18690
0869	02216	0 001473		DAC	JL22	11T18700
0870	02217	0 001512		DAC	JL23	11T18710
0871	02220	0 001533		DAC	JL24	11T18720
0872	02221	0 001621		DAC	JL25	11T18730
0873	02222	0 001643		DAC	JL26	11T18740
0874	02223	0 001663		DAC	JL27	11T18750
0875	02224	0 001743		DAC	JL28	11T18760
0876			*			11T18770
0877			*	MULTIPLY-DIVIDE	TABLE	11T18780
0878			*			11T18790
0879	02226	000001	DBP	1	PREVENTS ODD WORD LOCATION	11T18800
	02227	000000				
0880			ORG	*-2	BACK UP TO LAST EVEN LOCATION	11T18810
0881	02226	000000	MDTB	OCT	000000,00000,075770,20100,176000,40200,073770,60300	11T18820



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	02227	000000		
	02230	075770		
	02231	020100		
	02232	176000		
	02233	040200		
	02234	073770		
	02235	060300		
0882	02236	174001	OCT 174001,00400,071771,20500,172001,40600,067771,60700	11T18830
	02237	000400		
	02240	071771		
	02241	020500		
	02242	172001		
	02243	040600		
	02244	067771		
	02245	060700		
0883	02246	000000	OCT 000000,00000,176000,40200,000041,00400,176041,40600	11T18840
	02247	000000		
	02250	176000		
	02251	040200		
	02252	000041		
	02253	000400		
	02254	176041		
	02255	040600		
0884	02256	000102	OCT 000102,01000,176102,41200,000143,01400,176143,41600	11T18850
	02257	001000		
	02260	176102		
	02261	041200		
	02262	000143		
	02263	001400		
	02264	176143		
	02265	041600		
0885	02266	000000	OCT 000000,00000,073770,60300,176041,40600,072032,21100	11T18860
	02267	000000		
	02270	073770		
	02271	060300		
	02272	176041		
	02273	040600		



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	02274	072032			
	02275	021100			
0886	02276	174103	OCT	174103,01400,070073,61700,172144,42200,066135,22500	11T18870
	02277	001400			
	02300	070073			
	02301	061700			
	02302	172144			
	02303	042200			
	02304	066135			
	02305	022500			
0887	02306	000000	OCT	000000,00000,174001,00400,000102,01000,174103,01400	11T18880
	02307	000000			
	02310	174001			
	02311	000400			
	02312	000102			
	02313	001000			
	02314	174103			
	02315	001400			
0888			*		11T18890
0889	02316	000204	OCT	000204,02000,174205,02400,000306,03000,174307,03400	11T18900
	02317	002000			
	02320	174205			
	02321	002400			
	02322	000306			
	02323	003000			
	02324	174307			
	02325	003400			
0890	02326	000000	OCT	000000,00000,071771,20500,176102,41200,070073,61700	11T18910
	02327	000000			
	02330	071771			
	02331	020500			
	02332	176102			
	02333	041200			
	02334	070073			
	02335	061700			
0891	02336	174205	OCT	174205,02400,066176,23100,172307,43600,064300,64300	11T18920
	02337	002400			



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	02340	066176		
	02341	023100		
	02342	172307		
	02343	043600		
	02344	064300		
	02345	064300		
0892	02346	000000	OCT	000000,00000,172001,40600,000143,01400,172144,42200
	02347	000000		11T13930
	02350	172001		
	02351	040600		
	02352	000143		
	02353	001400		
	02354	172144		
	02355	042200		
0893	02356	000306	OCT	000306,03000,172307,43600,000451,04400,172452,45200
	02357	003000		11T18940
	02360	172307		
	02361	043600		
	02362	000451		
	02363	004400		
	02364	172452		
	02365	045200		
0894	02366	000000	OCT	000000,00000,067771,60700,176143,41600,066135,22500
	02367	000000		11T18950
	02370	067771		
	02371	060700		
	02372	176143		
	02373	041600		
	02374	066135		
	02375	022500		
0895	02376	174307	OCT	174307,03400,064300,64300,172452,45200,062444,26100
	02377	003400		11T18960
	02400	064300		
	02401	064300		
	02402	172452		
	02403	045200		
	02404	062444		



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	02405	026100			
0896			*		
0897			*		11T18970
0898	02406	000000			11T18980
	02407	000000	OCT	000000,00000,060616,30201,161636,60402,042455,10603	11T18990
	02410	060616			
	02411	030201			
	02412	161636			
	02413	060402			
	02414	042455			
	02415	010603			
0899	02416	143475	OCT	143475,41004,024313,71205,125334,21406,006152,51607	11T19000
	02417	041004			
	02420	024313			
	02421	071205			
	02422	125334			
	02423	021406			
	02424	006152			
	02425	051607			
0900	02426	000000	OCT	000000,00000,161636,60402,004101,41004,165740,21406	11T19010
	02427	000000			
	02430	161636			
	02431	060402			
	02432	004101			
	02433	041004			
	02434	165740			
	02435	021406			
0901	02436	010203	OCT	010203,02010,172041,62412,014304,43014,176143,23416	11T19020
	02437	002010			
	02440	172041			
	02441	062412			
	02442	014304			
	02443	043014			
	02444	176143			
	02445	023416			
0902	02446	000000	OCT	000000,00000,042455,10603,165740,21406,030415,32211	11T19030
	02447	000000			



