

FILE: QUAD0:HELIOS           HEWLETT-PACKARD: COCONUT ASSEMBLER 1.03 / CORVALLIS DIVISION           PAGE 1

LOCATION	OBJECT	CODE	LINE	SOURCE LINE		
			1	"COCONUT"		
0000	001D		2	CON	29	;ROM ID 0029
0001	0019		3	CON	25	;FUNCS+LABEL0025
0002	00000000		4	DEFR4K	PHEAD	;0
0004	00000000		5	DEFR4K	ACA	;1
0006	00000000		6	DEFR4K	=ACCHR	;2
0008	00000000		7	DEFR4K	=ACCOL	;3
000A	00000000		8	DEFR4K	=ACSPEC	;4
000C	00000000		9	DEFR4K	=ACX	;5
000E	00000000		10	DEFR4K	=BLDSPC	;6
0010	00000000		11	DEFR4K	=LIST	;7
0012	00000000		12	DEFR4K	PRA	;8
0014	00000200		13	U4KDEF	PRAXIS	;9
0016	00000000		14	DEFR4K	=PRBUF	;10
0018	00000000		15	DEFR4K	=PRFLAG	;11
001A	00000000		16	DEFR4K	=PRKEYS	;12
001C	00000000		17	DEFR4K	=PRP	;13
001E	00000200		18	U4KDEF	PRPLOT	;14
0020	00000200		19	U4KDEF	PRPLTP	;15
0022	00000000		20	DEFR4K	PRREG	;16
0024	00000000		21	DEFR4K	PRREGX	;17
0026	00000000		22	DEFR4K	PRSIGM	;18
0028	00000000		23	DEFR4K	PRSTK	;19
002A	00000000		24	DEFR4K	=PRX	;20
002C	00000000		25	DEFR4K	=REGPLT	;21
002E	00000000		26	DEFR4K	SKPCHR	;22
0030	00000000		27	DEFR4K	SKPCOL	;23
0032	00000000		28	DEFR4K	=STKPLT	;24
0034	0000		29	CON	0	
0035	0000		30	CON	0	
			31	GLB	PRPLOT	
			32	GLB	PRPLTP	
			33	GLB	PRAXIS	
0036	004D		34	CON	00115Q	;REGISTERS: 0077
0037	0260		35	CON	01140Q	;BYTES 1ST REG 006
0038	01C8		36	PRPLOT	CON	; 0001 LBL PRPLOT
0039	0000		37	CON	00000Q	
003A	00F7		38	CON	00367Q	
003B	0000		39	CON	00000Q	
003C	0050		40	CON	00120Q	
003D	0052		41	CON	00122Q	
003E	0050		42	CON	00120Q	
003F	004C		43	CON	00114Q	
0040	004F		44	CON	00117Q	
0041	0054		45	CON	00124Q	
0042	018C		46	CON	00614Q	; 0002 AON
0043	01F6		47	CON	00766Q	; 0003 @NAME ?
0044	004E		48	CON	00116Q	
0045	0041		49	CON	00101Q	
0046	004D		50	CON	00115Q	
0047	0045		51	CON	00105Q	
0048	0020		52	CON	00040Q	
0049	003F		53	CON	00077Q	
004A	018E		54	CON	00616Q	; 0004 PRMT
004B	018B		55	CON	00613Q	; 0005 AOFF
004C	019A		56	CON	00632Q	; 0006 ASTO 11
004D	000B		57	CON	00013Q	

# NOMAS

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recipient agrees NOT to contact manufacturer

LOCATION	OBJECT	CODE	LINE	SOURCE LINE			
004E	010C		58	CON	00414Q		; 0007 LBL 11
004F	01F7		59	CON	00767Q		; 0008 @Y MIN ?
0050	0059		60	CON	00131Q		
0051	0020		61	CON	00040Q		
0052	004D		62	CON	00115Q		
0053	0049		63	CON	00111Q		
0054	004E		64	CON	00116Q		
0055	0020		65	CON	00040Q		
0056	003F		66	CON	00077Q		
0057	018E		67	CON	00616Q		; 0009 PRMT
0058	0130		68	CON	00460Q		; 0010 STO 00
0059	01F7		69	CON	00767Q		; 0011 @Y MAX ?
005A	0059		70	CON	00131Q		
005B	0020		71	CON	00040Q		
005C	004D		72	CON	00115Q		
005D	0041		73	CON	00101Q		
005E	0058		74	CON	00130Q		
005F	0020		75	CON	00040Q		
0060	003F		76	CON	00077Q		
0061	018E		77	CON	00616Q		; 0012 PRMT
0062	0131		78	CON	00461Q		; 0013 STO 01
0063	0146		79	CON	00506Q		; 0014 X<=Y
0064	01BC		80	CON	00674Q		; 0015 GTO 11
0065	0018		81	CON	00030Q		
0066	010D		82	CON	00415Q		; 0016 LBL 12
0067	01F6		83	CON	00766Q		; 0017 @AXIS ?
0068	0041		84	CON	00101Q		
0069	0058		85	CON	00130Q		
006A	0049		86	CON	00111Q		
006B	0053		87	CON	00123Q		
006C	0020		88	CON	00040Q		
006D	003F		89	CON	00077Q		
006E	01A9		90	CON	00651Q		; 0018 CF    23
006F	0017		91	CON	00027Q		
0070	018E		92	CON	00616Q		; 0019 PRMT
0071	0134		93	CON	00464Q		; 0020 STO 04
0072	01AC		94	CON	00654Q		; 0021 FS?    23
0073	0017		95	CON	00027Q		
0074	019A		96	CON	00632Q		; 0022 ASTO   04
0075	0004		97	CON	00004Q		
0076	0121		98	CON	00441Q		; 0023 RCL 01
0077	0144		99	CON	00504Q		; 0024 X<Y?
0078	01BD		100	CON	00675Q		; 0025 GTO 12
0079	0014		101	CON	00024Q		
007A	0177		102	CON	00567Q		; 0026 CLX
007B	0120		103	CON	00440Q		; 0027 RCL 00
007C	0145		104	CON	00505Q		; 0028 X>Y?
007D	01BD		105	CON	00675Q		; 0029 GTO 12
007E	0019		106	CON	00031Q		
007F	010E		107	CON	00416Q		; 0030 LBL 13
0080	01F7		108	CON	00767Q		; 0031 @X MIN ?
0081	0058		109	CON	00130Q		
0082	0020		110	CON	00040Q		
0083	004D		111	CON	00115Q		
0084	0049		112	CON	00111Q		
0085	004E		113	CON	00116Q		
0086	0020		114	CON	00040Q		

LOCATION	OBJECT	CODE	LINE	SOURCE	LINE			
0087	003F		115	CON		00077Q		
0088	018E		116	CON		00616Q		; 0032 PRMT
0089	0138		117	CON		00470Q		; 0033 STO 08
008A	01F7		118	CON		00767Q		; 0034 @X MAX ?
008B	0058		119	CON		00130Q		
008C	0020		120	CON		00040Q		
008D	004D		121	CON		00115Q		
008E	0041		122	CON		00101Q		
008F	0058		123	CON		00130Q		
0090	0020		124	CON		00040Q		
0091	003F		125	CON		00077Q		
0092	018E		126	CON		00616Q		; 0035 PRMT
0093	0139		127	CON		00471Q		; 0036 STO 09
0094	0146		128	CON		00506Q		; 0037 X<=Y
0095	01BE		129	CON		00676Q		; 0038 GTO 13
0096	0018		130	CON		00030Q		
0097	01F7		131	CON		00767Q		; 0039 @X INC ?
0098	0058		132	CON		00130Q		
0099	0020		133	CON		00040Q		
009A	0049		134	CON		00111Q		
009B	004E		135	CON		00116Q		
009C	0043		136	CON		00103Q		
009D	0020		137	CON		00040Q		
009E	003F		138	CON		00077Q		
009F	018E		139	CON		00616Q		; 0040 PRMT
00A0	013A		140	CON		00472Q		; 0041 STO 10
00A1	01C0	141	PRPLTP	CON		00700Q		; 0042 LBL PRPLOT
00A2	000F		142	CON		00017Q		
00A3	00F8		143	CON		00370Q		
00A4	0000		144	CON		00000Q		
00A5	0050		145	CON		00120Q		
00A6	0052		146	CON		00122Q		
00A7	0050		147	CON		00120Q		
00A8	004C		148	CON		00114Q		
00A9	004F		149	CON		00117Q		
00AA	0054		150	CON		00124Q		
00AB	0050		151	CON		00120Q		
00AC	01A9		152	CON		00651Q		; 0043 CF 12
00AD	000C		153	CON		00014Q		
00AE	018F		154	CON		00617Q		; 0044 ADVN
00AF	0116		155	CON		00426Q		; 0045 6
00B0	01A7		156	CON		00647Q		; 0046 XROM 2922
00B1	0056		157	CON		00126Q		
00B2	01F8		158	CON		00770Q		; 0047 @PLOT OF
00B3	0050		159	CON		00120Q		
00B4	004C		160	CON		00114Q		
00B5	004F		161	CON		00117Q		
00B6	0054		162	CON		00124Q		
00B7	0020		163	CON		00040Q		
00B8	004F		164	CON		00117Q		
00B9	0046		165	CON		00106Q		
00BA	0020		166	CON		00040Q		
00BB	019B		167	CON		00633Q		; 0048 ARCL 11
00BC	000B		168	CON		00013Q		
00BD	01A7		169	CON		00647Q		; 0049 XROM 2901
00BE	0041		170	CON		00101Q		
00BF	01A7		171	CON		00647Q		; 0050 XROM 2910

LOCATION	OBJECT	CODE	LINE	SOURCE	LINE			
00C0	004A		172	CON	00112Q			
00C1	0128		173	CON	00450Q		; 0051 RCL 08	
00C2	0129		174	CON	00451Q		; 0052 RCL 09	
00C3	01F1		175	CON	00761Q		; 0053 @X	
00C4	0058		176	CON	00130Q			
00C5	01E1		177	CON	00741Q		; 0054 XEQ 09	
00C6	0034		178	CON	00064Q			
00C7	0089		179	CON	00211Q			
00C8	0137		180	CON	00467Q		; 0055 STO 07	
00C9	0117		181	CON	00427Q		; 0056 7	
00CA	01A7		182	CON	00647Q		; 0057 XROM 2902	
00CB	0042		183	CON	00102Q			
00CC	01A7		184	CON	00647Q		; 0058 XROM 2910	
00CD	004A		185	CON	00112Q			
00CE	0111		186	CON	00421Q		; 0059 1	
00CF	0013		187	CON	00023Q		; 3	
00D0	0010		188	CON	00020Q		; 0	
00D1	0132		189	CON	00462Q		; 0060 STO 02	
00D2	01A7		190	CON	00647Q		; 0061 XROM 2909	
00D3	0049		191	CON	00111Q			
00D4	012A		192	CON	00452Q		; 0062 RCL 10	
00D5	0164		193	CON	00544Q		; 0063 X>0?	
00D6	01B1		194	CON	00661Q		; 0064 GTO 00	
00D7	0087		195	CON	00207Q			
00D8	0129		196	CON	00451Q		; 0065 RCL 09	
00D9	0128		197	CON	00450Q		; 0066 RCL 08	
00DA	0141		198	CON	00501Q		; 0067 -	
00DB	012A		199	CON	00452Q		; 0068 RCL 10	
00DC	0161		200	CON	00541Q		; 0069 ABS	
00DD	0143		201	CON	00503Q		; 0070 /	
00DE	013A		202	CON	00472Q		; 0071 STO 10	
00DF	0101		203	CON	00401Q		; 0072 LBL 00	
00E0	0129		204	CON	00451Q		; 0073 RCL 09	
00E1	0128		205	CON	00450Q		; 0074 RCL 08	
00E2	0161		206	CON	00541Q		; 0075 ABS	
00E3	0144		207	CON	00504Q		; 0076 X<Y?	
00E4	0171		208	CON	00561Q		; 0077 X<>Y	
00E5	0127		209	CON	00447Q		; 0078 RCL 07	
00E6	0143		210	CON	00503Q		; 0079 /	
00E7	0156		211	CON	00526Q		; 0080 LOG	
00E8	0168		212	CON	00550Q		; 0081 INT	
00E9	0112		213	CON	00422Q		; 0082 2	
00EA	0141		214	CON	00501Q		; 0083 -	
00EB	0135		215	CON	00465Q		; 0084 STO 05	
00EC	0128		216	CON	00450Q		; 0085 RCL 08	
00ED	0136		217	CON	00466Q		; 0086 STO 06	
00EE	010F		218	CON	00417Q		; 0087 LBL 14	
00EF	019C		219	CON	00634Q		; 0088 FIX I 05	
00F0	0085		220	CON	00205Q			
00F1	0127		221	CON	00447Q		; 0089 RCL 07	
00F2	0143		222	CON	00503Q		; 0090 /	
00F3	016E		223	CON	00556Q		; 0091 RND	
00F4	01A7		224	CON	00647Q		; 0092 XROM 2905	
00F5	0045		225	CON	00105Q			
00F6	0113		226	CON	00423Q		; 0093 3	
00F7	01A7		227	CON	00647Q		; 0094 XROM 2923	
00F8	0057		228	CON	00127Q			

LOCATION	OBJECT	CODE	LINE	SOURCE	LINE			
00F9	0126		229	CON	00446Q			; 0095 RCL 06
00FA	01AE		230	CON	00656Q			; 0096 XEQ I 11
00FB	008B		231	CON	00213Q			
00FC	01A7		232	CON	00647Q			; 0097 XROM 2921
00FD	0055		233	CON	00125Q			
00FE	012A		234	CON	00452Q			; 0098 RCL 10
00FF	0192		235	CON	00622Q			; 0099 STO+ 06
0100	0006		236	CON	00006Q			
0101	0129		237	CON	00451Q			; 0100 RCL 09
0102	0126		238	CON	00446Q			; 0101 RCL 06
0103	0146		239	CON	00506Q			; 0102 X<=Y
0104	01BF		240	CON	00677Q			; 0103 GTO 14
0105	0018		241	CON	00030Q			
0106	019C		242	CON	00634Q			; 0104 FIX 04
0107	0004		243	CON	00004Q			
0108	0185		244	CON	00605Q			; 0105 RTN
0109	01CC		245	CON	00714Q			; 0106 LBL PRAXIS
010A	000E		246	CON	00016Q			
010B	00F7		247	CON	00367Q			
010C	0000		248	CON	00000Q			
010D	0050		249	CON	00120Q			
010E	0052		250	CON	00122Q			
010F	0041		251	CON	00101Q			
0110	0058		252	CON	00130Q			
0111	0049		253	CON	00111Q			
0112	0053		254	CON	00123Q			
0113	01A9		255	CON	00651Q			; 0107 CF 12
0114	000C		256	CON	00014Q			
0115	0120		257	CON	00440Q			; 0108 RCL 00
0116	0121		258	CON	00441Q			; 0109 RCL 01
0117	01F1		259	CON	00761Q			; 0110 @Y
0118	0059		260	CON	00131Q			
0119	01E0		261	CON	00740Q			; 0111 XEQ 09
011A	00E0		262	CON	00340Q			
011B	0089		263	CON	00211Q			
011C	0136		264	CON	00466Q			; 0112 STO 06
011D	0111		265	CON	00421Q			; 0113 1
011E	0012		266	CON	00022Q			; 2
011F	0015		267	CON	00025Q			; 5
0120	01A7		268	CON	00647Q			; 0114 XROM 2902
0121	0042		269	CON	00102Q			
0122	01A7		270	CON	00647Q			; 0115 XROM 2910
0123	004A		271	CON	00112Q			
0124	0122		272	CON	00442Q			; 0116 RCL 02
0125	0168		273	CON	00550Q			; 0117 INT
0126	0161		274	CON	00541Q			; 0118 ABS
0127	0132		275	CON	00462Q			; 0119 STO 02
0128	0111		276	CON	00421Q			; 0120 1
0129	0016		277	CON	00026Q			; 6
012A	0018		278	CON	00030Q			; 8
012B	0144		279	CON	00504Q			; 0121 X<Y?
012C	01BB		280	CON	00673Q			; 0122 GTO 10(UNCOMPILED)
012D	0000		281	CON	00000Q			
012E	0120		282	CON	00440Q			; 0123 RCL 00
012F	0126		283	CON	00446Q			; 0124 RCL 06
0130	0143		284	CON	00503Q			; 0125 /
0131	016E		285	CON	00556Q			; 0126 RND

LOCATION	OBJECT	CODE	LINE	SOURCE	LINE			
0132	01A7		286	CON	00647Q		; 0127	XROM 2905
0133	0045		287	CON	00105Q			
0134	01E0		288	CON	00740Q		; 0128	XEQ 05
0135	0090		289	CON	00220Q			
0136	0085		290	CON	00205Q			
0137	0174		291	CON	00564Q		; 0129	R^
0138	0121		292	CON	00441Q		; 0130	RCL 01
0139	01E0		293	CON	00740Q		; 0131	XEQ 04
013A	0087		294	CON	00207Q			
013B	0084		295	CON	00204Q			
013C	0174		296	CON	00564Q		; 0132	R^
013D	0140		297	CON	00500Q		; 0133	+
013E	0141		298	CON	00501Q		; 0134	-
013F	0117		299	CON	00427Q		; 0135	7
0140	0146		300	CON	00506Q		; 0136	X<=Y
0141	0175		301	CON	00565Q		; 0137	RDWN
0142	01A7		302	CON	00647Q		; 0138	XROM 2923
0143	0057		303	CON	00127Q			
0144	0121		304	CON	00441Q		; 0139	RCL 01
0145	0126		305	CON	00446Q		; 0140	RCL 06
0146	0143		306	CON	00503Q		; 0141	/
0147	016E		307	CON	00556Q		; 0142	RND
0148	01A7		308	CON	00647Q		; 0143	XROM 2905
0149	0045		309	CON	00105Q			
014A	018F		310	CON	00617Q		; 0144	ADV N
014B	0124		311	CON	00444Q		; 0145	RCL 04
014C	017A		312	CON	00572Q		; 0146	SIGN
014D	0167		313	CON	00547Q		; 0147	X=0?
014E	01B4		314	CON	00664Q		; 0148	GTO 03
014F	00CF		315	CON	00317Q			
0150	0176		316	CON	00566Q		; 0149	LSTX
0151	0120		317	CON	00440Q		; 0150	RCL 00
0152	0145		318	CON	00505Q		; 0151	X>Y?
0153	01BB		319	CON	00673Q		; 0152	GTO 10(UNCOMPILED)
0154	0000		320	CON	00000Q			
0155	0141		321	CON	00501Q		; 0153	-
0156	0121		322	CON	00441Q		; 0154	RCL 01
0157	0120		323	CON	00440Q		; 0155	RCL 00
0158	0141		324	CON	00501Q		; 0156	-
0159	0144		325	CON	00504Q		; 0157	X<Y?
015A	01BB		326	CON	00673Q		; 0158	GTO 10(UNCOMPILED)
015B	0000		327	CON	00000Q			
015C	0143		328	CON	00503Q		; 0159	/
015D	0122		329	CON	00442Q		; 0160	RCL 02
015E	0111		330	CON	00421Q		; 0161	1
015F	0141		331	CON	00501Q		; 0162	-
0160	0142		332	CON	00502Q		; 0163	*
0161	011A		333	CON	00432Q		; 0164	.
0162	0015		334	CON	00025Q		; 5	
0163	0140		335	CON	00500Q		; 0165	+
0164	0168		336	CON	00550Q		; 0166	INT
0165	0191		337	CON	00621Q		; 0167	STO Y
0166	0072		338	CON	00162Q			
0167	0124		339	CON	00444Q		; 0168	RCL 04
0168	0126		340	CON	00446Q		; 0169	RCL 06
0169	0143		341	CON	00503Q		; 0170	/
016A	016E		342	CON	00556Q		; 0171	RND

LOCATION	OBJECT	CODE	LINE	SOURCE	LINE			
016B	01A7		343	CON	00647Q		; 0172	XROM 2905
016C	0045		344	CON	00105Q			
016D	01E0		345	CON	00740Q		; 0173	XEQ 05
016E	0057		346	CON	00127Q			
016F	0085		347	CON	00205Q			
0170	0112		348	CON	00422Q		; 0174	2
0171	0143		349	CON	00503Q		; 0175	/
0172	0145		350	CON	00505Q		; 0176	X>Y?
0173	01B1		351	CON	00661Q		; 0177	GTO 00
0174	0089		352	CON	00211Q			
0175	0140		353	CON	00500Q		; 0178	+
0176	0122		354	CON	00442Q		; 0179	RCL 02
0177	0111		355	CON	00421Q		; 0180	1
0178	0141		356	CON	00501Q		; 0181	-
0179	0144		357	CON	00504Q		; 0182	X<Y?
017A	0183		358	CON	00603Q		; 0183	ENT^
017B	0141		359	CON	00501Q		; 0184	-
017C	01B2		360	CON	00662Q		; 0185	GTO 01
017D	0085		361	CON	00205Q			
017E	0101		362	CON	00401Q		; 0186	LBL 00
017F	0183		363	CON	00603Q		; 0187	ENT^
0180	0140		364	CON	00500Q		; 0188	+
0181	0122		365	CON	00442Q		; 0189	RCL 02
0182	0141		366	CON	00501Q		; 0190	-
0183	0102		367	CON	00402Q		; 0191	LBL 01
0184	01A7		368	CON	00647Q		; 0192	XROM 2923
0185	0057		369	CON	00127Q			
0186	018F		370	CON	00617Q		; 0193	ADV N
0187	01E0		371	CON	00740Q		; 0194	XEQ 08
0188	006A		372	CON	00152Q			
0189	0088		373	CON	00210Q			
018A	0135		374	CON	00465Q		; 0195	STO 05
018B	0167		375	CON	00547Q		; 0196	X=0?
018C	01B1		376	CON	00661Q		; 0197	GTO 00
018D	0095		377	CON	00225Q			
018E	0122		378	CON	00442Q		; 0198	RCL 02
018F	0111		379	CON	00421Q		; 0199	1
0190	0141		380	CON	00501Q		; 0200	-
0191	0178		381	CON	00570Q		; 0201	X=Y?
0192	01B1		382	CON	00661Q		; 0202	GTO 00
0193	008F		383	CON	00217Q			
0194	0171		384	CON	00561Q		; 0203	X<>Y
0195	0111		385	CON	00421Q		; 0204	1
0196	0141		386	CON	00501Q		; 0205	-
0197	01E0		387	CON	00740Q		; 0206	XEQ 06
0198	003F		388	CON	00077Q			
0199	0086		389	CON	00206Q			
019A	0125		390	CON	00445Q		; 0207	RCL 05
019B	0111		391	CON	00421Q		; 0208	1
019C	0140		392	CON	00500Q		; 0209	+
019D	01B2		393	CON	00662Q		; 0210	GTO 01
019E	0087		394	CON	00207Q			
019F	0104		395	CON	00404Q		; 0211	LBL 03
01A0	01E0		396	CON	00740Q		; 0212	XEQ 08
01A1	0051		397	CON	00121Q			
01A2	0088		398	CON	00210Q			
01A3	0101		399	CON	00401Q		; 0213	LBL 00

LOCATION	OBJECT	CODE	LINE	SOURCE	LINE		
01A4	0122		400	CON	00442Q		; 0214 RCL 02
01A5	0112		401	CON	00422Q		; 0215 2
01A6	0102		402	CON	00402Q		; 0216 LBL 01
01A7	0141		403	CON	00501Q		; 0217 -
01A8	01E0		404	CON	00740Q		; 0218 XEQ 06
01A9	002E		405	CON	00056Q		
01AA	0086		406	CON	00206Q		
01AB	018F		407	CON	00617Q		; 0219 ADVN
01AC	0122		408	CON	00442Q		; 0220 RCL 02
01AD	0125		409	CON	00445Q		; 0221 RCL 05
01AE	0111		410	CON	00421Q		; 0222 1
01AF	0140		411	CON	00500Q		; 0223 +
01B0	0111		412	CON	00421Q		; 0224 1
01B1	001B		413	CON	00033Q		; EEX
01B2	0013		414	CON	00023Q		; 3
01B3	0143		415	CON	00503Q		; 0225 /
01B4	0140		416	CON	00500Q		; 0226 +
01B5	0183		417	CON	00603Q		; 0227 ENT^
01B6	0154		418	CON	00524Q		; 0228 CHS
01B7	0171		419	CON	00561Q		; 0229 X<>Y
01B8	0124		420	CON	00444Q		; 0230 RCL 04
01B9	017A		421	CON	00572Q		; 0231 SIGN
01BA	0167		422	CON	00547Q		; 0232 X=0?
01BB	0175		423	CON	00565Q		; 0233 RDWN
01BC	0175		424	CON	00565Q		; 0234 RDWN
01BD	0132		425	CON	00462Q		; 0235 STO 02
01BE	019C		426	CON	00634Q		; 0236 FIX 04
01BF	0004		427	CON	00004Q		
01C0	0185		428	CON	00605Q		; 0237 RTN
01C1	0105		429	CON	00405Q		; 0238 LBL 04
01C2	0126		430	CON	00446Q		; 0239 RCL 06
01C3	0143		431	CON	00503Q		; 0240 /
01C4	016E		432	CON	00556Q		; 0241 RND
01C5	0106		433	CON	00406Q		; 0242 LBL 05
01C6	0161		434	CON	00541Q		; 0243 ABS
01C7	0168		435	CON	00550Q		; 0244 INT
01C8	0163		436	CON	00543Q		; 0245 X#0?
01C9	01B1		437	CON	00661Q		; 0246 GTO 00
01CA	0082		438	CON	00202Q		
01CB	0175		439	CON	00565Q		; 0247 RDWN
01CC	0115		440	CON	00425Q		; 0248 5
01CD	0101		441	CON	00401Q		; 0249 LBL 00
01CE	0156		442	CON	00526Q		; 0250 LOG
01CF	0168		443	CON	00550Q		; 0251 INT
01D0	0125		444	CON	00445Q		; 0252 RCL 05
01D1	0140		445	CON	00500Q		; 0253 +
01D2	0113		446	CON	00423Q		; 0254 3
01D3	0140		447	CON	00500Q		; 0255 +
01D4	0117		448	CON	00427Q		; 0256 7
01D5	0142		449	CON	00502Q		; 0257 *
01D6	0185		450	CON	00605Q		; 0258 RTN
01D7	0107		451	CON	00407Q		; 0259 LBL 06
01D8	0183		452	CON	00603Q		; 0260 ENT^
01D9	0183		453	CON	00603Q		; 0261 ENT^
01DA	0117		454	CON	00427Q		; 0262 7
01DB	014B		455	CON	00513Q		; 0263 MOD
01DC	0112		456	CON	00422Q		; 0264 2



LOCATION	OBJECT	CODE	LINE	SOURCE	LINE		
01DD	0143		457	CON	00503Q		; 0265 /
01DE	0168		458	CON	00550Q		; 0266 INT
01DF	01A7		459	CON	00647Q		; 0267 XROM    2923
01E0	0057		460	CON	00127Q		
01E1	0141		461	CON	00501Q		; 0268 -
01E2	01F1		462	CON	00761Q		; 0269 @-
01E3	002D		463	CON	00055Q		
01E4	0108		464	CON	00410Q		; 0270 LBL 07
01E5	0117		465	CON	00427Q		; 0271 7
01E6	0145		466	CON	00505Q		; 0272 X>Y?
01E7	01B1		467	CON	00661Q		; 0273 GTO 00
01E8	0085		468	CON	00205Q		
01E9	0141		469	CON	00501Q		; 0274 -
01EA	01A7		470	CON	00647Q		; 0275 XROM    2901
01EB	0041		471	CON	00101Q		
01EC	01B8		472	CON	00670Q		; 0276 GTO 07
01ED	000A		473	CON	00012Q		
01EE	0101		474	CON	00401Q		; 0277 LBL 00
01EF	0175		475	CON	00565Q		; 0278 RDWN
01F0	01A7		476	CON	00647Q		; 0279 XROM    2923
01F1	0057		477	CON	00127Q		
01F2	0109		478	CON	00411Q		; 0280 LBL 08
01F3	0111		479	CON	00421Q		; 0281 1
01F4	0012		480	CON	00022Q		;        2
01F5	0017		481	CON	00027Q		;        7
01F6	01A7		482	CON	00647Q		; 0282 XROM    2903
01F7	0043		483	CON	00103Q		
01F8	0174		484	CON	00564Q		; 0283 R^
01F9	0185		485	CON	00605Q		; 0284 RTN
01FA	010A		486	CON	00412Q		; 0285 LBL 09
01FB	01F9		487	CON	00771Q		; 0286-@ <UNITS=
01FC	007F		488	CON	00177Q		
01FD	0020		489	CON	00040Q		
01FE	003C		490	CON	00074Q		
01FF	0055		491	CON	00125Q		
0200	004E		492	CON	00116Q		
0201	0049		493	CON	00111Q		
0202	0054		494	CON	00124Q		
0203	0053		495	CON	00123Q		
0204	003D		496	CON	00075Q		
0205	0146		497	CON	00506Q		; 0287 X<=Y
0206	01BB		498	CON	00673Q		; 0288 GTO 10
0207	00C3		499	CON	00303Q		
0208	0171		500	CON	00561Q		; 0289 X<>Y
0209	0161		501	CON	00541Q		; 0290 ABS
020A	0144		502	CON	00504Q		; 0291 X<Y?
020B	0171		503	CON	00561Q		; 0292 X<>Y
020C	0156		504	CON	00526Q		; 0293 LOG
020D	0166		505	CON	00546Q		; 0294 X<0?
020E	01B1		506	CON	00661Q		; 0295 GTO 00
020F	008B		507	CON	00213Q		
0210	0168		508	CON	00550Q		; 0296 INT
0211	0112		509	CON	00422Q		; 0297 2
0212	0171		510	CON	00561Q		; 0298 X<>Y
0213	0145		511	CON	00505Q		; 0299 X>Y?
0214	01B2		512	CON	00662Q		; 0300 GTO 01
0215	008D		513	CON	00215Q		

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LOCATION	OBJECT	CODE	LINE	SOURCE	LINE		
0216	0141		514	CON	00501Q		; 0301 -
0217	0135		515	CON	00465Q		; 0302 STO 05
0218	0110		516	CON	00420Q		; 0303 0
0219	01B3		517	CON	00663Q		; 0304 GTO 02
021A	008D		518	CON	00215Q		
021B	0101		519	CON	00401Q		; 0305 LBL 00
021C	0169		520	CON	00551Q		; 0306 FRAC
021D	0163		521	CON	00543Q		; 0307 X#0?
021E	0111		522	CON	00421Q		; 0308 1
021F	0176		523	CON	00566Q		; 0309 LSTX
0220	0168		524	CON	00550Q		; 0310 INT
0221	0171		525	CON	00561Q		; 0311 X<>Y
0222	0141		526	CON	00501Q		; 0312 -
0223	0102		527	CON	00402Q		; 0313 LBL 01
0224	01F3		528	CON	00763Q		; 0314-@ E
0225	007F		529	CON	00177Q		
0226	0020		530	CON	00040Q		
0227	0045		531	CON	00105Q		
0228	0103		532	CON	00403Q		; 0315 LBL 02
0229	0114		533	CON	00424Q		; 0316 4
022A	01A7		534	CON	00647Q		; 0317 XROM 2922
022B	0056		535	CON	00126Q		
022C	01A7		536	CON	00647Q		; 0318 XROM 2901
022D	0041		537	CON	00101Q		
022E	019C		538	CON	00634Q		; 0319 FIX 00
022F	0000		539	CON	00000Q		
0230	0175		540	CON	00565Q		; 0320 RDWN
0231	0167		541	CON	00547Q		; 0321 X=0?
0232	01B1		542	CON	00661Q		; 0322 GTO 00
0233	008A		543	CON	00212Q		
0234	01A7		544	CON	00647Q		; 0323 XROM 2905
0235	0045		545	CON	00105Q		
0236	0157		546	CON	00527Q		; 0324 10^X
0237	0112		547	CON	00422Q		; 0325 2
0238	0135		548	CON	00465Q		; 0326 STO 05
0239	019C		549	CON	00634Q		; 0327 FIX 02
023A	0002		550	CON	00002Q		
023B	0175		551	CON	00565Q		; 0328 RDWN
023C	01B2		552	CON	00662Q		; 0329 GTO 01
023D	0086		553	CON	00206Q		
023E	0101		554	CON	00401Q		; 0330 LBL 00
023F	0111		555	CON	00421Q		; 0331 1
0240	01A7		556	CON	00647Q		; 0332 XROM 2905
0241	0045		557	CON	00105Q		
0242	019C		558	CON	00634Q		; 0333 FIX I 05
0243	0085		559	CON	00205Q		
0244	0102		560	CON	00402Q		; 0334 LBL 01
0245	01F2		561	CON	00762Q		; 0335 @>
0246	003E		562	CON	00076Q		
0247	0020		563	CON	00040Q		
0248	01A7		564	CON	00647Q		; 0336 XROM 2901
0249	0041		565	CON	00101Q		
024A	0185		566	CON	00605Q		; 0337 RTN
024B	010B		567	CON	00413Q		; 0338 LBL 10
024C	0110		568	CON	00420Q		; 0339 0
024D	0143		569	CON	00503Q		; 0340 /
024E	0000		570	CON	00000Q		; NULL*****

# NOMAS

Not Manufacturer Supported  
recipient agrees NOT to contact manufacturer

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LOCATION OBJECT CODE LINE       SOURCE LINE
024F 01C0           571           CON           00710Q           ; 0341 END
0250 002E           572           CON           00056Q
0251 022F           573           CON           01057Q
                    574 *
                    575 *
                    576           GLB           PHEAD
0252 00AD           577           CON           255Q           ;-
0253 0012           578           CON           22Q           ;R
0254 0005           579           CON           5Q           ;E
0255 0014           580           CON           24Q           ;T
0256 000E           581           CON           16Q           ;N
0257 0009           582           CON           11Q           ;I
0258 0012           583           CON           22Q           ;R
0259 0010           584           CON           20Q           ;P
025A 002D           585           CON           55Q           ;-
025B                586 PHEAD                       ;PRINTER HEADER FOR CATALOG
                    587                               ;DUMMY FCN - NAME>7CHARS
                    588 *
                    589 *
025B 0092           590 *****
                    591 *SKPCHR-SKIP SPACES AS SPECIFIED BY X-23 MAX.
                    592 *****
                    593           GLB           SKPCHR
025C 0008           594           CON           222Q           ;R
025D 0003           595           CON           10Q           ;H
025E 0010           596           CON           3           ;C
025F 000B           597           CON           16           ;P
0260 0013           598           CON           11           ;K
0261 00001000       599           CON           19           ;S
0263 0106           600 SKPCHR       GOSUB       =CONV3D       ;GET X CONV TO BIN
0264 0130           601           A=C           X           ;SAVE BINARY X
0265 0018           602           LDI
0266 0306           603           CON           24
0267 0003           604           A<C?       X           ;# OF CHARS TO SKIP<24?
0268 00001000       605           GONC       ERL
026A 0130           606           GOSUB       =IACHR       ;INITIALIZE,SEND MODE IF NECESSARY
026B 00A0           607           LDI
026C 0003           608           CON           240Q
                    609           GOTO       SKPC10
026D 008C           610 *****
026E 000F           611 ***** SKPCOL = SKIP COLUMNS *****
026F 0003           612 *****
                    613           GLB           SKPCOL
0270 0010           614           CON           214Q           ;L
0271 000B           615           CON           15           ;O
0272 0013           616           CON           3           ;C
0273 00001000       617           CON           16           ;P
0275 0106           618           CON           11           ;K
0276 0130           619           CON           19           ;S
0277 00A8           620 SKPCOL       GOSUB       =CONV3D       ;GET ARGUMENT FROM XREG
0278 0306           621           A=C           X
0279 00001002       622           LDI
027B 00001000       623           CON           168
027D 0003           624           A<C?       X
                    625 ERL       GOLNC       =ERRDE       ;#OF COLS TOO LARGE
                    626           GOSUB       =IACOL       ;INITIALIZE,SEND MODE IF NECESSARY
                    627           GOTO       SKPC4

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LOCATION	OBJECT CODE	LINE	SOURCE LINE		
		628			
		629	*SKPCOM=	SKIP COLUMN, MICROCODE	
		630	*USES:	A(X),C,N       NO STATUS, NO PT,   1 ADDITIONAL SUB LEVEL	
		631	*INPUTS:	C(X)= # COLUMNS TO SKIP (SKPCOM)	
		632	*	A(X)= # COLUMNS TO SKIP (SKPC4)	
		633	*	PRINTER MODE ALREADY SET TO PROPER STATE	
		634	*IN&OUT:	HEX MODE	
		635			
		636		GLB               SKPCOM	
		637		GLB               SKPC4	
027E	0106	638	SKPCOM	A=C               X               ;# COLS TO "A" (BINARY)	
027F	0130	639	SKPC4	LDI	
0280	009F	640		CON               237Q               ;(SKIP 0 CHAR) - 1	
0281	01BC	641		RCR               11               ;CHAR CTR TO C(M)	
0282	0130	642		LDI	
0283	0007	643		CON               7               ;7 COLUMNS/CHARACTER	
0284	0306	644		A<C?             X               ;# COLUMNS < 7?	
0285	0007	645		GOC               SKPC8               ;YES, DON'T SEND # CHAR	
0286	023A	646	SKPC6	C=C+1            M               ;ADD A CHARACTER	
0287	01C6	647		A=A-C            X               ;SUBTRACT 7 COLUMNS	
0288	0003	648		GONC             SKPC6	
0289	003C	649		RCR               3               ;CHAR CTR TO C(X)	
028A	00001000	650		GOSUB            =PBYTEC               ;# BLANK CHARS TO PRINTER	
028C	01BC	651		RCR               11               ;BRING BACK THE 7	
028D	0146	652		A=A+C            X               ;RESTORE # COLUMNS	
028E	0346	653		A#0?             X               ;# COLUMNS= 0?	
028F	0003	654		GONC             XPECHK               ;YES, DON'T SEND IT	
0290	0130	655	SKPC8	LDI	
0291	00B8	656		CON               270Q               ;SKIP 0 COLUMNS	
0292	00001000	657	SKPC10	GOSUB            =PBYA_C               ;# BLANK COLUMNS TO PRINTER	
0294	0003	658		GOTO             XPECHK	

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LOCATION OBJECT CODE LINE           SOURCE LINE
660 *****
661 ***** PRA -- PRINT ALPHA REG, NO DISPLAY *****
662 *****
663                   GLB           LPECHK
664                   GLB           PRA
0295 0081           665           CON           201Q           ;A
0296 0012           666           CON           22Q           ;R
0297 0010           667           CON           20Q           ;P
0298 00001000       668 PRA           GOSUB          =IPRT
029A 00001000       669 PRA20         GOSUB          PAREG
029C 03B8           670           C=REGN        14           ;RESTORE SS0 FOR AVIEW PATH
029D 0358           671           ST=C
029E 00001000       672 LPECHK        GOSUB          =EOLL
02A0 00001002       673 XPECHK       GOLONG         =PECHK
674 *****
675 ***** PRT 7= PROMPT *****
676 *****
677                   GLB           PPROMP
02A2 00001000       678 PPROMP       GOSUB          =CKOEN
02A4 03E0           679           RTN           ;P+1 - DON'T PRINT
02A5 00001000       680           GOSUB         =IAUNA           ;P+2
02A7 03E0           681           RTN           ;P+1 - DON'T PRINT
02A8 0003           682           GOTO          PRA20           ;P+2 - PRINT
683 *****
684 ***** PRT11= AVIEW *****
685 *****
686                   GLB           PAVIEW
02A9 00001000       687 PAVIEW        GOSUB          =IPRTM
02AB 0003           688           GOTO          PRA20
689 *****
690 ***** ACA - ACCUMULATE ALPHA REGISTER *****
691 *****
692                   GLB           ACA
02AC 0081           693           CON           201Q           ;A
02AD 0003           694           CON           3           ;C
02AE 0001           695           CON           1           ;A
02AF 00001000       696 ACA           GOSUB          =IACHR
02B1 00001000       697           GOSUB         PAREG
02B3 0003           698           GOTO          XPECHK
699 *****
700 *-PAREG           SEND ALPHA REG TO PRINTER
701 *
702 *-USES: A,B(X&S),C,N, ACTIVE PT, S9 FOR ERRORS, 1 ADDITIONAL SUB LEVEL
703 *-INPUTS: CHIP 0 ENABLED, HEXMODE
704 * OUTPUT: A.M=# OF CHARACTERS IN ALPHA REGISTER, PT=0 (CAN BE CHANGED),
705 *           CHIP 0 ENABLED, HEX MODE
706 *
707 *
708                   GLB           PAREG
02B4 004E           709 PAREG        C=0           W
02B5 039C           710           PT=           0
02B6 0210           711           LC           8           ;C(X)= REG 8 ADDR
02B7 0090           712           LC           2           ;C(S)= REG BYTE CTR (R8= 3 BYTES)
02B8 010E           713           A=C          W           ;A= 2 000000000 008
02B9 039C           714           PT=           0
02BA 0150           715           LC           5           ;C(X)= REG 5 ADDR
02BB 0190           716           LC           6           ;C(S)= REG BYTE COUNTER

