

HP 3000 Computer Systems

COMMUNICATIONS HANDBOOK



HEWLETT  PACKARD

5303 STEVENS CREEK BLVD.,
SANTA CLARA, CALIFORNIA, 95050

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LIST OF EFFECTIVE PAGES

The List of Effective Pages gives the date of the current edition and the dates when pages were changed in updates to that edition. Within the manual, any page changed since the last edition has the date the changes were made on the bottom of the page. Changes are marked with a vertical bar in the margin. When an update is incorporated in a subsequent reprinting of the manual, these bars are removed.

First Edition	Dec 1977
Second Edition	Oct 1978

PRINTING HISTORY

New editions incorporate all update material since the previous edition. Update packages, which are issued between editions, contain additional and replacement pages to be merged into the manual. The date on the title page changes only when a new edition is published. If minor corrections and updates are incorporated, the manual is reprinted but neither the date on the title page nor the edition changes.

First Edition	Dec 1977
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This handbook is designed for quick reference by those who install, service, and use Hewlett-Packard data communications products. The information herein is appropriate for both Series II and Series III Computer Systems and does not apply for Series I.

The sections in the handbook are independent of each other so that readers need refer only to the material that is relevant to their situation. To aid in locating material, the contents of each section are listed on the title page for that section.

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ASCII/EBCDIC/HOLLERITH

CHAR CODE			ASCII			EBCDIC	
Dec	Oct	Hex	Cntl/ Gph	to EBCDIC (Oct)	Hollerith	Cntl/ Gph	to ASCII (Oct)
0	000	00	NUL	000	12-0-1-8-9	NUL	000
1	001	01	SOH	001	12-1-9	SOH	001
2	002	02	STX	002	12-2-9	STX	002
3	003	03	ETX	003	12-3-9	ETX	003
4	004	04	EOT	067	7-9	PF	234
5	005	05	ENO	055	0-5-8-9	HT	011
6	006	06	ACK	056	0-6-8-9	LC	206
7	007	07	BEL	057	0-7-8-9	DEL	177
8	010	08	BS	026	11-6-9		227
9	011	09	HT	005	12-5-9		215
10	012	0A	LF	045	0-5-9	SMM	216
11	013	0B	VT	013	12-3-8-9	VT	013
12	014	0C	FF	014	12-4-8-9	FF	014
13	015	0D	CR	015	12-5-8-9	CR	015
14	016	0E	SO	016	12-6-8-9	SO	016
15	017	0F	SI	017	12-7-8-9	SI	017
16	020	10	DLE	020	12-11-1-8-9	DLE	020
17	021	11	DC1	021	11-1-9	DC1	021
18	022	12	DC2	022	11-2-9	DC2	022
19	023	13	DC3	023	11-3-9	TM	023
20	024	14	DC4	074	4-8-9	RES	235
21	025	15	NAK	075	5-8-9	NL	205
22	026	16	SYN	062	2-9	BS	010
23	027	17	ETB	046	0-6-9	IL	207
24	030	18	CAN	030	11-8-9	CAN	030
25	031	19	EM	031	11-1-8-9	EM	031
26	032	1A	SUB	077	7-8-9	CC	222
27	033	1B	ESC	047	0-7-9	CU1	217
28	034	1C	FS	034	11-4-8-9	IFS	034
29	035	1D	GS	035	11-5-8-9	IGS	035
30	036	1E	RS	036	11-6-8-9	IRS	036
31	037	1F	US	037	11-7-8-9	IUS	037
32	040	20	SP	100	Blank	DS	200
33	041	21	!	117	12-7-8	SOS	201
34	042	22	"	177	7-8	FS	202
35	043	23	#	173	3-8		203
36	044	24	\$	133	11-3-8	BYP	204
37	045	25	%	154	0-4-8	LF	012
38	046	26	&	120	12	ETB	027
39	047	27	'	175	5-8	ESC	033
40	050	28	(	115	12-5-8		210
41	051	29	)	135	11-5-8		211
42	052	2A	*	134	11-4-8	SM	212
43	053	2B	+	116	12-6-8	CU2	213
44	054	2C	,	153	0-3-8		214
45	055	2D	-	140	11	ENO	005
46	056	2E	.	113	12-3-8	ACK	006
47	057	2F	/	141	0-1	BEL	007
48	060	30	0	360	0		220
49	061	31	1	361	1		221
50	062	32	2	362	2	SYN	026
51	063	33	3	363	3		223
52	064	34	4	364	4	PN	224
53	065	35	5	365	5	RS	225
54	066	36	6	366	6	UC	226
55	067	37	7	367	7	EOT	004
56	070	38	8	370	8		230
57	071	39	9	371	9		231
58	072	3A	:	172	2-8		232
59	073	3B	;	136	11-6-8	CU3	233
60	074	3C	<	114	12-4-8	DC4	024
61	075	3D	=	176	6-8	NAK	025
62	076	3E	>	156	0-6-8		236
63	077	3F	?	157	0-7-8	SUB	032