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02450	042455			
02451	010603			
02452	165740			
02453	021406			
02454	030415			
02455	032211			
0903	02456	153700	OCT	153700,43014,016355,53617,141640,64422,004315,75225
	02457	043014		
	02460	016355		
	02461	053617		
	02462	141640		
	02463	064422		
	02464	004315		
	02465	075225		
0904	02466	000000	OCT	000000,00000,143475,41004,010203,02010,153700,43014
	02467	000000		
	02470	143475		
	02471	041004		
	02472	010203		
	02473	002010		
	02474	153700		
	02475	043014		
0905			*	
0906	02476	020406	OCT	020406,04020,164103,45024,030611,06030,174306,47034
	02477	004020		
	02500	164103		
	02501	045024		
	02502	030611		
	02503	006030		
	02504	174306		
	02505	047034		
0907	02506	000000	OCT	000000,00000,024313,71205,172041,62412,016355,53617
	02507	000000		
	02510	024313		
	02511	071205		
	02512	172041		
	02513	062412		



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	02514	016355			
	02515	053617			
0908	02516	164103	OCT	164103,45024,010417,36231,156145,27436,002461,20643	11T19090
	02517	045024			
	02520	010417			
	02521	036231			
	02522	156145			
	02523	027436			
	02524	002461			
	02525	020643			
0909	02526	000000	OCT	000000,00000,125334,21406,014304,43014,141640,64422	11T19100
	02527	000000			
	02530	125334			
	02531	021406			
	02532	014304			
	02533	043014			
	02534	141640			
	02535	064422			
0910	02536	030611	OCT	030611,06030,156145,27436,045115,51044,172451,72452	11T19110
	02537	006030			
	02540	156145			
	02541	027436			
	02542	045115			
	02543	051044			
	02544	172451			
	02545	072452			
0911	02546	000000	OCT	000000,00000,006152,51607,176143,23416,004315,75225	11T19120
	02547	000000			
	02550	006152			
	02551	051607			
	02552	176143			
	02553	023416			
	02554	004315			
	02555	075225			
0912	02556	174306	OCT	174306,47034,002461,20643,172451,72452,000624,44261	11T19130
	02557	047034			
	02560	002461			



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02561	020643						
02562	172451						
02563	072452						
02564	000624						
02565	044261						
0913		*					11T19140
0914	02566	34 0104	TITL	SKS	'104	ASR BUSY	11T19150
0915	02567	0 01 02566		JMP	*-1	LOOP	11T19160
0916	02570	14 0104		OCP	'104	ENABLE ASR	11T19170
0917	02571	0 02 02630		LDA	MTIT		11T19180
0918	02572	0 04 02573		STA	RPT1		11T19190
0919	02573	0 02 02610	RPT1	LDA	TIT1	LOAD WORD	11T19200
0920	02574	0406 70		ARR	8	POSITION FOR OUTPUT	11T19210
0921	02575	74 0004		OTA	4	OUTPUT LEFT HALF OF WORD	11T19220
0922	02576	0 01 02575		JMP	*-1	BUSY	11T19230
0923	02577	0406 70		ARR	8	POSITION	11T19240
0924	02600	74 0004		OTA	4	OUTPUT RIGHT HALF OF WORD	11T19250
0925	02601	0 01 02600		JMP	*-1	BUSY	11T19260
0926	02602	0 12 02573		IRS	RPT1	BUMP FOR NEXT WORD	11T19270
0927	02603	0 12 02627		IRS	CTR1	BUMP WORD COUNTER	11T19280
0928	02604	0 01 02573		JMP	RPT1	OUTPUT NEXT WORD	11T19290
0929	02605	0 02 02632		LDA	=-15	INITIALIZE WORD COUNTER	11T19300
0930	02606	0 04 02627		STA	CTR1		11T19310
0931	02607	0 01 01010		JMP	MPY1	BEGIN PROGRAM	11T19320
0932	02610	106612	TIT1	OCT	106612		11T19330
0933	02611	147661		BCI	14,016-11T1	REV. D 8 MAY 1970	11T19340
	02612	133255					
	02613	130661					
	02614	152261					
	02615	120240					
	02616	151305					
	02617	153256					
	02620	120304					
	02621	120240					
	02622	134240					
	02623	146701					
	02624	154640					



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	02625	130671			
	02626	133660			
0934	02627	177761	CTR1 DEC	-15	
0935	02630	0 02 02610	MT11 LDA	T1T1	11T19350
0936			*		11T19360
0937	02631	177771		EVD MPY1	11T19370
	02632	177761			11T19380
	02633	177744			
	02634	177710			
	02635	177440			
	02636	007707			
	02637	070770			
	02640	000252			
	02641	177600			
	02642	050000			
	02643	005000			
	02644	000036			
	02645	000035			
	02646	000077			
	02647	167777			
	02650	007700			
	02651	177007			
	02652	070077			
	02653	056340			
	02654	105303			
	02655	101710			
	02656	070707			
	02657	007070			
	02660	040000			
	02661	177000			
	02662	177400			
	02663	000002			
	02664	000005			
	02665	000033			
	02666	100000			
	02667	063640			
	02670	000003			



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02671	177770
02672	141414
02673	016162
02674	170707
02675	152525
02676	025252
02677	077764
02700	000004
02701	177775
02702	077776
02703	077777
02704	177777
02705	000000
02706	000001
02707	166170
02710	177766
02711	177767

NO ERRORS IN ABOVE ASSEMBLY.
\$DA 41285326-002-02