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FILE: QUAD0:HELIOS           HEWLETT-PACKARD: COCONUT ASSEMBLER 1.03 / CORVALLIS DIVISION           PAGE 14

LOCATION	OBJECT CODE	LINE	SOURCE LINE			
02BC	00EE	717	CBEX	W		;B= 6 0000000000 005
02BD	0238	718	C=REGN	8		;GET REG 8
02BE	017C	719	RCR	6		;1ST ALPHA REG BYTE TO C(0-1)
02BF	031C	720	PT=	1		
02C0	037C	721	PAR40 RCR	12		;NEXT BYTE TO C(0-1)
02C1	0314	722	PT=?	1		;STILL LOOKING FOR 1ST CHAR?
02C2	0003	723	GONC	PAR60		;NO
02C3	02EA	724	C#0?	WPT		;YES, C(0-1)= 1ST CHAR?
02C4	0003	725	GONC	PAR70		;NO
02C5	039C	726	PT=	0		;YES, SET PT#0
02C6	00001000	727	PAR60 GOSUB	=PBYTDU		;SEND CHARACTER TO PRINTER
02C8	017A	728	A=A+1	M		;COUNT THE CHARACTER
02C9	01BE	729	PAR70 A=A-1	S		;DONE WITH REG YET?
02CA	0003	730	GONC	PAR40		;NO
02CB	007E009E	731	A=B	S		;YES, A(S)=6= REG BYTE CTR
02CD	01A6	732	A=A-1	X		;GET NEXT REG ADDR
02CE	00A60106	733	C=A	X		;COPY ADDR TO C
02D0	0270	734	DADD=C			
02D1	0038	735	C=DATA			
02D2	0326	736	A<B?	X		;MORE REGS TO CHECK?
02D3	0003	737	GONC	PAR40		;YES
02D4	03E0	738	RTN			;NO
739	*****					
740	***** PRT14 -- EXITING FROM ALPHA MODE WITH ALPHA KEY *****					
741	*****					
742			GLB	ENDALP		
02D5	0158	743	ENDALP M=C			;SAVE REG C
02D6	00001000	744	GOSUB	=DATAPR		;PRINT ALPHA ENTRY STRING
02D8	001C	745	PT=	3		
02D9	0198	746	C=M			;RESTORE REG C
02DA	00001002	747	GOLONG	=PR14RT		

FILE: QUAD0:HELIOS           HEWLETT-PACKARD: COCONUT ASSEMBLER 1.03 / CORVALLIS DIVISION       PAGE 15

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LOCATION OBJECT CODE LINE       SOURCE LINE
749 *
750 *-INITSC= MODE TO PRINTER (SPECIAL CHARACTER)
751 *-INITSM= INITIALIZE - SEND MODE TO PRINTER
752 *
753 *-USES: C,N, S8, S9 FOR ERRORS, PT, NO ADDITIONAL SUB LEVELS
754 *-INPUTS: S8=1 FOR COLUMN OUT MODE, ELSE S8=0,       HEXMODE
755 *-OUTPUTS: CHIP 0 ENABLED, HEXMODE
756 *
757                   GLB               INITSC
758                   GLB               INITSM
02DC 0108           759 INITSC           ST=1               8                   ;COLUMN OUT MODE
02DD 0046           760 INITSM           C=0               X                   ;ENABLE CHIP 0
02DE 0270           761                   DADD=C
02DF 00DC           762                   PT=               10
02E0 00001002       763                   GOLONG            =INIT60           ;SEND MODE TO PRINTER
764 *****
765 *
766 * MESSLP - PRINTER ROM ENTRY FOR MESSL SUBROUTINE IN MAINFRAME
767 * USES: C6:0, 1 ADDITIONAL SUBROUTINE LEVEL, AND LEAVES LCD ENABLED
768 * IN: FOLLOWING THE GOSUB A SERIES OF CONSTANTS GIVING THE LCD
769 *       FORM OF THE CHARACTERS IN THE MESSAGE, FROM LEFT TO RIGHT.
770 *       LAST CHAR SHOULD HAVE @1000 ADDED. SPECIAL CHARACTERS
771 *       (THOSE HAVING LCD CREG=1) CAN ONLY BE USED AS THE FINAL
772 *       CHAR OF THE MESSAGE.
773 * OUT: LEAVES LCD ENABLED.
774 * ASSUMES: HEXMODE
775 *
776                   GLB               MESSLP
02E2 00001000       777 MESSLP           GOSUB            =CLLCDE           ;ENABLE AND CLEAR LCD
02E4 00001002       778                   GOLONG            =MESSL
779
780 *****
781 *****
782 *PRSTK-PRINT STACK ROUTINE
783 *PRINTS STACK IN T,Z,Y,X ORDER.
784 *****
785                   GLB               PRSTK
02E6 008B           786                   CON               213Q              ;K
02E7 0014           787                   CON               24Q               ;T
02E8 0013           788                   CON               23Q               ;S
02E9 0012           789                   CON               22Q               ;R
02EA 0010           790                   CON               20Q               ;P
02EB 00001000       791 PRSTK           GOSUB            =IPRT
02ED 004E           792                   C=0               W
02EE 0130           793                   LDI
02EF 0000           794                   CON               =NFRC
02F0 01BC           795                   RCR               11
02F1 0170           796                   STK=C             ;SET FOR NFRC
02F2 004E           797                   C=0               W
02F3 0130           798                   LDI               ;C.M=0,C.X=3
02F4 0003           799                   CON               3Q
02F5 0268           800                   REGN=C            9
02F6 0003           801                   GOTO              REGL00
802 *****
803 *PRREG-PRINT REGISTERS
804 *****
805                   GLB               PRREG

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FILE: QUAD0:HELIOS           HEWLETT-PACKARD: COCONUT ASSEMBLER 1.03 / CORVALLIS DIVISION           PAGE 16

LOCATION	OBJECT	CODE	LINE	SOURCE	LINE	
02F7	0087		806	CON	207Q	;G
02F8	0005		807	CON	5Q	;E
02F9	0012		808	CON	22Q	;R
02FA	0012		809	CON	22Q	;R
02FB	0010		810	CON	20Q	;P
02FC	00001000		811	PRREG	=FNDEND	;FIND LAST REG
02FE	01A6		812	A=A-1	X	
02FF	004E		813	C=0	W	
0300	0270		814	DADD=C		
0301	0378		815	C=REGN	13	;GET REG 0
0302	00BA		816	ACEX	M	
0303	0003		817	GOTO	REGL	
			818	*****		
			819	*PRSIGM-PRINT THE STATISTICS REGISTERS.		
			820	*****		
			821	GLB	PRSIGM	
0304	00CE		822	CON	316Q	;SIGMA
0305	0012		823	CON	22Q	;R
0306	0010		824	CON	20Q	;P
0307	00001000		825	PRSIGM	=SUMCHK	;STOP ADR IN C.X
0309	00A6		826	ACEX	X	;STOP ADR IN A.X
030A	004E		827	C=0	W	;ENABLE CHIP 0
030B	0270		828	DADD=C		;(SUMCHK LEAVES IT DISABLED)
030C	0378		829	C=REGN	13	;GET SIGMA ADR
030D	00DC		830	PT=	10	;PUT IN A
030E	004A		831	C=0	WPT	
030F	013C		832	RCR	8	
0310	023E		833	C=C+1	S	;SIGMA FLAG SET
0311	00A6		834	ACEX	X	;START=C.M STOP=C.X
0312	0003		835	STKCKX	GOTO	STKCHK ;DO IT
			836	*****		
			837	*PRREGX-PRINT REGISTERS AS SPECIFIED BY THE X REGISTER.		
			838	*****		
			839	GLB	PRREGX	
0313	0098		840	CON	230Q	;X
0314	0007		841	CON	7Q	;G
0315	0005		842	CON	5Q	;E
0316	0012		843	CON	22Q	;R
0317	0012		844	CON	22Q	;R
0318	0010		845	CON	20Q	;P
0319	00001000		846	PRREGX	=CONV3D	
031B	01BC		847	RCR	11	
031C	0268		848	REGN=C	9	;STORE START ADDRESS
031D	02A0		849	SETDEC		
031E	00F8		850	C=REGN	3	;GET X
031F	0084		851	ST=0	5	;SET FRACTION FLAG
0320	00001000		852	GOSUB	=INTFRC	;GET FRACTION OF X
0322	0226		853	C=C+1	X	
0323	0226		854	C=C+1	X	
0324	0226		855	C=C+1	X	;MULT BY 1000
0325	0260		856	SETHX		
0326	00001000		857	GOSUB	=CONV3C	;CONVERT FRAC TO BIN
0328	00A6		858	ACEX	X	;PUT STOP NUMBER IN A
0329	0278		859	C=REGN	9	;START NUM IN C
032A	00BA		860	ACEX	M	;START ADR IN PLC
032B	0378		861	C=REGN	13	;GET REG 0
032C	015A		862	A=A+C	M	;GEN ADR



FILE: QUAD0:HELIOS           HEWLETT-PACKARD: COCONUT ASSEMBLER 1.03 / CORVALLIS DIVISION           PAGE 17

LOCATION	OBJECT	CODE	LINE	SOURCE	LINE	
032D	003C		863	RCR	3	;MOVE REG 0
032E	0146		864	A=A+C	X	
			865	GLB	REGL	
032F	004E		866	REGL	C=0	W ;CLEAR HIGH END
0330	009C		867	PT=	5	
0331	00AA		868	ACEX	WPT	
0332	0268		869	STKCHK	REGN=C	9 ;ENTRY FOR PRREG
0333	00001000		870	GOSUB	=IPRT	
0335	00001000		871	REGL00	GOSUB	=EOLL ;LINE FEED
			872			
			873	GLB	REGLOP	
0337	0278		874	REGLOP	C=REGN	9 ;GET ADDRESS
0338	003C		875	RCR	3	;ADR IN C.X
0339	00001000		876	GOSUB	=CHKADR	;ERRNE IF REG NONEXISTENT
			877			;C(X)= REG ADDR, B= REG CONTENTS
033B	0244		878	ST=0	9	
033C	00EE		879	BCEX	W	;GET VALUE BACK
033D	0158		880	M=C		;SAVE FOR LATER
033E	004E		881	C=0	W	
033F	0270		882	DADD=C		
0340	0278		883	C=REGN	9	;GET N
0341	00AE		884	ACEX	W	
0342	0378		885	C=REGN	13	
0343	009C		886	PT=	5	
0344	0046		887	C=0	X	
0345	024A		888	C=A-C	WPT	;ADDRESS TO BYTE
0346	0007		889	GOC	STK	;IF CARRY THEN STACK ADDRESS
0347	035E		890	A#0?	S	;IS THIS SIGMA REGISTERS?
0348	0003		891	GONC	REG	;NO
0349	00001000		892	GOSUB	SIGSTF	;LOOK UP SIGMA ALPHA
034B	007E		893	CON	176Q	;SIGMA
034C	0058		894	CON	130Q	;X
034D	0020		895	CON	40Q	
034E	0220		896	CON	1040Q	
034F	007E		897	CON	176Q	;SIGMA
0350	0058		898	CON	130Q	;X^2
0351	005E		899	CON	136Q	
0352	0232		900	CON	1062Q	
0353	007E		901	CON	176Q	;SIGMA
0354	0059		902	CON	131Q	;Y
0355	0020		903	CON	40Q	
0356	0220		904	CON	1040Q	
0357	007E		905	CON	176Q	;SIGMA
0358	0059		906	CON	131Q	;Y^2
0359	005E		907	CON	136Q	
035A	0232		908	CON	1062Q	
035B	007E		909	CON	176Q	;SIGMA
035C	0058		910	CON	130Q	;XY
035D	0059		911	CON	131Q	
035E	0220		912	CON	1040Q	
035F	004E		913	CON	116Q	;N
0360	02A3		914	CON	1243Q	;THREE BLANKS
			915	GLB	SIGSTF	
0361	0046		916	SIGSTF	C=0	X
0362	013C		917	RCR	8	;CALCULATE ADDR FOR TABLE
0363	01DA		918	A=A-C	M	
0364	01B0		919	C=STK		

LOCATION	OBJECT	CODE	LINE	SOURCE	LINE			
0365	021A		920	C=C+A	M		;ADD OFFSET 4 TIMES	
0366	021A		921	C=C+A	M			
0367	021A		922	C=C+A	M			
0368	021A		923	C=C+A	M			
0369	0330		924	MORALP			;GET CHR	
036A	00001000		925	GOSUB	=PBYTEC		;PUT IT OUT	
036C	023A		926	C=C+1	M		;INC COUNT	
036D	02F6		927	C#0?	XS		;LAST BYTE?	
036E	0003		928	GONC	MORALP		;NO	
036F	0003		929	GOTO	MSG			
0370	0130		930	REG			;LOAD R CONSTANT	
0371	0052		931	CON	122Q		;R	
0372	00001000		932	GOSUB	=PBYTEC			
0374	003C		933	RCR	3		;OUTPUT REG #	
0375	00001000		934	GOSUB	=PBINB0		;REG # TO PRINTER	
0377	0003		935	GOTO	MSG			
0378	00001000		936	STK	STKADR		;TABLE CHARACTER LOOK UP	
037A	0054		937	CON	124Q		;T	
037B	005A		938	CON	132Q		;Z	
037C	0059		939	CON	131Q		;Y	
037D	0058		940	CON	130Q		;X	
			941					
			942	GLB	STKADR			
037E	01B0		943	STKADR	C=STK		;GET T,Z,Y,X	
037F	021A		944	C=C+A	M			
0380	0330		945	CXISA				
0381	00001000		946	GOSUB	=PBYTEC			
0383	00001000		947	MSG	=PRMSG		; " = " TO PRINTER	
0385	003D		948	CON	75Q		;=	
0386	0120		949	CON	440Q		; BLANK	
0387	00001000		950	GOSUB	=PRIM		;PUT OUT REG CONTENT	
0389	00001000		951	GOSUB	=EOLL		;PRINT THE LINE	
038B	00001000		952	GOSUB	=PWAIT			
038D	0278		953	C=REGN	9		;DONE YET	
038E	023A		954	C=C+1	M			
038F	0268		955	REGN=C	9			
0390	00A6		956	ACEX	X			
0391	003C		957	RCR	3			
0392	0306		958	A<C?	X			
0393	00001002		959	GOLNC	REGLOP			
0395	00001000		960	GOSUB	=PECHK		;CHECK PRINTER ERRORS	
0397	0248		961	ST=1	9		;FOR CARD READER	
0398	03E0		962	RTN				
			963	*****				
			964	***** PRT12 -- PRINT CATALOG *****				
			965	*****				
			966	GLB	PRTCAT			
0399	0104		967	PRTCAT	ST=0			
039A	00001000		968	GOSUB	=IAUALL			
039C	03E0		969	RTN			;P+1 - DON'T PRINT	
039D	0238		970	C=REGN	8		;GET CATALOG #	
039E	027E		971	C=C-1	S			
039F	027E		972	C=C-1	S		;CATALOG 1 ?	
03A0	0003		973	GONC	DOLCD		;NO	
			974	**FOR CAT 1, IF PGM PTR IS AT AN END, PRINT THE NUMBER OF BYTES BETWEEN				
			975	*THE PREVIOUS END AND THIS END, INCLUDING 3 BYTES FOR THIS END.				
03A1	00001000		976	GOSUB	=GETPC		;YES, A(0-3)= PGM POINTER	

FILE: QUAD0:HELIOS                   HEWLETT-PACKARD: COCONUT ASSEMBLER 1.03 / CORVALLIS DIVISION                   PAGE 19

LOCATION	OBJECT CODE	LINE	SOURCE LINE				
03A3	00001000	977	GOSUB	=INCAD		;INCREMENT ADDRESS= 1ST BYTE	
03A5	008A	978	B=A	WPT		;SAVE COPY OF 1ST BYTE ADDRESS	
03A6	00001000	979	GOSUB	=INCAD		;SKIP 2ND BYTE	
03A8	00001000	980	GOSUB	=NXTBYT		;GET 3RD BYTE	
03AA	0358	981	ST=C			;SAVE 3RD BYTE IN STATUS	
03AB	031C	982	PT=	1			
03AC	0222	983	C=C+1	PT		;ALPHA LBL?	
03AD	0007	984	GOC	DOLCD		;YES	
03AE	001C	985	PT=	3		;IT'S AN END	
03AF	00AA	986	ACEX	WPT		;C= 3RD BYTE ADDRESS	
03B0	0158	987	M=C			;SAVE 3RD BYTE ADDRESS	
03B1	008C	988	ST=1?	5		;FINAL END	
03B2	0003	989	GONC	PCAT20		;NO	
03B3	00001000	990	GOSUB	=PR_END		;YES. PRINT ".END."	
03B5	00001000	991	GOSUB	=PRTMSG			
03B7	01A7	992	CON	647Q		;SKIP 7 CHARACTERS	
03B8	0003	993	GOTO	PCAT25			
03B9	00001000	994	DOLCD	GOSUB	=PRTLCD		
03BB	0003	995	GOTO	OUTPCT			
03BC	00001000	996	PCAT20	GOSUB	=PRTLCD		
03BE	001C	997	PCAT25	PT=	3		
03BF	006A	998	ABEX	WPT		;A= PC= 1ST BYTE OF END	
03C0	00001000	999	GOSUB	=CPGMHD		;A= ADDR OF TOP OF PROGRAM	
03C2	0198	1000	C=M			;C= 3RD BYTE ADDRESS	
03C3	01C6	1001	A=A-C	X		;C(X)= #REGS	
03C4	01C2	1002	A=A-C	PT		;C(3)= #BYTES	
03C5	0003	1003	GONC	PCAT30			
03C6	01A6	1004	A=A-1	X		;#REG _ #REG-1	
03C7	01A2	1005	A=A-1	PT		;#BYTES _ #BYTES-2	
03C8	01A2	1006	A=A-1	PT			
03C9	004E	1007	PCAT30	C=0	W		
03CA	00AA	1008	ACEX	WPT			
03CB	0106	1009	A=C	X		;SAVE #REG	
03CC	01EE	1010	C=C+C	W		;*2	
03CD	01EE	1011	C=C+C	W		;*4	
03CE	01EE	1012	C=C+C	W		;*8	
03CF	00A6	1013	ACEX	X		;A= *8, C= *1	
03D0	01C6	1014	A=A-C	X		; -1= MULTIPLY #REGS BY 7	
03D1	007C	1015	RCR	4		;C(0)= #BYTES/2	
03D2	0206	1016	C=A+C	X		;C= TOTAL # BYTES	
		1017	LEGAL				
03D3	00001000	1018	GOSUB	=PBINB0		;PRINT # BYTES	
03D5	00001000	1019	GOSUB	=PRTMSG			
03D7	0020	1020	CON	40Q		; BLANK	
03D8	0042	1021	CON	102Q		;B	
03D9	0059	1022	CON	131Q		;Y	
03DA	0054	1023	CON	124Q		;T	
03DB	0045	1024	CON	105Q		;E	
03DC	0153	1025	CON	523Q		;S	
		1026					
		1027	GLB	OUTPCT			
03DD	00001000	1028	OUTPCT	GOSUB	=EOLL	;SEND EOLL	
03DF	00001000	1029	GOSUB	=BECHK		;WAIT FOR PRINTER	
03E1	00001002	1030	GOLONG	=PECHK			
		1031					
		1032	*****				
		1033	***** PRT6 -- PRINT MESSAGE *****				

FILE: QUAD0:HELIOS           HEWLETT-PACKARD: COCONUT ASSEMBLER 1.03 / CORVALLIS DIVISION           PAGE 20

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LOCATION OBJECT CODE LINE       SOURCE LINE
1034 *****
1035 *
1036 * USES: A,C,G,N,S8, AND 1 ADDITIONAL SUBROUTINE LEVEL
1037 *
1038 * INPUT: CONTENTS OF LCD REGISTERS
1039 * OUTPUT: ONE LINE TO PRINTER
1040 * ASSUMES: S8=1 ON ENTRY       RETURNS S8=1 ON EXIT
1041 *       ASSUMES ADDRESS OF MSG110 IN MAINFRAME IS ON THE TOP OF THE
1042 *       SUBROUTINE STACK ON ENTRY. RETURNS WITH A GOLONG TO MSG110
1043 *       ON EXIT.
1044 *
1045                               GLB               PMESSG
03E3 035C           1046 PMESSG           PT=           12               ;SAVE S9 IN A[12]
03E4 0002           1047               A=0               PT
03E5 024C           1048               ST=1?           9
03E6 0003           1049               GONC           PMSG10
03E7 0162           1050               A=A+1           PT
03E8 039C           1051 PMSG10           PT=           0               ;SAVE S7-S0 IN G
03E9 0398           1052               C=ST
03EA 0058           1053               G=C
03EB 0020           1054               SPOPND               ;FREE UP A SUBROUTINE LEVEL
03EC 00001000       1055               GOSUB           =IAUNA
03EE 0003           1056               GOTO           PMSG15           ;P+1 - DON'T PRINT
                    1057                                       ;P+2 - PRINT
03EF 00001000       1058               GOSUB           =PRTLCD
03F1 00001000       1059               GOSUB           =EOLL           ;SEND EOLL
03F3 0244           1060 PMSG15           ST=0           9               ;RESTORE S9
03F4 035C           1061               PT=           12
03F5 0342           1062               A#0?           PT
03F6 0003           1063               GONC           PMSG20
03F7 0248           1064               ST=1           9
03F8 039C           1065 PMSG20           PT=           0               ;RESTORE S0-S7
03F9 0098           1066               C=G
03FA 0358           1067               ST=C
03FB 0108           1068               ST=1           8               ;RETURN S8=1
03FC 00001002       1069               GOLONG          =MSG110
03FE 00000000       1070               FILLTO          1777Q
                    1071               END

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Errors= 0

# NOMAS

Not Manufacturer Supported  
recipient agrees NOT to contact manufacturer

FILE: QUAD0: HELIOS      CROSS REFERENCE TABLE      PAGE 21

LINE#	SYMBOL	TYPE	REFERENCES
696	ACA	P	5,692
	ACCHR	E	6
	ACCOL	E	7
	ACSPEC	E	8
	ACX	E	9
	BECHK	E	1029
	BLDSPC	E	10
	CHKADR	E	876
	CKOEN	E	678
	CLLCDE	E	777
	CONV3C	E	857
	CONV3D	E	600,620,846
	CPGMHD	E	999
	DATAPR	E	744
994	DOLCD	P	973,984
743	ENDALP	P	742
	EOLL	E	672,871,951,1028,1059
625	ERL	P	605
	ERRDE	E	625
	FNDEND	E	811
	GETPC	E	976
	IACHR	E	606,696
	IACOL	E	626
	IAUALL	E	968
	IAUNA	E	680,1055
	INCAD	E	977,979
	INIT60	E	763
759	INITSC	P	757
760	INITSM	P	758
	INTFRC	E	852
	IPRT	E	668,791,870
	IPRTM	E	687
	LIST	E	11
672	LPECHK	P	663
	MESSL	E	778
777	MESSLP	P	776
924	MORALP	P	928
947	MSG	P	929,935
	MSG110	E	1069
	NFRC	E	794
	NXTBYT	E	980
1028	OUTPCT	P	995,1027
721	PAR40	P	730,737
727	PAR60	P	723
729	PAR70	P	725
709	PAREG	P	669,697,708
687	PAVIEW	P	686
	PBINB0	E	934,1018
	PBYA_C	E	657
	PBYTDU	E	727
	PBYTEC	E	650,925,932,946
996	PCAT20	P	989
997	PCAT25	P	993
1007	PCAT30	P	1003
	PECHK	E	673,960,1030
586	PHEAD	P	4,576
1046	PMESSG	P	1045

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LINE#	SYMBOL	TYPE	REFERENCES
1051	PMSG10	P	1049
1060	PMSG15	P	1056
1065	PMSG20	P	1063
678	PPROMP	P	677
	PR14RT	E	747
668	PRA	P	12,664
669	PRA20	P	682,688
245	PRAXIS	P	13,33
	PRBUF	E	14
	PRFLAG	E	15
	PRKEYS	E	16
	PRP	E	17
36	PRPLOT	P	18,31
141	PRPLTP	P	19,32
811	PRREG	P	20,805
846	PRREGX	P	21,839
825	PRSIGM	P	22,821
791	PRSTK	P	23,785
967	PRTCAT	P	966
	PRTLCD	E	994,996,1058
	PRTM	E	950
	PRMSG	E	947,991,1019
	PRX	E	24
	PR_END	E	990
	PWAIT	E	952
930	REG	P	891
866	REGL	P	817,865
871	REGL00	P	801
874	REGLOP	P	873,959
	REGPLT	E	25
916	SIGSTF	P	892,915
657	SKPC10	P	609
639	SKPC4	P	627,637
646	SKPC6	P	648
655	SKPC8	P	645
600	SKPCHR	P	26,593
620	SKPCOL	P	27,613
638	SKPCOM	P	636
936	STK	P	889
943	STKADR	P	936,942
869	STKCHK	P	835
835	STKCKX	P	
	STKPLT	E	28
	SUMCHK	E	825
673	XPECHK	P	654,658,698

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LOCATION OBJECT CODE LINE       SOURCE LINE
1 "COCONUT"
2 *
3 *
4 *****
5 *
6 * PRTMSG - PRINT MESSAGE. SENDS A LIST OF CONSTANTS (FOLLOWING THE
7 * "GOSUB PRTMSG") TO THE PRINTER, STOPPING WHEN IT SEES THE 9TH BIT=1.
8 * USES THE CPBYTE OUTPUT SUBROUTINE, SO OUTPUT IS CONDITIONED ON
9 * FLAG 55. IF THE 10TH BIT=1 IT WAITS FOR BUFFER EMPTY, THEN CHECKS
10 * FOR PRINTER ERRORS, AND THEN CHECKS FOR "R/S" AND "ON" KEYS, BEFORE
11 * CONTINUING TO PRINT THE LIST OF CONSTANTS. THE 9TH AND 10TH BITS
12 * MAY NOT BOTH BE SET IN THE SAME CONSTANT. WHEN THE 10TH BIT IS SET,
13 * IF "R/S" OR "ON" IS DOWN OR AN ERROR HAS OCCURRED, PRTMSG ABORTS.
14 *
15 * USES: FOR BIT 10=0: C,N, NO PT, S9, HEXMODE, 1 ADDITIONAL SUBROUTINE
16 *                                            LEVEL
17 *        FOR BIT 10=1: A,X, C, N, NO PT, S9, ? ADDITIONAL SUB LEVELS
18 *                                            NOTE THESE BIT 10=1 COMMENTS ARE PARTLY GUESSES.
19 * IN: LIST OF CONSTANTS FOLLOWING THE "GOSUB PRTMSG", WHERE THE LAST
20 *        CONSTANT HAS THE 9TH BIT=1 TO FLAG THE END OF THE LIST.
21 * OUT: MESSAGE TO PRINTER (IF FLAG 55=1), CHIP 0 ENABLED, HEXMODE,
22 *        S9=1 FOR ERRORS.
23 * ASSUMES: HEXMODE
24 *
25 *CAUTION!!! DO NOT MOVE PRTMSG FROM THIS LOCATION (QUAD 2, @000) !!!!
26 *                                            IT MAY BE USED BY OTHER PLUG-IN ROMS.
27
28                                    GLB                    PRTMSG
0000 01B0        29 PRTMSG            C=STK                                    ;GET ADDR OF 1ST CHAR
0001 0330        30 PRTMS1          CXISA                                   ;GET CHAR
0002 00001000   31                                    GOSUB                                =CPBYTE                            ;SEND CHAR TO PRINTER
0004 023A        32                                    C=C+1                                M                                    ;INC ADDR
0005 02F6        33                                    C#0?                                XS                                  ;DONE?
0006 0003        34                                    GONC                                 PRTMS1                             ;NO
0007 0170        35                                    STK=C                                ;PUT CHR POINTER ON STK
0008 01F6        36                                    C=C+C                                XS                                  ;IS THIS A 1000 CODE?
0009 01F6        37                                    C=C+C                                XS
000A 01F6        38                                    C=C+C                                XS
000B 03A0        39                                    RTNNC                                ;NO A 400 CODE
000C 00001000   40                                    GOSUB                                =PWAIT                             ;WAIT FOR THE PRINTER
000E 0003        41                                    GOTO                                 PRTMSG
42 *****
43                                    GLB                    OVERFL
000F 0260        44 OVERFL            SETHX
0010 00001000   45                                    GOSUB                                =IAUNA                             ;OK TO PRINT?
0012 03E0        46                                    RTN                                  ;P+1 -- DON'T PRINT
0013 00001000   47                                    GOSUB                                ACXSUB                             ;P+2 -- PRINT X REGISTER
0015 0003        48                                    GOTO                                 DATP25
49
50 *OVERFL FALLS INTO DATAPR HERE!!!!!!!!!!!!!!!!!!!!!!
51

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LOCATION OBJECT CODE LINE       SOURCE LINE
53 * DATAPR - PRINT DATA ENTRY STRING AND CLEAR DATAENTRY FLAG
54 * IF PRINTER IS OFF OR IN MANUAL MODE, RETURNS WITHOUT PRINTING.
55 * IF ANY PRINTER ERROR, CALLS RSTSEQ AND GOES TO PEDIAG (NEVER
56 * RETURNS).
57 *
58 * REQUIRES CHIP 0 SELECTED ON ENTRY
59 * DOES NOT REQUIRE HEXMODE OR P SELECTED ON ENTRY
60 * USES 3 ADDITIONAL SUBROUTINE LEVELS!
61 * USES A, B, C, G, N, P, Q, S0-S9
62 * LEAVES HEXMODE, CHIP 0 SELECTED, P SELECTED
63 * PRESERVES M
64 *
0016 0260           65           GLB            DATAPR
0017 00A0           66 DATAPR        SETHEX
0018 03B8           67            SELP
0019 023C           68            C=REGN       14
001A 0358           69            RCR            2
001B 020C           70            ST=C           ;PUT UP SS1
001C 03A0           71            ST=1?         2            ;DATAENTRY FLAG SET?
001D 0204           72            RTNNC         ;NOPE
001E 0398           73            ST=0           2            ;CLEAR DATAENTRY FLAG
001F 037C           74            C=ST
0020 03A8           75            RCR            12
0020 03A8           76            REGN=C     14            ;PUT SS1 BACK
                  77
0021 00001000       78            GOSUB         =IAUNA
0023 03E0           79            RTN           ;P+1 - DON'T PRINT
                  80                            ;P+2 - OK TO PRINT
0024 03B8           81            C=REGN     14            ;RESTORE SS0
0025 0358           82            ST=C
0026 000C           83            ST=1?         3            ;PROGRAM MODE?
0027 0003           84            GONC         DATP15        ;NO
                  85 * WE'RE IN PROGRAM MODE WITH THE DATA ENTRY FLAG SET.  A DIGIT ENTRY
                  86 * STRING OR ALPHA ENTRY STRING HAS JUST BEEN INSERTED INTO PROGRAM
                  87 * MEMORY.  LINE# MUST BE VALID AND NON-ZERO.  PRIVACY MUST BE CLEAR.
0028 00001000       88            GOSUB         =PPGMST
002A 0003           89            GOTO         DATP17
                  90
002B 028C           91 DATP15        ST=1?         7            ;ALPHAMODE?
002C 0003           92            GONC         DATP20        ;NO
                  93                            ;YES, ALPHAMODE
002D 00001000       94            GOSUB         =PAREG        ;SEND ALPHA REG TO PRINTER
002F 00001000       95 DATP17        GOSUB         =EOLL
0031 0003           96            GOTO         DATP30
                  97
0032 00001000       98 DATP20        GOSUB         PRIDEF        ;PRINT FORMATTED STRING
                  99            GLB            DATP25        ;FOR PRT5
0034 00001000       100 DATP25       GOSUB         PRMSG
0036 00A7           101           CON           247Q         ;SKIP 7 CHARACTERS
0037 01E8           102           CON           750Q         ;EOLR
                  103           GLB            DATP30        ;USED BY PRT5
0038 024C           104 DATP30       ST=1?         9            ;ANY ERROR?
0039 03A0           105           RTNNC
003A 00001000       106           GOSUB         =RSTSEQ
003C 00001002       107           GOLONG        =PEDIAG
108 *****
109 *-RG9PRT= REG 9 TO PRINTER

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LOCATION	OBJECT CODE	LINE	SOURCE LINE	
		110	*	
		111	*-PUT D.E. STRING IN REG 9 INTO SAME FORMAT AS OUTPUT BY "FORMAT"	
		112	* (PLEASE REFER TO DIGENT (CN2, @66) FOR FORMAT OF INPUT D.E. STRING)	
		113	* S0 - D.P. HIT	S1 - EEX HIT
		114	* S2 - CHS HIT	S4 - DIGIT GROUPING FLAG
		115	* S5 - DECIMAL POINT FLAG	
		116	*	
		117	*	
		118	* PDIGE - PRINT DIGIT ENTRY STRING. ENTRY POINT FOR PRT5 LOGIC	
		119	*	
		120		GLB                   PDIGE
003E	00001000	121	PDIGE	=INIT5
		122		GLB                   PRTDEF
0040	0238	123	PRTDEF	C=REGN               8                   ;LOAD FLAGS - S2:CHS
0041	01BC	124		RCR                   11
0042	0358	125		ST=C   ; S1 : EEX   S0:D.P.
0043	0004	126		ST=0   ;CLEAR LEADING D.P. FLAG
0044	0278	127		C=REGN               9
0045	010E	128		A=C                   W                   ;A _ REG.9
0046	03B8	129		C=REGN               14                   ;GET # TRAILING DIGITS
0047	023C	130		RCR                   2
0048	00F6	131		BCEX                  XS                   ;# TRAILING DIGITS TO B(XS)
0049	00001000	132		GOSUB                =LOAD3               ;LOAD ALL 3'S INTO C
004B	001C	133		PT=                   3                   ;START FROM END OF MANTISSA
004C	0003	134		GOTO                  RG9P13
004D	0262	135	RG9P10	C=C-1                PT                   ;C(PT) _ 2
004E	01BE	136		A=A-1                S                   ;DECREMENT D.P. POS COUNTER
004F	03DC	137		INCPT                ;POINT TO LEFT NEXT DIGIT
0050	0162	138	RG9P13	A=A+1                PT                   ;FOUND THE LAST DIGIT?
0051	0007	139		GOC                   RG9P10               ;NO
0052	01A2	140		A=A-1                PT                   ;YES, RESTORE THE DIGIT
0053	038C	141		ST=1?                0                   ;D.P. HIT ?
0054	0003	142		GONC                RG9P20               ;NO, DON'T LOOK FOR D.P.
0055	0003	143		GOTO                  RG9P19               ;YES, LOOK FOR D.P.
0056	03DC	144	RG9P17	INCPT                ;POINT TO LEFT NEXT DIGIT
0057	01BE	145	RG9P19	A=A-1                S                   ;FOUND THE D.P.?
0058	0003	146		GONC                RG9P17               ;NO
0059	00001000	147		GOSUB                =LDDP10               ;YES, LOAD THE D.P./COMMA
005B	00A2	148		ACEX                PT                   ;D.P./COMMA BACK TO "C"
005C	02D4	149		PT=?                13                   ;LEADING D.P.?
005D	0003	150		GONC                RG9P20               ;NO
005E	0008	151		ST=1                3                   ;YES, SET LEADING D.P. FLAG
005F	004C	152	RG9P20	ST=1?                4                   ;GROUPING FLAG SET ?
0060	0003	153		GONC                RG9P29               ;NO
0061	00E0	154		SELQ                ;YES
0062	021C	155		PT=                   2
0063	03DC	156	RG9P24	INCPT                ;LOOK FOR P
0064	0120	157		P=Q?                ;FOUND P?
0065	0003	158		GONC                RG9P24               ;NO
0066	02D4	159		PT=?                13                   ;YES, NOW P=Q
0067	0007	160		GOC                   RG9P30
0068	011E	161	RG9P26	A=C                   S                   ;A(13) _ 3
0069	01BE	162	RG9P27	A=A-1                S                   ;COUNT 3 FROM LEFT
006A	0007	163		GOC                   RG9P28               ;PUT A COMMA HERE ?
006B	0354	164		PT=?                12                   ;NO, REACH LEFT END OF MANTISSA ?
006C	0007	165		GOC                   RG9P30               ;YES, DONE
006D	03DC	166		INCPT                ;POINT TO LEFT NEXT DIGIT

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LOCATION	OBJECT	CODE	LINE	SOURCE	LINE	
			167	LEGAL		
006E	0003		168	GOTO	RG9P27	
006F	008C		169	RG9P28	ST=1?	5 ;LOAD A COMMA TO C
0070	0003		170	GONC	\$+3	
0071	03D0		171	LC	15	
0072	0003		172	GOTO	\$+2	
0073	01D0		173	LC	7	;LOAD A D.P. INSTEAD OF
0074	03DC		174	INCPT		;RESTORE POINTER
			175	LEGAL		
0075	0003		176	GOTO	RG9P26	
0076	02D6		177	RG9P29	B#0?	XS ;DISPLAY MODE= 0?
0077	0003		178	GONC	RG9P35	;YES, NO TRAILING ZEROS
0078	00A0		179	RG9P30	SELP	
0079	028C		180	ST=1?	7	;FIX MODE?
007A	0003		181	GONC	RG9P35	;NO, NO TRAILING ZEROS
007B	030C		182	ST=1?	1	;YES, EEX HIT?
007C	0007		183	GOC	RG9P35	;YES, NO TRAILING ZEROS
007D	00001000		184	GOSUB	=LDDP10	;NO, LOAD D.P./COMMA
007F	00A2		185	ACEX	PT	;D.P./COMMA BACK TO "C"
0080	00F6		186	CBEX	XS	;# TRAILING DIGITS TO "C"
0081	03D4		187	DECPT		;PT TO 1ST TRAILING DIGIT
			188	LEGAL		
0082	0003		189	GOTO	RG9P33	
0083	00D0		190	RG9P32	LC	3 ;ADD TRAILING DIGIT
0084	0214		191	PT=?	2	;REACHED END OF MANTISSA?
0085	0007		192	GOC	RG9P34	;YES
0086	0276		193	RG9P33	C=C-1	XS ;NO, COUNT TRAILING DIGIT
0087	0003		194	GONC	RG9P32	
0088	021C		195	PT=	2	
0089	00D0		196	RG9P34	LC	3 ;RESTORE C(XS)
008A	011E		197	RG9P35	A=C	S ;TAKE CARE OF THE SIGN
008B	01BE		198	A=A-1	S	;A(13) _ 2
008C	005E		199	C=0	S	;ASSUME POSITIVE MANTISSA
008D	02DC		200	PT=	13	
008E	020C		201	ST=1?	2	;CHS HIT ?
008F	0003		202	GONC	\$+2	;NO, MANTISSA POSITIVE
0090	0350		203	LC	13	;"- " = 2D
0091	00BE		204	ACEX	S	
0092	0276		205	C=C-1	XS	;C(2) _ 2
0093	030C		206	ST=1?	1	;EEX HIT ?
0094	0003		207	GONC	RG9P50	;NO, DONE
0095	0226		208	C=C+1	X	;YES, C(0)= 3
0096	031C		209	PT=	1	;LOOK AT DIGIT 1
0097	0162		210	A=A+1	PT	;IS THERE A DIGIT THERE ?
0098	0007		211	GOC	RG9P42	;NO, EXP = 00
0099	01A2		212	A=A-1	PT	;YES, RESTORE DIGIT 1
009A	039C		213	PT=	0	;LOOK AT DIGIT 0
009B	0162		214	A=A+1	PT	;IS THERE A DIGIT ?
009C	0003		215	GONC	RG9P40	;YES
009D	031C		216	PT=	1	;NO
009E	038A		217	ASR	WPT	;MAKE 2D EXP
009F	0003		218	GOTO	RG9P45	
00A0	01A2		219	RG9P40	A=A-1	PT ;RESTORE DIGIT 0
			220	LEGAL		
00A1	0003		221	GOTO	RG9P45	
00A2	000A		222	RG9P42	A=0	WPT
00A3	001C		223	RG9P45	PT=	3 ;SAY PRINT EXP

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LOCATION	OBJECT CODE	LINE	SOURCE LINE		
00A4	0003	224	GOTO	OUTRG9	
00A5	0016	225	RG9P50	A=0	XS
00A6	039C	226	PT=	0	;SAY ONLY PRINT MANTISSA
00A7	0003	227	OUTRG9	GOTO	PDIGAC