ASCII/EBCDIC/HOLLERITH

CHAR CODE			ASCII			EBCDIC	
Dec	Oct	Hex	Cntl/ Gph	to EBCDIC (Oct)	Hollerith	Cntl/ Gph	to ASCII (Oct)
64	100	40	@	174	4-8	SP	040
65	101	41	A	301	12-1		240
66	102	42	8	302	12-2		241
67	103	43	C	303	12-3		242
68	104	44	D	304	12-4		243
69	105	45	E	305	12-5		244
70	106	46	F	306	12-6		245
71	107	47	G	307	12-7		246
72	110	48	H	310	12-8		247
73	111	49	I	311	12-9		250
74	112	4A	J	321	11-1	¢	133
75	113	4B	K	322	11-2	•	056
76	114	4C	L	323	11-3	<	074
77	115	4D	M	324	11-4	!	050
78	116	4E	N	325	11-5	+	053
79	117	4F	O	326	11-6	!	041
80	120	50	P	327	11-7	&	046
81	121	51	Q	330	11-8		251
82	122	52	R	331	11-9		252
83	123	53	S	342	0-2		253
84	124	54	T	343	0-3		254
85	125	55	U	344	0-4		255
86	126	56	V	345	0-5		256
87	127	57	W	346	0-6		257
88	130	58	X	347	0-7		260
89	131	59	Y	350	0-8		261
90	132	5A	Z	351	0-9		135
91	133	5B	[	112	12-2-8	\$	044
92	134	5C	\	340	0-2-8	*	052
93	135	5D	]	132	11-2-8	!	051
94	136	5E	^	137	11-7-8	;	073
95	137	5F	_	155	0-5-8	!	136
96	140	60	`	171	1-8	-	055
97	141	61	a	201	12-0-1	/	057
98	142	62	b	202	12-0-2		262
99	143	63	c	203	12-0-3		263
100	144	64	d	204	12-0-4		264
101	145	65	e	205	12-0-5		265
102	146	66	f	206	12-0-6		266
103	147	67	g	207	12-0-7		267
104	150	68	h	210	12-0-8		270
105	151	69	i	211	12-0-9		271
106	152	6A	j	221	12-11-1	!	174
107	153	6B	k	222	12-11-2	!	054
108	154	6C	l	223	12-11-3	%	045
109	155	6D	m	224	12-11-4	>	137
110	156	6E	n	225	12-11-5		076
111	157	6F	o	226	12-11-6	?	077
112	160	70	p	227	12-11-7		272
113	161	71	q	230	12-11-8		273
114	162	72	r	231	12-11-9		274
115	163	73	s	242	11-0-2		275
116	164	74	t	243	11-0-3		276
117	165	75	u	244	11-0-4		277
118	166	76	v	245	11-0-5		300
119	167	77	w	246	11-0-6		301
120	170	78	x	247	11-0-7		302
121	171	79	y	250	11-0-8	!	140
122	172	7A	z	251	11-0-9	!	072
123	173	7B	{	300	12-0	!	043
124	174	7C		152	12-11	@	100
125	175	7D	~	320	11-0	!	047
126	176	7E		241	11-0-1	=	075
127	177	7F	DEL	007	12-7-9	!"	042