LOCATION	OBJECT CODE	LINE	SOURCE LINE
		229	*****
		230	***** PRT 10= VIEW *****
		231	*****
		232	GLB PVIEW
00A8	004E	233	PVIEW C=0 W ;RE-ENABLE CHIP 0
00A9	0270	234	DADD=C
00AA	00001000	235	GOSUB =IPRTM
00AC	0020	236	SPOPND ;SAVE A SUBR LEVEL
00AD	00CE	237	C=B W ;SAVE VALUE TO BE VIEWED
00AE	0158	238	M=C ; IN M
00AF	00001000	239	GOSUB ACREGC
00B1	00001000	240	GOSUB RPECHK ;EOLR, CHECK PRINTER ERRORS
00B3	0198	241	C=M ;RESTORE VALUE TO C
00B4	00001002	242	GOLONG =PR10RT
		243	*
		244	* ACXSUB (SUBROUTINE TO ACCUMULATE X) - SENDS WHATS IN THE X REGISTER
		245	* TO THE PRINTER BUFFER
		246	* USES: A,B,C,N,P,Q,G,S0-S9 AND 2 ADDITIONAL SUBROUTINE LEVELS
		247	* CAUTION: I'M GUESSING AT WHAT FORMAT AND PDIGAC USE WHEN THEY ARE
		248	* CALLED BY ACXSUB
		249	* INPUTS: GETS VALUE OF X FROM R3
		250	* OUTPUTS: A CHARACTER STREAM TO THE PRINTER BUFFER
		251	* ASSUMES: CHIP 0 ENABLED, S9 IS THE PRINTER INTERFACE ERROR FLAG
		252	* HEXMODE
		253	*
		254	* ACREGC (ACCUMULATE C REGISTER) - SAME AS ACXSUB EXCEPT ASSUMES INPUT
		255	* VALUE IS IN C ON ENTRY.
		256	*
		257	* PRTM - SAME AS ACXSUB EXCEPT ASSUMES INPUT VALUE IN M ON ENTRY
		258	*
		259	GLB PRTM
00B6	0198	260	PRTM C=M
00B7	0003	261	GOTO ACREGC
		262	GLB ACREGC
		263	GLB ACXSUB
00B8	00F8	264	ACXSUB C=REGN 3
00B9	001E	265	ACREGC A=0 S
00BA	017E	266	A=A+1 S
00BB	037E	267	A#C? S ;NUMERIC DATA?
00BC	0003	268	GONC ALPDAT ;NO, ALPHA DATA
00BD	00001000	269	GOSUB =FORMAT ;YES, FORMAT THE NUMBER
00BF	006E	270	ABEX W
00C0	0004	271	ST=0 3 ;NO LEADING D.P.
00C1	0003	272	GOTO PDIGAB ;SEND NUMBER TO PRINTER
00C2	010E	273	ALPDAT A=C W ;SAVE C
00C3	00001000	274	GOSUB PRQUOT
00C5	00AE	275	ACEX W ;RESTORE C
00C6	037C	276	RCR 12
00C7	031C	277	PT= 1
00C8	004A	278	C=0 WPT
00C9	02EE	279	C#0? W ;ANY ALPHA DATA?
00CA	0003	280	GONC ALPD55 ;NO, ALL NULLS
00CB	037C	281	ALPD45 RCR 12 ;CHAR TO C(0-1)
00CC	02EA	282	C#0? WPT ;NULL?
00CD	0003	283	GONC ALPD45 ;YES, GET NEXT CHAR
00CE	00001000	284	ALPD50 GOSUB =PBYTDU
00D0	037C	285	RCR 12 ;NEXT CHAR TO C(0-1)

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LOCATION	OBJECT CODE	LINE	SOURCE LINE				
00D1	02EA	286	C#0?	WPT		;NULL?	
00D2	0007	287	GOC	ALPD50		;NO	
00D3		288	ALPD55				
		289	GLB	PRQUOT			
00D3	0130	290	PRQUOT	LDI			
00D4	0022	291	CON	42Q		;QUOTATION MARK	
00D5	00001002	292	GOLONG	=CPBYTE			
		293	*****				
		294	*-INPUTS: [PDIGAB] B= DIGITS, A= PUNCTUATION				
		295	* [PDIGAC] A= DIGITS, C= PUNCTUATION				
		296	* BOTH ENTRIES: P SELECTED, HEX MODE				
		297	*				
		298	*-USES: A,B,C,G,N,P,Q, S3, S9 FOR ERRORS, 1 ADDITIONAL SUB LEVEL				
		299	*-OUTPUTS: HEX MODE, DOESN'T USE OR CHANGE CHIP ENABLE				
		300	*				
		301	GLB	PDIGAB			
		302	GLB	PDIGAC			
00D7	008E	303	PDIGAC	B=A	W	;DIGITS TO "B"	
00D8	010E	304		A=C	W	;PUNCTUATION TO "A"	
00D9	0130	305	PDIGAB	LDI			
00DA	0200	306	CON	1000Q			
00DB	0394	307	PT=?	0		;PRINT EXPONENT?	
00DC	0003	308	GONC	PDIG10		;YES	
00DD	0106	309	A=C	X		;NO,A(0-1)=0=FLAG, A(XS)= BLANK	
00DE	023C	310	PDIG10	RCR	2	;C(0)= 2	
00DF	00DE	311	C=B	S		;GET SIGN OF NUMBER	
00E0	02FC	312	RCR	13		;PUT IT IN C(0-1)	
00E1	00001000	313	GOSUB	=PBYTEC		;SEND BLANK OR "-" TO PRINTER	
00E3	0130	314	LDI				
00E4	002E	315	CON	56Q		;ASCII D.P.	
00E5	000C	316	ST=1?	3		;PRINT LEADING D.P.?	
00E6	00001001	317	GSUBC	=PBYTEC		;YES, D.P. TO PRINTER	
00E8	035C	318	PT=	12			
00E9	00D0	319	PDIG25	LC	3		
00EA	03DC	320	INCPT				
00EB	0302	321	A<C?	PT		;BLANK?	
00EC	0003	322	GONC	PDIG30		;NO	
00ED	031C	323	PT=	1		;YES	
00EE	034A	324	A#0?	WPT		;EXPONENT NEEDED?	
00EF	03A0	325	RTNNC			;NO, FIX MODE	
00F0	021C	326	PT=	2		;YES	
00F1	02D6	327	B#0?	XS		;EXPONENT POSITIVE?	
00F2	0007	328	GOC	PDIGXS		;NO, NEGATIVE	
00F3	02D0	329	LC	11		;YES, POSITIVE	
00F4	021C	330	PT=	2			
00F5	00E2	331	BCEX	PT		;FIX "B" TO PUT OUT A "+"	
00F6	0090	332	PDIGXS	LC	2		
00F7	021C	333	PT=	2			
00F8	02FC	334	PDIG30	RCR	13		
00F9	00E2	335	CBEX	PT		;DIGIT TO "C"	
00FA	0058	336	G=C			;ASCII DIGIT TO "G"	
00FB	00E0	337	SELQ				
00FC	039C	338	PT=	0			
00FD	0098	339	C=G			;DIGIT TO C(0-1)	
00FE	00001000	340	GOSUB	=PBYTEC		;SEND BYTE TO PRINTER	
0100	00A0	341	SELP				
0101	033C	342	RCR	1		;MOVE THE "3" BACK TO C(PT)	

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LOCATION	OBJECT CODE	LINE	SOURCE LINE		
0102	0362	343	A#C?	PT	;PUNCTUATION?
0103	0003	344	GONC	PDIG50	;NO
0104	0130	345	LDI		
0105	002C	346	CON	54Q	;ASCII COMMA
0106	00A2	347	ACEX	PT	;PUNCTUATION TO "C"
0107	01E2	348	C=C+C	PT	;COMMA?
0108	0007	349	GOC	PDIG48	;YES
0109	0226	350	C=C+1	X	;NO, D.P.
010A	0226	351	C=C+1	X	;C(X)= @56= ASCII D.P.
		352	LEGAL		
010B	00001000	353	PDIG48 GOSUB	=PBYTEC	;SEND PUNCTUATION TO PRINTER
010D	03D4	354	PDIG50 DECP		
010E	02D4	355	PT=?	13	;DONE?
010F	0003	356	GONC	PDIG25	;NO
0110	03E0	357	RTN		;YES, DONE
		358			

# NOMAS

Not Manufacturer Supported  
recipient agrees NOT to contact manufacturer

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LOCATION OBJECT CODE LINE       SOURCE LINE
360 *****
361 ***** PRT2 -- NEXT INSTRUCTION IN MAIN LOOP *****
362 *****
363                   GLB                   NXINST
0111 0264       364 NXINST           SELPF           PTR
0112 0083       365                   PFSET?           2                   ;PRINTER ON?
                 366                   LEGAL
0113 03A0       367                   RTNNC
0114 00CC       368                   ST=1?           10                   ;ROMFLAG?
0115 0360       369                   RTNC
0116 0046       370                   C=0             X                   ;RE-ENABLE CHIP 0
0117 0270       371                   DADD=C
0118 0398       372                   C=ST            ;ST TO C[1:0]
0119 010C       373                   ST=1?           8                   ;COPY S8 TO C.XS
011A 0003       374                   GONC            NXIN10
011B 0236       375                   C=C+1           XS
011C 0268       376 NXIN10          REGN=C          9                   ;SAVE MISC INFO IN REG 9
011D 037C       377                   RCR             12                   ;FC TO C[1:0]
011E 0056       378                   C=0             XS
011F 02E6       379                   C#0?            X                   ;IS THIS NON-NULL?
0120 00001002   380                   GOLNC           =RUNING          ;NULL
0122 0244       381                   ST=0            9                   ;CLEAR ERROR FLAG
0123 00001000   382                   GOSUB           =FNSTS
0125 024C       383                   ST=1?           9                   ;ANY ERROR SO FAR?
                 384 * IF WE GET AN ERROR FROM FNSTS, WE TRY TO PRINT IN ORDER TO FORCE
                 385 * OUT THE ERROR MESSAGE
0126 0007       386                   GOC             NXIN21
0127 028C       387                   ST=1?           7                   ;"ALL" MODE?
0128 0007       388                   GOC             NXIN21           ;YES
0129 0278       389                   C=REGN          9                   ;RESTORE C
012A 0358       390                   ST=C            ;RESTORE STATUS
012B 03E0       391                   RTN
                 392
                 393 * WE ARE SAVING IN R9: R9[13:10]=ORIG C[13:10]
                 394 *                   R9.XS=S8
                 395 *                   R9[1:0]=S7-0
                 396 *
012C 0070       397 NXIN21          N=C             ;SAVE C IN N FOR INITC
012D 00001000   398                   GOSUB           =GETPCA          ;GET ORIGINAL PC
012F 02B8       399                   C=REGN          10
0130 00AA010A   400                   C=A             WPT               ;COPY ORIGINAL PC TO "C"
0132 02A8       401                   REGN=C          10               ;SAVE ORIG PC IN R10(3:0)
0133 00001000   402                   GOSUB           =PUTPCD          ;DECREMENT & STORE PC
0135 00001000   403                   GOSUB           =FLINKA          ;RECOMPUTE PRIVACY
0137 004E       404                   C=0             W
0138 0270       405                   DADD=C                   ;RE-ENABLE CHIP 0
0139 034C       406                   ST=1?           12               ;PRIVATE?
013A 0003       407                   GONC            NXIN30           ;NO
013B 00001000   408                   GOSUB           CLR_SS           ;YES,CLEAR RUNNING & SSTING
013D 00001002   409                   GOLONG          =ERRPR
                 410
013F 00B0       411 NXIN30          C=N             ;RESTORE C
0140 00001000   412                   GOSUB           =INITC          ;INITIALIZE
0142 02B8       413                   C=REGN          10               ;FETCH ORIGINAL PC
0143 010E       414                   A=C             W                ;PC TO A(3:0)
0144 0278       415                   C=REGN          9                ;GET FUNCTION CODE
0145 037C       416                   RCR             12               ;FC TO C(0-1)

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LOCATION	OBJECT CODE	LINE	SOURCE LINE				
0146	00001000	417	GOSUB	=LBLCK		;CHECK FOR LBL	
0148	0046	418	C=0	X		;RE-ENABLE CHIP 0	
0149	0270	419	DADD=C				
014A	004C	420	ST=1?	4		;FC= LBL?	
014B	00001001	421	GOSUB	=GLINE_NO		;YES, COMPUTE LINE #	
014D	03CC	422	NXIN70	CHKKB		;IS A KEY DOWN?	
014E	00001003	423	GOLC	=NFRFC		;YES,CHECK "R/S" & "ON"	
0150	00001000	424	GOSUB	=FXSTS		;FETCH PRINTER STATUS	
0152	024C	425	ST=1?	9		;ERROR?	
0153	0007	426	GOC	NXIN80		;YES	
0154	000C	427	ST=1?	3		;OOPS?	
0155	0003	428	GONC	NXIN75		;NO	
0156	0248	429	ST=1	9		;SET ERROR FLAG	
0157	0003	430	GOTO	NXIN80			
0158	030C	431	NXIN75	ST=1?	1	;IDLE?	
0159	0003	432	GONC	NXIN70		;NO, WAIT SOME MORE	
		433					
015A	0284	434	NXIN80	ST=0	7	;SET UP FOR PPGSNL	
015B	00001000	435	GOSUB	=PPGSNL		;PRINT PROGRAM STEP	
015D	00001000	436	GOSUB	=EOLR		;PRINT RIGHT JUSTIFIED	
015F	024C	437	ST=1?	9		;ANY PRINTER ERRORS?	
0160	0003	438	GONC	NXIN90		;NO	
0161	0264	439	SELPF	PTR			
0162	0083	440	PFSET?	2		;PRINTER ON?	
		441	LEGAL				
0163	0003	442	GONC	NXIN90		;NO,BUT IGNORE PRINTER OFF	
0164	00001000	443	GOSUB	CLR_SS		;CLEAR RUNNING, SST, PAUSING	
0166	00001002	444	GOLONG	=PEDIAG			
0168	005A	445	NXIN90	C=0	M	;PUT NFRPU BACK ON THE	
0169	005C	446	PT=	4		; RTN STACK	
016A	03D0	447	LC	15		;NFRPU= 00F0	
		448	*THE "LC" LEAVES PT= 3 !!!!!!!!!!!				
016B	0170	449	STK=C				
016C	02B8	450	C=REGN	10		;FETCH ORIGINAL PC	
016D	010A	451	A=C	WPT		;PC TO "A"	
016E	00001000	452	GOSUB	=PUTPCF		;STORE PC & SET LINE#= FFF	
0170	0278	453	C=REGN	9		;RESTORE "C"	
0171	0358	454	ST=C			;RESTORE ST	
0172	0104	455	ST=0	8			
0173	02F6	456	C#0?	XS		;TEST STORED STATUS OF S8	
0174	0003	457	GONC	NXIN99			
0175	0108	458	ST=1	8			
0176	00001002	459	NXIN99	GOLONG	=NOPRT	;BACK TO MAINFRAME	
		460	*****				
		461	*				
		462	*-CLR&SS= CLEAR RUNNING & SST FLAG				
		463	*           ALSO CLEARS PAUSING				
		464	*				
		465	*-USES:    C,  S0-S7,  NO PT,  1 ADDITIONAL SUB LEVEL				
		466	*-IN:       NOTHING				
		467	*-OUT:     SS0 UP,  CHIP 0 ENABLED,    RUNNING,SSTFLAG,&PAUSING CLEARED				
		468	*-ASSUMES:  NOTHING				
		469	*				
		470	GLB	CLR_SS			
0178	00001000	471	CLR_SS	GOSUB	=LDSS0	;LOAD STATUS SET 0	
017A	0044	472	ST=0	4		;CLEAR SST FLAG	
017B	00001002	473	GOLONG	=STOPSB		;CLEAR PAUSING&RUNNING,	



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LOCATION OBJECT CODE LINE      SOURCE LINE
474                                     ; & STORE AWAY SST0
475 *
476 *****
477 ***** PRT 8 *****
478 *****
479 *
480 * PUTS A R/S FC INTO A[4:3] AND DROPS INTO PRT5
481 *
482          GLB          DATA_R
017D 0130 483 DATA_R          LDI
017E 0005 484          CON          5          ;FC FOR R/S
017F 01BC 485          RCR          11
0180 010E 486          A=C          W
487 *
488 *****
489 ***** PRT 5 *****
490 *****
491 *
492 * SAVES AND RESTORES: A[4:1]=FC, B.X=3D ARG, M[3:0]=XADR, G (PTEMP2),
493 *   AND S9 (SAYS WHETHER XADR IS ANY GOOD).
494 * USES: A,B,C,M,N,G,S9-S0,P,Q, AND 3 ADDITIONAL SUBROUTINE LEVELS
495 *
496 * INPUT: FC, LEFT JUSTIFIED IN A[4:1].  MAINFRAME FUNCTION CODES WITH
497 *   1 OR 2 DIGIT NUMERIC ARGUMENTS HAVE THE ARGUMENT PACKED INTO
498 *   A[2:1].  XROM FUNCTION CODES AND ALL FUNCTIONS WITH 3 DIGIT
499 *   ARGUMENTS HAVE THE ARGUMENT IN B.X
500 * OUTPUT: 0, 1, OR 2 LINES TO THE PRINTER BUFFER
501 * ASSUMES: STANDARD ASSUMPTIONS (HEXMODE, CHIP 0 SELECTED, PRT=P)
502 *
503 * NOTE: IF THE PRINTER IS ON, SAVES FC, 3D ARG, XADR, PTEMP2, AND S9
504 *   M[13]=S9
505 *   M[12:9]=XADR
506 *   M[8:5]=FC
507 *   M[4:2]=3D ARG
508 *   M[1:0]=PTEMP2
509 *
510 * FOR FLOWCHARTS, SEE DRC'S LAB BOOK #8378 P.28
511 *
512          GLB          DATA_F
0181 03B8 513 DATA_F          C=REGN          14          ;PUT UP SS0
0182 0358 514          ST=C
0183 038C 515          ST=1?          0          ;PRINTER EXISTENCE FLAG SET?
0184 00001000 516          GSUBNC          =SF5521          ;NO,SET FLAG 55 & 21
0186 0264 517          SELPF          PTR
0187 0083 518          PFSET?          2          ;IS THE PRINTER ON?
519          LEGAL
0188 03A0 520          RTNNC          ;NO
0189 0198 521          C=M          ;GET XADR
018A 027C 522          RCR          9          ;SHIFT LEFT 5
018B 005C 523          PT=          4
018C 00AA 524          ACEX          WPT          ;GET FC FROM A[4:1]
018D 037C 525          RCR          12          ;LEFT SHIFT 2
018E 00C6 526          C=B          X          ;GET 3D ARG
018F 037C 527          RCR          12          ;LEFT SHIFT 2
0190 039C 528          PT=          0          ;GET PTEMP2
0191 0098 529          C=G
0192 005E 530          C=0          S          ;SAVE S9

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LOCATION	OBJECT	CODE	LINE	SOURCE	LINE	
0193	024C		531	ST=1?	9	
0194	0003		532	GONC	DF10	
0195	023E		533	C=C+1	S	
0196	0158		534	DF10 M=C		;SAVE ALL IN M
0197	0244		535	ST=0	9	
0198	00001000		536	GOSUB	=FNSTS	
019A	028C		537	ST=1?	7	;PRINTER "ALL" MODE?
019B	0007		538	GOC	DF15	;YES
019C	014C		539	ST=1?	6	;PRINTER "NORM" MODE?
019D	0003		540	GONC	DF900X	
019E	0398		541	DF15 C=ST		;SAVE PRINTER STATUS
019F	00EE		542	BCEX	W	; IN B[1:0] AND [13:12]
01A0	03B8		543	C=REGN	14	;PUT UP SS0
01A1	0358		544	ST=C		
01A2	000C		545	ST=1?	3	;PROGRAM MODE?
01A3	00001003		546	GOLC	DF400	;YES
01A5	033C		547	RCR	1	;PUT UP SS 1/2
01A6	0358		548	ST=C		
01A7	0198		549	C=M		
01A8	00BC		550	RCR	5	;FC TO C[3:0]
01A9	001C		551	PT=	3	
01AA	010A		552	A=C	WPT	;FC TO A[3:0]
01AB	0290		553	LC	10	
01AC	01D0		554	LC	7	
01AD	0150		555	LC	5	
01AE	0110		556	LC	4	;FC FOR PRX=A754
01AF	001C		557	PT=	3	
01B0	036A		558	A#C?	WPT	;FC#PRX?
01B1	0007		559	GOC	DF20	
			560	* PRX		
			561	* IF THE FCN IS PRX AND THE DATA ENTRY FLAG IS NOT SET, THEN WE DON'T		
			562	* PRINT ANYTHING HERE IN PRT5. WE JUST LET THE PRX FUNCTION ITSELF		
			563	* PRINT THE VALUE OF X		
			564	* IF, ON THE OTHER HAND, THE DATA ENTRY FLAG IS SET, THEN PRT5 PRINTS		
			565	* THE DIGIT ENTRY STRING AND ABORTS THE PRX FUNCTION.		
01B2	014C		566	ST=1?	6	;DATA ENTRY FLAG?
01B3	0003		567	DF900X GONC	DF900Y	;NO
01B4	00001000		568	GOSUB	PDIGE	;PRINT DIGIT ENTRY STRING
01B6	00001000		569	GOSUB	DATP25	
01B8	00001000		570	GOSUB	=RSTSEQ	
01BA	00001002		571	GOLONG	=NFRPU	
			572			
01BC	014C		573	DF20 ST=1?	6	;DATA ENTRY FLAG?
01BD	0003		574	GONC	DF200	;NO
01BE	000C		575	ST=1?	3	;ALPHAMODE?
01BF	0007		576	GOC	DF40	;YES
01C0	00001000		577	GOSUB	PDIGE	;PRINT DIGIT ENTRY STRING
01C2	0130		578	LDI		
01C3	0011		579	CON	17	;RIGHT EDGE OF DE STRING
			580			;IN CHAR POS 17
01C4	0003		581	GOTO	DF50	
			582			
01C5	031C		583	DF40 PT=	1	;FC FOR PRA=A748
01C6	0110		584	LC	4	
01C7	0210		585	LC	8	
01C8	001C		586	PT=	3	
01C9	036A		587	A#C?	WPT	;FC#PRA?

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LOCATION	OBJECT CODE	LINE	SOURCE LINE			
01CA	0003	588	GONC	DF900Z		;PRA
		589	* THE FUNCTION PRA WILL PRINT THE ALPHA REG, SO THERE'S NO POINT			
		590	* IN PRINTING IT HERE.			
01CB	00001000	591	GOSUB	=INIT5		
01CD	00001000	592	GOSUB	=PAREG		;PRINT ALPHA REG
01CF	00BA	593	ACEX	M		
01D0	003C	594	RCR	3		;CHAR COUNT TO C.X
01D1	039C	595	DF50	PT=	0	
01D2	0058	596	G=C			;SAVE CHAR COUNT IN G
01D3	00001000	597	GOSUB	NPFTST		;NON-PRINTING FCN?
01D5	0003	598	GOTO	DF70		;P+1 - NON-PRINTING
		599				;P+2 - PRINTING
01D6	03B8	600	C=REGN	14		;CLEAR FLAG 55 TO SUPPRESS
01D7	026E	601	C=C-1	W		; PRINTING WHILE
01D8	03A8	602	REGN=C	14		; COUNTING CHARACTERS
01D9	00001000	603	GOSUB	=CPFKB		;COUNT CHARS IN FCN DESC
01DB	003C	604	RCR	3		
01DC	0106	605	A=C	X		;SAVE FCN DESC LENGTH IN A.X
01DD	03B8	606	C=REGN	14		;RESTORE FLAG 55
01DE	022E	607	C=C+1	W		; FLAG 55 IS THE
01DF	03A8	608	REGN=C	14		; PRINTER EXISTENCE FLAG
01E0	039C	609	PT=	0		
01E1	0098	610	C=G			;RECOVER ORIGINAL CHAR COUNT
01E2	0056	611	C=0	XS		
01E3	0146	612	A=A+C	X		;A.X=CHAR CT + FCN DESC LENGTH
01E4	0130	613	LDI			
01E5	0017	614	CON	23		
01E6	00A6	615	ACEX	X		
01E7	01C6	616	A=A-C	X		;A.X=23-(CHAR CT+FCN DESC LENGTH)
01E8	0007	617	GOC	DF60		;TOO MUCH FOR ONE LINE
01E9	00001000	618	GOSUB	=PAD1_A		;MAKE FCN DESC RIGHT JUSTIFIED
01EB	0003	619	GOTO	DF300		
		620				
01EC	00001000	621	DF60	GOSUB	=FILLIN	
01EE	0003	622	GOTO	DF300		
		623				
01EF	00001000	624	DF70	GOSUB	=FILLNP	
01F1	0003	625	DF900Y	GOTO	DF900Z	
		626				
01F2	00001000	627	DF200	GOSUB	NPFTST	
01F4	0003	628	GOTO	DF900Z		;P+1 - NON PRINTING
01F5	00001000	629	GOSUB	=INIT5		;P+2 - PRINTING
		630				
01F7		631	DF300			;SEND FCN DESC
01F7	00001000	632	GOSUB	=CPFKB		
01F9	00001000	633	GOSUB	=EOLR		
01FB	0003	634	DF900Z	GOTO	DF900	
		635				
		636	GLB	DF400		
01FC		637	DF400			;PROGRAM MODE
01FC	00001000	638	GOSUB	=INIT5		
01FE	03B8	639	C=REGN	14		;GET SS 1/2
01FF	033C	640	RCR	1		
0200	0358	641	ST=C			
0201	014C	642	ST=1?	6		;DATAENTRY FLAG?
0202	0003	643	GONC	DF410		;NO
0203	00001000	644	GOSUB	=GETPC		;PRINT DATAENTRY STRING

LOCATION	OBJECT CODE	LINE	SOURCE LINE				
0205	000C	645	ST=1?	3		;ALPHAMODE?	
0206	00001000	646	GSUBNC	=INCADA		;NO. SKIP OVER NULL AT	
		647				;BEGINNING OF DIGIT ENTRY STRING	
0208	00001000	648	GOSUB	=NXBYTA		; FROM PROGRAM MEMORY	
020A	0148	649	ST=1	6		;SET UP FOR	
020B	0388	650	ST=1	0		; PPGS35	
020C	008A	651	B=A	WPT		;MOVE ADDR TO B[3:0]	
020D	039C	652	PT=	0		;SAVE FC	
020E	0058	653	G=C			; IN G FOR PPGS35	
020F	00001000	654	GOSUB	=PPGS35			
0211	00001000	655	GOSUB	=EOLL			
0213	0198	656	DF410	C=M		;PUT PTEMP2	
0214	0358	657	ST=C			; TO ST	
0215	004C	658	ST=1?	4		;"INSERT" BIT?	
0216	0003	659	GONC	DF300		;NON-PROGRAMMABLE FUNCTION	
0217	034C	660	ST=1?	12		;PRIVATE PGM?	
0218	0007	661	GOC	DF900		;YES. DON'T PRINT ANYTHING.	
0219	00001000	662	GOSUB	=GETPC		;A(0-3)= PC	
021B	00001000	663	GOSUB	=SKPLIN		;TEST FOR PC AT AN END	
021D	00001000	664	GOSUB	=GETLIN		;C(X)= LINE#, EN CHIP 0	
021F	02E6	665	C#0?	X		;LINE NUMBER= 000?	
0220	0003	666	GONC	DF414		;YES	
0221	014C	667	ST=1?	6		;NO, WAS IT AN END?	
0222	0007	668	GOC	DF415		;YES	
0223	0226	669	DF414	C=C+1	X	;INC LINE #	
		670	LEGAL				
0224	00001000	671	DF415	GOSUB	=LINELB	;LINE # TO PRINTER	
0226	0198	672	C=M			;IS FC=ALBL OR LBLNN?	
0227	02BC	673	RCR	7			
0228	0056	674	C=0	XS		;FC TO	
0229	0106	675	A=C	X		; A.X	
022A	0130	676	LDI				
022B	00CD	677	CON	12*16+13		;CD=ALBL	
022C	0366	678	A#C?	X		;FC#ALBL?	
022D	0003	679	GONC	DF420		;ALBL	
022E	0130	680	LDI				
022F	00CF	681	CON	12*16+15		;CF=LBL NN	
0230	0366	682	A#C?	X		;FC#LBL NN?	
0231	0003	683	GONC	DF420		;LBL NN	
0232	00001000	684	GOSUB	=PBLANK			
0234	00001000	685	DF440	GOSUB	=CPFKB		
0236	00001000	686	GOSUB	=EOLL			
		687	* FALL INTO DF900 HERE				
		688					
0238	00001000	689	DF900	GOSUB	DATP30	;CHECK ERROR FLAG	
		690	* ON RETURN FROM PDAT30, S9 IS CLEAR				
023A	0198	691	C=M				
023B	02FE	692	C#0?	S		;RESTORE S9	
023C	0003	693	GONC	DF910			
023D	0248	694	ST=1	9			
023E	039C	695	DF910	PT=	0		
023F	0058	696	G=C			;RESTORE PTEMP2 TO G	
0240	023C	697	RCR	2			
0241	00E6	698	BCEX	X		;RESTORE 3D ARG TO B.X	
0242	023C	699	RCR	2			
0243	005C	700	PT=	4			
0244	010A	701	A=C	WPT		;RESTORE FC TO A[4:1]	

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LOCATION	OBJECT CODE	LINE	SOURCE LINE		
0245	00BC	702	RCR	5	
0246	0158	703	M=C		;RESTORE XADR TO M[3:0]
0247	03E0	704	RTN		
		705			
0248	00001000	706	DF420	GOSUB	PRTMSG ;LABEL - PUT IN A DIAMOND
024A	0100	707		CON	400Q ;DIAMOND
024B	0003	708		GOTO	DF440
		709			
		710	*****		
		711	*		
		712	* NPFTST - NON-PRINTING FCN TEST		
		713	* NON-PRINTING FUNCTIONS ARE: PRA A748		
		714	* PRBUF A74A		
		715	* ADV 8F		
		716	* RTNS TO P+1 IF FC IS ONE OF THE ABOVE		
		717	* RTNS TO P+2 IF FC IS NOT ONE OF THE ABOVE		
		718	* USES: C, A3:0, PT		
		719	* IN: M8:5=FC, LEFT JUSTIFIED		
		720	* OUT: NOTHING		
		721	* ASSUMES: NOTHING		
		722	*		
		723	GLB	NPFTST	
024C	0198	724	NPFTST	C=M	
024D	00BC	725		RCR	5
024E	001C	726		PT=	3 ;INPUT FC TO A3:0
024F	010A	727		A=C	WPT
0250	0290	728		LC	10
0251	01D0	729		LC	7
0252	0110	730		LC	4
0253	0290	731		LC	10 ;A74A=FC FOR PRBUF
0254	001C	732		PT=	3
0255	036A	733		A#C?	WPT ;FC#PRBUF?
0256	03A0	734		RTNNC	
0257	039C	735		PT=	0
0258	0210	736		LC	8 ;A748=FC FOR PRA
0259	001C	737		PT=	3
025A	036A	738		A#C?	WPT ;FC#PRA?
025B	03A0	739		RTNNC	
025C	0130	740		LDI	
025D	008F	741		CON	8*16+15 ;8F=FC FOR ADV
025E	00AA	742		ACEX	WPT
025F	023C	743		RCR	2
0260	031C	744		PT=	1
0261	036A	745		A#C?	WPT ;FC#ADV?
0262	03A0	746		RTNNC	
0263	01B0	747		C=STK	
0264	023A	748		C=C+1	M
0265	01E0	749		GOTOC	

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LOCATION OBJECT CODE LINE       SOURCE LINE
751 *****
752 *****       STKPLT       *****
753 *****
754                   GLB           STKPLT
0266 0094           755           CON           224Q           ;T
0267 000F           756           CON           17Q           ;O
0268 000C           757           CON           14Q           ;L
0269 0010           758           CON           20Q           ;P
026A 000B           759           CON           13Q           ;K
026B 0014           760           CON           24Q           ;T
026C 0013           761           CON           23Q           ;S
026D 00001000       762 STKPLT       GOSUB       =IACHR
026F 0048           763           ST=1           4           ;S4=1 TO SHOW STKPLT
0270 0003           764           GOTO           RPLT00
765 *****
766 *****       REGPLT       *****
767 *****
768                   GLB           REGPLT
0271 0094           769           CON           224Q           ;T
0272 000F           770           CON           17Q           ;O
0273 000C           771           CON           14Q           ;L
0274 0010           772           CON           20Q           ;P
0275 0007           773           CON           7Q           ;G
0276 0005           774           CON           5Q           ;E
0277 0012           775           CON           22Q           ;R
0278 00001000       776 REGPLT       GOSUB       =IACHR
027A 0044           777           ST=0           4           ;S4=0 TO SHOW REGPLT
027B 00001000       778 RPLT00       GOSUB       GETVAL       ;REG A= MAX, REG M= MIN
027D 00AE010E       779           C=A           W           ;COPY MAX TO C
027F 00001000       780           GOSUB       ACKC       ;ERROR IF MAX= ALPHA
0281 0198           781           C=M           ;MIN TO C
0282 00001000       782           GOSUB       ACKC       ;ERROR IF MIN= ALPHA
0284 0198           783           C=M           ;REG C= MIN
0285 00001000       784           GOSUB       A_C       ;MAX - MIN
785 *IF (MAX-MIN) OVER/UNDER FLOWS THEN THE NUMBERS ARE TOO FAULTY TO BE ABLE
786 *TO PLOT, SO GIVE "DATA ERROR".
787
0287 0354           788           PT=?           12           ;RESULTS OK?
0288 0003           789           GONC           RPLTDE       ;NO, OVER/UNDER FLOW= "DATA ERROR"
0289 02EE           790           C#0?           W           ;MAX = MIN?
028A 00001002       791 RPLTDE       GOLNC       =ERRDE       ;YES, "DATA ERROR"
028C 02FE           792           C#0?           S           ;NO, MAX < MIN?
028D 0007           793           GOC           RPLTDE       ;YES, "DATA ERROR"
028E 0070           794           N=C           ;N= MAX-MIN
028F 00001000       795           GOSUB       GETVAL       ;A= MAX
0291 00CE           796           C=B           W           ;C= Y VALUE
0292 00001000       797           GOSUB       ACKC       ;ERROR IF Y VALUE= ALPHA
0294 00CE           798           C=B           W           ;C= Y VALUE (SIGN DESTROYED BY ACKC)
0295 00001000       799           GOSUB       A_C       ;MAX = Y VALUE
800 *FOR (MAX-Y) AN UNDERFLOW IS OK AND PERFECTLY LEGITIMATE FOR "Y" VERY
801 *CLOSE TO "MAX".       JUST SET (Y-MIN) = (MAX-MIN) SINCE Y=MAX.
802 *AN OVERFLOW CAN OCCUR FOR 2 CASES:
803 *CASE 1 -- MAX<0 AND Y>0.   THIS MEANS Y>MAX SO IT WILL BE CAUGHT AND
804 *   Y WILL BE MADE EQUAL TO MAX.
805 *CASE 2 -- MAX>0 AND Y<0.   SINCE (MAX-MIN) DIDN'T OVERFLOW, Y WOULD HAVE
806 *   TO BE LESS THAN "MIN", WHICH WILL BE CAUGHT IN THE TEST OF
807 *   Y<MIN.

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LOCATION	OBJECT	CODE	LINE	SOURCE	LINE	
			808			
0297	02FE		809	C#0?	S	;Y VALUE > MAX?
0298	0003		810	GONC	Y_LT_MIN	;NO
0299	00B0		811	C=N		;YES, Y-MIN= MAX-MIN SINCE Y=MAX
029A	0003		812	GOTO	RPLT20	
029B	00001000		813	Y_LT_MIN	GOSUB	GETVAL ;B= Y VALUE, M= MIN
029D	006E		814	ABEX	W	;A= Y VALUE
029E	0198		815	C=M		;C= MIN
029F	00001000		816	GOSUB	A_C	;Y VALUE - MIN
			817	*FOR (Y-MIN) AN UNDERFLOW IS OK AND PERFECTLY LEGITIMATE FOR Y VERY CLOSE		
			818	*TO MIN. JUST SET (Y-MIN)=0.		
			819	*AN OVERFLOW CAN OCCUR IN 2 CASES:		
			820	*CASE 1 -- Y<0 AND MIN>0. THIS MEANS Y<MIN WHICH IS HANDLED BY MAKING		
			821	* Y-MIN=0 WHICH IS THE SAME AS SETTING Y=MIN.		
			822	*CASE 2 -- Y>0 AND MIN<0. SINCE THIS POINT IN THE CODE IS ONLY REACHED		
			823	* WHEN Y<=MAX, AND MAX-MIN DIDN'T OVERFLOW, THIS CASE IS IMPOSSIBLE.		
			824			
02A1	02FE		825	C#0?	S	;Y VALUE < MIN?
02A2	0003		826	GONC	RPLT20	;NO
02A3	004E		827	C=0	W	;YES, SET Y VALUE-MIN= 0
02A4	0268		828	RPLT20	REGN=C	9 ;REG 9= Y VALUE-MIN
02A5	00001000		829	GOSUB	GETVAL	;C= NNN.AAA
02A7	0158		830	M=C		;SAVE COPY OF NNN.AAA
02A8	00001000		831	GOSUB	ACKC	;ERROR IF NNN.AAA= ALPHA
02AA	0198		832	C=M		;RESTORE C= NNN.AAA
02AB	0204		833	ST=0	2	
02AC	02FE		834	C#0?	S	;NNN.AAA < 0?
02AD	0003		835	GONC	GETNNN	;NO
02AE	0208		836	ST=1	2	;YES
02AF	005E		837	C=0	S	;MAKE IT POSITIVE
02B0	0088		838	GETNNN	ST=1	5 ;GET INTEGER PART
02B1	02A0		839	SETDEC		
02B2	00001000		840	GOSUB	=INTFRC	;GET NNN
02B4	02EE		841	C#0?	W	;NNN= 0?
02B5	0003		842	GONC	RPLTDE	;YES, "DATA ERROR"
02B6	010E		843	A=C	W	;A= NNN
02B7	004E		844	C=0	W	
02B8	035C		845	PT=	12	
02B9	0050		846	LC	1	;C= 1
02BA	00001000		847	GOSUB	A_C	;C= NNN - 1
			848	*NNN IS A POSITIVE INTEGER AT THIS POINT SO OVER/UNDER FLOW IS NOT POSSIBLE		
			849	*BY SUBTRACTING A "1".		
			850			
02BC	0260		851	SETHX		
02BD	0158		852	M=C		;SAVE NNN-1 IN FLOATING FORM
02BE	00001000		853	GOSUB	CONV3C	;CONVERT NNN-1 TO BINARY
02C0	0106		854	A=C	X	;A= NNN-1
02C1	0130		855	LDI		
02C2	00A8		856	CON	168	
02C3	0306		857	A<C?	X	;NNN-1 < 168?
02C4	0003		858	RPLTER	GONC	RPLTDE ;NO, "DATA ERROR"
02C5	02B8		859	C=REGN	10	;YES
02C6	00A6		860	ACEX	X	;C= NNN-1 (BINARY)
02C7	02A8		861	REGN=C	10	;STORE NNN-1 IN REG 10
02C8	0198		862	C=M		;RESTORE F.P. VALUE OF NNN-1
02C9	010E		863	A=C	W	;A= NNN-1 (F.P.)
02CA	00B0		864	C=N		;C= MAX - MIN (F.P.)

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LOCATION	OBJECT CODE	LINE	SOURCE LINE
02CB	02A0	865	SETDEC
02CC	00001000	866	GOSUB            =DV2_10            ;(NNN-1)/(MAX-MIN)
		867	*(MAX-MIN) AND (NNN-1) ARE KNOWN TO BE VALID NUMBERS.
		868	*SINCE 0<= (NNN-1) < 168 UNDERFLOW IS HARD TO GET AND RESULTS IN VVV=0 OR
		869	* (AAA-1)=0 WHICH IS OK SO DON'T CHECK, BUT AN OVERFLOW COULD
		870	*HAPPEN FOR VERY SMALL (MAX-MIN)
		871	
02CE	00001000	872	GOSUB            =OVFL10            ;CHECK OVERFLOW
02D0	00D4	873	PT=?            10            ;OVERFLOW?
02D1	0007	874	GOC            RPLTER            ;YES, "DATA ERROR"
02D2	0070	875	N=C            ;N= (NNN-1)/(MAX-MIN)
02D3	010E	876	A=C            W
02D4	0278	877	C=REGN            9            ;C= Y - MIN
02D5	00001000	878	GOSUB            INTCAL            ;C=INT[(Y-MIN)(NNN-1)/(MAX-MIN) + 0.5]
02D7	0106	879	A=C            X            ;A= VVV
02D8	0130	880	LDI
02D9	0003	881	CON            3
02DA	0246	882	C=A-C            X            ;C= VVV-3
02DB	0003	883	GONC            RPLT30            ;VVV<3?
02DC	0046	884	C=0            X            ;YES, VVV-3= 0
02DD	01BC	885	RPLT30            RCR            11            ;VVV-3 TO C(3-4)
02DE	010E	886	A=C            W
02DF	02B8	887	C=REGN            10
02E0	0106	888	A=C            X            ;NNN-1 TO A(X)
02E1	005C	889	PT=            4
02E2	00AA	890	ACEX            WPT            ;VVV-3, NNN-1 TO "C"
02E3	02A8	891	REGN=C            10            ;R10(X)=NNN-1,R10(3-4)=VVV-3
02E4	020C	892	ST=1?            2            ;SUPPRESS AXIS?
02E5	0003	893	GONC            RPLT40            ;NO
02E6	003C	894	RCR            3            ;YES, SET AAA-1 = VVV-3
02E7	0056	895	C=0            XS
02E8	0003	896	GOTO            RPLT50
02E9	00001000	897	RPLT40            GOSUB            GETVAL            ;C= NNN.AAA
02EB	02A0	898	SETDEC
02EC	0084	899	ST=0            5            ;GET FRACTIONAL PART
02ED	00001000	900	GOSUB            =INTFRC            ;GET .AAA
02EF	02E6	901	C#0?            X            ;.AAA=0?
02F0	0007	902	GOC            RPLT45            ;NO
02F1	00001000	903	GOSUB            GETVAL            ;YES, A= MAX, M= MIN
02F3	034E	904	A#0?            W            ;MAX=0?
02F4	0003	905	GONC            AAA005            ;YES
02F5	035E	906	A#0?            S            ;NO, MAX < 0?
02F6	0003	907	GONC            AAA010            ;NO
02F7	02B8	908	AAA005            C=REGN            10            ;YES, AAA-1= NNN-1
02F8	0003	909	GOTO            RPLT50
02F9	0198	910	AAA010            C=M            ;C= MIN
02FA	02FE	911	C#0?            S            ;MIN => 0?
02FB	0007	912	GOC            AAA015            ;NO
02FC	004E	913	C=0            W            ;YES, AAA-1= 0
02FD	0003	914	GOTO            RPLT50
02FE	02A0	915	AAA015            SETDEC
02FF	02BE	916	C=-C-1            S            ;CHANGE (MIN) TO (-MIN)
0300	010E	917	A=C            W            ;A= -MIN
0301	00B0	918	C=N            ;C= (NNN-1)/(MAX-MIN)
0302	00001000	919	GOSUB            INTCAL            ;C=INT[-MIN(NNN-1)/(MAX-MIN)+0.5]
0304	0003	920	GOTO            RPLT50
0305	0106	921	RPLT45            A=C            X            ;A= EXP OF .AAA

# NOMAS

Not Manufacturer Supported  
recipient agrees NOT to contact manufacturer



LOCATION	OBJECT	CODE	LINE	SOURCE	LINE	
0306	0130		922	LDI		
0307	0003		923	CON	3	
0308	0206		924	C=A+C	X	;MULTIPLY .AAA BY 1000
0309	0260		925	SETHEX		
030A	00001000		926	GOSUB	CONV3C	;CONVERT TO BINARY
030C	0106		927	A=C	X	;A= AAA
030D	01A6		928	A=A-1	X	;A= AAA-1
030E	02B8		929	C=REGN	10	;C(0-1)= NNN-1
030F	00A6		930	ACEX	X	;A=NNN-1, C= AAA-1
0310	0306		931	A<C?	X	;NNN-1 < AAA-1?
0311	0007		932	GOC	AAA005	;PEG AXIS AT RIGHT MARGIN
0312	0268		933	REGN=C	9	;R9(X)= AAA-1
0313	01BC		934	RCR	11	
0314	011A		935	A=C	M	;A(M)= AAA-1
0315	02B8		936	C=REGN	10	;C= NNN-1
0316	0106		937	A=C	X	;A= NNN-1
0317	0130		938	LDI		
0318	0006		939	CON	6	
0319	01C6		940	A=A-C	X	;A= NNN-7
031A	0003		941	GONC	RPLT52	;NNN < 7?
031B	0006		942	A=0	X	;YES
031C	0086		943	B=A	X	;B= NNN-7
031D	003C		944	RCR	3	;C= VVV-3
031E	0056		945	C=0	XS	
031F	038E		946	ASR	W	
0320	038E		947	ASR	W	
0321	038E		948	ASR	W	
0322	0306		949	A<C?	X	;AAA-1 < VVV-3?
0323	0003		950	GONC	RPLT56	;NO
0324	0158		951	M=C		;M= VVV-3
0325	0326		952	A<B?	X	;AAA-1 < NNN-7?
0326	0007		953	GOC	RPLT75	;YES, PLOT AXIS LINE
0327	00C6		954	C=B	X	;NO, C= NNN-7= SKIP
0328	0026		955	B=0	X	;#RCOL= 0
0329	0003		956	GOTO	RPLT61	;SKIP COLUMNS & PLOT VALUE
032A	00001000		957	GOSUB	=SKPC4	;SKPCOL= A(X)= AAA-1
032C	00001000		958	GOSUB	=INITSC	;SEND OUT MODE= SPECIAL CHAR
032E	00001000		959	GOSUB	PRTMSG	
0330	0177		960	CON	567Q	;AXIS LINE
0331	00660086		961	A=B	X	;A= NNN-7
0333	0198		962	C=M		;C= VVV-3
0334	0306		963	A<C?	X	;NNN-7 < VVV-3?
0335	0007		964	GOC	RPLT80	;YES
0336	0106		965	A=C	X	;NO, A=VVV-3
0337	0278		966	C=REGN	9	;C= AAA-1
0338	022E		967	C=C+1	W	;C= (AAA-1)+1= AAA
0339	01C6		968	A=A-C	X	;A= "A" - AAA= SKIP
033A	0066		969	ABEX	X	;B=SKIP, A=NNN-7
033B	01C6		970	A=A-C	X	;A= NNN-AAA-7
033C	00C6		971	C=B	X	;C= SKIP
033D	0003		972	GOTO	RPLT60	
			973	*		
033E	0104		974	SPLT90		;NORMAL MODE
033F	00001000		975	GOSUB	=INITSM	;SEND MODE
0341	00001000		976	GOSUB	PRTMSG	
0343	0101		977	CON	401Q	;LITTLE X
0344	0003		978	GOTO	RPLT65	

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LOCATION	OBJECT CODE	LINE	SOURCE LINE		
		979			
0345	0066	980	RPLT56	ABEX	X ;NO,A= NNN-7, B= AAA-1
0346	0306	981		A<C?	X ;NNN-7 < VVV-3?
0347	0003	982		GONC	RPLT60 ;NO, C=VVV-3
0348	00A60106	983		C=A	X ;YES, C= NNN-7
034A	01C6	984	RPLT60	A=A-C	X ;A= # REMAINING COLUMNS
034B	0086	985		B=A	X ;B= #RCOL
034C	00001000	986	RPLT61	GOSUB	=SKPCOM ;SKIP TO CHARACTER
034E	004C	987	RPLT62	ST=1?	4 ;STKPLT?
034F	0007	988		GOC	SPLT90 ;YES
0350	0378	989		C=REGN	13 ;NO, REGPLT
0351	003C	990		RCR	3 ;GET USER REG 0 POINTER
0352	0106	991		A=C	X ;A= R0 PTR
0353	0130	992		LDI	
0354	0003	993		CON	3
0355	0206	994		C=A+C	X ;C= R3 PTR
0356	0270	995		DADD=C	
0357	0038	996		C=DATA	;GET USER REG 3= SPECIAL CHAR
0358	027E	997		C=C-1	S
0359	027E	998		C=C-1	S ;ALPHA DATA?
035A	0003	999		GONC	SPLT90 ;NO, USE DEFAULT CHAR
035B	010E	1000		A=C	W ;SAVE SPEC CHAR
035C	00001000	1001		GOSUB	=INITSC ;SEND OUT MODE= SPECIAL CHAR
035E	02DC	1002		PT=	13
035F	0190	1003		LC	6
0360	00AE	1004		ACEX	W ;A(S)=6 FOR ACSPCC, C=SPEC CHAR
0361	00001000	1005		GOSUB	=ACSPCC ;SEND OUT SPECIAL CHAR
0363	02B8	1006	RPLT65	C=REGN	10 ;GET VVV-3
0364	003C	1007		RCR	3
0365	0056	1008		C=0	XS
0366	0106	1009		A=C	X ;A= VVV-3
0367	0130	1010		LDI	
0368	0007	1011		CON	7
0369	0146	1012		A=A+C	X ;A= VVV + 4
036A	0278	1013		C=REGN	9 ;C= AAA-1
036B	00A6	1014		ACEX	X ;A= AAA-1, C= VVV+4
036C	0306	1015		A<C?	X ;AAA-1 < VVV+4?
036D	0007	1016		GOC	RPLT70 ;YES
036E	0246	1017		C=A-C	X ;NO, C= AAA-VVV-5= SKIP
036F	0066	1018		ABEX	X ;A= #RCOL
0370	01C6	1019		A=A-C	X ;A= NEW #RCOL= #RCOL-SKIP
0371	01A6	1020		A=A-1	X ;SUBTRACT 1 COL FOR AXIS
0372	0086	1021		B=A	X ;B= NEW #RCOL
0373	00001000	1022		GOSUB	=SKPCOM ;SKPCOL
0375	00001000	1023		GOSUB	=INITSC ;SEND OUT MODE= SPEC CHAR
0377	00001000	1024		GOSUB	PRMSG
0379	0177	1025		CON	567Q ;AXIS LINE
037A	00C6	1026	RPLT70	C=B	X ;C= # REMAINING COLUMNS
037B	00001000	1027		GOSUB	=SKPCOM ;SKPCOL
		1028			
		1029		GLB	RPECHK
037D	00001000	1030	RPECHK	GOSUB	=EOLR ;SEND RIGHT END OF LINE
037F	00001002	1031		GOLONG	=PECHK ;CHECK FOR ERRORS

FILE: QUAD1:HELIOS           HEWLETT-PACKARD: COCONUT ASSEMBLER 1.03 / CORVALLIS DIVISION           PAGE 21

LOCATION	OBJECT CODE	LINE	SOURCE LINE
		1033	*
		1034	*- A_C= REG A - REG C
		1035	*
		1036	*-SETDEC, SUBTRACT REGS A&C, GO TO "DATA ERROR" FOR OVERFLOW OR UNDERFLOW
		1037	* (DOESN'T MESS WITH RAM)
		1038	*
		1039	*-USES: A,B,C,M, PT, NO STS ?? 1 SUB LEVEL
		1040	*-INPUTS: REG A&C= FLOATING POINT, NORMALIZED NUMBERS
		1041	*-OUTPUTS: C= A-C (FLOATING POINT), DEC MODE, PT= 12 -- OK
		1042	* PT= 11 -- UNDERFLOW, PT= 10 -- OVERFLOW
		1043	*
		1044	GLB A_C
0381	02A0	1045	A_C SETDEC
0382	02BE	1046	C=-C-1 S
0383	0000	1047	NOP
0384	00001000	1048	GOSUB =AD2_10 ;ADD "A" TO "-C"
0386	00001002	1049	GOLONG =OVFL10 ;CHECK FOR OVER/UNDER FLOW
		1050	*****
		1051	*-GETVAL= GET VALUES
		1052	*
		1053	*-GETS Y MIN, Y MAX, NNN.AAA FROM USER REGS 0-3 FOR REGPLT, OR FROM
		1054	* STK X-Z FOR STKPLT.
		1055	*-ALSO GETS Y VALUE FROM X FOR REGPLT, OR FROM T FOR STKPLT
		1056	*
		1057	*-USES: A,B,C,M, NO PT, S4, NO SUB LEVELS
		1058	*-INPUTS: S4=1 FOR STKPLT, S4=0 FOR REGPLT
		1059	*-OUTPUTS: A= Y MAX, B= Y VALUE, C= NNN.AAA, M= Y MIN,
		1060	* CHIP 0 ENABLED, HEXMODE
		1061	*
		1062	GLB GETVAL
0388	0046	1063	GETVAL C=0 X
0389	0270	1064	DADD=C
038A	0260	1065	SETHEX
038B	004C	1066	ST=1? 4 ;STKPLT?
038C	0007	1067	GOC GTSTK ;YES
038D	0378	1068	C=REGN 13 ;NO
038E	003C	1069	RCR 3 ;GET USER REG 0 POINTER
038F	010E	1070	A=C W ;A= POINTER
0390	0270	1071	DADD=C
0391	0038	1072	C=DATA ;GET Y MIN
0392	0158	1073	M=C ;M= Y MIN
0393	00AE	1074	ACEX W ;C= POINTER
0394	022E	1075	C=C+1 W
0395	010E	1076	A=C W
0396	0270	1077	DADD=C
0397	0038	1078	C=DATA ;GET Y MAX
0398	00AE	1079	ACEX W ;A= Y MAX
0399	022E	1080	C=C+1 W
039A	0270	1081	DADD=C
039B	0038	1082	C=DATA ;GET NNN.AAA
039C	00EE	1083	BCEX W ;B= NNN.AAA
039D	004E	1084	C=0 W
039E	0270	1085	DADD=C
039F	00F8	1086	C=REGN 3 ;C= VALUE
03A0	00EE	1087	BCEX W ;C= NNN.AAA, B= Y VALUE
03A1	03E0	1088	RTN
03A2	0038	1089	GTSTK C=DATA

FILE: QUAD1:HELIOS           HEWLETT-PACKARD: COCONUT ASSEMBLER 1.03 / CORVALLIS DIVISION           PAGE 22

LOCATION	OBJECT CODE	LINE	SOURCE LINE				
03A3	00EE	1090	BCEX	W		;B= Y VALUE	
03A4	0078	1091	C=REGN	1			
03A5	0158	1092	M=C			;M= Y MIN	
03A6	00B8	1093	C=REGN	2			
03A7	010E	1094	A=C	W		;A= Y MAX	
03A8	00F8	1095	C=REGN	3		;C= NNN.AAA	
03A9	03E0	1096	RTN				
		1097	*****				
		1098	*-INTCAL=	CALCULATE INTEGER=	INT [A*C + 0.5]		
		1099	*				
		1100	*-USES:	A,B,C,M,   PT,       S5,       2	SUB LEVELS		
		1101	*-INPUTS:	A= (NNN-1)/(MAX-MIN)=	FLOATING POINT	[INTCAL ONLY]	
		1102	*	C= (X-MIN) OR (-MIN)	[INTCAL]		
		1103	*	DEC MODE [INTCAL ONLY]			
		1104	*-OUTPUTS:	C(X)=	BINARY NUMBER		
		1105	*	HEXMODE, DOESN'T CHANGE CHIP ENABLE			
		1106	*				
		1107		GLB	INTCAL		
03AA	00001000	1108	INTCAL	GOSUB	=MP2_10	;(    )(NNN-1)/(MAX-MIN)	
		1109	*CAN'T OVERFLOW, AND UNDERFLOW RTNS C=0 WHICH IS OK, SO DON'T CHECK.				
		1110					
03AC	00001000	1111		GOSUB	=OVFL10	;NORMALIZE UNDERFLOW TO 0	
03AE	010E	1112		A=C	W	;A=(    )(NNN-1)/(MAX-MIN)	
03AF	001E	1113		A=0	S	;TAKE ABSOLUTE VALUE	
03B0	004E	1114		C=0	W		
03B1	02A6	1115		C=-C-1	X	;EXP= -1	
03B2	0150	1116		LC	5	;C= 0.5	
03B3	00001000	1117		GOSUB	=AD2_10	;C= A + C	
		1118	*CAN'T OVERFLOW SINCE 0.5 ADDS NOTHING TO "9 E99"				
		1119					
03B5	0088	1120		ST=1	5	;GET INTEGER PART	
03B6	00001000	1121		GOSUB	=INTFRC	;INT [C + 0.5]	
03B8	0260	1122		SETHEX			
		1123		GLB	CONV3D		
		1124		GLB	CONV3C		
03B9	0106	1125	CONV3C	A=C	X	;COPY EXPONENT TO A.X	
03BA	005E	1126		C=0	S	;TAKE ABSOLUTE VALUE	
03BB	0046	1127		C=0	X	;INITIALIZE ANSWER TO 0	
03BC	02FA	1128		C#0?	M	;HANDLES ZERO UNNORML #S	
03BD	03A0	1129		RTNNC			
03BE	0356	1130		A#0?	XS	;NEGATIVE EXPONENT?	
03BF	0360	1131		RTNC		;YES. ANSWER IS 000	
03C0	037C	1132		RCR	12	;MOVE 1ST DIGIT TO C.0	
03C1	01A6	1133		A=A-1	X	;WAS EXPONENT 0?	
03C2	0007	1134		GOC	XGOTI	;YES	
03C3	02FC	1135		RCR	13	;ROTATE NEXT DIG IN	
03C4	01A6	1136		A=A-1	X	;WAS EXPONENT 1?	
03C5	0007	1137		GOC	XGOTI	;YES	
03C6	02FC	1138		RCR	13	;MOVE 3RD DIGIT	
03C7	01A6	1139		A=A-1	X	;WAS EXPONENT 2?	
03C8	00001002	1140		GOLNC	=ERRDE	;NO, NUMBER TOO LARGE	
03CA	00001002	1141	XGOTI	GOLONG	=GOTINT	;CONVERT ANSWER TO BINARY	
		1142	*				
		1143	*				
		1144	* CONV3D - CONVERTS THE THREE DIGITS TO THE LEFT OF THE DECIMAL POINT				
		1145	* IN THE X REGISTER TO A BINARY NUMBER AND LEAVES IT IN C.X				
		1146	* CONV3C - SAME EXCEPT INPUT IS IN C.				

FILE: QUAD1:HELIOS           HEWLETT-PACKARD: COCONUT ASSEMBLER 1.03 / CORVALLIS DIVISION       PAGE 23

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LOCATION OBJECT CODE LINE       SOURCE LINE
1147 * IGNORES THE SIGN OF X.  IF ABS X IS GREATER THAN 999, GIVES "DATA
1148 * ERROR".  IF X CONTAINS AN ALPHA STRING, GIVE "ALPHA DATA" ERROR.
1149 * IF A NON-NORMALIZED NUMBER WITH ZERO MANTISSA RETURNS ZERO.
1150 *
1151 * ASSUMES CHIP 0 ENABLED AND HEXMODE.
1152 * USES A.X AND C, NO PT, NO STS, 1 ADDITIONAL SUB LEVEL (GOTINT)
1153 * USUALLY EXITS VIA GOTINT IN THE MAINFRAME.
1154 * RETURNS ANSWER IN C.X
1155 *
03CC 00001000 1156 CONV3D           GOSUB            ACKX               ;GET X, ERROR IF ALPHA
03CE 0003       1157                   GOTO             CONV3C
1158 *****
1159 *-ACKX= ALPHA CHECK OF X REGISTER   (ERRORS IF ALPHA)
1160 *
1161 *-USES:    C
1162 *           NO PT,   NO STATUS,  NO ADDITIONAL SUB LEVELS
1163 *-INPUTS:  CHIP 0 ENABLED,  HEX MODE
1164 *-OUTPUTS: C= X REGISTER,  EXCEPT THE SIGN FIELD HAS BEEN DESTROYED
1165 *
1166                   GLB                ACKX
1167                   GLB                ACKC
03CF 00F8       1168 ACKX            C=REGN           3                   ;GET X REGISTER
03D0 027E       1169 ACKC           C=C-1            S
03D1 027E       1170                   C=C-1            S                   ;CHECK FOR ALPHA DATA
03D2 03A0       1171                   RTNNC                 ;NOT ALPHA
03D3 00001002 1172                   GOLONG           =ERRAD           ;ERROR= ALPHA DATA
1173 *****
1174 *
1175 * CPYS6M - COPY S10 TO S6 & MISCELLANEOUS OTHER STUFF
1176 * USES: A.S,A3:0, B3:0, PT, S6
1177 * IN: C.S=CHAR COUNT
1178 *       B3:0=ADDRESS
1179 *       S10=1 FOR ROM, S10=0 FOR RAM
1180 * OUT: A.S=CHAR COUNT
1181 *       A3:0=ADDRESS
1182 *       S6=1 FOR ROM, S6=0 FOR RAM
1183 *       PT = 3
1184 * ASSUMES: NOTHING
1185 *
1186                   GLB                CPYS6M
03D5 011E       1187 CPYS6M           A=C               S
03D6 001C       1188                   PT=               3
03D7 006A       1189                   ABEX             WPT
03D8 0144       1190                   ST=0             6                   ;ASSUME RAM
03D9 00CC       1191                   ST=1?           10                  ;ROM?
03DA 03A0       1192                   RTNNC                 ;RAM
03DB 0148       1193                   ST=1             6                   ;SAY ROM
03DC 03E0       1194                   RTN
1195
03DD 00000000 1196                   FILLTO           1777Q
1197                   END

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Errors=    0

FILE: QUAD1: HELIOS      CROSS REFERENCE TABLE      PAGE 24

LINE#	SYMBOL	TYPE	REFERENCES
908	AAA005	P	905,932
910	AAA010	P	907
915	AAA015	P	912
1169	ACKC	P	780,782,797,831,1167
1168	ACKX	P	1156,1166
265	ACREGC	P	239,261,262
	ACSPCC	E	1005
264	ACXSUB	P	47,263
	AD2_10	E	1048,1117
281	ALPD45	P	283
284	ALPD50	P	287
288	ALPD55	P	280
273	ALPDAT	P	268
1045	A_C	P	784,799,816,847,1044
471	CLR_SS	P	408,443,470
1125	CONV3C	P	853,926,1124,1157
1156	CONV3D	P	1123
	CPBYTE	E	31,292
	CPFKB	E	603,632,685
1187	CPYS6M	P	1186
66	DATAPR	P	65
513	DATA_F	P	512
483	DATA_R	P	482
91	DATP15	P	84
95	DATP17	P	89
98	DATP20	P	92
100	DATP25	P	48,99,569
104	DATP30	P	96,103,689
534	DF10	P	532
541	DF15	P	538
573	DF20	P	559
627	DF200	P	574
631	DF300	P	619,622,659
583	DF40	P	576
637	DF400	P	546,636
656	DF410	P	643
669	DF414	P	666
671	DF415	P	668
706	DF420	P	679,683
685	DF440	P	708
595	DF50	P	581
621	DF60	P	617
624	DF70	P	598
689	DF900	P	634,661
567	DF900X	P	540
625	DF900Y	P	567
634	DF900Z	P	588,625,628
695	DF910	P	693
	DV2_10	E	866
	EOLL	E	95,655,686
	EOLR	E	436,633,1030
	ERRAD	E	1172
	ERRDE	E	791,1140
	ERRPR	E	409
	FILLIN	E	621
	FILLNP	E	624
	FLINKA	E	403

FILE: QUAD1: HELIOS      CROSS REFERENCE TABLE      PAGE 25

LINE#	SYMBOL	TYPE	REFERENCES
	FNSTS	E	382,536
	FORMAT	E	269
	FXSTS	E	424
	GETLIN	E	664
838	GETNNN	P	835
	GETPC	E	644,662
	GETPCA	E	398
1063	GETVAL	P	778,795,813,829,897,903,1062
	GLINE_NO	E	421
	GOTINT	E	1141
1089	GTSTK	P	1067
	IACHR	E	762,776
	IAUNA	E	45,78
	INCADA	E	646
	INIT5	E	121,591,629,638
	INITC	E	412
	INITSC	E	958,1001,1023
	INITSM	E	975
1108	INTCAL	P	878,919,1107
	INTFRC	E	840,900,1121
	IPRTM	E	235
	LBLCK	E	417
	LDDP10	E	147,184
	LDSST0	E	471
	LINELB	E	671
	LOAD3	E	132
	MP2_10	E	1108
	NFRC	E	423
	NFRPU	E	571
	NOPRT	E	459
724	NPFTST	P	597,627,723
	NXBYTA	E	648
376	NXIN10	P	374
397	NXIN21	P	386,388
411	NXIN30	P	407
422	NXIN70	P	432
431	NXIN75	P	428
434	NXIN80	P	426,430
445	NXIN90	P	438,442
459	NXIN99	P	457
364	NXINST	P	363
227	OUTRG9	P	224
44	OVERFL	P	43
	OVFL10	E	872,1049,1111
	PAD1_A	E	618
	PAREG	E	94,592
	PBLANK	E	684
	PBYTDU	E	284
	PBYTEC	E	313,317,340,353
310	PDIG10	P	308
319	PDIG25	P	356
334	PDIG30	P	322
353	PDIG48	P	349
354	PDIG50	P	344
305	PDIGAB	P	272,301
303	PDIGAC	P	227,301
121	PDIGE	P	120,568,577

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LINE#	SYMBOL	TYPE	REFERENCES
332	PDIGXS	P	328
	PECHK	E	1031
	PEDIAG	E	107,444
	PPGMST	E	88
	PPGS35	E	654
	PPGSNL	E	435
	PRL0RT	E	242
290	PRQUOT	P	274,289
123	PRTDEF	P	98,122
260	PRTM	P	259
30	PRTMS1	P	34
29	PRTMSG	P	28,41,100,706,959,976,1024
	PUTPCD	E	402
	PUTPCF	E	452
233	PVIEW	P	232
	PWAIT	E	40
776	REGPLT	P	768
135	RG9P10	P	139
138	RG9P13	P	134
144	RG9P17	P	146
145	RG9P19	P	143
152	RG9P20	P	142,150
156	RG9P24	P	158
161	RG9P26	P	176
162	RG9P27	P	168
169	RG9P28	P	163
177	RG9P29	P	153
179	RG9P30	P	160,165
190	RG9P32	P	194
193	RG9P33	P	189
196	RG9P34	P	192
197	RG9P35	P	178,181,183
219	RG9P40	P	215
222	RG9P42	P	211
223	RG9P45	P	218,221
225	RG9P50	P	207
1030	RPECHK	P	240,1029
778	RPLT00	P	764
828	RPLT20	P	812,826
885	RPLT30	P	883
897	RPLT40	P	893
921	RPLT45	P	902
933	RPLT50	P	896,909,914,920
943	RPLT52	P	941
980	RPLT56	P	950
984	RPLT60	P	972,982
986	RPLT61	P	956
987	RPLT62	P	
1006	RPLT65	P	978
1026	RPLT70	P	1016
957	RPLT75	P	953
966	RPLT80	P	964
791	RPLTDE	P	789,793,842,858
858	RPLTER	P	874
	RSTSEQ	E	106,570
	RUNING	E	380
	SF5521	E	516



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LINE#	SYMBOL	TYPE	REFERENCES
	SKPC4	E	957
	SKPCOM	E	986,1022,1027
	SKPLIN	E	663
974	SPLT90	P	988,999
762	STKPLT	P	754
	STOPSB	E	473
1141	XGOTI	P	1134,1137
813	Y_LT_MIN	P	810

FILE: QUAD2:HELIOS           HEWLETT-PACKARD: COCONUT ASSEMBLER 1.03 / CORVALLIS DIVISION           PAGE 1

LOCATION	OBJECT	CODE	LINE	SOURCE	LINE			
			1	"COCONUT"				
			2	*				
			3	* ROW JUMP TABLE FOR PPGMST				
			4	*				
0000	0003		5		GOTO	PROW0		
0001	0003		6		GOTO	PROW1		
0002	0003		7		GOTO	PROW2		
0003	0003		8		GOTO	PROW3		
0004	0003		9		GOTO	PROW4_8		
0005	0003		10		GOTO	PROW4_8		
0006	0003		11		GOTO	PROW4_8		
0007	0003		12		GOTO	PROW4_8		
0008	0003		13		GOTO	PROW4_8		
0009	0003		14		GOTO	PROW09		
000A	0003		15		GOTO	PROW10		
000B	0003		16		GOTO	PROW11		
000C	0003		17		GOTO	PROW12		
000D	0003		18		GOTO	PR1314		
000E	0003		19		GOTO	PR1314		
000F	00010002		20		GOLONG	PTXROW		
0011	0130		21	PROW0	LDI			
0012	00CF		22		CON	12*16*15		;PROMPT STRING IN C,F
0013	01A6		23	PRW010	A=A-1	X		;OPERAND MINUS ONE
			24		LEGAL			
0014	0003		25		GOTO	PPS120		
0015	00001002		26	PROW1	GOLONG	PDEROW		;THIS IS A DIGIT ENTRY ROW
0017	0130		27	PROW2	LDI			
0018	0090		28		CON	9*16+0		;PROMPT STRING IN 9,0
0019	0003		29		GOTO	PPS120		
001A	00001000		30	PRW4_8	GOSUB	PPROMT		
001C	00001002		31		GOLONG	OUTPPS		
001E	0130		32	PROW3	LDI			
001F	0091		33		CON	9*16+1		;PROMPT STRING IN 9,1
0020	0002		34	PPS120	A=0	PT		;A(1) _ 0
0021	0086		35		B=A	X		;SAVE THE OPERAND IN B
0022	00001000		36		GOSUB	BPROM1		;OUTPUT PROMPT STRING
0024	011E		37		A=C	S		;A(S)= CHAR COUNTER
0025	00C6		38		C=B	X		;C.X _ OPERAND
0026	00001002		39		GOLONG	PRW930		
0028	0003		40	PROW09	GOTO	PROW9		
0029	0130		41	PROW11	LDI			
002A	00D0		42		CON	13*16+0		;PROMPT STRING IN 13,0
002B	0003		43		GOTO	PRW010		
002C	0130		44	PROW12	LDI			
002D	00CE		45		CON	12*16+14		
002E	0306		46		A<C?	X		;IS IT LBLNN OR X<>NN?
002F	0003		47		GONC	PRW910		;YES
0030	00001002		48		GOLONG	PRW120		
0032	039C		49	PR1314	PT=	0		
0033	0002		50		A=0	PT		
0034	00001000		51		GOSUB	BPROMT		;PRINT "GTO " OR "XEQ "
0036	00FE		52		BCEX	S		;CHAR CTR TO B(S)
0037	006E		53		ABEX	W		;A(0-3)= PC, A(S)= CHAR CTR
0038	00001000		54		GOSUB	=INCAD		;SKIP ONE BYTE(THREE BYTE FC)
003A	00001000		55		GOSUB	=NXTBYT		;GET 3RD BYTE (LBL)
003C	03D8		56		CSTEX			
003D	0284		57		ST=0	7		

# NOMAS

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LOCATION	OBJECT CODE	LINE	SOURCE LINE				
003E	0003	58	GOTO	PRW935			
003F	0130	59	PROW10	LDI			
0040	00A8	60	CON	10*16+8		;TEST FOR XECROM FC	
0041	0306	61	A<C?	X		;IS IT AN XECROM FC ?	
0042	00001003	62	GOLC	PXROM		;YES	
0044	0130	63	LDI			;NO	
0045	00AE	64	CON	10*16+14			
0046	0306	65	A<C?	X		;IS IT AN XEQ/GTO IND ?	
0047	0007	66	GOC	PRW910		;NO	
		67	**NOTE: FC (10,15) WILL BE PRINTED AS AN XEQ/GTO IND.				
0048	00001000	68	GOSUB	=NBYTAB		;GET OPERAND	
		69	GLB	PR1010		;FOR CPFKB	
004A	00E6	70	PR1010	BCEX	X	;OPERAND TO "B"	
004B	0130	71	LDI				
004C	00D0	72	CON	13*16+0		;LOAD GTO FC	
004D	0106	73	A=C	X		;A= GTO FC	
00R3	00C6	74	C=B	X		;OPERAND TO "C"	
004F	031C	75	PT=	1			
0050	01E2	76	C=C+C	PT		;IS IT AN XEQ?	
0051	0003	77	GONC	PR1020		;NO, A GTO	
0052	0162	78	A=A+1	PT		;YES, "A"= XEQ FC	
		79	LEGAL				
0053	00001000	80	PR1020	GOSUB	PPROMT	;FC PROMPT TO PRINTER	
		81	* SUBROUTINE LEVELS RESTRICTED TO 2 HERE FOR CPFKB				
0055	00001000	82	GOSUB	BPROM			
0057	011E	83	A=C	S		;CHAR CTR TO A(S)	
0058	00C6	84	C=B	X		;OPERAND TO "C"	
0059	03D8	85	CSTEX			;C=STATUS BITS, ST= OPERAND	
005A	0003	86	GOTO	PRW933			
		87	*				
		88	* NUMERICAL OPERAND				
		89	* ROW 9				
		90	*				
005B	0148	91	PROW9	ST=1	6	;S6= 1 GIVES 1 DIGIT OUTPUT	
005C	0130	92	LDI				
005D	009C	93	CON	9*16+12		;TEST FOR 1 OR 2 DIGIT OPERAND	
005E	0306	94	A<C?	X		;1 DIGIT OPERAND ?	
005F	0003	95	GONC	PRW911		;YES	
		96	*				
		97	* NUMERICAL OPERAND				
		98	* B[3:0] HAS ADDR POINT TO ONE BYTE BEFORE OPERAND				
		99	* IF S0=1 MEANS 1 DIGIT OPERAND				
		100	* IF S0=0 MEANS 2 DIGITS OPERAND				
		101	*				
0060	0144	102	PRW910	ST=0	6	;SET FLAG FOR 2 DIGIT OPERAND	
0061	00001000	103	PRW911	GOSUB	BPROMT	;PRINT THE FUNCTION FIRST	
0063	00FE	104	BCEX	S		;B(S)= CHAR CTR	
0064	00001000	105	GOSUB	=NBYTAB		;AB EX, GET OPERAND	
		106	* ENTRY PRW930 FOR CPFKB				
		107	* USES: A,B,C,PT,N + 2 SUBROUTINE LEVELS				
		108	* INPUT:                   A(S)= CHAR CTR, C(0-1)= OPERAND + + + + +				
		109	* OUTPUT: # CHARS IN C.M, CHIP 0 ENABLED				
		110	* ASSUMES: HEXMODE, PT=P				
		111	GLB	PRW930			
0066	03D8	112	PRW930	CSTEX		;MOVE OPERAND TO STATUS BITS	
0067	028C	113	ST=1?	7		;INDIRECT ?	
0068	0003	114	GONC	PRW935		;NO	

LOCATION	OBJECT	CODE	LINE	SOURCE	LINE	
			115	GLB	PRW933	
0069	0284		116	PRW933	ST=0	7 ;YES, CLEAR IND BIT OF OPERAND
006A	03D8		117	CSTEX		;"C"= OPERAND,STATUS TO "ST"
006B	0106		118	A=C	X	; OPERAND TO "A"
006C	0144		119	ST=0	6	;TWO DIGIT OPERAND
006D	00001000		120	GOSUB	=PRTMSG	;PRINT "IND "
006F	0049		121	CON	111Q	;I
0070	004E		122	CON	116Q	;N
0071	0044		123	CON	104Q	;D
0072	0120		124	CON	440Q	; BLANK
0073	02DC		125	PT=	13	
0074	0110		126	LC	4	;COUNT 4 CHARS
0075	015E		127	A=A+C	S	
			128	LEGAL		
0076	0003		129	GOTO	PRW936	
0077	03D8		130	PRW935	CSTEX	;"C"= OPERAND, STATUS TO "ST"
0078	0106		131	A=C	X	;A(1-0) OPERAND
0079	0016		132	PRW936	A=0	XS
007A	0130		133	LDI		
007B	0066		134	CON	102	
007C	0306		135	A<C?	X	;NUMERICAL OPERAND ?
007D	0003		136	GONC	PRW940	;NO
007E	00BE		137	ACEX	S	;YES, CHAR CTR TO C(S)
007F	001E		138	A=0	S	
0080	017E		139	A=A+1	S	
0081	014C		140	ST=1?	6	;1 DIGIT NUMERICAL OPERAND ?
0082	0007		141	GOC	PRW938	;YES, LEAVE A(S)= 1
0083	017E		142	A=A+1	S	;NO,SET A(S)=2 TO GET 2 DIGITS
			143	GLB	PRW938	;FOR CPFKB
0084	021E		144	PRW938	C=C+A	S ;COUNT THE OPERAND CHARS
0085	02FC		145	RCR	13	;CHAR COUNT TO B(0)
0086	00E6		146	BCEX	X	
0087	00001000		147	GOSUB	BINBCD	
			148	* RESTRICTED TO 2 SUB LEVELS HERE FOR CPFKB		
0089	00001000		149	GOSUB	PNUMBB	;PRINT OPERAND
008B	00C6		150	C=B	X	
008C	033C		151	RCR	1	;CHAR CTR TO C(S)
008D	0003		152	GOTO	OUTPPS	
			153	* + + + + A(S)= CHAR CTR, A(X)= OPERAND		
			154	GLB	PRW940	
008E	0130		155	PRW940	LDI	
008F	0074		156	CON	116	
0090	0366		157	A#C?	X	;IS IT A LSTX ?
0091	0003		158	GONC	P_L	;YES
0092	0306		159	A<C?	X	;NO, IS IT A SMALL A-E?
0093	0003		160	GONC	SMABC	;YES
0094	0130		161	LDI		
0095	0070		162	CON	112	
0096	0306		163	A<C?	X	;CAPITAL A-J?
0097	0007		164	GOC	CPABC	;YES
0098	0366		165	A#C?	X	;IS IT A T?
0099	0003		166	GONC	P_T	;YES
			167	* NO, IT IS Z,Y OR X		
009A	0226		168	C=C+1	X	;C(X)= 113
009B	01C6		169	A=A-C	X	;A(X)= OFFSET
009C	0130		170	LDI		
009D	005A		171	CON	132Q	

LOCATION	OBJECT	CODE	LINE	SOURCE	LINE		
009E	01A6		172	PRW945	A=A-1	X	
009F	0007		173		GOC	PRW960	
00A0	0266		174		C=C-1	X	
			175		LEGAL		
00A1	0003		176		GOTO	PRW945	
00A2	0246		177	PRW950	C=A-C	X	
00A3	017E		178	PRW960	A=A+1	S	;COUNT THE CHAR
			179		LEGAL		
00A4	00001000		180		GOSUB	=CPBYTE	;SEND TO PRINTER
			181		GLB	PPS200	;FOR CPFKB
			182		GLB	OUTPPS	
00A6	00BE		183	PPS200	ACEX	S	;# CHARS TO "C"
00A7	0046		184	OUTPPS	C=0	X	
00A8	005A		185		C=0	M	
00A9	00FC		186		RCR	10	;# CHARS TO C(M)
00AA	0270		187		DADD=C		;ENABLE CHIP 0
00AB	03E0		188		RTN		
00AC	0130		189	CPABC	LDI		
00AD	0025		190		CON	45Q	;LOAD OFFSET
00AE	0003		191		GOTO	PRW950	
00AF	0130		192	SMABC	LDI		
00B0	001A		193		CON	32Q	;LOAD OFFSET
			194		LEGAL		
00B1	0003		195		GOTO	PRW950	
00B2	0130		196	P_L	LDI		
00B3	004C		197		CON	114Q	;L
00B4	0003		198		GOTO	PRW960	
00B5	0130		199	P_T	LDI		
00B6	0054		200		CON	124Q	;T
00B7	0003		201		GOTO	PRW960	
			202	*			
			203	*			
			204	*	ROW 1 - INCLUDING DIGIT ENTRY AND AGTO, AXEQ		
			205	*	A[2:0] HAS THE FUNCTION CODE. B[3:0] POINTING 1ST BYTE OF		
			206	*	DIGIT ENTRY STRING, IF IT'S A DIGIT ENTRY FC.		
			207	*			
			208		GLB	PDEROW	
00B8	0130		209	PDEROW	LDI		
00B9	001D		210		CON	1*16+13	
00BA	0306		211		A<C?	X	;IS IT A DIGIT ENTRY FC ?
00BB	0003		212		GONC	PR0110	;NO, EITHER AGTO OR AXEQ
00BC	001A		213		A=0	M	;YES, CLEAR CHAR COUNTER
00BD	0130		214	PDER00	LDI		
00BE	001A		215		CON	1*16+10	
00BF	0306		216		A<C?	X	;IS IT A DIGIT ?
00C0	0007		217		GOC	PDER50	;YES
00C1	0366		218		A#C?	X	;NO, IS IT A D.P.?
00C2	0007		219		GOC	PDER10	;NO
00C3	0130		220		LDI		
00C4	002E		221		CON	56Q	;ASCII D.P.
00C5	008C		222		ST=1?	5	;D.P. FLAG SET?
00C6	0007		223		GOC	PDER55	;YES, SHOW D.P.
00C7	0266		224		C=C-1	X	
00C8	0266		225		C=C-1	X	;C(X)= @54= ASCII COMMA
			226		LEGAL		
00C9	0003		227		GOTO	PDER55	
00CA	0226		228	PDER10	C=C+1	X	