ASCII/EBCDIC/HOLLERITH

CHAR CODE			ASCII			EBCDIC	
Dec	Oct	Hex	Cntl/ Gph	to EBCDIC (Oct)	Hollerith	Cntl/ Gph	to ASCII (Oct)
128	200	80		040	11-0-1-8-9		303
129	201	81		041	0-1-9	a	141
130	202	82		042	0-2-9	b	142
131	203	83		043	0-3-9	c	143
132	204	84		044	0-4-9	d	144
133	205	85		025	11-5-9	e	145
134	206	86		006	12-6-9	f	146
135	207	87		027	11-7-9	g	147
136	210	88		050	0-8-9	h	150
137	211	89		051	0-1-8-9	i	151
138	212	8A		052	0-2-8-9		304
139	213	8B		053	0-3-8-9		305
140	214	8C		054	0-4-8-9		306
141	215	8D		011	12-1-8-9		307
142	216	8E		012	12-2-8-9		310
143	217	8F		033	11-3-8-9		311
144	220	90		060	12-11-0-1-8-9		312
145	221	91		061	1-9	j	152
146	222	92		032	11-2-8-9	k	153
147	223	93		063	3-9	l	154
148	224	94		064	4-9	m	155
149	225	95		065	5-9	n	156
150	226	96		066	6-9	o	157
151	227	97		010	12-8-9	p	160
152	230	98		070	8-9	q	161
153	231	99		071	1-8-9	r	162
154	232	9A		072	2-8-9		313
155	233	9B		073	3-8-9		314
156	234	9C		004	12-4-9		315
157	235	9D		024	11-4-9		316
158	236	9E		076	6-8-9		317
159	237	9F		341	11-0-1-9		320
160	240	A0		101	12-0-1-9		321
161	241	A1		102	12-0-2-9	~	176
162	242	A2		103	12-0-3-9	s	163
163	243	A3		104	12-0-4-9	t	164
164	244	A4		105	12-0-5-9	u	165
165	245	A5		106	12-0-6-9	v	166
166	246	A6		107	12-0-7-9	w	167
167	247	A7		110	12-0-8-9	x	170
168	250	A8		111	12-1-8	y	171
169	251	A9		121	12-11-1-9	z	172
170	252	AA		122	12-11-2-9		322
171	253	AB		123	12-11-3-9		323
172	254	AC		124	12-11-4-9		324
173	255	AD		125	12-11-5-9		325
174	256	AE		126	12-11-6-9		326
175	257	AF		127	12-11-7-9		327
176	260	80		130	12-11-8-9		330
177	261	81		131	11-1-8		331
178	262	82		142	11-0-2-9		332
179	263	83		143	11-0-3-9		333
180	264	84		144	11-0-4-9		334
181	265	85		145	11-0-5-9		335
182	266	86		146	11-0-6-9		336
183	267	87		147	11-0-7-9		337
184	270	88		150	11-0-8-9		340
185	271	89		151	0-1-8		341
186	272	8A		160	12-11-0		342
187	273	8B		161	12-11-0-1-9		343
188	274	8C		162	12-11-0-2-9		344
189	275	8D		163	12-11-0-3-9		345
190	276	8E		164	12-11-0-4-9		346
191	277	8F		165	12-11-0-5-9		347