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LOCATION	OBJECT CODE	LINE	SOURCE LINE				
00CB	0366	229	A#C?	X		;IS IT AN EEX ?	
00CC	0007	230	GOC	PDER20		;NO	
00CD	00001000	231	GOSUB	PBLANK		;YES, BLANK TO PRINTER	
00CF	017A	232	A=A+1	M		;COUNT THE BLANK	
00D0	0130	233	LDI				
00D1	0045	234	CON	105Q		;E	
00D2	0003	235	GOTO	PDER55			
00D3	0130	236	PDER20 LDI			;IT MUST BE A CHS	
00D4	002D	237	CON	55Q			
00D5	0003	238	GOTO	PDER55			
00D6	00A6	239	PDER50 ACEX	X			
00D7	031C	240	PT=	1			
00D8	00D0	241	LC	3			
00D9	017A	242	PDER55 A=A+1	M		;COUNT THE CHAR	
		243	LEGAL				
00DA	00001000	244	GOSUB	=CPBYTE		;SEND BYTE TO PRINTER	
00DC	00001000	245	GOSUB	=NBYPAB		;AB EX, GET NEXT BYTE	
00DE	006E	246	ABEX	W		;B= PGM PTR, A(M)= CHAR COUNTER	
00DF	0056	247	C=0	XS			
00E0	0106	248	A=C	X		;A.X _ NEXT BYTE	
00E1	0130	249	LDI				
00E2	001D	250	CON	1*16+13			
00E3	031C	251	PT=	1			
00E4	0362	252	A#C?	PT		;IS THIS BYTE A ROW 1 FC ?	
00E5	0007	253	GOC	PDER90		;NO	
00E6	0306	254	A<C?	X		;IS IT A DIGIT ENTRY FC ?	
00E7	0007	255	GOC	PDER00		;YES	
00E8	00BA	256	PDER90 ACEX	M		;# CHAR CTR TO C(M)	
00E9	0046	257	C=0	X			
00EA	0270	258	DADD=C			;ENABLE CHIP 0	
00EB	03E0	259	RTN				
		260	GLB	PR0110			
		261	*				
		262	** THE FC FOR "ASN" WILL NOT BE HANDLED VERY WELL!!!!!!!!!!!!!!				
00EC	03E6	263	PR0110 ASL	X		;CONVERT FC FROM 1D TO D0	
00ED	0016	264	A=0	XS		; OR FROM 1E TO E0	
00EE	00001000	265	GOSUB	BPROMT		;PRINT "GTO " OR XEQ "	
00F0	00001000	266	GOSUB	=CPYS6M			
00F2	00001000	267	GOSUB	=NXBTXP			
00F4	0003	268	GOTO	PSTRNG			
		269					
		270	*****				
		271	*				
		272	* PSTRNG - PRINT TEXT STRING				
		273	* USES: C, A.S,A3:0, B.S, N, S9, AND 2 ADDITIONAL SUBROUTINE LEVELS				
		274	* IN: A3:0 = ADDRESS OF BYTE BEFORE FIRST CHARACTER				
		275	*     S6=1 IF ROM ADDRESS, S6=0 IF RAM ADDRESS				
		276	*     PT=3				
		277	*     C.0=LENGTH OF STRING				
		278	*     A.S=INCOMING CHAR COUNT				
		279	*     NOTE C.0+A.S MUST BE <= 15				
		280	* OUT: C.M=TOTAL CHAR COUNT (=C.0+A.S+2)				
		281	* ASSUMES: HEXMODE, S9=PRINTER INTERFACE ERROR FLAG				
		282					
		283	*				
		284	* PLBL - PRINT ALPHA LABEL				
		285	* USES: C, A.S,A3:0, B.S, N, S9, AND 2 ADDITIONAL SUBROUTINE LEVELS				

LOCATION	OBJECT CODE	LINE	SOURCE LINE
		286	* IN: A3:0 = ADDRESS OF 1ST BYTE OF LABEL
		287	*       S6=1 FOR ROM, S6=0 FOR RAM
		288	*       A.S = INCOMING CHARACTER COUNT (MUST BE <= 8)
		289	* OUT: C.M=FINAL CHAR COUNT
		290	* ASSUMES: HEXMODE, S9=PRINTER INTERFACE ERROR FLAG
		291	
		292	*
		293	* PLBL0 - PRINT ALPHA LABEL WITH ZERO INCOMING CHAR COUNT
		294	* ZEROES OUT A.S AND DROPS INTO PLBL
		295	
		296	*
		297	* PLBL3 - PRINT ALPHA LABEL WITH ADDR OF 3RD BYTE
		298	* SAME AS PLBL EXCEPT FOR DIFFERENT INPUT.
		299	* IN: A3:0=ADDRESS OF 3RD BYTE OF LABEL
		300	*       S6=1 FOR ROM, S6=0 FOR RAM
		301	*       A.S = INCOMING CHARACTER COUNT (MUST BE <= 8)
		302	*       C.0 = LENGTH OF ALPHA LABEL, NOT COUNTING KEYCODE
		303	*       PT=3
		304	
		305	*
		306	* PTXROW - PRINT TEXT ROW
		307	* SAME AS PSTRNG EXCEPT USES MORE AND TAKES DIFFERENT INPUT
		308	* USES: C, A.S,A3:0, B.S,B3:0, N, S9 & 1 ADDITIONAL SUB LEVEL
		309	* IN: B3:0=ADDRESS OF BYTE BEFORE FIRST CHARACTER
		310	*       S10=1 FOR ROM, S10=0 FOR RAM
		311	*       A.0=LENGTH OF STRING
		312	*
		313	GLB                   PTXROW
		314	GLB                   PSTRNG
		315	GLB                   PLBL
		316	GLB                   PLBL0
		317	GLB                   PLBL3
00F5	001E	318	PLBL0       A=0                S                   ;INITIALIZE CHAR COUNT
00F6	001C	319	PLBL        PT=                3
00F7	00001000	320	GOSUB                =INADXP               ;INC ADDR
00F9	00001000	321	GOSUB                =NXBTXP               ;GET 3RD BYTE
00FB	00001000	322	PLBL3       GOSUB               =INADXP               ;POINT TO KEYCODE
00FD	0266	323	C=C-1                X                   ;DEC LENGTH FOR KEYCODE
		324	LEGAL
00FE	0003	325	GOTO                 PSTRNG
		326	
00FF	00A6	327	PTXROW       ACEX               X                   ;STRING LENGTH TO C.0
0100	005E	328	C=0                 S                   ;INITIALIZE CHAR COUNT
0101	00001000	329	GOSUB                =CPYS6M
		330	
0103	033C	331	PSTRNG       RCR                1                   ;STRING LENGTH TO C.S
0104	00BE	332	ACEX                S                   ;A.S=STRING LENGTH
		333	;C.S=CHAR COUNT
0105	021E	334	C=A+C                S
0106	00FE	335	BCEX                S                   ;SAVE TOTAL CHAR COUNT IN B.S
0107	0130	336	LDI
0108	0022	337	CON                 42Q                   ;QUOTES
0109	00001000	338	PSTR10       GOSUB               =CPBYTE
010B	01BE	339	A=A-1                S                   ;DONE?
010C	0007	340	GOC                 PSTR20               ;YES
010D	00001000	341	GOSUB                =NXBTXP               ;GET NEXT BYTE
010F	0003	342	GOTO                 PSTR10

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LOCATION	OBJECT CODE	LINE	SOURCE LINE				
		343					
0110	00001000	344	PSTR20	GOSUB	=PRQUOT	;PRINT OUT QUOTE	
0112	004E	345		C=0	W		
0113	00DE	346		C=B	S		
0114	00FC	347		RCR	10	;TOTAL CHAR COUNT TO C.M	
0115	023A	348		C=C+1	M		
0116	023A	349		C=C+1	M	;ADD 2 FOR QUOTES	
0117	03E0	350		RTN			
		351		GLB	PRW120		
		352	**.....FUNCTION CODE= ALPHA LBL OR END .....				
0118	006E	353	PRW120	ABEX	W	;PGM PTR TO "A"	
0119	008E	354		B=A	W	& KEEP A COPY IN B	
011A	00001000	355		GOSUB	=INCAD	;SKIP LINK BYTE	
011C	00001000	356		GOSUB	=NXTBYT	;LOAD 3RD BYTE	
011E	031C	357		PT=	1		
011F	0222	358		C=C+1	PT	;IS IT LBL ?	
0120	0003	359		GONC	PRW122	;NO, IT'S AN END	
0121	0130	360		LDI		;FC= LBL	
0122	00CF	361		CON	12*16+15	;LOAD LBL FC	
0123	00001000	362		GOSUB	BPROM1	;PRINT THE FUNCTION	
0125	00001000	363		GOSUB	=CPYS6M		
0127	0003	364		GOTO	PLBL		
		365	*				
		366	** .....FUNCTION CODE= END .....				
0128	03D8	367	PRW122	CSTEX		;SET THE STATUS	
0129	00CC	368		ST=1?	10	;ARE WE IN ROM ?	
012A	0007	369		GOC	PRW124	;YES, PROMPT "END" ONLY	
012B	008C	370		ST=1?	5	;FINAL END ?	
012C	0003	371		GONC	PRW124	;NO	
012D	03D8	372		CSTEX		;YES, RESTORE STATUS	
		373		GLB	PR_END	;FOR PRINTING THE CATALOG	
012E		374	PR_END				
012E	00001000	375		GOSUB	=PRTMSG	;PRINT ".END."	
0130	002E	376		CON	56Q	;	
0131	0045	377		CON	105Q	;E	
0132	004E	378		CON	116Q	;N	
0133	0044	379		CON	104Q	;D	
0134	012E	380		CON	456Q	;	
0135	004E	381		C=0	W		
0136	001C	382		PT=	3		
0137	0150	383		LC	5	;# CHAR CTR= 5	
0138	03E0	384		RTN			
0139	03D8	385	PRW124	CSTEX		;RESTORE STATUS BITS	
013A	0130	386		LDI			
013B	00C0	387		CON	12*16+0	;PRINT "END"	
013C	00001000	388		GOSUB	PPROM1		
013E	00001002	389		GOLONG	OUTPPS		
		390	*****				
		391	*-GLINE#= GET LINE #				
		392	*				
		393	*-CALCULATES LINE # (BINARY) IF THE LINE # = FFF, OTHERWISE RETURNS				
		394	* EXISTING LINE #.				
		395	*-GENERATES ERROR MESSAGE FOR PRIVATE PROGRAM, & DOESN'T RETURN				
		396	*				
		397	*-USES:    A, B(0-3), C, M, N, P, Q, (S0-S8),        3 SUB LEVELS				
		398	*-INPUTS:  CURRENT PRIVACY FLAG (S12) FOR VALID LINE#,R12=DESIRED PC				
		399	*-OUTPUTS: A(X)= C(X)= LINE #   (BINARY)				



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LOCATION OBJECT CODE LINE       SOURCE LINE
400 *-ASSUMES: NOTHING
401 *
402                   GLB           GLINE_NO
0140 00001000       403 GLINE_NO       GOSUB           =ENCP00       ;ENABLE CHIP 0
0142 00001000       404                   GOSUB           =LINNUM       ;GET LINE #
0144 02E6           405                   C#0?           X           ;LINE # = 0?
0145 0007           406                   GOC            GLIN20       ;NON-ZERO
0146 0226           407                   C=C+1         X           ;YES, INC TO 1
408 **C= REG 15 ON EXIT FROM LINNUM!!!!!!!!!!!!!!
0147 03E8           409 GLIN20        REGN=C        15           ;STORE NEW LINE #
0148 0106           410                   A=C            X           ;LINE # TO "A"
0149 034C           411                   ST=1?         12           ;PRIVATE?
014A 00001003       412                   GOLC           =ERRPR       ;YES,ERROR, DISPLAY "PRIVATE"
014C 03E0           413                   RTN
414 *****
415 *-PPGMST= PRINT PROGRAM STEP
416 *-SENDS LINE# AND PROGRAM STEP TO PRINTER
417 *
418 *-PPGSNL= PRINT PROGRAM STEP, NO LINE NUMBER
419 *-SAME AS PPGMST EXCEPT ONLY SENDS LINE NUMBERS FOR LABELS
420 *
421 *-USES:        A,B,C,G,N,        PT,        S0-S7        3 SUB LEVELS
422 *-INPUTS:     PC= LAST BYTE OF LAST INSTR,   REG F= VALID LINE #
423 *            S7=1 FOR PGM LISTING IF IN "ALL" (TRACE), ELSE S7= DON'T CARE
424 *-OUTPUTS:   # OF CHARS IN C.M, CHIP 0 ENABLED
425 *
426 *
427 * PPGS35 - ENTRY POINT USED BY PRT5 IN PROGRAM MODE TO PRINT DATAENTRY
428 * STRINGS ONLY.
429 *
430 * USES A,B,C,G,N,PT,S0-S7
431 *
432 * INPUT: SET S6 (LINE# FLAG) AND S0 ("ADD BLANK" FLAG)
433 *        ADDR OF FIRST BYTE OF DATA ENTRY STRING IN MM FORM IN B[3:0]
434 *        FIRST BYTE OF DATA ENTRY STRING IN G
435 * OUTPUT: ONE LINE TO PRINTER
436 * ASSUMES: HEXMODE & PT=P.
437 *
438                   GLB           PPGMRS
439                   GLB           PPGSNL
440                   GLB           PPGMST
441                   GLB           PPGS35
014D 0144           442 PPGSNL        ST=0           6           ;CLEAR LINE # FLAG
014E 0003           443                   GOTO           PPGS05
014F 0358           444 PPGMRS       ST=C                   ;RESTORE STATUS
0150 0148           445 PPGMST       ST=1           6           ;SET LINE# FLAG
0151 00001000       446 PPGS05       GOSUB           =GETPC       ;GET PROGRAM POINTER
0153 00001000       447 PPGS10       GOSUB           =NXBTBYT     ;GET 1ST BYTE OF PROGRAM STEP
0155 031C           448                   PT=           1
0156 02EA           449                   C#0?         WPT           ;NULL?
0157 0003           450                   GONC         PPGS10       ;YES, SKIP IT
0158 0388           451                   ST=1         0           ;NO, INITIALIZE "ADD BLANK" FLAG
0159 00001000       452                   GOSUB        LBLCK       ;CHECK FOR LBL
015B 004C           453                   ST=1?        4           ;FC= LBL?
015C 0003           454                   GONC         PPGS35       ;NO
015D 00001000       455                   GOSUB        =FXSTS       ;YES, GET PRINTER STATUS
015F 000C           456                   ST=1?        3           ;OOPS?

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LOCATION	OBJECT CODE	LINE	SOURCE LINE			
0160	0003	457	GONC	PPGS20		;NO
0161	0248	458	ST=1	9		;SET ERROR FLAG
0162	03D8	459	PPGS20 CSTEX			;RESTORE STATUS
0163	023C	460	RCR	2		
0164	01FE	461	C=C+C	S		;"ALL" MODE?
0165	0003	462	GONC	PPGS25		;NO
0166	028C	463	ST=1?	7		;YES, PRINTING PROGRAM?
0167	0007	464	GOC	PPGS30		;YES
0168	0003	465	GOTO	PPGS33		;NO,BLANK LINE BEFORE LBL
0169	01FE	466	PPGS25 C=C+C	S		;NORM?
016A	0003	467	GONC	PPGS34		;NO, MAN, NO BLANK LINE
016B	01BC	468	PPGS30 RCR	11		
016C	01FE	469	C=C+C	S		;LAST LINE HAD EOLL?
016D	00001000	470	GSUBNC	EOLL		;NO, ADD EOLL
016F	010C	471	ST=1?	8		;LAST LINE= LBL??
0170	00001000	472	PPGS33 GSUBNC	EOLL		;NO, ADD BLANK LINE
0172	0148	473	ST=1	6		;SET LINE # FLAG
0173	0384	474	PPGS34 ST=0	0		;CLEAR "ADD BLANK" FLAG
0174	0046	475	PPGS35 C=0	X		
0175	0270	476	DADD=C			;ENABLE CHIP 0
0176	0084	477	ST=0	5		;CLEAR D.P. FLAG
0177	03B8	478	C=REGN	14		;GET STATUS REG
0178	015C	479	PT=	6		
0179	01E2	480	C=C+C	PT		;D.P. FLAG SET?
017A	0003	481	GONC	PPGS37		;NO
017B	0088	482	ST=1	5		;YES, SET D.P. FLAG
017C	014C	483	PPGS37 ST=1?	6		;PRINT LINE# ?
017D	0003	484	GONC	PPGS65		;NO
017E	03F8	485	C=REGN	15		;GET LINE #
017F	00001000	486	GOSUB	LINELB		;LINE # TO PRINTER
0181	0130	487	LDI			
0182	0020	488	CON	40Q		;BLANK
0183	038C	489	ST=1?	0		;ADD A BLANK?
0184	0007	490	GOC	PPGS60		;YES
0185	0046	491	C=0	X		;NO, 000= DIAMOND
0186	00001000	492	PPGS60 GOSUB	=CPBYTE		;SEND DIAMOND TO PRINTER
0188	039C	493	PPGS65 PT=	0		
0189	0098	494	C=G			;GET SAVED FC
018A	0106	495	A=C	X		;COPY OF FC IN "C" AND "A"
018B	0016	496	A=0	XS		
018C	031C	497	PT=	1		;SET UP PT FOR JUMP TABLE
018D	0144	498	ST=0	6		;SET UP 2 DIGIT OPERAND FLAG
018E	023C	499	RCR	2		;SAVE FC
018F	0130	500	LDI			;GET ADDR OF JUMP TABLE
0190	0340	501	CON	1500Q		
0191	01E6	502	C=C+C	X		;ADDR= @64000= 6800 HEX
0192	00FC	503	RCR	10		;FC ROW= LAST ADDR DIGIT
0193	01E0	504	GOTOC			;TO ROW JUMP TABLE (@64000)

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LOCATION OBJECT CODE LINE       SOURCE LINE
506 *****
507 * PPRMPT= PRINT A PROMPT STRING FOR A MICROCODE FUNCTION
508 *
509 * PPRMPT ENTRY: A[1:0]=MAINFRAME FC,       LEAVES PT= 2
510 * PPRM1 ENTRY: C[1:0]=MAINFRAME FC,       LEAVES PT= 2
511 * PPRM2 ENTRY: C[6:3]=XADR
512 *
513 * ALL ENTRY POINTS USE: A,C,N, NO PT, S0,S5,S9 FOR ERRORS,1 SUB LEVEL
514 *
515 *-INPUT: A(0-1)= MAINFRAME FC
516 *-OUTPUT: C(S)= # CHARS
517 *       A.M=XADR
518 *-ASSUMES: NO PUNCTUATION IN MAINFRAME FC PROMPTS
519 *
520               GLB               PPROMT
521               GLB               PPROM1
522               GLB               PPROM2
0194 00A6       523 PPRMPT       ACEX               X               ;FC TO C(X)
0195 023C       524 PPRM1       RCR               2
0196 0130       525               LDI               ;MAIN FUNCTION TABLE
0197 0014       526               CON               24Q           ; START FROM @12000 (CN5)
0198 027C       527               RCR               9               ;LAST 2 ADDR DIGITS= FC
0199 0330       528               CXISA           ;LOAD XADR= XDEF
019A 001C       529               PT=               3
019B 0050       530               LC               1
019C 01BC       531               RCR               11              ;CHANGE XDEF TO XEQ ADDR
019D 0084       532 PPRM2       ST=0           5               ;INITIALIZE FINAL CHAR FLAG
019E 005E       533               C=0               S               ;INITIALIZE CHAR COUNTER
019F 011A       534               A=C               M               ;SAVE XADR IN A.M
01A0 0384       535 PRMT20      ST=0           0               ;INITIALIZE SPECIAL CHAR FLAG
01A1 027A       536               C=C-1           M
01A2 0330       537               CXISA           ;GET CHARACTER
01A3 023E       538               C=C+1           S               ;COUNT THE CHAR
01A4 0056       539               C=0               XS              ;UPPER BITS USED BY MAINFRAME
01A5 03D8       540               CSTEX
01A6 014C       541               ST=1?           6               ;SPECIAL CHARACTER?
01A7 0003       542               GONC            PRMT30       ;NO
01A8 022E       543               C=C+1           W               ;YES, SET SPEC CHAR FLAG (S0)
01A9 0144       544               ST=0               6               ;CLEAR SPECIAL CHAR BIT
01AA 028C       545 PRMT30      ST=1?           7               ;FINAL CHARACTER?
01AB 0003       546               GONC            PRMT40       ;NO
01AC 0284       547               ST=0               7               ;YES, CLEAR FINAL CHAR BIT
01AD 03D8       548               CSTEX
01AE 0088       549               ST=1               5               ;SET FINAL CHAR FLAG
01AF 0003       550               GOTO            PRMT45
01B0 03D8       551 PRMT40      CSTEX
01B1 0070       552 PRMT45      N=C               ;CTR,ADDRESS TO "N"
01B2 0106       553               A=C               X               ;CHAR TO A.X
554 ***DON'T HAVE TO CHECK FOR ILLEGAL CHARS IN MAINFRAME PROMPTS
01B3 00001000   555               GOSUB           LCDASC       ;LCD FORMAT CHAR TO ASCII
01B5 00B0       556               C=N               ;CTR & ADDRESS TO C
01B6 00A6       557               ACEX               X               ;CHAR TO C.X
01B7 00001000   558               GOSUB           =CPBYTE     ;CHAR TO PRINTER
01B9 008C       559               ST=1?           5               ;FINAL CHARACTER?
01BA 0003       560               GONC            PRMT20       ;NO, GET NEXT ONE
01BB 03E0       561               RTN               ;YES
562 *****

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FILE: QUAD2:HELIOS           HEWLETT-PACKARD: COCONUT ASSEMBLER 1.03 / CORVALLIS DIVISION           PAGE 11

LOCATION	OBJECT CODE	LINE	SOURCE	LINE			
		563	GLB	BPROMT			
		564	GLB	BPROM			
		565	GLB	BPROM1			
01BC	00A6	566	BPROMT	ACEX	X	;FC TO C	
01BD	00001000	567	BPROM1	GOSUB	PPROM1	;SEND FC PROMPT TO PRINTER	
01BF	023E	568	BPROM	C=C+1	S	;COUNT THE BLANK	
		569	*				
		570	*BPROM FALLS INTO PBLANK HERE.				
		571	*				
		572	*****				
		573					
		574	* EOLR - SEND AN EOLR USING CPBYTE				
		575					
		576	* EOLL - SEND AN EOLL USING CPBYTE				
		577					
		578	* PBLANK - SEND A BLANK USING CPBYTE				
		579	*				
		580	***ALL USE: C(X),N, NO PT, NOT STS, NO ADDITIONAL SUB LEVELS				
		581	***PRINT IF FLAG S5=1, DON'T PRINT IF FLAG 55=0 (FLAG 55= PRINTER EXISTENCE)				
		582					
		583	GLB	PBLANK			
01C0	0130	584	PBLANK	LDI			
01C1	0020	585		CON	40Q	;BLANK	
01C2	0003	586		GOTO	EOLR10		
		587		GLB	EOLR		
01C3	0130	588	EOLR	LDI			
01C4	00E8	589		CON	350Q	;EOLR	
01C5	00001002	590	EOLR10	GOLONG	=CPBYTE		
		591					
		592	GLB	EOLL			
01C7	0130	593	EOLL	LDI			
01C8	00E0	594		CON	340Q	;EOLL	
01C9	0003	595		GOTO	EOLR10		
		596					

# NOMAS

Not Manufacturer Supported  
recipient agrees NOT to contact manufacturer

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LOCATION OBJECT CODE LINE       SOURCE LINE
598 *****
599 * PXROM - PRINT EXTERNAL ROM FUNCTION PROMPT
600 *
601 *-FINDS THE EXECUTION ADDRESS IN ROM THEN PRINTS:
602 *     - THE PROMPT= MICROCODE
603 *     - THE ALPHA LBL= USER LANGUAGE
604 *
605 *-USES:     A, B, C,     N,   PT,         S6, S8         2 SUB LEVELS
606 *-INPUTS:   A(0-1)= 1ST BYTE OF 2 BYTE FC
607 *           B(0-3)= PC POINTING TO 1ST BYTE OF FC
608 *                         P SELECTED
609 *-OUTPUTS:  C.M=CHAR COUNT
610 *           IF FCN IS IN MICROCODE, THEN XADR IS RETURNED IN A.M
611 *-ASSUMES:  HEXMODE, S9=PRINTER INTERFACE ERROR FLAG
612
613 *
614 * PPIXROM - PRINT PROMPT, BUT NOT ARGUMENT, FOR AN XROM FUNCTION
615 * USES: A, B, C, PT, S8:0, N, AND 2 ADDITIONAL SUBROUTINE LEVELS
616 * IN:  C2:0=XROM FC, RIGHT THREE DIGITS
617 * OUT: C.M=CHAR COUNT
618 *     IF FCN IS IN MICROCODE, THEN XADR IS PRESERVED IN A.M
619 *     S7:0 OUT = 1:0 IN
620 * ASSUMES:  HEXMODE, S9=PRINTER INTERFACE ERROR FLAG
621
622 *
623 * PXR10 - SPECIAL ENTRY POINT FOR CPFKB, WHICH ENTERS WITH S8=1 SO
624 * THAT, IF THE FCN IS IN MICROCODE, PXROM WILL EXIT WITH A GOLONG
625 * TO PFK20 TO ALLOW CPFKB TO TACK ON THE ARGUMENT, IF THERE IS ONE.
626 * CPFKB CAN'T AFFORD TO CALL PPIXROM WITH A GOSUB BECAUSE OF NOT
627 * ENOUGH SUBROUTINE LEVELS.
628 *
629                   GLB                 PXROM
630                   GLB                 PIXROM
631                   GLB                 PXR10
01CA 00A6         632 PXROM            ACEX                 X                 ;1ST BYTE TO "C"
01CB 037C         633                   RCR                 12
01CC 0070         634                   N=C                 ;SAVE 1ST BYTE
01CD 00001000     635                   GOSUB                 =NBYTAB             ; GET THE SECOND BYTE
01CF 0106         636                   A=C                 X                 ;2ND BYTE TO "A"
01D0 0398         637                   C=ST
01D1 00F0         638                   CNEX                 ;N(0-1)=STATUS,C(2-3)=1ST BYTE
01D2 031C         639                   PT=                 1
01D3 00AA         640                   ACEX                 WPT                 ;2ND BYTE TO C(0-1)
01D4 0104         641 PPIXROM         ST=0                 8                 ;AVOID EXIT TO PFK20
01D5 00001000     642 PXR10           GOSUB                 =GTRMAD             ;FIND IT IN THE ROM (NO CHIP 0)
01D7 0003         643                   GOTO                 PXR19             ;ROM NOT PLUGGED IN
01D8 000C         644                   ST=1?                3                 ;XTYPE=1?
01D9 0007         645                   GOC                 PXR20             ;YES
01DA 00B0         646                   C=N                 ;MICROCODE FCN
01DB 0358         647                   ST=C                 ;RESTORE SAVED STATUS
01DC 00AE         648                   ACEX                 W                 ;XADR TO C3:0
01DD 01BC         649                   RCR                 11                 ;XADR TO C.M
01DE 00001000     650                   GOSUB                 PPROM2
01E0 010C         651                   ST=1?                8                 ;SPEC EXIT FOR CPFKB?
01E1 00001002     652 OUTPPX         GOLNC                 OUTPPS             ;NO
01E3 00001002     653                   GOLONG                 PFK20             ;YES
654

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LOCATION	OBJECT CODE	LINE	SOURCE LINE				
01E5	000E	655	PXR19	A=0	W	;SAY NOT FOUND	
01E6	00B0	656	PXR20	C=N		;RESTORE	
01E7	0358	657		ST=C		; SAVED STATUS	
01E8	00001000	658		GOSUB	=PRMSG	;SEND "XROM" TO PRINTER	
01EA	0058	659		CON	130Q	;X	
01EB	0052	660		CON	122Q	;R	
01EC	004F	661		CON	117Q	;O	
01ED	004D	662		CON	115Q	;M	
01EE	0120	663		CON	440Q	; BLANK	
01EF	034E	664		A#0?	W	;WAS THE FCN FOUND?	
01F0	0003	665		GONC	PXR30	;NO	
01F1	02DC	666		PT=	13		
01F2	0150	667		LC	5		
01F3	011E	668		A=C	S	;CHAR COUNT TO A.S	
01F4	0148	669		ST=1	6	;SAY ROM	
01F5	00001002	670		GOLONG	PLBL		
		671	*				
		672	*	ROM NOT PLUGGED IN, DISPLAY ROM ID & FC #			
		673	*				
01F7	00DA	674	PXR30	C=B	M	;C(M)= ROM ID	
01F8	003C	675		RCR	3	;ROM ID TO C(X)	
01F9	00001000	676		GOSUB	PBIN0	;SEND ROM ID TO PRINTER	
01FB	0130	677		LDI			
01FC	002C	678		CON	54Q	;ASCII COMMA	
01FD	00001000	679		GOSUB	=CPBYTE	;SEND TO PRINTER	
01FF	00C6	680		C=B	X	;FUNCTION # TO C(X)	
0200	00001000	681		GOSUB	PBIN0	;FUNCTION # TO PRINTER	
0202	02DC	682		PT=	13		
0203	0290	683		LC	10	;CHAR CTR= 10 CHARS	
0204	0003	684		GOTO	OUTPPX		
		685	*****				

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LOCATION OBJECT CODE LINE           SOURCE LINE
687 *****
688 ***** LIST -- LIST NNN LINES *****
689 *****
0205 0094           690           CON           224Q           ;T
0206 0013           691           CON           23Q           ;S
0207 0109           692           CON           411Q          ;I
0208 010C           693           CON           414Q          ;L
                  694           GLB           LIST
0209 0000           695 LIST       NOP                   ;NOP= NON-PROGRAMMABLE
020A 03F8           696           C=REGN       15           ;GET LINE #
020B 0046           697           C=0           X
020C 0266           698           C=C-1       X           ;GET LINE # = FFF
020D 03E8           699           REGN=C       15           ;STORE LINE# = FFF
020E 00A6           700           ACEX        X           ;# LINES TO "C"
020F 0003           701           GOTO        LISTN
702 *****
703 ***** PRP -- PRINT PROGRAM *****
704 *****
0210 0090           705           CON           220Q           ;P
0211 0012           706           CON           22Q           ;R
0212 0110           707           CON           420Q          ;P
                  708 * UPPER BIT IS ARGUMENT TYPE
                  709           GLB           PRP
0213 0000           710 PRP       NOP                   ;NOP SHOWS NON-PROGRAMMABLE
0214 0278           711           C=REGN       9           ;RETRIEVE THE NAME
0215 0158           712           M=C                   ;SAVE FOR ASRCH
0216 02EE           713           C#0?        W           ;LABEL PRESENT?
0217 0003           714           GONC        PRTP15       ;NO
0218 00001000       715           GOSUB       =ASRCH       ;YES, GO DO ALPHA SEARCH
021A 02EE           716           C#0?        W           ;SUCCESS?
021B 00001002       717 PRPERR    GOLNC       =ERRNE       ;ERROR= "NONEXISTENT"
021D 024C           718           ST=1?       9           ;MICROCODE?
021E 0007           719           GOC        PRPERR       ;YES, CAN'T LIST IT
021F 00C4           720           ST=0        10          ;CLEAR ROM FLAG
0220 020C           721           ST=1?       2           ;ROM?
0221 0003           722           GONC        PRTP18       ;NO, RAM
0222 00C8           723           ST=1        10          ;YES, SET ROM FLAG
0223 0003           724           GOTO        PRTP18
                  725 *
0224 00CC           726 PRTP15    ST=1?       10          ;ROM FLAG?
0225 0003           727           GONC        PRTP16       ;NO
0226 00001000       728           GOSUB       =GETPC       ;YES, GET PGM POINTER
0228 0003           729           GOTO        PRTP20
0229 00001000       730 PRTP16    GOSUB       =FLINKP       ;IN RAM, FIND END OF PGM
022B 013C           731           RCR           8
022C 001C           732 PRTP18    PT=           3
022D 010A           733           A=C           WPT
022E 00001000       734 PRTP20    GOSUB       =CPGMHD       ;FIND THE TOP OF THE PROGRAM
0230 00001000       735           GOSUB       =PUTPCF       ;STORE NEW PC, SET LINE# = FFF
0232 0046           736           C=0           X           ;LOAD LARGE # OF LINES SO IT
0233 0266           737           C=C-1       X           ;WON'T STOP UNTIL AN END
                  738           GLB           LISTN
0234 005A           739 LISTN     C=0           M           ;CLEAR CHAR COUNTER
0235 005C           740           PT=           4
0236 0050           741           LC           1
0237 0210           742           LC           8           ;LOAD CHAR CTR= 24
0238 0268           743           REGN=C     9           ;SAVE CTRS IN REG 9

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LOCATION	OBJECT CODE	LINE	SOURCE LINE				
0239	00001000	744	GOSUB	=IPRT		;INITIALIZE FOR EXPLICIT PRINT	
023B	00001000	745	GOSUB	GLINE_NO		;CALC & STO LINE#,CK PRIVATE	
023D	00001000	746	GOSUB	EOLL		;CLEAR BUFFER OF MODE BYTE	
023F	0108	747	ST=1	8		;1 BLANK LINE BEFORE PACK LISTING	
0240	0003	748	GOTO	PRTP40			
0241	022E	749	PRTP30	C=C+1	W		
0242	03E8	750		REGN=C	15	;UPDATE LINE #	
		751	*****				
		752	GLB	PRTP40		;ENTRY FOR SDS "PRINT ROM" ROUTINE	
		753	*****				
0243	0278	754	PRTP40	C=REGN	9	;GET # LINES COUNTER	
0244	0266	755		C=C-1	X	;DONE WITH NNN LINES?	
0245	0007	756		GOC	OUTPRP	;YES	
0246	0268	757		REGN=C	9	;NO, UPDATE # LINES CTR	
		758					
		759		GLB	PRTP50		
0247	00001000	760	PRTP50	GOSUB	=FNSTS	;GET NEW PRINTER STATUS	
0249	00E6	761		BCEX	X	;SAVE STATUS IN B(X)	
024A	000C	762		ST=1?	3	;OOPS?	
024B	0003	763		GONC	PRTP55	;NO	
024C	0248	764		ST=1	9	;SET ERROR FLAG	
024D	028C	765	PRTP55	ST=1?	7	;TRACE?	
024E	0007	766		GOC	PRTPAC	;YES, PRINT PACKED LISTING	
		767	**NOTE: SWITCHING FROM PRINTER "ALL" (TRACE) MODE TO NORM OR MAN CAN				
		768	*	LEAVE A PARTIAL LINE IN THE PRINTER BUFFER.			
		769	*				
024F	01FA	770		C=C+C	M	;LAST LINE HAD EOL?	
0250	00001000	771		GOSUBNC	EOLL	;NO, SEND EOLL	
0252	00001000	772		GOSUB	=PWAIT	;WAIT FOR THE PRINTER	
0254	00C6	773		C=B	X	;BRING ORIG ST BACK TO C.X	
0255	014C	774		ST=1?	6	;NORM?	
0256	0003	775		GONC	PRTPL	;NO,MAN, PRINT LEFT JUSTIFIED	
0257	00001000	776		GOSUB	PPGMRS	;RESTORE STS,PRT FUNCT WITH LINE#	
0259	0104	777		ST=0	8		
025A	004C	778		ST=1?	4	;JUST PRINTED LBL?	
025B	0003	779		GONC	PRTP60	;NO	
025C	0108	780		ST=1	8	;YES	
025D	0130	781	PRTP60	LDI			
025E	0007	782		CON	7		
025F	0106	783		A=C	X		
0260	003C	784		RCR	3	;CHAR COUNT TO C.X	
0261	01C6	785		A=A-C	X	;CHAR COUNT>7?	
0262	00001000	786		GOSUBNC	=PAD1_A	;NO. PAD WITH BLANKS	
0264	00001000	787		GOSUB	EOLR	;PRINT LINE RIGHT JUSTIFIED	
0266	0003	788		GOTO	PRTP80		
0267	00001000	789	PRTPL	GOSUB	PPGMRS	;RESTORE STS,PRT FUNCT WITH LINE #	
0269	00001000	790		GOSUB	EOLL	;PRINT LINE LEFT JUSTIFIED	
		791					
		792		GLB	PRTP80		
026B	00001000	793	PRTP80	GOSUB	=GETPC	;GET PROGRAM POINTER,EN CHIP 0	
026D	00001000	794		GOSUB	=SKPLIN	;MOVE PC TO NEXT LINE	
		795	*	* SKPLIN SETS S6= 1 FOR AN END			
026F	00001000	796		GOSUB	=PUTPCL	;STORE PROGRAM POINTER, GET LINE#	
0271	014C	797		ST=1?	6	;HIT AN END?	
0272	0003	798		GONC	PRTP30	;NO, CONTINUE	
		799		GLB	OUTPRP		
0273	00001000	800	OUTPRP	GOSUB	=FXSTS	;YES, GET PRINTER STATUS	



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LOCATION	OBJECT CODE	LINE	SOURCE LINE			
0275	028C	801	ST=1?	7		;PACKED LISTING?
0276	00001001	802	GSUBC	EOLL		;YES, FINISH PACKED LISTING
0278	00001002	803	GOLONG	=PRX10		;CHECK FOR ERRORS, GOLONG NFRPU
		804	*			
		805	GLB	PRTPAC		
027A	00C6	806	PRTPAC	C=B	X	;RESTORE ORIG STATUS
027B	0358	807		ST=C		
027C	03B8	808		C=REGN	14	
027D	026E	809		C=C-1	W	;CLEAR PRINT FLAG
027E	03A8	810		REGN=C	14	
027F	00001000	811		GOSUB	PPGSNL	;COUNT THE CHARS
0281	011A	812		A=C	M	;SAVE CHAR CTR
0282	017A	813		A=A+1	M	;A= (#CHAR + 2 BLANKS) - 1
0283	03B8	814		C=REGN	14	
0284	022E	815		C=C+1	W	;SET PRINT FLAG
0285	03A8	816		REGN=C	14	
0286	0278	817		C=REGN	9	;GET # REMAINING CHAR POSITIONS
0287	0284	818		ST=0	7	;CLEAR "JUST FIT" FLAG
0288	031A	819		A<C?	M	;FITS WITH 2 BLANKS?
0289	0007	820		GOC	PRPA20	;YES, A= (#CHAR + 2 BLANKS) - 1
028A	01BA	821		A=A-1	M	;NO
028B	01BA	822		A=A-1	M	;SCRAP 2 BLANKS [A= #CHAR - 1]
028C	031A	823		A<C?	M	;FITS W/O 2 BLANKS?
028D	0003	824		GONC	PRPA50	;NO
028E	005A	825	PRPA15	C=0	M	;YES,MAKE # POSITIONS LEFT= 0
028F	0003	826		GOTO	PRPA40	
0290	017A	827	PRPA20	A=A+1	M	;A= #CHAR + 2 BLANKS
0291	00BA	828		ACEX	M	; "A"= # POS LEFT, "C"= # CHARS
0292	025A	829		C=A-C	M	;UPDATE CHAR COUNT
0293	0268	830	PRPA40	REGN=C	9	;STORE IT
0294	0288	831		ST=1	7	;SET PROGRAM LISTING FLAG
0295	00001000	832		GOSUB	PPGSNL	;PROGRAM STEP TO PRINTER
0297	0104	833		ST=0	8	;CLEAR LBL FLAG
0298	004C	834		ST=1?	4	;JUST PRINTED A LBL?
0299	0007	835		GOC	PRPA48	;YES
029A	0278	836		C=REGN	9	;GET # POSITIONS LEFT
029B	02FA	837		C#0?	M	;LAST STEP JUST FIT?
029C	0003	838		GONC	PRPA49	;YES, NO BLANKS
029D	00001000	839		GOSUB	=PRTMSG	;NO, SEND 2 BLANKS
029F	01A2	840		CON	642Q	;SKIP 2 CHARACTERS
02A0	0003	841	PRPA45	GOTO	PRPT80	
02A1	0108	842	PRPA48	ST=1	8	;SET LBL FLAG
02A2	0288	843	PRPA49	ST=1	7	;SET "JUST FIT" FLAG
02A3	001A	844		A=0	M	;CLEAR CHARACTER COUNTER
02A4	00001000	845	PRPA50	GOSUB	EOLL	;PRINT LEFT JUSTIFIED
02A6	0278	846		C=REGN	9	;GET COUNTERS
02A7	005A	847		C=0	M	;CLEAR CHAR COUNTER
02A8	005C	848		PT=	4	;LOAD NEW CHAR CTR= 24
02A9	0050	849		LC	1	
02AA	0210	850		LC	8	
02AB	0268	851		REGN=C	9	;STORE IT
02AC	031A	852		A<C?	M	;# CHARACTERS <= 24?
02AD	0003	853		GONC	PRPA15	;NO, PRINT ON OWN LINE
02AE	00001000	854		GOSUB	=PWAIT	;WAIT FOR THE PRINTER
02B0	028C	855		ST=1?	7	;LAST STEP JUST FIT?
02B1	0007	856		GOC	PRPA45	;YES, GET NEXT STEP
02B2	00001002	857		GOLONG	PRPT50	;NO, IT DIDN'T FIT AT ALL

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LOCATION OBJECT CODE LINE           SOURCE LINE
858 *****
859 *-LBLCK= LABEL CHECK
860 *
861 *-CHECKS FUNCTION CODE FOR LBL. RTNS WITH S4=1 FOR LBL, ELSE S4=0.
862 *
863 *-USES:    A,B,C,G,       PT,       S4,        2 SUB LEVELS
864 *-INPUTS:  A(0-3)= PC,     C(0-1)= FC
865 *-OUTPUTS: S4=1 FOR LBL,  ELSE S4=0.
866 *         PT= 1,        CHIP 0 NOT NECESSARILY ENABLED
867 *         RETURNS FC IN G INSTEAD OF C[1:0]
868 *         RETURNS PC IN B[3:0] INSTEAD OF A[3:0]
869 *
870                            GLB            LBLCK
02B4 0044           871 LBLCK           ST=0           4                    ;CLEAR "EOLL AFTER LBL" FLAG
02B5 008E           872                    B=A            W                    ;SAVE PC
02B6 0056           873                    C=0            XS
02B7 0106           874                    A=C            X                    ;FC TO "A"
02B8 039C           875                    PT=            0
02B9 0058           876                    G=C                                ;SAVE FC IN "G"
02BA 031C           877                    PT=            1
02BB 0342           878                    A#0?           PT                    ;SHORT NUMERIC LBL?
02BC 0003           879                    GONC           LBLCK9               ;YES
02BD 0130           880                    LDI                                ;NO
02BE 00CE           881                    CON            12*16+14
02BF 0362           882                    A#C?           PT                    ;ROW 12 FUNCTION?
02C0 0360           883                    RTNC                               ;NO
02C1 0366           884                    A#C?           X                    ;YES, "X<> NN" ?
02C2 03A0           885                    RTNNC                             ;YES, SO SEND A BLANK
02C3 0306           886                    A<C?           X                    ;NO, ALPHA LBL OR END?
02C4 0003           887                    GONC           LBLCK9               ;NO, LONG NUMERIC LBL
02C5 001C           888                    PT=            3                    ;YES
02C6 006A008A       889                    A=B            WPT                  ;COPY PC TO "A"
02C8 00001000       890                    GOSUB          =INCAD               ;SKIP 2ND BYTE
02CA 00001000       891                    GOSUB          =NXTBYT              ;GET 3RD BYTE
02CC 031C           892                    PT=            1
02CD 0222           893                    C=C+1         PT                    ;ALPHA LBL?
02CE 03A0           894                    RTNNC                             ;NO, IT'S AN END
02CF 0048           895 LBLCK9           ST=1           4                    ;SET LBL FLAG
02D0 03E0           896                    RTN
897
898 * CPFKB - COUNT OR PRINT FCN FROM KEYBOARD ENTRY
899 *
900 * PRESERVES: M
901 * USES: PT, A, B, C, N, S7:0, & 2 ADDITIONAL SUBROUTINE LEVELS
902 *
903 * INPUT: M[8:5] = 1 OR 2 BYTE FC, LEFT JUSTIFIED
904 *        IF FC IS XROM OR MAINFRAME NON-PROGRAMMABLE, M[4:2] MAY CONTAIN
905 *        AN ARGUMENT
906 *        FLAG 55=1 IMPLIES COUNT AND PRINT.  FLAG55=0 IMPLIES COUNT ONLY.
907 * OUTPUT: C.M=NUMBER OF CHARACTERS IN FCN DESCRIPTION
908 * ASSUMES: STD ASSUMPTIONS (PTR=P, HEXMODE, CHIP 0 ENABLED)
909 *
910                            GLB            CPFKB
02D1 0198           911 CPFKB           C=M                    ;RETRIEVE FC
02D2 02BC           912                    RCR            7                    ;1ST BYTE OF FC TO C[1:0]
02D3 0056           913                    C=0            XS
02D4 010E           914                    A=C            W                    ;FC TO A[2:12]

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LOCATION	OBJECT	CODE	LINE	SOURCE	LINE	
02D5	0130		915	LDI		
02D6	00CD		916	CON	12*16+13	;CD=FC FOR ALBL FROM PARSE
02D7	0366		917	A#C?	X	;FC#ALBL?
02D8	0003		918	GONC	PFK12	;ALBL
02D9	0130		919	LDI		
02DA	00A0		920	CON	10*16+0	;LOW END OF XROM FC RANGE
02DB	0306		921	A<C?	X	;FC<XROM?
02DC	0007		922	GOC	PFK10	;YES
02DD	0130		923	LDI		
02DE	00A8		924	CON	10*16+8	;1 PAST XROM RANGE
02DF	0306		925	A<C?	X	;FC=XROM?
02E0	0003		926	GONC	PFK10	;NO
02E1	0198		927	C=M		;XROM
02E2	00BC		928	RCR	5	;XROM TO C[3:0]
02E3	0108		929	ST=1	8	;SET UP FOR PXR10
02E4	00001002		930	GOLONG	PXR10	
			931			
02E6	00A60106		932	PFK10	C=A	X ;CONSTRUCT XADR
02E8	01BC		933	RCR	11	
02E9	015C		934	PT=	6	
02EA	0050		935	LC	1	
02EB	0110		936	LC	4	
02EC	0330		937	CXISA		
02ED	001C		938	PT=	3	
02EE	0050		939	LC	1	
			940	GLB	PFK11	;USED BY PXROM
02EF	01BC		941	PFK11	RCR	11 ;XADR TO C.M
02F0	027A		942	C=C-1	M	;CONSTRUCT XADR-1
02F1	0330		943	CXISA		
02F2	02E6		944	C#0?	X	
02F3	0007		945	GOC	PFK17	
			946	GLB	PFK300	
02F4			947	PFK12		
02F4			948	PFK300		;C(XADR-1)=0...NO PROMPT STRING
			949			;OR ALBL
			950			* COULD BE ALBL, GTOL, AGTO, AXEQ, XEQ/GTO IND, OR R/S FROM PRT8
02F4	02DC		951	PT=	13	
02F5	0130		952	LDI		
02F6	0005		953	CON	5	;FC FOR R/S
02F7	0366		954	A#C?	X	;FC#R/S?
02F8	0007		955	GOC	PFK310	;NOT R/S
02F9	00001000		956	GOSUB	=PRTMSG	
02FB	0052		957	CON	122Q	;R
02FC	0055		958	CON	125Q	;U
02FD	014E		959	CON	516Q	;N
02FE	00D0		960	LC	3	
02FF	00001002		961	PFK305	GOLONG	OUTPPS
			962			
0301	0130		963	PFK310	LDI	
0302	0001		964	CON	1	;GTOL
0303	0366		965	A#C?	X	;FC#GTOL?
0304	0007		966	GOC	PFK320	;NOT GTOL
0305	00001000		967	GOSUB	=PRTMSG	
0307	0047		968	CON	107Q	;G
0308	0054		969	CON	124Q	;T
0309	004F		970	CON	117Q	;O
030A	0020		971	CON	40Q	; BLANK

LOCATION	OBJECT	CODE	LINE	SOURCE	LINE		
030B	012E		972	CON		456Q	;
030C	0198		973	C=M			;RETRIEVE ARGUMENT
030D	023C		974	RCR		2	
030E	0226		975	C=C+1		X	;GTO..?
030F	0007		976	GOC		PFK315	;YES
0310	0150		977	LC		5	;NO, CHAR COUNT
0311	011E		978	A=C		S	
0312	0226		979	C=C+1		X	;GTO.ALPHA?
0313	0007		980	GOC		PFK337	;YES
0314	0003		981	GOTO		PFK45	;3D (OR 4D) ARGUMENT
			982				
0315	00001000		983	PFK315	GOSUB	=PRTMSG	;GTO..
0317	012E		984	CON		456Q	;
0318	0190		985	LC		6	;CHAR COUNT
0319	0003		986	GOTO		PFK305	
			987				
031A	0130		988	PFK320	LDI		
031B	00AE		989	CON		10*16+14	;FC=AE=XEQ/GTO IND
031C	0366		990	A#C?		X	;FC#XEQ/GTO IND
031D	0007		991	GOC		PFK330	
031E	0198		992	C=M			;XEQ/GTO IND
031F	00BC		993	RCR		5	;INDIRECT 2ND ARGUMENT
0320	00001002		994		GOLONG	PR1010	
			995				
0322	0130		996	PFK330	LDI		
0323	00CD		997	CON		12*16+13	;CD=ALBL
0324	0366		998	A#C?		X	;FC#ALBL?
0325	0007		999	GOC		PFK340	
0326	0130		1000	LDI			;ALBL
0327	00CF		1001	CON		12*16+15	;CF=FC FOR LBL NN
0328	00001000		1002	PFK334	GOSUB	PPROM1	
032A	00001000		1003		GOSUB	BPROM	;SEND & COUNT BLANK
032C	011E		1004	A=C		S	;CHAR COUNT TO A.S
032D	0003		1005	PFK337	GOTO	PFK52	
			1006				
032E	00A6		1007	PFK340	ACEX	X	;AXEQ OR AGTO
032F	005E		1008	C=0		S	;CONSTRUCT FC FOR
0330	02FC		1009	RCR		13	; XEQNN OR GTONN
0331	0003		1010	GOTO		PFK334	
			1011	*			
0332	023A		1012	PFK17	C=C+1	M	;CONSTRUCT XADR AGAIN
			1013		LEGAL		
0333	00001000		1014		GOSUB	PPROM2	
			1015		GLB	PFK20	
0335	011E		1016	PFK20	A=C	S	;CHAR COUNT TO A.S
0336	00BA		1017	ACEX		M	;C.M=XADR
0337	027A		1018	C=C-1		M	;C.M=XADR-1
0338	0330		1019	CXISA			;GET OP1 TO C.XS
0339	02F6		1020	C#0?		XS	;OP1#0?
			1021	*	FOR KEY TO PARSE OPERAND TYPES (OP1, OP2) SEE		DRC'S LAB BOOK #8338
			1022	*	P.25		
033A	00001002		1023		GOLNC	PPS200	;EXIT
033C	00001000		1024		GOSUB	PBLANK	;ADD A BLANK
033E	017E		1025	A=A+1		S	;INC CHAR COUNT
033F	0330		1026	CXISA			;RESTORE OP1 TO C.XS
0340	01F6		1027	C=C+C		XS	
0341	01F6		1028	C=C+C		XS	

LOCATION	OBJECT	CODE	LINE	SOURCE	LINE		
0342	01F6		1029	C=C+C	XS		;OPI BIT 1 SET?
0343	0003		1030	GONC	PFK38		;NO
0344	0144		1031	ST=0	6		;SAY 2D ARGUMENT
0345	0003		1032	GOTO	PFK35		
0346	0148		1033	PFK34	ST=1	6	;1 DIGIT ARGUMENT
0347	0198		1034	PFK35	C=M		;PUT ARG
0348	00BC		1035	RCR	5		; IN C[1:0]
0349	00001002		1036	GOLONG	PRW930		
			1037				
034B	027A		1038	PFK38	C=C-1	M	;C.M=XADR-2
034C	0330		1039	CXISA			;GET OP2
034D	0276		1040	C=C-1	XS		
034E	0007		1041	GOC	PFK52		;ALPHA OPERAND
034F	0276		1042	C=C-1	XS		
0350	0003		1043	GONC	PFK50		
			1044	GLB	PFK45		
0351			1045	PFK45			;3D ARGUMENT
0351	0198		1046	C=M			;PUT ARG
0352	023C		1047	RCR	2		; TO C.X
0353	02DC		1048	PT=	13		;SET A.S=3 TO GET 3D
0354	00D0		1049	LC	3		; FROM BINBCD
0355	00AE		1050	ACEX	W		;AND PUT ARG IN A.X
0356	0130		1051	LDI			
0357	03E8		1052	CON	1000		
0358	0306		1053	A<C?	X		;ARG < 4 DIGITS?
0359	0007		1054	GOC	PFK47		;YES
035A	017E		1055	A=A+1	S		;NO, OUTPUT 4 DIGITS
			1056	LEGAL			
035B	00001002		1057	PFK47	GOLONG	PRW938	
			1058				
035D	0276		1059	PFK50	C=C-1	XS	
035E	0003		1060	GONC	PFK34		
			1061	GLB	PFK52		
035F			1062	PFK52			;ALPHA OPERAND
035F	00001000		1063	GOSUB	=PRQUOT		
0361	004E		1064	C=0	W		
0362	00BE		1065	ACEX	S		;MOVE CHAR COUNT TO C.S
0363	00FC		1066	RCR	10		; NOW TO C.M
0364	011A		1067	A=C	M		; AND BACK TO A.M
0365	0278		1068	C=REGN	9		;GET STRING
0366	031C		1069	PT=	1		
0367	017A		1070	PFK55	A=A+1	M	;INC CHAR COUNT
0368	02EA		1071	C#0?	WPT		;IS THERE A CHARACTER LEFT?
0369	0003		1072	GONC	PFK57		;NO
036A	00001000		1073	GOSUB	=CPBYTE		
036C	004A		1074	C=0	WPT		;ZERO OUT THIS CHAR
036D	023C		1075	RCR	2		;ROTATE NEXT CHAR INTO POS
036E	0003		1076	GOTO	PFK55		
			1077				
036F	00001000		1078	PFK57	GOSUB	=PRQUOT	
0371	017A		1079	A=A+1	M		;INC CHAR COUNT
0372	0198		1080	C=M			
0373	02BC		1081	RCR	7		
0374	031C		1082	PT=	1		
0375	010A		1083	A=C	WPT		
0376	0130		1084	LDI			
0377	000F		1085	CON	15		;FC FOR ASN

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LOCATION	OBJECT CODE	LINE	SOURCE LINE				
0378	036A	1086	A#C?	WPT		;FC#ASN?	
0379	0003	1087	GONC	PFK70			
037A	00BA	1088	PFK59 ACEX	M		;CHAR COUNT TO C.M	
037B	03E0	1089	RTN				
		1090					
037C	00001000	1091	PFK70 GOSUB	PBLANK		;ASN	
037E	017A	1092	A=A+1	M		;INC CHAR COUNT	
037F	0198	1093	C=M				
0380	00BC	1094	RCR	5		;KC TO C1:0	
0381	0266	1095	C=C-1	X		;GET RID OF OFFSET	
0382	0358	1096	ST=C			;KC TO S7:0	
0383	00001000	1097	GOSUB	=PRKC		;PRINT KEYCODE	
0385	0003	1098	GOTO	PFK59			
		1099	*****				
		1100	*-BINBCD= CONVERT FROM BIN TO BCD				
		1101	*				
		1102	*-CONVERTS THE BINARY # IN A(X) TO BCD				
		1103	*				
		1104	*-USES: A, B(S), C, NO ST, ACTIVE PT, 1 ADDITIONAL SUB LEVEL				
		1105	* (GENNUM CALLS SUBROUTINE)				
		1106	*-INPUTS: [BINBCD] A(X)= BINARY #, A(S)= # OUTPUT DIGITS				
		1107	* [BINBD] C(X)= BINARY #, C(S)= # OUTPUT DIGITS				
		1108	* BOTH ENTRIES: HEX MODE				
		1109	*				
		1110	*-OUTPUTS: A(M)= DIGIT STRING (LEFT JUSTIFIED), B(S)=# OUTPUT DIGITS				
		1111	* HEX MODE, LCD DISABLED, RAM DISABLED				
		1112	*				
		1113	GLB	BINBD0			
		1114	GLB	BINBDC			
		1115	GLB	BINBCD			
0386	005E	1116	BINBD0	C=0	S	;OUTPUT 2, 3, OR 4 DIGITS	
0387	010E	1117	BINBDC	A=C	W	;INPUTS TO "A"	
0388	0130	1118	BINBCD	LDI			
0389	0010	1119	CON	20Q		;ADDR= CHIP 1 (NONEXISTENT)	
038A	0270	1120	DADD=C			;UNSELECT RAM	
038B	0046	1121	C=0	X			
038C	03F0	1122	PFAD=C			;UNSELECT PERIPHERALS	
038D	00001002	1123	GOLONG	=GENNUM		;CALC BCD #, AND # DIGITS OUTPUT	
		1124	*****				
		1125	*-PNUMBR= NUMBER TO PRINTER				
		1126	*				
		1127	*-SENDS DIGIT STRING IN A(M) TO PRINTER				
		1128	*-THE # OF DIGITS IS DETERMINED BY A(S)				
		1129	*				
		1130	*-USES: A(3-13), B(S), C, N, NO PT, NO STS, 1 SUB LEVEL				
		1131	*-INPUTS: A(M)= DIGIT STRING (LEFT JUSTIFIED)				
		1132	* A(S)= # DIGITS TO SEND TO PRINTER				
		1133	* HEX MODE				
		1134	*-OUTPUTS: HEX MODE, CHIP 0 ENABLED, (IF # DIGITS PRINTED#0)				
		1135	*				
		1136	*				
		1137	* PNUMBB - SAME AS PNUMBR EXCEPT EXPECTS # OF DIGITS IN B.S INSTEAD OF				
		1138	* A.S				
		1139	*				
		1140	GLB	PNUMBB			
		1141	GLB	PNUMBR			
		1142	GLB	PBINB0			

# NOMAS

Not Manufacturer Supported  
recipient agrees NOT to contact manufacturer

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LOCATION OBJECT CODE LINE           SOURCE LINE
038F 005E           1143           GLB                    PBINBD
0390 00001000       1144 PBINB0           C=0                    S                       ;OUTPUT 2,3, OR 4 DIGITS
0392 0073           1145 PBINBD           GOSUB                 BINBDC                 ;CONVERT TO BCD
0393 00BA           1146 PNUMBB           ABEX                   S                       ;# DIGITS TO A(S)
0394 02FC           1147 PNUMBR           ACEX                   M                       ;DIGITS TO C(M)
0395 01BE           1148                 RCR                   13                     ;LEFT JUSTIFY DIGITS IN "C"
0396 0360           1149 BNBCD3           A=A-1                 S                       ;COUNT DIGITS, DONE?
0397 0130           1150                 RTNC                                 ;YES
0398 0003           1151                 LDI                                 ;NO
0399 02FC           1152                 CON                   3                       ;ADD UPPER 4 BITS
0399 02FC           1153                 RCR                   13                     ;GET NEXT DIGIT
039A 00001000       1154                 GOSUB                 =CPBYTE               ;SEND TO PRINTER
039C 0003           1155                 GOTO                  BNBCD3
1156 *****
1157 *-LINELB= LINE # WITH LEADING BLANKS TO PRINTER
1158 *
1159 *-INPUTS: C(X)= LINE # (BINARY), HEXMODE
1160 *-USES: A,B(S),C,N, ACTIVE PT, NO STS, 2 ADDITIONAL SUB LEVELS
1161 *-OUTPUTS: HEX MODE, CHIP 0 ENABLED (IF # DIGITS PRINTED # 0)
1162 *
039D 00001000       1163                 GLB                   LINELB
039F 02DC           1164 LINELB           GOSUB                 BINBD0                 ;LINE#: BIN TO BCD
03A0 00D0           1165                 PT=                   13
03A1 007E           1166                 LC                    3
03A2 031E           1167                 ABEX                   S                       ;A.S= # OUTPUT DIGITS
03A3 00001001       1168                 A<C?                 S                       ;ADD LEADING BLANK?
03A5 0003           1169                 GOSUB                 PBLANK                ;YES
03A5 0003           1170                 GOTO                  PNUMBR               ;LINE # TO PRINTER
1171 *****
1172 ***** PRT3 -- BEGIN TO KEY IN ALPHA OPERAND *****
1173 *****
03A6 039C           1174                 GLB                   ALPHOP
03A7 0098           1175 ALPHOP           PT=                   0
03A8 0158           1176                 C=G
03A9 00001000       1177                 M=C                                 ;SAVE G REG
03AB 0198           1178                 GOSUB                 =DATAPR               ;PRINT DIGIT ENTRY STRING
03AC 039C           1179                 C=M
03AD 0058           1180                 PT=                   0
03AE 00001002       1181                 G=C                                 ;RESTORE G REG
03AE 00001002       1182                 GOLONG                =PR3RT
1183 *
1184 *****
1185 ***** PRT15 - SST/BST *****
1186 *****
03B0 01B0           1187                 GLB                   XPRT15
03B1 01B0           1188 XPRT15           C=STK
03B2 0158           1189                 C=STK
03B3 00001000       1190                 M=C                                 ;SAVE SSTBST RTN IN M
03B5 0198           1191                 GOSUB                 =DATAPR
03B6 0170           1192                 C=M
03B7 00001002       1193                 STK=C
1194                 GOLONG                =PR15RT
1195 *
1196 *****
1197 * PRTLCD - PRINT WHAT'S IN THE DISPLAY
1198 *
1199 * USES: A(X&S), C,S0,S9,N,ACTIVE PTR, AND 1 ADDITIONAL SUBROUTINE LEVEL

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LOCATION OBJECT CODE LINE       SOURCE LINE
1200 *
1201 * INPUT: CONTENTS OF THE LCD REGISTERS
1202 * OUTPUT: ONE LINE TO THE PRINTER BUFFER (NO EOL), CHIP 0 ENABLED.
1203 * ASSUMES: HEXMODE. DOESN'T CARE WHICH CHIP IS ENABLED.
1204 *
1205                           GLB                   PRTLCD
03B9 02DC           1206 PRTLCD           PT=                   13
03BA 02D0           1207                   LC                   11                   ;SET UP COUNTER
03BB 011E           1208                   A=C                   S                   ; IN A.S
03BC 00001000       1209                   GOSUB                =ENLCD
03BE 00001000       1210 PLCD10           GOSUB                GCHAR
03C0 00001000       1211                   GOSUB                =PBYTDA           ;A(X) TO PRINTER
03C2 031C           1212                   PT=                   1
03C3 037C           1213                   RCR                   12
03C4 02EA           1214                   C#0?                WPT                   ;PUNCTUATION?
03C5 00001001       1215                   GSUBC                =PBYTEC           ;YES
03C7 01BE           1216                   A=A-1                S                   ;DONE?
03C8 0003           1217                   GONC                 PLCD10             ;NO
03C9 00001002       1218                   GOLONG               =ENCP00
1219
1220 *****
1221 *-GCHAR= GET CHARACTER (FROM DISPLAY)
1222 *-LCDASC= LCD TO ASCII
1223 *
1224 *-GCHAR GETS A CHARACTER FROM THE DISPLAY AND CONVERTS IT TO ASCII
1225 *
1226 *-USES: A(X),C, NO PT, S0 (SPECIAL CHAR), NO ADDITIONAL SUB LEVELS
1227 *-INPUTS: [GCHAR]: DISPLAY ENABLED, RAM DISABLED
1228 *           [LCDASC]: A(0-1)= LCD FORMAT CHAR WITH NO PUNCTUATION
1229 *           [LCDASC]: C(12-13) WILL BE PRESERVED (IT IS OUTPUT AS PUNCTUATION)
1230 *-OUTPUTS: A(0-1)= ASCII CHARACTER, C(12-13)= PUNCTUATION (=0 IF NO PUNCT)
1231 *
1232                           GLB                   GCHAR
1233                           GLB                   LCDASC
03CB 0384           1234 GCHAR           ST=0                   0
03CC 03F8           1235                   RABCL                   ;FETCH LEFT CHAR FROM DISPLAY
03CD 01F6           1236                   C=C+C                XS                   ;SCRAP GARBAGE BITS
03CE 01F6           1237                   C=C+C                XS                   ;SCRAP GARBAGE BITS
03CF 01F6           1238                   C=C+C                XS                   ;SCRAP GARBAGE BITS
03D0 01F6           1239                   C=C+C                XS                   ;SPECIAL CHARACTER?
03D1 0003           1240                   GONC                 GCHR40             ;NO
03D2 0388           1241                   ST=1                   0                   ;YES
03D3 0106           1242 GCHR40           A=C                   X                   ;CHAR TO "A" (XS= 0)
03D4 0130           1243                   LDI
03D5 0040           1244                   CON                   100Q
03D6 01C6           1245                   A=A-C                X                   ;ANY PUNCTUATION?
03D7 0003           1246                   GONC                 GCHR45             ;YES
03D8 0046           1247                   C=0                   X                   ;NO
03D9 0003           1248                   GOTO                 GCHR50
03DA 01C6           1249 GCHR45           A=A-C                X                   ;PERIOD?
03DB 0007           1250                   GOC                   GCHR47             ;YES
03DC 01C6           1251                   A=A-C                X                   ;NO, COLON?
03DD 0007           1252                   GOC                   GCHR48             ;YES
03DE 0130           1253                   LDI                   ;NO, MUST BE COMMA
03DF 002C           1254                   CON                   54Q                 ;ASCII COMMA
03E0 023C           1255                   RCR                   2                   ;SAVE PUNCTUATION
03E1 0003           1256                   GOTO                 LCDASC

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LOCATION	OBJECT	CODE	LINE	SOURCE	LINE	
03E2	0130		1257	GCHR47		LDI
03E3	002E		1258			CON            56Q            ;ASCII PERIOD
03E4	0003		1259			GOTO           GCHR49
03E5	0130		1260	GCHR48		LDI
03E6	003A		1261			CON            72Q            ;ASCII COLON
03E7	023C		1262	GCHR49		RCR            2               ;SAVE PUNCTUATION
03E8	0130		1263	GCHR50		LDI
03E9	0040		1264			CON            100Q
03EA	0146		1265			A=A+C           X               ;RESTORE UPPER BITS
03EB	038C		1266	LCDASC		ST=1?           0               ;SPECIAL CHAR?
03EC	0007		1267			GOC            SPCASC          ;YES
03ED	0130		1268			LDI                                   ;NO
03EE	0020		1269			CON            40Q
03EF	0306		1270			A<C?           X               ;CHAR < @40 ?
03F0	03A0		1271			RTNNC                               ;NO
03F1	01E6		1272			C=C+C           X               ;YES, C(X)= @100
03F2	0146		1273			A=A+C           X               ;ASCII= CHAR + @100
03F3	03E0		1274			RTN
03F4	003C		1275	SPCASC		RCR            3               ;SAVE PUNCTUATION IN C(9-10)
03F5	00A6		1276			ACEX           X               ;LCD CHAR TO "C"
03F6	033C		1277			RCR            1               ;SAVE DIGIT 0 OF CHAR
03F7	0130		1278			LDI
03F8	02C0		1279			CON            1300Q           ;LOAD ADDR= @26000
03F9	00FC		1280			RCR            10              ;ADDR DIGIT 0= LCD DIGIT 0
03FA	0330		1281			CXISA                               ;GET ASCII EQUIVALENT FORM
			1282 *			*SPECIAL CHAR TABLE, CN11, @0
03FB	0106		1283			A=C            X               ;ASCII CHAR TO "A"
03FC	03E0		1284			RTN
			1285 *			
03FD	00000000		1286			FILLTO                               1777Q
			1287			END

Errors=      0

FILE: QUAD2: HELIOS      CROSS REFERENCE TABLE      PAGE 25

LINE#	SYMBOL	TYPE	REFERENCES
1175	ALPHOP	P	1174
	ASRCH	E	715
1118	BINBCD	P	147,1115
1116	BINBD0	P	1113,1164
1117	BINBDC	P	1114,1145
1149	BNBCD3	P	1155
568	BPROM	P	82,564,1003
567	BPROM1	P	36,362,565
566	BPROMT	P	51,103,265,563
189	CPABC	P	164
	CPBYTE	E	180,244,338,492,558,590,679,1073,1154
911	CPFKB	P	910
	CPGMHD	E	734
	CPYS6M	E	266,329,363
	DATAPR	E	1178,1191
	ENCP00	E	403,1218
	ENLCD	E	1209
593	EOLL	P	470,472,592,746,771,790,802,845
588	EOLR	P	587,787
590	EOLR10	P	586,595
	ERRNE	E	717
	ERRPR	E	412
	FLINKP	E	730
	FNSTS	E	760
	FXSTS	E	455,800
1234	GCHAR	P	1210,1232
1242	GCHR40	P	1240
1249	GCHR45	P	1246
1257	GCHR47	P	1250
1260	GCHR48	P	1252
1262	GCHR49	P	1259
1263	GCHR50	P	1248
	GENNUM	E	1123
	GETPC	E	446,728,793
409	GLIN20	P	406
403	GLINE_NO	P	402,745
	GTRMAD	E	642
	INADXP	E	320,322
	INCAD	E	54,355,890
	IPRT	E	744
871	LBLCK	P	452,870
895	LBLCK9	P	879,887
1266	LCDASC	P	555,1233,1256
1164	LINELB	P	486,1163
	LINNUM	E	404
695	LIST	P	694
739	LISTN	P	701,738
	NBYTAB	E	68,105,245,635
	NXBTXP	E	267,321,341
	NXTBYT	E	55,356,447,891
184	OUTPPS	P	31,152,182,389,652,961
652	OUTPPX	P	684
800	OUTPRP	P	756,799
	PAD1_A	E	786
1144	PBINB0	P	676,681,1142
1145	PBINBD	P	1143
584	PBLANK	P	231,583,1024,1091,1169

FILE: QUAD2: HELIOS      CROSS REFERENCE TABLE      PAGE 26

LINE#	SYMBOL	TYPE	REFERENCES
	PBYTDA	E	1211
	PBYTEC	E	1215
214	PDER00	P	255
228	PDER10	P	219
236	PDER20	P	230
239	PDER50	P	217
242	PDER55	P	223,227,235,238
256	PDER90	P	253
209	PDEROW	P	26,208
932	PFK10	P	922,926
941	PFK11	P	940
947	PFK12	P	918
1012	PFK17	P	945
1016	PFK20	P	653,1015
948	PFK300	P	946
961	PFK305	P	986
963	PFK310	P	955
983	PFK315	P	976
988	PFK320	P	966
996	PFK330	P	991
1002	PFK334	P	1010
1005	PFK337	P	980
1033	PFK34	P	1060
1007	PFK340	P	999
1034	PFK35	P	1032
1038	PFK38	P	1030
1045	PFK45	P	981,1044
1057	PFK47	P	1054
1059	PFK50	P	1043
1062	PFK52	P	1005,1041,1061
1070	PFK55	P	1076
1078	PFK57	P	1072
1088	PFK59	P	1098
1091	PFK70	P	1087
319	PLBL	P	315,364,670
318	PLBL0	P	316
322	PLBL3	P	317
1210	PLCD10	P	1217
1146	PNUMBB	P	149,1140
1147	PNUMBR	P	1141,1170
444	PPGMRS	P	438,776,789
445	PPGMST	P	440
446	PPGS05	P	443
447	PPGS10	P	450
459	PPGS20	P	457
466	PPGS25	P	462
468	PPGS30	P	464
472	PPGS33	P	465
474	PPGS34	P	467
475	PPGS35	P	441,454
483	PPGS37	P	481
492	PPGS60	P	490
493	PPGS65	P	484
442	PPGSNL	P	439,811,832
524	PPROM1	P	388,521,567,1002
532	PPROM2	P	522,650,1014
523	PPROMT	P	30,80,520

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LINE#	SYMBOL	TYPE	REFERENCES
34	PPS120	P	25,29
183	PPS200	P	181,1023
641	PPXROM	P	630
263	PR0110	P	212,260
70	PR1010	P	69,994
80	PR1020	P	77
49	PR1314	P	18,19
	PR15RT	E	1194
	PR3RT	E	1182
	PRKC	E	1097
535	PRMT20	P	560
545	PRMT30	P	542
551	PRMT40	P	546
552	PRMT45	P	550
21	PROW0	P	5
40	PROW09	P	14
26	PROW1	P	6
59	PROW10	P	15
41	PROW11	P	16
44	PROW12	P	17
27	PROW2	P	7
32	PROW3	P	8
91	PROW9	P	40
710	PRP	P	709
825	PRPA15	P	853
827	PRPA20	P	820
830	PRPA40	P	826
841	PRPA45	P	856
842	PRPA48	P	835
843	PRPA49	P	838
845	PRPA50	P	824
717	PRPERR	P	719
	PRQUOT	E	344,1063,1078
1206	PRTLCD	P	1205
	PRTMSG	E	120,375,658,839,956,967,983
726	P RTP15	P	714
730	P RTP16	P	727
732	P RTP18	P	722,724
734	P RTP20	P	729
749	P RTP30	P	798
754	P RTP40	P	748,752
760	P RTP50	P	759,857
765	P RTP55	P	763
781	P RTP60	P	779
793	P RTP80	P	788,792,841
806	P RTPAC	P	766,805
789	P RTPPL	P	775
23	PRW010	P	43
353	PRW120	P	48,351
367	PRW122	P	359
385	PRW124	P	369,371
30	PRW4_8	P	9,10,11,12,13
102	PRW910	P	47,66
103	PRW911	P	95
112	PRW930	P	39,111,1036
116	PRW933	P	86,115
130	PRW935	P	58,114

FILE: QUAD2: HELIOS      CROSS REFERENCE TABLE      PAGE 28

LINE#	SYMBOL	TYPE	REFERENCES
132	PRW936	P	129
144	PRW938	P	141,143,1057
155	PRW940	P	136,154
172	PRW945	P	176
177	PRW950	P	191,195
178	PRW960	P	173,198,201
	PRX10	E	803
374	PR_END	P	373
338	PSTR10	P	342
344	PSTR20	P	340
331	PSTRNG	P	268,314,325
327	PTXROW	P	20,313
	PUTPCF	E	735
	PUTPCL	E	796
	PWAIT	E	772,854
642	PXR10	P	631,930
655	PXR19	P	643
656	PXR20	P	645
674	PXR30	P	665
632	PXROM	P	62,629
196	P_L	P	158
199	P_T	P	166
	SKPLIN	E	794
192	SMABC	P	160
1275	SPCASC	P	1267
1188	XPRT15	P	1187

FILE: QUAD3:HELIOS           HEWLETT-PACKARD: COCONUT ASSEMBLER 1.03 / CORVALLIS DIVISION           PAGE 1

LOCATION	OBJECT	CODE	LINE	SOURCE	LINE
			1	"COCONUT"	
			2	*	
			3	*	
0000	0086		4	CON	206Q ;F
0001	0015		5	CON	21 ;U
0002	0002		6	CON	2 ;B
0003	0012		7	CON	22Q ;R
0004	0010		8	CON	20Q ;P
			9	GLB	PRBUF
0005	00001000		10	PRBUF	GOSUB ICF
0007	00101002		11	GOLONG	=LPECHK ;EOLL, CHECK FOR PRINTER ERRORS
			12	*****	
			13	++	
			14	GLB	PADV
0009	00001000		15	PADV	GOSUB CKOEN
000B	03E0		16	RTN	;P+1 - DON'T PRINT
000C	00001000		17	GOSUB	ICF10 ;P+2 - PRINT
000E	00001002		18	GOLONG	=RPECHK ;EOLR, CHECK PRINTER ERRORS
			19	*****	
			20	++	
			21	* SFF5521 - SET FLAGS 55 AND 21	
			22	* USES: C, ST, AND 1 ADDITIONAL SUBROUTINE LEVEL	
			23	* IN: NOTHING	
			24	* OUT: SS 0 UP, CHIP 0 ENABLED, C=REG 14	
			25	* ASSUMES: NOTHING	
			26	*	
			27	GLB	SF5521
0010	00001000		28	SF5521	GOSUB =LDSSTO ;GET FLAGS
0012	0388		29	ST=1	0 ;SET PRINTER EXISTENCE FLAG
0013	0398		30	C=ST	
0014	013C		31	RCR	8
0015	03D8		32	CSTEX	;C= SST 0
0016	0208		33	ST=1	2 ;SET PRINTER CONTROL FLAG
0017	03D8		34	CSTEX	; (ENABLE PRINTER)
0018	017C		35	RCR	6
0019	03A8		36	REGN=C	14 ;PUT FLAGS BACK
001A	03E0		37	RTN	
			38	*****	
001B	0092		39	CON	222Q ;R
001C	0008		40	CON	10Q ;H
001D	0003		41	CON	3Q ;C
001E	0003		42	CON	3Q ;C
001F	0001		43	CON	1Q ;A
			44	GLB	ACCHR
0020	00001000		45	ACCHR	GOSUB CX_128 ;CONVERT X TO BINARY, RTN ONLY
			46		;IF X<128
0022	00001000		47	GOSUB	IACHR
0024	0003		48	GOTO	PPECHK ;A(X) TO PRINTER, CHECK ERRORS
			49	*****	
			50	*	
			51	* ACCOL - ACCUMULATE COLUMN IN PRINTER BUFFER	
			52	*	
0025	008C		53	CON	214Q ;L
0026	000F		54	CON	15 ;O
0027	0003		55	CON	3 ;C
0028	0003		56	CON	3 ;C
0029	0001		57	CON	1 ;A

LOCATION	OBJECT CODE	LINE	SOURCE LINE			
		58		GLB	ACCOL	
002A	00001000	59	ACCOL	GOSUB	CX_128	;"X" TO BINARY, CHECK < 128
002C	00001000	60		GOSUB	IACOL	;INITIALIZE COL OUT PRINT
		61				
		62		GLB	PPECHK	
002E	00001000	63	PPECHK	GOSUB	PBYTDA	;A(X) BIT PATTERN TO PRINTER
0030	00001002	64		GOLONG	PECHK	;ERROR CHK AND EXIT
		65	*			
		66	*	PR SVC (PRINTER SERVICE) - I/O SERVICE ENTRY POINT LOGIC.		
		67	*			
		68	*	FOR FLOWCHART SEE BW'S LAB BOOK #8377 P.15		
		69	*			
		70	*	ENTERS WITH SS0 UP		
		71	*	IF NORMAL RETURN TO RMCK10 IS MADE, C MUST BE PRESERVED AND		
		72	*	SS 0 MUST BE UP.		
		73	*			
		74		GLB	PR SVC	
		75	*	WHEN WE ARRIVE AT PR SVC, WE HAVE ALREADY CHECKED THAT THE PRINTER		
		76	*	IS TURNED ON.		
0032	00A6	77	PR SVC	ACEX	X	;COPY PAUSETIMER TO C.X
0033	0158	78		M=C		;SAVE C IN M
0034	038C	79		ST=1?	0	;FLAG 55 SET?
		80	*	FLAG 55 COULD BE CLEAR HERE IF THE USER PLUGGED IN THE PRINTER WHILE		
		81	*	THE 41C WAS ON.		
0035	00001000	82		G SUBNC	SF5521	;NO, SET FLAGS 55 AND 21
0037	0244	83		ST=0	9	;INITIALIZE ERROR FLAG
0038	00001000	84		GOSUB	FNSTS	
003A	024C	85		ST=1?	9	;INTERFACE ERROR?
003B	0007	86		GOC	PSVC90	;YES
003C	010E	87		A=C	W	;SAVE SS0 & 2ND PTR STS BYTE
003D	03B8	88		C=REGN	14	
003E	023C	89		R CR	2	
003F	03D8	90		CSTEX		
0040	030C	91		ST=1?	1	;PKSEQ?
0041	0007	92		GOC	PSVC40	;YES
0042	0358	93		ST=C		;RESTORE 1ST PTR STS BYTE
0043	00AE	94		ACEX	W	;BRING BACK SAVED C REG
0044	000C	95		ST=1?	3	;OUT OF PAPER?
0045	0007	96		GOC	PSVC10	;YES
0046	01FA	97		C=C+C	M	;NO
0047	01FA	98		C=C+C	M	;OUT OF PAPER HOLD?
0048	0003	99		GONC	PSVC30	;NO
0049	008C	100		ST=1?	5	;YES, PRINT KEY?
004A	0007	101		GOC	PSVC20	;YES
004B	00001000	102	PSVC10	GOSUB	OOPMSG	;DISPLAY "OUT OF PAPER"
004D	0003	103		GOTO	PSVC90	
004E	00001000	104	PSVC20	GOSUB	=EOLL	;SEND EOLL TO CLEAR "HOLD" AND
		105				;TO GIVE VISIBLE RESPONSE
0050	00001002	106		GOLONG	=ABTS10	;CLR MSGFLG & RENEW DISPLAY
0052	030C	107	PSVC30	ST=1?	1	;IDLE?
0053	0007	108		GOC	PSVC50	;YES
0054	038C	109		ST=1?	0	;NO, BUFFER EMPTY?
0055	0007	110		GOC	PSVC90	;YES
0056	0358	111		ST=C		;NO, PUT UP SST0
0057	0208	112		ST=1	2	;SET I/O FLAG= STAY AWAKE UNTIL
		113				;PRINTER IS DONE SO NUT CAN
		114				;DISPLAY "OUT OF PAPER" IF

LOCATION	OBJECT CODE	LINE	SOURCE LINE		
		115			;NECESSARY.
0058	00001000	116	GOSUB	=STOSTO	;STORE SSTO
005A	0003	117	GOTO	PSVC95	
005B	0358	118	PSVC40	ST=C	
005C	004C	119		ST=1?	4 ;ADV KEY DOWN?
005D	0003	120	GONC	PSVC90	;NO
005E	0130	121	LDI		
005F	00FF	122	CON	377Q	;IGNORE LOCAL PAPER ADVANCE
0060	00001000	123	GOSUB	PBYTEC	;IGN LOCAL P ADV COMMAND TO PRINTER
		124 *	CAN'T USE PRMSG -- TOO MANY SUB LEVELS		
		125			
0062	0003	126	GOTO	PSVC90	
0063	008C	127	PSVC50	ST=1?	5 ;PRINT KEY DOWN?
0064	0007	128	GOC	PKEY	;YES
0065	004C	129		ST=1?	4 ;NO, ADV KEY DOWN?
0066	00001003	130	GOLC	ADVKEY	;YES
		131			
0068	03B8	132	PSVC90	C=REGN	14 ;RESTORE SS0 TO ST
0069	0358	133		ST=C	
006A	0198	134	PSVC95	C=M	;RESTORE C
006B	0106	135		A=C	X ;RESTORE PAUSETIMER
006C	01A6	136		A=A-1	X ;ADJUST PAUSETIMER
006D	0003	137	GONC	PSVC99	
006E	0006	138		A=0	X ;DON'T ALLOW PSETMR TO ROLL OVER
006F	00001002	139	PSVC99	GOLONG	=RMCK10
		140 *			
		141 *	PKEY - SERVICE PRINT KEY		
		142 *			
0071	0358	143	PKEY	ST=C	;RESTORE STATUS SET 0
0072	000C	144		ST=1?	3 ;PROGRAM MODE?
0073	0003	145	GONC	PKEY15	;NO
		146			;PROGRAM MODE
0074	0048	147		ST=1	4 ;SET INSERT BIT FOR
		148 *	DSPLN+ AND NLT040. OVERLAYS SSTFLAG IN SS 0		
0075	00001000	149	PKEY15	GOSUB	=DSPLN_
0077	00001000	150		GOSUB	=MESSL
0079	0010	151	CON	16	;P
007A	0012	152	CON	18	;R
007B	0218	153	CON	1030Q	;X
007C	028C	154		ST=1?	7 ;ALPHAMODE?
007D	0003	155	GONC	PRT30	;NO
		156			
007E	03B8	157	RABCR		;SCRAP THE X
007F	00001000	158	GOSUB	=MESSL	;ADD "A" TO GET "PRA"
0081	0201	159	CON	1001Q	;A
0082	00001000	160	PRT30	GOSUB	=LEFTJ
0084	00001000	161		GOSUB	=ENCP00
0086	005C	162		PT=	4 ;SET UP FC FOR PRA OR PRX
0087	0290	163	LC	10	;FC FOR PRX=A754
0088	01D0	164	LC	7	
0089	0150	165	LC	5	
008A	0110	166	LC	4	;ASSUME PRX
008B	028C	167		ST=1?	7 ;ALPHAMODE?
008C	0003	168	GONC	PKEY35	;NO
008D	021C	169		PT=	2 ;YES, FC FOR PRA=A748
008E	0110	170	LC	4	
008F	0210	171	LC	8	

# NOMAS

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LOCATION	OBJECT CODE	LINE	SOURCE LINE				
0090	010E	172	PKEY35	A=C	W	;FC TO A[4:1]	
0091	0398	173		C=ST		;COPY ST TO G FOR NLT040	
0092	039C	174		PT=	0		
0093	0058	175		G=C			
		176					
0094	0130	177		LDI			
0095	00E0	178		CON	340Q	;INITIALIZE TIMER	
0096	0266	179	PRT40	C=C-1	X		
0097	0007	180		GOC	PRT60	;TIMEOUT	
0098	00E6	181		BCEX	X	;SAVE TIMER IN B.X	
0099	00001000	182		GOSUB	FXSTS	;GET PRINTER STATUS	
009B	00C6	183		C=B	X	;TIMER BACK TO C.X	
009C	024C	184		ST=1?	9	;PRINTER ERROR?	
009D	0007	185		GOC	PRT50	;YES, ASSUME KEY IS UP.	
009E	008C	186		ST=1?	5	;PRINT KEY STILL DOWN?	
009F	0007	187		GOC	PRT40	;YES	
		188	*SINCE THE PRINT KEY WON'T BE RECOGNIZED UNTIL THE PRINTER IS IDLE				
		189	*AGAIN, AND SINCE THE PRINTER KEYBOARD DOESN'T LATCH KEYS, THE TIME				
		190	*TAKEN TO PRINT IS USED TO DEBOUNCE THE KEY.				
		191					
00A0	00001002	192	PRT50	GOLONG	=NLT040		
		193					
00A2		194	PRT60			;NULL OUT THE PRINT KEY	
00A2	0104	195		ST=0	8		
00A3	00001000	196		GOSUB	=MSGA	;"NULL" MESSAGE TO DISPLAY	
00A5	0000	197		CON	=MSGNL		
00A6	0130	198		LDI			
00A7	03E8	199		CON	1000	;WAIT 2(1000)155 MICROSEC= 0.31 SEC	
00A8	0266	200	PRT70	C=C-1	X		
00A9	0003	201		GONC	PRT70		
00AA	00001000	202	PRT80	GOSUB	FXSTS		
00AC	024C	203		ST=1?	9	;PRINTER ERROR?	
00AD	0007	204		GOC	PRT90	;YES, ASSUME KEY IS UP.	
00AE	008C	205		ST=1?	5	;PRINT KEY STILL DOWN?	
00AF	0007	206		GOC	PRT80	;YES	
00B0	0003	207	PRT90	GOTO	ADV03		
		208	*				
		209	* ADVKEY - SERVICE PAPER ADVANCE KEY				
		210	*				
		211		GLB	ADVKEY		
00B1	0358	212	ADVKEY	ST=C		;RESTORE SST 0	
00B2	000C	213		ST=1?	3	;PROGRAM MODE?	
00B3	0007	214		GOC	ADV04	;YES	
00B4	00001000	215		GOSUB	=DATAPR	;NO, PRINT DATA ENTRY STRING	
00B6	00001000	216		GOSUB	=EOLR	;EOLR= GET OUT ANY PARTIAL LINE	
00B8	0244	217		ST=0	9	;IGNORE ANY ERROR SO FAR	
00B9	00001000	218	ADV02	GOSUB	FXSTS		
00BB	024C	219		ST=1?	9	;PRINTER ERROR?	
00BC	0007	220		GOC	ADV50	;YES, ASSUME KEY IS UP	
00BD	004C	221		ST=1?	4	;ADV KEY STILL DOWN?	
00BE	0007	222		GOC	ADV02	;YES	
00BF	0003	223	ADV03	GOTO	ADV50	;NO. ALL DONE.	
		224					
		225	* SEND COMMAND TO HELIOS TO IGNORE LOCAL PAPER ADVANCE				
00C0	00001000	226	ADV04	GOSUB	=PRMSG	;PROGRAM MODE, IGNORE PAPER ADVANCE	
00C2	01FF	227		CON	777Q	;IGNORE PAPER ADVANCE COMMAND	
00C3	0048	228		ST=1	4	;SET S4 FOR DSPLN+,ETC.	

LOCATION	OBJECT CODE	LINE	SOURCE LINE
00C4	00001000	229	GOSUB            =DSPLN_
00C6	00001000	230	GOSUB            =MESSL
00C8	0001	231	CON              1            ;A
00C9	0004	232	CON              4            ;D
00CA	0216	233	CON              1026Q       ;V
00CB	00001000	234	GOSUB            =LEFTJ
00CD	00001000	235	GOSUB            =ENCP00
00CF	005C	236	PT=              4
00D0	0210	237	LC               8            ;FC FOR
00D1	03D0	238	LC               15          ; ADV
00D2	010E	239	A=C              W
00D3	0398	240	C=ST
00D4	039C	241	PT=              0
00D5	0058	242	G=C
00D6	0130	243	LDI
00D7	00E0	244	CON              340Q
00D8	0266	245 ADV10	C=C-1            X            ;TIMEOUT?
00D9	0007	246	GOC              ADV30       ;YES
00DA	00E6	247	BCEX             X
00DB	00001000	248	GOSUB            FXSTS
00DD	024C	249	ST=1?            9            ;PRINTER ERROR?
00DE	0007	250	GOC              ADV20       ;YES, ASSUME KEY IS UP
00DF	00C6	251	C=B              X
00E0	004C	252	ST=1?            4            ;ADV KEY STILL DOWN?
00E1	0007	253	GOC              ADV10       ;YES
00E2	00001002	254 ADV20	GOLONG           =NLT040
		255	
00E4		256 ADV30	
			;DO LOCAL PAPER ADVANCE
00E4	0266	257	C=C-1            X            ;C(X): FF TO FE
		258	LEGAL
		259	* SEND HELIOS A COMMAND TO RE-ENABLE LOCAL PAPER ADVANCE
00E5	00001000	260	GOSUB            PBYTEC
00E7	00001002	261 ADV50	GOLONG           =ABTS10
		262	*****
		263	*-CX<128= CONVERT X TO BINARY, CHECK X<128
		264	*
		265	*-USES: A(X),C, NO STS, NO PT, 2 ADDITIONAL SUB LEVELS
		266	*-INPUTS: CONTENTS OF X REG, CHIP 0 ENABLED, HEXMODE
		267	*-OUTPUTS: A(X)= BINARY NUMBER<128, CHIP 0 ENABLED, HEXMODE
		268	*
		269	GLB              CX_128
00E9	00001000	270 CX_128	GOSUB            =CONV3D       ;CONVERT X REG TO BINARY
00EB	0106	271	A=C              X            ;A= BINARY NUMBER
00EC	0130	272	LDI
00ED	0080	273	CON              128
00EE	0306	274	A<C?            X            ;NUMBER < 128?
00EF	0360	275	RTNC             ;YES
00F0	0003	276	GOTO             AERRDE       ;NO, DATA ERROR
		277	*****
		278	*
		279	* BLDSPC - BUILD SPECIAL CHARACTER
		280	*
00F1	0083	281	CON              203Q       ;C
00F2	0005	282	CON              5           ;E
00F3	0010	283	CON              16          ;P
00F4	0013	284	CON              19          ;S
00F5	0004	285	CON              4           ;D

LOCATION	OBJECT CODE	LINE	SOURCE LINE			
00F6	000C	286	CON	12		;L
00F7	0002	287	CON	2		;B
		288	GLB	BLDSPC		
00F8	00001000	289	BLDSPC	GOSUB	CX_128	; "X" TO BINARY, CHECK < 128
00FA	00B8	290		C=REGN	2	;GET Y
00FB	027E	291		C=C-1	S	
00FC	02FE	292		C#0?	S	;IS Y A NUMBER?
00FD	0003	293		GONC	BLD10	;NO
00FE	004E	294		C=0	W	;YES. INITIALIZE TO NULL STRING
00FF	01EE	295	BLD10	C=C+C	W	
0100	01EE	296		C=C+C	W	
0101	037C	297		RCR	12	
0102	02DC	298		PT=	13	
0103	0050	299		LC	1	;LEAVE SIGN DIGIT= 1= ALPHA DATA
0104	03CA	300		CSR	WPT	;LEAVE 3 MSB OF DIGIT 12= 000
0105	01EA	301		C=C+C	WPT	
0106	0206	302		C=A+C	X	
0107	00EE	303		BCEX	W	
0108	00001002	304		GOLONG	=DROPST	
		305	*			
		306	*	ACSPEC - ACCUMULATE SPECIAL CHARACTER		
		307	*			
		308	*	USES A,C,M,N,PT,S9:0, & W ADDITIONAL SUBROUTINE LEVELS		
		309	*			
		310	*	ACSPCC= ACCUMULATE SPECIAL CHARACTER IN C REGISTER		
		311	*	USES: A,C,M,N, PT, S0-S9, 2 ADDITIONAL SUB LEVELS		
		312	*	INPUTS: C= SPECIAL CHARACTER, CHIP 0 ENABLED		
		313	*	RTNS WITH CHIP 0 ENABLED		
		314	*			
010A	0083	315		CON	203Q	;C
010B	0005	316		CON	5	;E
010C	0010	317		CON	16	;P
010D	0013	318		CON	19	;S
010E	0003	319		CON	3	;C
010F	0001	320		CON	1	;A
		321		GLB	ACSPEC	
0110	00F8	322	ACSPEC	C=REGN	3	
0111	027E	323		C=C-1	S	
0112	027E	324		C=C-1	S	
0113	00001002	325	AERRDE	GOLNC	=ERRDE	
0115	00001000	326		GOSUB	IACOL	;INITIALIZE COL OUT PRINT
0117	02DC	327		PT=	13	
0118	0190	328		LC	6	
0119	011E	329		A=C	S	
011A	00F8	330		C=REGN	3	
011B	0003	331		GOTO	ACSPCC	
		332				
011C	0198	333	SPEC10	C=M		
011D	01EE	334		C=C+C	W	
		335		GLB	ACSPCC	
011E	02FC	336	ACSPCC	RCR	13	
011F	01EE	337		C=C+C	W	
0120	01EE	338		C=C+C	W	
0121	0158	339		M=C		
0122	037C	340		RCR	12	
0123	00001000	341		GOSUB	PBYTDU	
0125	01BE	342		A=A-1	S	;DONE WITH REGISTER YET?

LOCATION	OBJECT CODE	LINE	SOURCE LINE			
0126	0003	343	GONC	SPEC10		;NO
		344	*			
		345	*ACSPEC FALLS INTO PECHK HERE!!!!!!!!!!!!!!			
		346	*			
		347	* PECHK (PRINTER ERROR CHECK) - IF S9=0 THEN DOES AN IMMEDIATE RETURN			
		348	* ELSE FALLS INTO PEDIAG			
		349	*			
		350	* PEDIAG (PRINTER ERROR DIAGNOSTIC) - PRODUCES MOST APPROPRIATE ONE			
		351	* OF THE POSSIBLE PRINTER ERRORS. EXITS TO MAINFRAME ERROR ROUTINE.			
		352	*			
		353	GLB	PECHK		
		354	GLB	PEDIAG		
0127	024C	355	PECHK	ST=1?	9	;ANY PRINTER ERROR?
0128	03A0	356	RTNNC			;NOPE
		357				
0129	00001000	358	PEDIAG	GOSUB	=ERRSUB	;DON'T RTN IF ERROR IGNORE= SET
012B	0264	359		SELPF	PTR	
012C	0083	360		PFSET?	2	;IS THE PRINTER TURNED ON?
		361		LEGAL		
012D	0007	362		GOC	PE10	;YES
012E	00001000	363		GOSUB	=MESSLP	;NO
0130	0010	364		CON	20Q	;P
0131	0012	365		CON	22Q	;R
0132	0009	366		CON	11Q	;I
0133	000E	367		CON	16Q	;N
0134	0014	368		CON	24Q	;T
0135	0005	369		CON	5Q	;E
0136	0012	370		CON	22Q	;R
0137	0020	371		CON	40Q	
0138	000F	372		CON	17Q	;O
0139	0006	373		CON	6Q	;F
013A	0206	374		CON	1006Q	;F
013B	00001000	375	PE05	GOSUB	=ENCP00	
013D	00001000	376		GOSUB	=MSGDLY	
013F	00001002	377		GOLONG	=ERR110	
		378				
0141	00001000	379	PE10	GOSUB	FS90	;GET STATUS
0143	024C	380		ST=1?	9	;UNABLE TO READ STATUS?
0144	0003	381		GONC	PE40	;CAN READ STATUS
0145	00001000	382	PE30	GOSUB	=MESSLP	
0147	0010	383		CON	20Q	;P
0148	0012	384		CON	22Q	;R
0149	0009	385		CON	11Q	;I
014A	000E	386		CON	16Q	;N
014B	0014	387		CON	24Q	;T
014C	0020	388		CON	40Q	
014D	0005	389		CON	5Q	;E
014E	0012	390		CON	22Q	;R
014F	0012	391		CON	22Q	;R
0150	000F	392		CON	17Q	;O
0151	0212	393		CON	1022Q	;R
0152	0003	394		GOTO	PE05	
		395				
0153	000C	396	PE40	ST=1?	3	;OUT-OF-PAPER?
0154	0003	397		GONC	PE30	;NO, SOME OTHER ERROR
0155	00001000	398		GOSUB	OOPMSG	;YES
0157	0003	399		GOTO	PE05	

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LOCATION OBJECT CODE LINE      SOURCE LINE
400 *+
401 * FNSTS - FETCH NEW STATUS
402 *
403 * USES: C,ST[7:0],S9, NO PT, NO ADDITIONAL SUBROUTINE LEVELS
404 * PRESERVES: ORIGINAL ST[7:0] IN C[1:0]
405 * INPUT: S9=PRINTER INTERFACE ERROR FLAG
406 *           (IF S9=1 THEN NO ATEMPT IS MADE TO READ STATUS)
407 * OUTPUT: ORIGINAL ST[7:0] IS IN C[1:0]
408 *           IF S9=0, THEN FIRST BYTE OF PRINTER STATUS IS IN S[7:0] AND
409 *           SECOND BYTE OF PRINTER STATUS IS IN C[13:12]
410 * ASSUMES: HEXMODE
411 *
412 *
413 * FXSTS - FETCH EXISTING STATUS. SAME AS FNSTS EXCEPT DOESN'T SCRATCH
414 * OLD STATUS BEFORE READING.
415 *
416 * FS90 - FETCH EXISTING STATUS, ENTRY POINT FOR ERROR DIAGNOSIS ROUTINE.
417 * SAME AS FXSTS EXCEPT IGNORES THE STATE OF S9 ON INPUT, DOESN'T
418 * PRESERVE ORIGINAL ST[7:0], AND IGNORES PRINTER'S "BUSY" STATUS BIT
419 *
420 * FOR FLOWCHARTS, SEE DRC'S LAB BOOK #8364 P.36
421 *
422                   GLB                   FNSTS
423                   GLB                   FXSTS
424                   GLB                   FS90
0158 0398           425 FXSTS           C=ST
0159 024C           426                   ST=1?           9                   ;ERROR ALREADY?
015A 0360           427                   RTNC                   ;YEP, C(0-1)= ORIGINAL STATUS ON RTN
015B 0003           428                   GOTO                   FS20
                  429
015C 0398           430 FNSTS           C=ST
015D 024C           431                   ST=1?           9                   ;ERROR ALREADY?
015E 0360           432                   RTNC                   ;YES, C(0-1)= ORIGINAL STATUS ON RTN
015F 0264           433                   SELPF                  PTR
0160 0003           434                   PFSET?                0                   ;BUSY?
                  435                   LEGAL
0161 0007           436                   GOC                   FS10                ;YES
0162 0264           437                   SELPF                  PTR
0163 0043           438                   PFSET?                1                   ;STATUS VALID?
                  439                   LEGAL
0164 0003           440                   GONC                  FS20                ;NOT NOW
0165 0248           441 FS10           ST=1                9                   ;SET UP TO GO AROUND TWICE
0166 0130           442 FS20           LDI                   CON
0167 0020           443                   CON                   32
                  444 * 25 MILLISEC = 32 LOOPS * 5 CYCLES/LOOP * 155 MICROSEC/CYCLE
0168 0266           445 FS30           C=C-1                X
0169 0003           446                   GONC                  FS40
016A 0248           447                   ST=1                9                   ;TIME OUT. SET ERROR FLAG
016B 0003           448                   GOTO                  FNSTS                ;PUT ORIGINAL STATUS IN C(0-1)
                  449
016C 0264           450 FS40           SELPF                  PTR
016D 0043           451                   PFSET?                1                   ;STATUS VALID?
                  452                   LEGAL
016E 0003           453                   GONC                  FS30                ;NOPE
016F 0264           454                   SELPF                  PTR
455 *CAUTION !!!!      DO NOT ADD ANY CODE BETWEEN HERE AND THE TEST OF
456 *                    BUSY AT FS50 !!!

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FILE: QUAD3:HELIOS                   HEWLETT-PACKARD: COCONUT ASSEMBLER 1.03 / CORVALLIS DIVISION                   PAGE 9

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LOCATION OBJECT CODE LINE           SOURCE LINE
457 * THERE IS A RACE GOING ON WHERE THE PRINTER MAY OUTPUT ANOTHER
458 * COPY OF OLD STATUS AND READ IN THE WAITING BYTE (CLEARING "BUSY")
459 * BEFORE NUT GETS TO FS50 AND CHECKS BUSY.
460 *     OLD STATUS WOULD BE OUTPUT AS NEW STATUS. SEE BW'S LAB NOTEBOOK
461 * #8377 PAGE 11.
0170 003A           462                   RDPTRN                                                 ;READ STATUS
0171 0005           463                   RTNCPU
0172 024C           464                   ST=1?                                                 9                                                 ;NEED TO GO AROUND AGAIN?
0173 0003           465                   GONC                                                 FS100                                                 ;NO
0174 0264           466 FS50               SELPF                                                 PTR
0175 0003           467                   PFSET?                                                 0                                                 ;BUSY?
                    468                   LEGAL
0176 0007           469                   GOC                                                 FS20                                                 ;YES
0177 0244           470 FS90               ST=0                                                 9
0178 0003           471                   GOTO                                                 FS20
472 *****
473 *
474 * ICF - INITIALIZE BEFORE SENDING A CONTROL FRAME. DOES A 2 LEVEL RTN
475 * IF NOT OK TO PRINT AND SETS S9 IF OUT OF PAPER.
476 * USES: C, S9, S7:0, PT, & 1 ADDITIONAL SUBROUTINE LEVEL
477 * IN: NONE
478 * OUT: S9=PRINTER INTERFACE ERROR FLAG
479 *     DOES A 2 LEVEL RTN IF (RUNNING OR SST'ING) AND FLAG 21 IS CLEAR
480 *     OTHERWISE RETURNS WITH 2ND BYTE OF PRINTER STATUS IN S7:0 AND
481 *     1ST BYTE OF PRINTER STATUS IN C3:2
482 * ASSUMES: HEXMODE, CHIP 0 ENABLED.
483
484 * ICF10 - SPECIAL ENTRY POINT FOR ADV. NEVER DOES A 2 LEVEL RTN
485 * (DOESN'T CHECK PRINTER ENABLED.)
486 * OTHERWISE THE SAME AS ICF.
487 *
488                   GLB                                                 ICF
489                   GLB                                                 ICF10
0179 00001000       490 ICF               GOSUB                                                 CKEN
017B 0003           491                   GOTO                                                 IN999                                                 ;P+1 - DON'T PRINT
                    492                                                                                                 ;P+2 - PRINT
017C 00001000       493 ICF10            GOSUB                                                 FNSTS
                    494                                                                                                 ;DROP INTO OOPCHK HERE
495 *****
496 *+
497 * OOPCHK (OUT-OF-PAPER CHECK) - CHECKS FOR OUT-OF-PAPER STATUS
498 * AND PUTS SECOND STATUS BYTE INTO ST[7:0]
499 *
500 * ON ENTRY ASSUMES FIRST BYTE OF PRINTER STATUS IS IN ST[7:0]
501 * IF OOPS THEN SETS S9.
502 * ALWAYS PUTS WHAT WAS IN C[13:12] ON ENTRY INTO ST[7:0]
503 * AND PUTS FIRST PRINTER STATUS BYTE TO C[3:2]. C[1:0] IS
504 * PRESERVED.
505 *
506                   GLB                                                 OOPCHK
017E 000C           507 OOPCHK           ST=1?                                                 3                                                 ;OOPS?
017F 0003           508                   GONC                                                 OOP10                                                 ;NO
0180 0248           509                   ST=1                                                 9                                                 ;YES. SET ERROR FLAG.
0181 03D8           510 OOP10            CSTEX
0182 037C           511 FS100            RCR                                                 12
0183 03D8           512                   CSTEX
0184 03E0           513                   RTN

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LOCATION OBJECT CODE LINE       SOURCE LINE
514 *****
515 **
516 **
517 * CKEN - CHECK PRINTER ENABLED IF RUNNING OR SINGLE-STEPPING
518 *
519 * RETURNS TO: P+1 IF NOT OK TO PRINT
520 *               P+2 IF OK TO PRINT
521 * USES: C, ST[7:0], S9, PT,   NO ADDITIONAL SUBROUTINE LEVELS
522 * INPUT: CHIP 0 ENABLED, HEXMODE
523 * OUTPUT: IF RTN TO P+2 THEN S9=0, CHIP 0 ENABLED, HEXMODE
524 *
525 *
526 * CKOEN - CHECK PRINTER ON AND ENABLED
527 * SAME AS CKEN EXCEPT ALSO CHECKS THAT THE PRINTER IS ON.
528 *
529                   GLB           CKOEN
530                   GLB           CKEN
0185 0264           531 CKOEN       SELPF       PTR
0186 0083           532           PFSET?       2           ;PRINTER ON?
533                   LEGAL
0187 03A0           534           RTNNC           ;NOPE
535
0188 03B8           536 CKEN       C=REGN       14           ;GET STATUS BITS
0189 02CC           537           ST=1?       13           ;RUNNING?
018A 0007           538           GOC           CKEN10       ;YES
018B 0358           539           ST=C               ;NO, PUT UP SS0
018C 004C           540           ST=1?       4           ;SINGLE STEPPING?
018D 0003           541           GONC           CKEN10       ;NOPE
018E 011C           542 CKEN10     PT=           8
018F 01E2           543           C=C+C       PT
0190 01E2           544           C=C+C       PT           ;FLAG 21? (PRINTER ENABLED?)
0191 03A0           545           RTNNC               ;NO
0192 0244           546 CKEN20     ST=0       9           ;CLEAR ERROR FLAG
0193 01B0           547           C=STK
0194 023A           548           C=C+1       M           ;INC RETURN ADDR
0195 01E0           549           GOTOC
550 *
551 *
552 * IPRT - INITIALIZE ORDINARY PRINTING FCNS (PRTX, ETC)
553 * 1. CALL CKEN. IF RETURN IS TO P+1 THEN POP THE SUBROUTINE STACK
554 *    AND RTN.
555 * 2. CALL FNSTS
556 * 3. CALL OOPCHK
557 * 4. FORCE OUT ANY PARTIAL LINE.
558 * 5. SEND MODE IF NECESSARY
559 *
560 * SOMETIMES DOES A 2 LEVEL RETURN!
561 * USES: C, N, S0-S9, PT, AND 1 ADDITIONAL SUBROUTINE LEVEL
562 * INPUT: NONE
563 * OUTPUT: S9 IS THE PRINTER INTERFACE ERROR FLAG
564 * ASSUMES: HEXMODE, CHIP 0 ENABLED
565 *
566 *
567 * IPRTM - INITIALIZE PRINT FOR MAINFRAME PRINTING FCNS VIEW AND AVIEW
568 * SAME AS IPRT EXCEPT CALLS CKOEN INSTEAD OF CKEN.
569 *
570 * IACHR - INITIALIZE ACCUMULATE CHARACTER FCNS. SAME AS IPRT EXCEPT

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LOCATION	OBJECT CODE	LINE	SOURCE LINE
		571	* DOESN'T FORCE OUT PARTIAL LINES AND USES 2 ADDITIONAL SUBROUTINE
		572	* LEVELS.
		573	*
		574	* IACOL - INITIALIZE ACCUMULATE COLUMN FCNS. SAME AS IACHR EXCEPT
		575	* SETS UP COL OUT MODE INSTEAD OF CHARACTER OUT MODE. NOTE IACHR'S
		576	* USE OF SUBROUTINE LEVELS.
		577	*
		578	*
		579	* IAUNA - INITIALIZE AUTOMATIC PRINT FCNS WHICH PRINT IN BOTH "NORM"
		580	* AND "ALL" PRINTER MODES. SIMILAR TO IPRT EXCEPT HAS DIFFERENT RETURNS
		581	* AND LOOKS AT PRINTER MODES INSTEAD OF CALLING CKEN.
		582	*
		583	* RETURNS TO P+1 IF NO PRINTING
		584	* RETURNS TO P+2 IF PRINTING IS OK
		585	* USES: C, N, S0-S9, PT, AND 1 ADDITIONAL SUBROUTINE LEVEL
		586	* INPUT: NONE
		587	* OUTPUT: S9 IS THE PRINTER INTERFACE ERROR FLAG
		588	* ASSUMES: HEXMODE, CHIP 0 ENABLED
		589	*
		590	*
		591	* IAUALL - INITIALIZE AUTOMATIC PRINT FCNS WHICH PRINT IN "ALL" MODE ONLY.
		592	* SAME AS IAUNA EXCEPT RETURNS TO P+1 WHEN PRINTER IS IN NORMAL MODE, AND
		593	* INPUT REQUIRES S8=0.
		594	*
		595	* FLOWCHARTS FOR PRECEDING INITIALIZE ROUTINES ARE IN DRC'S LAB
		596	* BOOK #8364 P.46
		597	*
		598	*
		599	* INITC (INITIALIZE COMMON PATH) - SPECIAL ENTRY POINT FOR PRT1 AND PRT2
		600	* LOGIC WHICH OPTIMIZES SPEED WHEN NO PRINTING IS DESIRED.
		601	*
		602	* USES: C, N, S0:9, PT, AND 1 ADDITIONAL SUBROUTINE LEVEL
		603	* IN: S9=PRINTER INTERFACE ERROR FLAG
		604	*     C13:12=2ND BYTE OF PRINTER STATUS
		605	*     S7:0=1ST BYTE OF PRINTER STATUS
		606	* OUT: S9=PRINTER INTERFACE ERROR FLAG
		607	* ASSUMES: HEXMODE, CHIP 0 ENABLED
		608	*
		609	*
		610	* INIT5 - SPECIAL ENTRY POINT FOR PRT5
		611	* SAME AS INITC EXCEPT FOR INPUT.
		612	* IN: S9=PRINTER INTERFACE ERROR FLAG
		613	*     B[13:12] = 2ND BYTE OF PRINTER STATUS
		614	*     B[1:0] = 1ST BYTE OF PRINTER STATUS
		615	*
		616	GLB           IPRT
		617	GLB           IPRTM
		618	GLB           IACHR
		619	GLB           IACOL
		620	GLB           IAUNA
		621	GLB           IAUALL
		622	GLB           INITC
		623	GLB           INIT5
0196	00001000	624	IPRT           GOSUB       CKEN           ;OK TO PRINT?
0198	0003	625	GOTO        IN999           ;P+1 - NO
		626	;P+2 - YES
0199	00001000	627	IN10          GOSUB       FNSTS



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LOCATION	OBJECT	CODE	LINE	SOURCE	LINE			
019B	0003		628		GOTO		INITC	
			629					
019C	0020		630	IN999	SPOPND			
019D	03E0		631		RTN			
			632					
019E	00001000		633	IPRTM	GOSUB	CKEN		;OK TO PRINT?
01A0	0003		634		GOTO	IN999		;P+1 - NO
01A1	0264		635		SELPF	PTR		;P+2 - YES
01A2	0083		636		PFSET?	2		;PRINTER ON?
			637		LEGAL			
01A3	0007		638		GOC	IN10		;YES, TRY TO PRINT
01A4	02C4		639		ST=0	13		;NO, CLEAR RUNNING FLAG
01A5	0003		640		GOTO	IN999		
			641					
01A6	0104		642	IACHR	ST=0	8		;SET UP FOR CHAR OUTPUT
01A7	00001000		643	IN20	GOSUB	CKEN		;OK TO PRINT?
01A9	0003		644		GOTO	IN999		;P+1 - NO
01AA	00001000		645		GOSUB	ICF10		;P+2 - YES
01AC	020C		646		ST=1?	2		;OUT-OF-PAPER HOLD?
01AD	00001001		647		GSUBC	=EOLL		;YES, GIVE VISIBLE RESPONSE
01AF	0003		648		GOTO	INIT10		
			649					
01B0	0108		650	IACOL	ST=1	8		;SET UP FOR COL OUTPUT
01B1	0003		651		GOTO	IN20		
			652					
01B2	0108		653	IAUNA	ST=1	8		;NORM MODE IS OK
01B3	0264		654	IAUALL	SELPF	PTR		
01B4	0083		655		PFSET?	2		;PRINTER ON?
			656		LEGAL			
01B5	03A0		657		RTNNC			
01B6	0244		658		ST=0	9		
01B7	00001000		659		GOSUB	FNSTS		
01B9	024C		660		ST=1?	9		;ERROR SO FAR?
01BA	0007		661		GOC	IN40		;YES, CAN'T TRUST PRINTER
			662					;STATUS SO TRY TO PRINT
			663					;IN ORDER TO GENERATE
			664					;AN ERROR MESSAGE.
01BB	028C		665		ST=1?	7		; "ALL" MODE?
01BC	0007		666		GOC	IN40		;YES, SO PRINT
01BD	010C		667		ST=1?	8		;PRINT IN NORM MODE?
01BE	03A0		668		RTNNC			;NO
01BF	014C		669		ST=1?	6		;NORM MODE?
01C0	03A0		670		RTNNC			;NO, SO DON'T PRINT.
01C1	033C		671	IN40	RCR	1		;INC RTN ADDR
01C2	01B0		672		C=STK			
01C3	023A		673		C=C+1	M		
01C4	0170		674		STK=C			
01C5	02FC		675		RCR	13		
01C6	0003		676		GOTO	INITC		
			677					
01C7	00CE		678	INIT5	C=B	W		;RESTORE STATUS TO C
01C8	0358		679		ST=C			; AND S7:0
01C9	00001000		680	INITC	GOSUB	OOPCHK		
01CB	000C		681		ST=1?	3		;EOLL?
01CC	00001000		682		GSUBNC	EOL		;FORCE OUT PARTIAL LINE
01CE	0104		683	INIT09	ST=0	8		;COL OUT MODE NOT DESIRED
01CF	03B8		684	INIT10	C=REGN	14		

LOCATION	OBJECT CODE	LINE	SOURCE LINE			
		685	* FLAG 12 (DIGIT 10 BIT 3) FOR DOUBLE WIDE			
		686	* FLAG 13 (DIGIT 10 BIT 2) FOR LOWER CASE			
01D0	00DC	687	PT=	10		
01D1	01E2	688	C=C+C	PT		;NUT DOUBLE WIDE?
01D2	0003	689	GONC	INIT20		;NO
		690				;NUT DOUBLE WIDE
01D3	008C	691	ST=1?	5		;HELIOS DWM?
01D4	0003	692	GONC	INIT60		;NO. GO SEND MODE
01D5	0003	693	GOTO	INIT30		
		694				;NUT NOT DOUBLE WIDE
01D6	008C	695	INIT20	ST=1?	5	;HELIOS DWM?
01D7	0007	696	GOC	INIT60		;YES. GO SEND MODE
		697				
01D8	01E2	698	INIT30	C=C+C	PT	;NUT LOWER CASE?
01D9	0003	699	GONC	INIT35		
		700				;YES, NUT LOWER CASE
01DA	028C	701	ST=1?	7		;HELIOS LOWER CASE?
01DB	0003	702	GONC	INIT60		;NO. GO SEND MODE
01DC	0003	703	GOTO	INIT40		
01DD		704	INIT35			;NUT NOT LOWER CASE
01DD	028C	705	ST=1?	7		;HELIOS LOWER CASE?
01DE	0007	706	GOC	INIT60		;YES. GO SEND MODE
		707				
01DF	010C	708	INIT40	ST=1?	8	;NUT COLUMN OUT?
01E0	0003	709	GONC	INIT50		;NO
		710				;YES, NUT COLUMN OUT
01E1	014C	711	ST=1?	6		;HELIOS SCOM?
01E2	0360	712	RTNC			;YES, RETURN
01E3	0003	713	GOTO	INIT60		;NO. GO SEND MODE
01E4		714	INIT50			;NOT NUT COLUMN OUT
01E4	014C	715	ST=1?	6		;HELIOS SCOM?
01E5	03A0	716	RTNNC			;NO, RETURN
		717	GLB	INIT60		
		718				
		719	*-INIT60-	SEND MODE COMMAND		
		720	*			
		721	*-USES:	C,N, PT, S8-S9,		NO ADDITIONAL SUB LEVELS
		722	*-INPUTS:	S8=1 FOR COLUMN OUT, ELSE S8=0		
		723	*	PT= 10, CHIP 0 ENABLED,		HEX MODE
		724	*-OUTPUTS:	CHIP 0 ENABLED,		HEX MODE
		725	*			
01E6		726	INIT60			;SEND MODE COMMAND
01E6	03B8	727	C=REGN	14		
01E7	0130	728	LDI			
01E8	00D0	729	CON	320Q		
01E9	03D8	730	CSTEX			
01EA	01E2	731	C=C+C	PT		;DWM?
01EB	0003	732	GONC	INIT70		;NO
01EC	0208	733	ST=1	2		;YES, SET DWM
01ED	01E2	734	INIT70	C=C+C	PT	;LOWER CASE
01EE	0003	735	GONC	INIT80		;NO
01EF	0388	736	ST=1	0		;YES, SET LCA
01F0	010C	737	INIT80	ST=1?	8	;COLUMN OUT?
01F1	0003	738	GONC	PBYTCS		;NO
01F2	0308	739	ST=1	1		;YES, SET SCOM
01F3	0003	740	GOTO	PBYTCS		
		741	**			

# NOMAS

Not Manufacturer Supported  
recipient agrees NOT to contact manufacturer

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LOCATION OBJECT CODE LINE       SOURCE LINE
742 * EOL - SEND AN EOL MATCHING THE LAST EOL SENT
743 *
744 * ON ENTRY, THE SECOND BYTE OF PRINTER STATUS IS IN ST[7:0]
745 * USES C(X),N [PBYTEC], PRESERVES ST[7:0] , S9 FOR ERRORS,
746 *       NO ADDITIONAL SUB LEVELS
747 *
748                           GLB               EOL
01F4 0130           749 EOL               LDI
01F5 00E0           750                           CON               340Q               ;LOAD EOLL (END OF LINE, LEFT)
01F6 004C           751                           ST=1?               4               ;TEOL= EOLR?
01F7 0003           752                           GONC               PBYTEC               ;NO. SEND EOLL
01F8 039C           753                           PT=               0
01F9 0210           754                           LC               8               ;YES. SEND EOLR
01FA 0003           755                           GOTO               PBYTEC
756 *****
757 *
758 * PRKC - PRINT KEYCODE
759 * USES: A.M, C, N, S3, PT, AND 1 ADDITIONAL SUBROUTINE LEVEL
760 * IN: S7:0=KEYCODE, A(M)= CHARACTER COUNTER
761 * OUT: "RC" OR "-RC" TO PRINTER (R=ROW#, C=COL#)
762 *       A.M=A.M+#OF CHARS SENT TO PRINTER
763 * ASSUMES: HEXMODE, CHIP 0 ENABLED, S9=PRINTER INTERFACE ERROR FLAG
764 *
765                           GLB               PRKC20
766                           GLB               PRKC
01FB 000C           767 PRKC               ST=1?               3               ;SHIFTED?
01FC 0003           768                           GONC               PRKC10               ;NO
01FD 0004           769                           ST=0               3               ;YES
01FE 0130           770                           LDI
01FF 002D           771                           CON               55Q               ;"-"
0200 00001000       772                           GOSUB               CPBYTE
773 * CAN'T USE PRMSG HERE BECAUSE NOT ENOUGH SUBROUTINE LEVELS
0202 017A           774                           A=A+1               M               ;COUNT THE CHAR
0203 017A           775 PRKC10           A=A+1               M               ;COUNT 2 MORE CHARS
0204 017A           776                           A=A+1               M
0205 0398           777                           C=ST
0206 031C           778                           PT=               1
0207 00D0           779                           LC               3
0208 00001000       780                           GOSUB               PRKC20               ;INCREMENT & SEND ROW
020A 02FC           781                           RCR               13               ;"3" TO C.XS
020B 0398           782                           C=ST
020C 033C           783                           RCR               1               ;ROW TO C.S
020D 027E           784                           C=C-1               S
020E 027E           785                           C=C-1               S
020F 027E           786                           C=C-1               S
0210 027E           787                           C=C-1               S               ;"ENTER" ROW?
0211 0003           788                           GONC               PRKC20               ;NO
0212 02E2           789                           C#0?               PT               ;KEY#"ENTER"?
0213 0007           790                           GOC               CPBYTE               ;NOT "ENTER"
0214 0222           791 PRKC20           C=C+1               PT
792 *
793 *PRKC FALLS INTO CPBYTE HERE!!!!
794 *
795 * PBYTEC - SENDS A CONTROL BYTE TO THE PRINTER
796 *
797 * ON ENTRY, C[1:0]=BYTE TO BE SENT TO THE PRINTER
798 *       AND S9=ERROR FLAG

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LOCATION	OBJECT CODE	LINE	SOURCE LINE			
		799	* USES: N, NO PT, S9 FOR ERRORS, NO ADDITIONAL SUB LEVELS			
		800	* IF S9=1 THEN DOES AN IMMEDIATE RETURN			
		801	* WAITS UP TO 1 SECOND FOR THE PRINTER TO BE NOT BUSY. ON A TIMEOUT,			
		802	* SETS S9 AND RETURNS.			
		803	*			
		804	* PBYTDU - PRINT A BYTE OF DATA UNCONDITIONALLY. SAME AS PBYTEC			
		805	* EXCEPT CLEARS BIT 7 OF THE DATA FRAME BEFORE SENDING IT TO THE			
		806	* PRINTER.			
		807	*			
		808	* CPBYTE - CONDITIONALLY PRINT BYTE. LOOKS AT FLAG 55 BEFORE DROPPING			
		809	* INTO PBYTEC. IF FLAG 55 IS CLEAR, THEN DOES AN IMMEDIATE RETURN			
		810	* WITHOUT SENDING ANYTHING TO THE PRINTER. USED FOR COUNTING			
		811	* CHARACTERS TO SEE WHETHER THEY WILL FIT ON A LINE. FLAG 55 IS THE			
		812	* PRINTER EXISTENCE FLAG, WHICH IS NOMINALLY ON ALL THE TIME THE			
		813	* PRINTER IS PLUGGED IN.			
		814	*			
		815	*			
		816		GLB		PBYTEC
		817		GLB		PBYTDA
		818		GLB		PBYTDU
		819		GLB		CPBYTE
0215	0070	820	CPBYTE	N=C		
0216	0046	821		C=0		X
0217	0270	822		DADD=C		
0218	03B8	823		C=REGN		14
0219	03D8	824		CSTEX		
021A	038C	825		ST=1?		0 ;FLAG 55?
021B	0007	826		GOC	CPBYT1	;YES, SEND BYTE TO PRINTER
021C	03D8	827		CSTEX		;NO, DON'T PRINT
021D	00B0	828	PBYT01	C=N		;RESTORE C REGISTER
021E	03E0	829		RTN		
021F	03D8	830	CPBYT1	CSTEX		
0220	00B0	831		C=N		
0221	0003	832		GOTO		PBYTEC
		833				
0222	00A6	834	PBYTDA	ACEX		X
0223	03D8	835	PBYTDU	CSTEX		
0224	0284	836		ST=0		7 ;SUPPRESS 8TH BIT
0225	03D8	837	PBYTCS	CSTEX		
0226	024C	838	PBYTEC	ST=1?		9 ;ANY ERROR SO FAR?
0227	0360	839		RTNC		;YES, RETURN IMMEDIATELY
0228	0070	840		N=C		;SAVE C IN N
0229	0130	841		LDI		
022A	0285	842		CON		645
022B	01E6	843		C=C+C		X
		844	* 1 SEC = 1290 LOOPS * 5 CYCLES/LOOP * 155 MICROSECS/CYCLE			
022C	0266	845	PBYT11	C=C-1		X ;TIMEOUT?
022D	0007	846		GOC	PBYT21	;YES
022E	0264	847		SELPF	PTR	
022F	0003	848		PFSET?		0 ;PRINTER BUSY?
		849		LEGAL		
0230	0007	850		GOC	PBYT11	;YES
0231	00B0	851		C=N		;NO, RETRIEVE C REG
0232	0264	852		SELPF	PTR	
0233	0007	853		PRINTC		
0234	03E0	854		RTN		
		855				

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LOCATION	OBJECT CODE	LINE	SOURCE LINE
0235	0248	856	PBYT21           ST=1                   9                   ;SET ERROR FLAG
0236	0003	857	GOTO                   PBYT01
		858	*****
		859	*
		860	* PAD - SEND PRINTER A COMMAND TO SKIP THE NUMBER OF CHARS IN A.X
		861	*
		862	* USES: C.X, N, S9
		863	* IN: A.X = # OF PADS DESIRED (0-23)
		864	* OUT: NOTHING
		865	* ASSUMES: HEXMODE, S9=PRINTER INTERFACE ERROR FLAG
		866	
		867	* PAD1+A - ADDS ONE TO A.X AND DROPS INTO PAD
		868	
		869	GLB                   PBYA_C
		870	GLB                   PAD
		871	GLB                   PAD1_A
0237	0166	872	PAD1_A           A=A+1                X
0238	0130	873	PAD              LDI
0239	00A0	874	CON                   240Q
023A	0206	875	PBYA_C           C=A+C                X
		876	LEGAL
023B	0003	877	GOTO                   PBYTEC
		878	
		879	*****
		880	*
		881	* BECHK (BUFFER EMPTY CHECK) - WAIT UNTIL PRINTER IS IDLE OR PRINTER
		882	* BUFFER IS EMPTY. NOTE THAT WHEN THE PRINTER RUNS OUT OF PAPER, IT
		883	* MAY GO IDLE WHILE THERE IS STILL DATA IN ITS BUFFER.
		884	*
		885	* USES C,NO PT, S7-S0,S9 (ERRORS). LEAVES ORIGINAL S7-S0 IN C[1:0].
		886	*        USES ONE ADDITIONAL SUBROUTINE LEVEL.
		887	*
		888	* INPUT: NONE
		889	* OUTPUT: 1ST BYTE OF PRINTER STATUS IS IN S7-S0. 2ND BYTE OF PRINTER
		890	*        STATUS IS IN C[13:12].
		891	* ASSUMES: S9 IS PRINTER INTERFACE ERROR FLAG
		892	*
		893	GLB                   BECHK
023C	00001000	894	BECHK           GOSUB               FNSTS
023E	000C	895	BECK20          ST=1?               3                   ;OOPS?
023F	0003	896	GONC                BECK30           ;NO
0240	0248	897	ST=1                9                   ;SET ERROR FLAG
0241	024C	898	BECK30          ST=1?               9                   ;ANY ERROR?
0242	0360	899	RTNC
0243	030C	900	ST=1?               1                   ;IDLE?
0244	0360	901	RTNC
0245	038C	902	ST=1?               0                   ;BUFFER EMPTY?
0246	0360	903	RTNC
0247	03D8	904	CSTEX               ;RESTORE ORIGINAL STATUS
0248	00001000	905	GOSUB               FXSTS
024A	0003	906	GOTO                BECK20
		907	*****
		908	*
		909	* PWAIT (PRINTER WAIT) - WAIT FOR BUFFER EMPTY OR IDLE, THEN CHECK
		910	* FOR PRINTER ERROR AND CHECK FOR KEYDOWN
		911	*
		912	* USES: C,A(X),NO PT, S9 FOR ERRORS, 2 ADDITIONAL SUBROUTINE LEVELS

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LOCATION	OBJECT CODE	LINE	SOURCE LINE	
		913	*	
		914	* INPUT: NONE	
		915	* OUTPUT: NONE	
		916	* ASSUMES: S9 IS PRINTER INTERFACE ERROR FLAG	
		917	*	
		918	GLB	PWAIT
024B	00001000	919	PWAIT	GOSUB            BECHK
024D	03D8	920		CSTEX                               ;RESTORE ORIGINAL STATUS
024E	00001000	921		GOSUB            PECHK
		922	* FALL INTO PCHKKB HERE	
		923		
		924	*****	
		925	*-PCHKKB= CHECK KEYBOARD (PRINTER FUNCTION)	
		926	*	
		927	*-RETURNS ONLY IF NEITHER THE "R/S" KEY NOR THE "ON" KEY IS DOWN	
		928	*	
		929	*-INPUTS: NONE	
		930	*-OUTPUTS: NONE	
		931	*-USES:    A(X), C,    NO PT,    NO STS,    NO ADDITIONAL SUB LEVELS	
		932	*	
		933	GLB	PCHKKB
0250	03CC	934	PCHKKB	CHKKB                               ;KEY DOWN?
0251	03A0	935		;NO
0252	0220	936		C=KEYS                             ;YES, GET KEYCODE
0253	003C	937		RCR                                3                               ;KEYCODE TO C(X)
0254	0056	938		C=0                                XS
0255	0106	939		A=C                                X                               ;KEYCODE TO "A"
0256	0130	940		LDI
0257	0018	941		CON                                24                             ;HEX 18= "OFF" KEY
0258	0366	942		A#C?                               X                             ;"OFF" KEY HIT?
0259	00001002	943		GOLNC                             =OFF                           ;YES, SHUT OFF
025B	0130	944		LDI                                ;NO
025C	0087	945		CON                                135                           ;HEX 87= "R/S" KEY
025D	0366	946		A#C?                               X                             ;"R/S" KEY HIT?
025E	0007	947		GOC                                OUTPCK                       ;NO
025F	02C4	948		ST=0                               13                             ;YES, CLEAR RUNNING FLAG
0260	00001002	949		GOLONG                            =NFRKB                       ;RESET THE KEYBOARD
0262	03C8	950	OUTPCK	RSTKB                             ;NO, TRY TO CLEAR THE KEY
0263	03CC	951		CHKKB
0264	03E0	952		RTN

LOCATION	OBJECT CODE	LINE	SOURCE LINE
		954	*****
		955	*PRFLAG-PRINT FLAGS AND STATUS INCLUDING SIZE,SIGMA
		956	* LOCATION, TRIG MODE AND DISPLAY SETTING.
		957	*****
0265	0093	958	CON                    223Q                    ;S
0266	0007	959	CON                    7Q                      ;G
0267	0001	960	CON                    1Q                      ;A
0268	000C	961	CON                    14Q                     ;L
0269	0006	962	CON                    6Q                      ;F
026A	0012	963	CON                    22Q                     ;R
026B	0010	964	CON                    20Q                     ;P
		965	GLB                    PRFLAG
026C	00001000	966	PRFLAG                GOSUB                    IPRT                    ;INITIALIZE PRINT
026E	00001000	967	GOSUB                    =PRTMSG                ;PRINT:LF,STATUS:,LF,SIZE=
0270	02E0	968	CON                    1340Q                   ;                    LINE FEED
0271	0053	969	CON                    123Q                    ;S
0272	0054	970	CON                    124Q                    ;T
0273	0041	971	CON                    101Q                    ;A
0274	0054	972	CON                    124Q                    ;T
0275	0055	973	CON                    125Q                    ;U
0276	0053	974	CON                    123Q                    ;S
0277	003A	975	CON                    72Q                     ;:
0278	02E0	976	CON                    1340Q                   ;                    LINE FEED
0279	0053	977	CON                    123Q                    ;S
027A	0049	978	CON                    111Q                    ;I
027B	005A	979	CON                    132Q                    ;Z
027C	0045	980	CON                    105Q                    ;E
027D	003D	981	CON                    75Q                     ;=
027E	0120	982	CON                    440Q                    ;                    BLANK
027F	00001000	983	GOSUB                    =FNDEND                ;COMPUTE SIZE
0281	004E	984	C=0                    W
0282	0270	985	DADD=C
0283	0378	986	C=REGN                13
0284	003C	987	RCR                    3
0285	0246	988	C=A-C                X
0286	02DC	989	PT=                    13
0287	00D0	990	LC                    3
0288	00001000	991	GOSUB                    =PBINBD                ;PRINT SIZE
028A	00001000	992	GOSUB                    =PRTMSG                ;PRINT:LF,SIGMA=
028C	02E0	993	CON                    1340Q                   ;                    LINE FEED
028D	007E	994	CON                    176Q                    ;SIGMA
028E	003D	995	CON                    75Q                     ;=
028F	0120	996	CON                    440Q                    ;                    BLANK
0290	0378	997	C=REGN                13                      ;COMPUTE SIGMA
0291	01BC	998	RCR                    11
0292	00A6	999	ACEX                    X
0293	017C	1000	RCR                    6
0294	0246	1001	C=A-C                X
		1002	LEGAL
0295	00001000	1003	GOSUB                    =PBINB0                ;PRINT SIGMA
0297	00001000	1004	GOSUB                    =EOLL
0299	03B8	1005	C=REGN                14                      ;CMP DEG RAD GRAD CODE
029A	003C	1006	RCR                    3
029B	031C	1007	PT=                    1
029C	0042	1008	C=0                    PT
029D	0358	1009	ST=C
029E	0204	1010	ST=0                    2

LOCATION	OBJECT CODE	LINE	SOURCE LINE			
029F	0004	1011	ST=0		3	
02A0	0288	1012	ST=1		7	
02A1	0398	1013	C=ST			
02A2	00001000	1014	GOSUB	=PPROM1		;OUTPUT DEG,RAD, OR GRAD
02A4	00001000	1015	GOSUB	=EOLL		
02A6	03B8	1016	C=REGN	14		;FIX,SCI,ENG?
02A7	003C	1017	RCR	3		
02A8	0358	1018	ST=C			
02A9	0130	1019	LDI			
02AA	009C	1020	CON	234Q		
02AB	000C	1021	ST=1?	3		
02AC	0007	1022	GOC	OUTDSP		
02AD	0226	1023	C=C+1	X		
02AE	020C	1024	ST=1?	2		
02AF	0003	1025	GONC	OUTDSP		
02B0	0226	1026	C=C+1	X		
02B1	00AE	1027	OUTDSP	ACEX	W	
02B2	00001000	1028	GOSUB	=BPROMT		;OUTPUT FIX SCI OR ENG
02B4	03B8	1029	C=REGN	14		;GET N
02B5	023C	1030	RCR	2		
02B6	005A	1031	C=0	M		
02B7	023C	1032	RCR	2		
02B8	005E	1033	C=0	S		
02B9	023E	1034	C=C+1	S		
		1035	LEGAL			
02BA	00001000	1036	GOSUB	=PBINBD		;FIX N ETC
02BC	00001000	1037	GOSUB	=PRTMSG		;PRINT:LF,LF,FLAGS:
02BE	02E0	1038	CON	1340Q		; LINE FEED
02BF	02E0	1039	CON	1340Q		; LINE FEED
02C0	0046	1040	CON	106Q		;F
02C1	004C	1041	CON	114Q		;L
02C2	0041	1042	CON	101Q		;A
02C3	0047	1043	CON	107Q		;G
02C4	0053	1044	CON	123Q		;S
02C5	013A	1045	CON	472Q		;:
02C6	03B8	1046	C=REGN	14		;STORE FLAGS AND COUNTER
02C7	0046	1047	C=0	X		
02C8	0158	1048	FLGLOP	M=C		
02C9	00001000	1049	GOSUB	=PRTMSG		;PRINT LF, F,SPACE
02CB	02E0	1050	CON	1340Q		; LINE FEED
02CC	0046	1051	CON	106Q		;F
02CD	0120	1052	CON	440Q		; BLANK
02CE	0198	1053	C=M			
02CF	00001000	1054	GOSUB	=PBINB0		;PRINT NUMBER OF FLAG
02D1	0198	1055	C=M			
02D2	01EE	1056	C=C+C	W		;IS FLAG SET?
02D3	0007	1057	GOC	FLGSET		;YES
02D4	00001000	1058	GOSUB	=PRTMSG		;PRINT " CLEAR"
02D6	00A2	1059	CON	242Q		;TWO BLANKS
02D7	0043	1060	CON	103Q		;C
02D8	004C	1061	CON	114Q		;L
02D9	0045	1062	CON	105Q		;E
02DA	0041	1063	CON	101Q		;A
02DB	0152	1064	CON	522Q		;R
02DC	0003	1065	GOTO	LPCHK		
02DD	00001000	1066	FLGSET	GOSUB	=PRTMSG	;PRINT " SET"
02DF	00A2	1067	CON	242Q		;TWO BLANKS



LOCATION	OBJECT CODE	LINE	SOURCE LINE			
02E0	0053	1068	CON	123Q		;S
02E1	0045	1069	CON	105Q		;E
02E2	0154	1070	CON	524Q		;T
02E3	00001000	1071	LPCHK	GOSUB	PECHK	
02E5	0198	1072		C=M		
02E6	00A6	1073		ACEX	X	
02E7	0130	1074		LDI		
02E8	000C	1075		CON	14Q	
02E9	0366	1076		A#C?	X	
02EA	0007	1077		GOC	C_C	
02EB	03B8	1078		C=REGN	14	
02EC	01BC	1079		RCR	11	
02ED	01EE	1080	C_C	C=C+C	W	
02EE	0130	1081		LDI		
02EF	0038	1082		CON	70Q	;DONE YET?
02F0	00A6	1083		ACEX	X	;C READY TO STORE IN M
02F1	0226	1084		C=C+1	X	;INC COUNT
02F2	0366	1085		A#C?	X	
02F3	0007	1086		GOC	FLGLOP	;LOOP AGAIN
		1087		GLB	FINISH	
02F4	00001000	1088	FINISH	GOSUB	=LPECHK	;EOLL, CHECK PRINTER ERRORS
02F6	00001002	1089		GOLONG	=NFRPU	
1090				*****		
1091				*PRKEYS-PRINTS OUT KEY REASSIGNMENTS		
1092				*IF NONE EXIST-PRINTS KEYS: NONE		
1093				*OTHERWISE PRINTS 1 1 SIZE		
1094	*			1 5	ASHIFT	
1095	*			4 2	SPCCHS	
1096				*****		
02F8	0093	1097		CON	223Q	;S
02F9	0019	1098		CON	31Q	;Y
02FA	0005	1099		CON	5Q	;E
02FB	000B	1100		CON	13Q	;K
02FC	0012	1101		CON	22Q	;R
02FD	0010	1102		CON	20Q	;P
		1103		GLB	PRKEYS	
02FE	00001000	1104	PRKEYS	GOSUB	IPRT	;INITIALIZE PRINT
0300	00001000	1105		GOSUB	=PRTMSG	;PRINT "USER KEYS:"
0302	00E0	1106		CON	340Q	;EOLL (LINE FEED)
0303	0055	1107		CON	125Q	;U
0304	0053	1108		CON	123Q	;S
0305	0045	1109		CON	105Q	;E
0306	0052	1110		CON	122Q	;R
0307	0020	1111		CON	40Q	; BLANK
0308	004B	1112		CON	113Q	;K
0309	0045	1113		CON	105Q	;E
030A	0059	1114		CON	131Q	;Y
030B	0053	1115		CON	123Q	;S
030C	013A	1116		CON	472Q	;:
030D	004E	1117		C=0	W	
030E	0270	1118		DADD=C		
		1119		GLB	KEYLP1	
030F	0268	1120	KEYLOP	REGN=C	9	;SET INDEX AT 0,0
0310	0278	1121	KEYLP1	C=REGN	9	;GET CURRENT INDEX BACK
0311	00AE	1122		ACEX	W	;SET UP INDEX FOR TBITMP
0312	00001000	1123		GOSUB	=TBITMP	;IS THIS KEY ASSIGNED?
0314	02EE	1124		C#0?	W	

LOCATION	OBJECT CODE	LINE	SOURCE LINE			
0315	00001002	1125	GOLNC	INCCNT		;NO SKIP PRINTING
0317	00001000	1126	GOSUB	=EOLL		;FINISH LAST LINE
0319	00001000	1127	GOSUB	PWAIT		;CHECK PRINT ERRORS
031B	0278	1128	C=REGN	9		
031C	005E	1129	C=0	S		;SET FOUND ONE BIT
031D	023E	1130	C=C+1	S		
031E	0268	1131	REGN=C	9		
031F	033C	1132	RCR	1		
0320	0358	1133	ST=C			
0321	000C	1134	ST=1?	3		;IS THIS A SHIFTED KEY?
0322	00001000	1135	GSUBNC	=PBLANK		
0324	00001000	1136	GOSUB	PRKC		
0326	00001000	1137	GOSUB	=PBLANK		
0328	0278	1138	C=REGN	9		
0329	033C	1139	RCR	1		
032A	00A6	1140	ACEX	X		
032B	0166	1141	A=A+1	X		
032C	0304	1142	ST=0	1		;GET KEY CODE OR ADR
032D	00001000	1143	GOSUB	=GCPKC		
032F	000C	1144	ST=1?	3		;RAM?
0330	0007	1145	GOC	DORAM		;YES
0331	001C	1146	PT=	3		;XROM FUNCTION
0332	02E2	1147	C#0?	PT		
0333	0007	1148	GOC	DOXROM		
0334	00001000	1149	GOSUB	=PPROM1		;MAINFRAME FCN
0336	0003	1150	GOTO	INCCNT		
0337	00001000	1151	DOXROM GOSUB	=PPXROM		;XROM FUNCTION
0339	0003	1152	GOTO	INCCNT		
		1153				
033A	010E	1154	DORAM A=C	W		;ADDRESS TO A3:0
033B	0144	1155	ST=0	6		;SAY RAM
033C	00001000	1156	GOSUB	=PLBL0		
		1157				
		1158	GLB	INCCNT		
033E	004E	1159	INCCNT C=0	W		
033F	0270	1160	DADD=C			
0340	031C	1161	PT=	1		;ADD 8 TO ROW
0341	0210	1162	LC	8		
0342	031C	1163	PT=	1		
0343	00A2	1164	ACEX	PT		
0344	0278	1165	C=REGN	9		;GET INDEX BACK
0345	0202	1166	C=A+C	PT		;SHIFTED YET?
0346	0003	1167	GONC	KEYLOP		;DO SHIFTED
0347	0236	1168	C=C+1	XS		;INC COLUMN
0348	0268	1169	REGN=C	9		
0349	01F6	1170	C=C+C	XS		
034A	01F6	1171	C=C+C	XS		
034B	0003	1172	GONC	KEYLNK		;COL WAS THREE OR LESS
034C	01E2	1173	C=C+C	PT		
034D	01E2	1174	C=C+C	PT		
034E	0007	1175	GOC	INCCOL		;YES INC COLUMN
034F	02F6	1176	C#0?	XS		
0350	0003	1177	GONC	KEYLNK		;COL=4
0351	0278	1178	INCCOL C=REGN	9		;GET INDEX BACK
0352	0056	1179	C=0	XS		;RESET COLUMN
0353	0222	1180	C=C+1	PT		;INC COLUMN
0354	0268	1181	REGN=C	9		;PUT INDEX AWAY

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LOCATION	OBJECT CODE	LINE	SOURCE LINE			
0355	01E2	1182	C=C+C	PT		;ROW LARGER THAN 7
0356	00001002	1183	KEYLNK	GOLNC	KEYLP1	;NO
0358	0278	1184		C=REGN	9	
0359	02FE	1185		C#0?	S	;FIND ANY ASSIGNMENTS?
035A	0007	1186		GOC	DONKEY	;YES
035B	00001000	1187		GOSUB	=PRTMSG	;NO
035D	004E	1188		CON	116Q	;N
035E	004F	1189		CON	117Q	;O
035F	004E	1190		CON	116Q	;N
0360	0145	1191		CON	505Q	;E
0361	00001002	1192	DONKEY	GOLONG	FINISH	
		1193	*****			
		1194	*			
		1195	* FILLIN - FILL LINE WITH BLANKS AND PRINT			
		1196	*			
		1197	* USES: A.X, C.X, N, S9, AND TWO ADDITIONAL SUBROUTINE LEVELS			
		1198	* IN: G=# OF LAST CHARACTER POSITION FILLED SO FAR			
		1199	*       PT=0			
		1200	* OUT: NOTHING			
		1201	* ASSUMES: HEXMODE, S9=PRINTER INTERFACE ERROR FLAG			
		1202				
		1203	*			
		1204	* FILLNP - SETS THE POINTER TO 0 AND FALLS INTO FILLIN			
		1205	*			
		1206		GLB	FILLIN	
		1207		GLB	FILLNP	
0363	039C	1208	FILLNP	PT=	0	
0364	0130	1209	FILLIN	LDI		
0365	0018	1210		CON	24	
0366	0106	1211		A=C	X	
0367	0098	1212		C=G		
0368	01C6	1213		A=A-C	X	
		1214		LEGAL		
0369	00001000	1215		GOSUB	PAD	
036B	00001002	1216		GOLONG	=EOLR	
		1217				
		1218	*****			
		1219	*			
		1220	* NXBTXP - GET NEXT BYTE, USING S6 TO DECIDE ROM/RAM			
		1221	* USES: C, A3:0, AND 1 ADDITIONAL SUBROUTINE LEVEL			
		1222	* IN: A3:0=ADDRESS			
		1223	*       S6=1 FOR ROM, S6=0 FOR RAM			
		1224	*       PT=3			
		1225	* OUT: A3:0 INCREMENTED TO NEXT BYTE ADDRESS			
		1226	*       C1:0=NEXT BYTE			
		1227	* ASSUMES: HEXMODE, ANY DATA STORAGE CHIP ENABLED			
		1228	*			
		1229		GLB	NXBTXP	
036D	014C	1230	NXBTXP	ST=1?	6	;ROM?
036E	00001002	1231		GOLNC	=NXBYTA	;NO
0370	00001002	1232		GOLONG	=NXBYTO	;YES
		1233				
		1234	*****			
		1235	*			
		1236	* INADXP - INCREMENT ADDRESS, USING S6 TO DECIDE ROM/RAM			
		1237	* USES: A3:0			
		1238	* IN: A3:0=ADDRESS			

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LOCATION OBJECT CODE LINE           SOURCE LINE
1239 *           S6=1 FOR ROM, S6=0 FOR RAM
1240 *           PT=3
1241 * OUT: A3:0 INCREMENTED TO NEXT BYTE ADDRESS
1242 * ASSUMES: HEXMODE
1243 *
1244                           GLB                   INADXP
0372 014C           1245 INADXP           ST=1?           6                   ;ROM?
0373 00001002       1246                   GOLNC           =INCADA           ;NO
0375 016E           1247                   A=A+1           W                   ;YES
0376 03E0           1248                   RTN
1249
1250 *****
1251 *
1252 * OOPMSG - PUT UP "OUT OF PAPER" MESSAGE IN LCD
1253 * USES: C6:0, AND 1 ADDITIONAL SUBROUTINE LEVEL
1254 * IN: NOTHING
1255 * OUT: LEAVES CHIP 0 ENABLED AND SS0 UP
1256 * ASSUMES: NOTHING
1257 *
1258                           GLB                   OOPMSG
0377 00001000       1259 OOPMSG           GOSUB           =MESSLP
0379 000F           1260                   CON               17Q                   ;O
037A 0015           1261                   CON               25Q                   ;U
037B 0014           1262                   CON               24Q                   ;T
037C 0020           1263                   CON               40Q
037D 000F           1264                   CON               17Q                   ;O
037E 0006           1265                   CON               6Q                   ;F
037F 0020           1266                   CON               40Q
0380 0010           1267                   CON               20Q                   ;P
0381 0001           1268                   CON               1Q                   ;A
0382 0010           1269                   CON               20Q                   ;P
0383 0005           1270                   CON               5Q                   ;E
0384 0212           1271                   CON               1022Q               ;R
0385 00001000       1272                   GOSUB           =ENCP00
0387 00001002       1273                   GOLONG           =STMSGF
1274
1275 *****
1276 ***** PRX -- PRINT X REG, NO DISPLAY *****
1277 *****
1278                           GLB                   PRX10
1279                           GLB                   PRX
0389 0098           1280                   CON               230Q                   ;X
038A 0012           1281                   CON               22Q                   ;R
038B 0010           1282                   CON               20Q                   ;P
038C 00001000       1283 PRX           GOSUB           IPRT
038E 00001000       1284                   GOSUB           PRXSUB
0390 00001000       1285 PRX10       GOSUB           PECHK
1286 * CANNOT SIMPLY RETURN HERE BECAUSE 1) PRXSUB CALL USES UP ALL FOUR
1287 * SUBROUTINE LEVELS: NFRPU IS NO LONGER ON THE STACK, AND 2) CARD
1288 * READER ROM LOGIC FOR THE 7PRX FUNCTION DOES A GOSUB TO PRX (VIA
1289 * PRT18) AND DOES NOT WANT PRX TO RETURN TO IT.
0392 00001002       1290                   GOLONG           =NFRPU
1291 *****
1292 ***** ACX -- ACCUMULATE X REG IN PRINTER BUFFER *****
1293 *****
1294                           GLB                   ACX
0394 0098           1295                   CON               230Q                   ;X

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# NOMAS

Not Manufacturer Supported  
recipient agrees NOT to contact manufacturer

LOCATION	OBJECT CODE	LINE	SOURCE LINE				
0395	0003	1296	CON	3Q		;C	
0396	0001	1297	CON	1Q		;A	
0397	00001000	1298	ACX	GOSUB	IACHR		
0399	00001000	1299		GOSUB	=ACXSUB		
039B	0003	1300		GOTO	PRX10		
		1301	*****				
		1302	***** PRT1 --- PRINT X IN TRACE *****				
		1303	*****				
		1304		GLB	PXTR		
039C	0264	1305	PXTR	SELPF	PTR		
039D	0083	1306		PFSET?	2	;PRINTER ON?	
		1307		LEGAL			
039E	03A0	1308		RTNNC			
039F	00CC	1309		ST=1?	10	;ROMFLAG?	
03A0	0007	1310		GOC	PXTR2	;YES	
03A1	034C	1311		ST=1?	12	;PRIVACY?	
03A2	0003	1312		GONC	PXTR4	;NO	
03A3	02CC	1313	PXTR2	ST=1?	13	;RUNNING?	
03A4	0360	1314		RTNC		;YES	
03A5	00001000	1315		GOSUB	=LDSST0	;NO, PUT UP STATUS SET 0	
03A7	004C	1316		ST=1?	4	;SINGLE-STEPPING?	
03A8	0360	1317		RTNC		;YES	
03A9	0260	1318	PXTR4	SETHEX			
03AA	004E	1319		C=0	W		
03AB	0270	1320		DADD=C			
03AC	0244	1321		ST=0	9	;CLEAR ERROR FLAG	
03AD	0284	1322		ST=0	7		
		1323	* WE CLEAR S7 HERE SO THAT, IF WE CAN'T READ STATUS, IE WILL LOOK LIKE				
		1324	* WE'RE NOT IN "ALL" MODE AND WE WON'T TRY TO PRINT.				
03AE	00001000	1325		GOSUB	FNSTS		
03B0	028C	1326		ST=1?	7	;"ALL" MODE?	
03B1	03A0	1327		RTNNC		;NOPE	
03B2	00A0	1328		SELP			
03B3	00001000	1329		GOSUB	INITC		
		1330	* PXTR DROPS INTO PRXSUB HERE				
		1331	*				
		1332	* PRXSUB (PRINT X SUBROUTINE) - PRINT X WITH THREE STARS AND EOLR				
		1333	*				
		1334	* USES - THREE ADDITIONAL SUBROUTINE LEVELS!!!				
		1335	*       A, B, C, P, Q, G, S0-S9				
		1336	*				
		1337	* INPUTS - S9 IS PRINTER INTERFACE ERROR FLAG				
		1338	*       VALUE OF X IS IN R3				
		1339	* OUTPUTS - ONE LINE TO PRINTER BUFFER, S9 ERROR FLAG				
		1340	* ASSUMES - CHIP 0 ENABLED, HEX MODE				
		1341	*				
		1342		GLB	PRXSUB		
03B5	00F8	1343	PRXSUB	C=REGN	3	;GET X REG	
03B6	00001000	1344		GOSUB	=ACXSUB		
03B8	00001000	1345		GOSUB	=PRTMSG		
03BA	00A4	1346		CON	244Q	;4 BLANKS	
03BB	002A	1347		CON	52Q	;*	
03BC	002A	1348		CON	52Q	;*	
03BD	002A	1349		CON	52Q	;*	
03BE	01E8	1350		CON	750Q	;EOLR	
03BF	03E0	1351		RTN			
		1352		FILLTO	1677Q		

LOCATION	OBJECT CODE	LINE	SOURCE LINE		
		1353	*****		
		1354	* SETPF - LOGIC FOR NORMAL WAKE UP FROM DEEP SLEEP		
		1355	*		
03C0	0158	1356	SETPF	M=C	;SAVE C REG
03C1	00001002	1357	GOSUB	SF5521	;SET FLAGS 55 AND 21
03C3	0198	1358	C=M		;RESTORE C REG
03C4	0003	1359	GOTO	KYCKX5	
		1360			
		1361			
03C5	0264	1362	KYCKX	SELPF	PTR
03C6	0083	1363	PFSET?	2	;PRINTER ON?
		1364	LEGAL		
03C7	00001002	1365	KYCKX5	GOLNC	=RMCK15
03C9	00001002	1366		GOLONG	PR SVC
		1367	* WHEN PAUSING WITH THE PRINTER TURNED OFF, THE EXTRA WORD TIMES TO		
		1368	* DISCOVER THAT THE PRINTER IS OFF LENGTHEN THE PAUSE BY ABOUT 10%.		
03CB		1369	PRT18		
03CB	00001002	1370	CRPRTX	GOLONG	PRX ;CR: 97 PRTX
03CD		1371	PRT17		
03CD	00001002	1372	CRPSTK	GOLONG	=PRSTK ;CR: 97 PRST
03CF		1373	PRT16		
03CF	00001002	1374	CRPREG	GOLONG	=REGL ;CR: 97 PREG
03D1	00001002	1375	PRT15	GOLONG	=XPRT15 ;SSTBST
03D3	00001002	1376	PRT14	GOLONG	=ENDALP ;ENTERING OR EXITING ALPHA MODE
03D5	00001002	1377	PRT13	GOLONG	=OVERFL ;D.E. UNDERFLOW OR OVERFLOW
03D7	00001002	1378	PRT12	GOLONG	=PRTCAT ;PRINT CATALOG IN TRACE
03D9	00001002	1379	PRT11	GOLONG	=PAVIEW
03DB	00001002	1380	PRT10	GOLONG	=PVIEW
		1381			
		1382		GLB	PRT9
03DD	00001002	1383	PRT9	GOLONG	PADV
03DF	00001002	1384	PRT8	GOLONG	=DATA_R ;DATA ENTRY STRING & R/S
03E1	00001002	1385	PRT7	GOLONG	=PPROMP
03E3	00001002	1386	PRT6	GOLONG	=PMESSG ;PRINT MESSAGES
03E5	00001002	1387	PRT5	GOLONG	=DATA_F ;DATA ENTRY STRING & FUNCTION
		1388			; (NUTO40 OR NAME42)
03E7	00001002	1389	PRT4	GOLONG	=DATAPR ;KEY SEQUENCE ABORTED
		1390			;OR PAUSE EXPIRED
		1391			;OR RAK100 IN CN1
03E9	00001002	1392	PRT3	GOLONG	=ALPHOP ;BEGIN TO KEY IN ALPHA OPERAND
03EB	00001002	1393	PRT2	GOLONG	=NXINST ;NEXT INST TO BE XEQ,RUNNING PGM
03ED	00001002	1394	PRT1	GOLONG	PXTR
		1395	*		
03EF	0000	1396	FILLTO	1757Q	
		1397	GLB	ACRGCX	
03F0	00001002	1398	ACRGCX	GOLONG	=ACREGC ;SEND C REG TO PRINTER
		1399	GLB	PBYTCX	
03F2	00001002	1400	PBYTCX	GOLONG	PBYTEC ;SEND C1:0 TO PRINTER
03F4	0003	1401	PPAUSE	GOTO	KYCKX ;ENTRY FROM PAUSE LOOP
03F5	0000	1402	PRUN	NOP	;RUNNING
03F6	0000	1403	WAKEP	NOP	;WAKE UP FROM DEEP SLEEP W/O KEY
03F7	0000	1404	POWOPF	NOP	
03F8	0003	1405	I_OSVP	GOTO	KYCKX
03F9	0003	1406	DEEPSP	GOTO	SETPF ;WAKE-UP FROM DEEP SLEEP
03FA	0003	1407	COLDSP	GOTO	SETPF ;COLD START ENTRY POINT
03FB	0005	1408	PRTID	CON	5 ;E
03FC	0031	1409	CON	49	;1

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LOCATION	OBJECT	CODE	LINE	SOURCE	LINE	
03FD	0012		1410	CON	18	;R
03FE	0010		1411	CON	16	;P
03FF			1412	BSS	1	;PRINTER CHECKSUM
			1413	END		

Errors=    0

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LINE#	SYMBOL	TYPE	REFERENCES
	ABTS10	E	106,261
45	ACCHR	P	44
59	ACCOL	P	58
	ACREGC	E	1398
1398	ACRGCX	P	1397
336	ACSPCC	P	331,335
322	ACSPEC	P	321
1298	ACX	P	1294
	ACXSUB	E	1299,1344
218	ADV02	P	222
223	ADV03	P	207
226	ADV04	P	214
245	ADV10	P	253
254	ADV20	P	250
256	ADV30	P	246
261	ADV50	P	220,223
212	ADVKEY	P	130,211
325	AERRDE	P	276
	ALPHOP	E	1392
894	BECHK	P	893,919
895	BECK20	P	906
898	BECK30	P	896
295	BLD10	P	293
289	BLDSPC	P	288
	BPROMT	E	1028
536	CKEN	P	490,530,624,633,643
542	CKEN10	P	538
546	CKEN20	P	541
531	CKOEN	P	15,529
1407	COLDSP	P	
	CONV3D	E	270
830	CPBYT1	P	826
820	CPBYTE	P	772,790,819
1374	CRPREG	P	
1370	CRPRTX	P	
1372	CRPSTK	P	
270	CX_128	P	45,59,269,289
1080	C_C	P	1077
	DATAPR	E	215,1389
	DATA_F	E	1387
	DATA_R	E	1384
1406	DEEPSP	P	
1192	DONKEY	P	1186
1154	DORAM	P	1145
1151	DOXROM	P	1148
	DROPST	E	304
	DSPLN_	E	149,229
	ENCP00	E	161,235,375,1272
	ENDALP	E	1376
749	EOL	P	682,748
	EOLL	E	104,647,1004,1015,1126
	EOLR	E	216,1216
	ERR110	E	377
	ERRDE	E	325
	ERRSUB	E	358
1209	FILLIN	P	1206
1208	FILLNP	P	1207



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LINE#	SYMBOL	TYPE	REFERENCES
1088	FINISH	P	1087,1192
1048	FLGLOP	P	1086
1066	FLGSET	P	1057
	FNDEND	E	983
430	FNSTS	P	84,422,448,493,627,659,894,1325
441	FS10	P	436
511	FS100	P	465
442	FS20	P	428,440,469,471
445	FS30	P	453
450	FS40	P	446
466	FS50	P	
470	FS90	P	379,424
425	FXSTS	P	182,202,218,248,423,905
	GCPKC	E	1143
642	IACHR	P	47,618,1298
650	IACOL	P	60,326,619
654	IAUALL	P	621
653	IAUNA	P	620
490	ICF	P	10,488
493	ICF10	P	17,489,645
627	IN10	P	638
643	IN20	P	651
671	IN40	P	661,666
630	IN999	P	491,625,634,640,644
1245	INADXP	P	1244
	INCADA	E	1246
1159	INCCNT	P	1125,1150,1152,1158
1178	INCCOL	P	1175
683	INIT09	P	
684	INIT10	P	648
695	INIT20	P	689
698	INIT30	P	693
704	INIT35	P	699
708	INIT40	P	703
678	INIT5	P	623
714	INIT50	P	709
726	INIT60	P	692,696,702,706,713,717
734	INIT70	P	732
737	INIT80	P	735
680	INITC	P	622,628,676,1329
624	IPRT	P	616,966,1104,1283
633	IPRTM	P	617
1405	I_OSVP	P	
1183	KEYLNK	P	1172,1177
1120	KEYLOP	P	1167
1121	KEYLP1	P	1119,1183
1362	KYCKX	P	1401,1405
1365	KYCKX5	P	1359
	LDSST0	E	28,1315
	LEFTJ	E	160,234
1071	LPCHK	P	1065
	LPECHK	E	11,1088
	MESSL	E	150,158,230
	MESSLP	E	363,382,1259
	MSGA	E	196
	MSGDLY	E	376
	MSGNL	E	197

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LINE#	SYMBOL	TYPE	REFERENCES
	NFRKB	E	949
	NFRPU	E	1089,1290
	NLT040	E	192,254
1230	NXBTXP	P	1229
	NXBYTA	E	1231
	NXBYTO	E	1232
	NXINST	E	1393
	OFF	E	943
510	OOP10	P	508
507	OOPCHK	P	506,680
1259	OOPMSG	P	102,398,1258
1027	OUTDSP	P	1022,1025
950	OUTPCK	P	947
	OVERFL	E	1377
873	PAD	P	870,1215
872	PAD1_A	P	871
15	PADV	P	14,1383
	PAVIEW	E	1379
	PBINB0	E	1003,1054
	PBINBD	E	991,1036
	PBLANK	E	1135,1137
875	PBYA_C	P	869
828	PBYT01	P	857
845	PBYT11	P	850
856	PBYT21	P	846
837	PBYTCS	P	738,740
1400	PBYTCX	P	1399
834	PBYTDA	P	63,817
835	PBYTDU	P	341,818
838	PBYTEC	P	123,260,752,755,816,832,877,1400
934	PCHKKB	P	933
375	PE05	P	394,399
379	PE10	P	362
382	PE30	P	397
396	PE40	P	381
355	PECHK	P	64,353,921,1071,1285
358	PEDIAG	P	354
143	PKEY	P	128
149	PKEY15	P	145
172	PKEY35	P	168
	PLBL0	E	1156
	PMESSG	E	1386
1404	POWOFPP	P	
1401	PPAUSE	P	
63	PPECHK	P	48,62
	PPROM1	E	1014,1149
	PPROMP	E	1385
	PPXROM	E	1151
10	PRBUF	P	9
966	PRFLAG	P	965
767	PRKC	P	766,1136
775	PRKC10	P	768
791	PRKC20	P	765,780,788
1104	PRKEYS	P	1103
	PRSTK	E	1372
77	PRSVC	P	74,1366
1394	PRT1	P	

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LINE#	SYMBOL	TYPE	REFERENCES
1380	PRT10	P	
1379	PRT11	P	
1378	PRT12	P	
1377	PRT13	P	
1376	PRT14	P	
1375	PRT15	P	
1373	PRT16	P	
1371	PRT17	P	
1369	PRT18	P	
1393	PRT2	P	
1392	PRT3	P	
160	PRT30	P	155
1389	PRT4	P	
179	PRT40	P	187
1387	PRT5	P	
192	PRT50	P	185
1386	PRT6	P	
194	PRT60	P	180
1385	PRT7	P	
200	PRT70	P	201
1384	PRT8	P	
202	PRT80	P	206
1383	PRT9	P	1382
207	PRT90	P	204
	PTRCAT	E	1378
1408	PRTID	P	
	PRMSG	E	226,967,992,1037,1049,1058,1066,1105,1187,1345
1402	PRUN	P	
1283	PRX	P	1279,1370
1285	PRX10	P	1278,1300
1343	PRXSUB	P	1284,1342
102	PSVC10	P	96
104	PSVC20	P	101
107	PSVC30	P	99
118	PSVC40	P	92
127	PSVC50	P	108
132	PSVC90	P	86,103,110,120,126
134	PSVC95	P	117
139	PRSV99	P	137
	PVIEW	E	1380
919	PWAIT	P	918,1127
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