CHAR CODE			ASCII			EBCDIC	
Dec	Oct	Hex	Cntl/ Gph	to EBCDIC (Dctl)	Hollerith	Cntl/ Gph	to ASCII (Oct)
192	300	C0		166	12-11-0-6-9	{	173
193	301	C1		167	12-11-0-7-9	A	101
194	302	C2		170	12-11-0-8-9	B	102
195	303	C3		200	12-0-1-8	C	103
196	304	C4		212	12-0-2-8	D	104
197	305	C5		213	12-0-3-8	E	105
198	306	C6		214	12-0-4-8	F	106
199	307	C7		215	12-0-5-8	G	107
200	310	C8		216	12-0-6-8	H	110
201	311	C9		217	12-0-7-8	I	111
202	312	CA		220	12-11-1-8		350
203	313	CB		232	12-11-2-8		351
204	314	CC		233	12-11-3-8	J	352
205	315	CD		234	12-11-4-8		353
206	316	CE		235	12-11-5-8	K	354
207	317	CF		236	12-11-6-8		355
208	320	D0		237	12-11-7-8	L	175
209	321	D1		240	11-0-1-8	J	112
210	322	D2		252	11-0-2-8	K	113
211	323	D3		253	11-0-3-8	L	114
212	324	D4		254	11-0-4-8	M	115
213	325	D5		255	11-0-5-8	N	116
214	326	D6		256	11-0-6-8	O	117
215	327	D7		257	11-0-7-8	P	120
216	330	D8		260	12-11-0-1-8	Q	121
217	331	D9		261	12-11-0-1	R	122
218	332	DA		262	12-11-0-2		356
219	333	DB		263	12-11-0-3		357
220	334	DC		264	12-11-0-4		360
221	335	DD		265	12-11-0-5		361
222	336	DE		266	12-11-0-6		362
223	337	DF		267	12-11-0-7		363
224	340	E0		270	12-11-0-8	\	134
225	341	E1		271	12-11-0-9		237
226	342	E2		272	12-11-0-2-8	S	123
227	343	E3		273	12-11-0-3-8	T	124
228	344	E4		274	12-11-0-4-8	U	125
229	345	E5		275	12-11-0-5-8	V	126
230	346	E6		276	12-11-0-6-8	W	127
231	347	E7		277	12-11-0-7-8	X	130
232	350	E8		312	12-0-2-8-9	Y	131
233	351	E9		313	12-0-3-8-9	Z	132
234	352	EA		314	12-0-4-8-9		364
235	353	EB		315	12-0-5-8-9		365
236	354	EC		316	12-0-6-8-9	H	366
237	355	ED		317	12-0-7-8-9		367
238	356	EE		332	12-11-2-8-9		370
239	357	EF		333	12-11-3-8-9		371
240	360	F0		334	12-11-4-8-9	0	060
241	361	F1		335	12-11-5-8-9	1	061
242	362	F2		336	12-11-6-8-9	2	062
243	363	F3		337	12-11-7-8-9	3	063
244	364	F4		352	11-0-2-8-9	4	064
245	365	F5		353	11-0-3-8-9	5	065
246	366	F6		354	11-0-4-8-9	6	066
247	367	F7		355	11-0-5-8-9	7	067
248	370	F8		356	11-0-6-8-9	8	070
249	371	F9		357	11-0-7-8-9	9	071
250	372	FA		372	12-11-0-2-8-9	I	372
251	373	FB		373	12-11-0-3-8-9		373
252	374	FC		374	12-11-0-4-8-9		374
253	375	FD		375	12-11-0-5-8-9		375
254	376	FE		376	12-11-0-6-8-9		376
255	377	FF		377	12-11-0-7-8-9	EO	377

ASCII/BYTES

BYTE POSITION			
CHAR	Left	Right	Dec.
A	040400	000101	65
B	041000	000102	66
C	041400	000103	67
D	042000	000104	68
E	042400	000105	69
F	043000	000106	70
G	043400	000107	71
H	044000	000110	72
I	044400	000111	73
J	045000	000112	74
K	045400	000113	75
L	046000	000114	76
M	046400	000115	77
N	047000	000116	78
O	047400	000117	79
P	050000	000120	80
Q	050400	000121	81
R	051000	000122	82
S	051400	000123	83
T	052000	000124	84
U	052400	000125	85
V	053000	000126	86
W	053400	000127	87
X	054000	000130	88
Y	054400	000131	89
Z	055000	000132	90
a	060400	000141	97
b	061000	000142	98
c	061400	000143	99
d	062000	000144	100
e	062400	000145	101
f	063000	000146	102
g	063400	000147	103
h	064000	000150	104
i	064400	000151	105
j	065000	000152	106
k	065400	000153	107
l	066000	000154	108
m	066400	000155	109
n	067000	000156	110
o	067400	000157	111
p	070000	000160	112
q	070400	000161	113
r	071000	000162	114
s	071400	000163	115
t	072000	000164	116
u	072400	000165	117
v	073000	000166	118
w	073400	000167	119
x	074000	000170	120
y	074400	000171	121
z	075000	000172	122
0	030000	000060	48
1	030400	000061	49
2	031000	000062	50
3	031400	000063	51
4	032000	000064	52
5	032400	000065	53
6	033000	000066	54
7	033400	000067	55
8	034000	000070	56
9	034400	000071	57

BYTE POSITION			
CHAR	Left	Right	Dec.
NUL	000000	000000	0
SOH	000400	000001	1
STX	001000	000002	2
ETX	001400	000003	3
EOT	002000	000004	4
ENO	002400	000005	5
ACK	003000	000006	6
BEL	003400	000007	7
BS	004000	000010	8
HT	004400	000011	9
LF	005000	000012	10
VT	005400	000013	11
FF	006000	000014	12
CR	006400	000015	13
SO	007000	000016	14
SI	007400	000017	15
DLE	010000	000020	16
DC1	010400	000021	17
DC2	011000	000022	18
DC3	011400	000023	19
DC4	012000	000024	20
NAK	012400	000025	21
SYN	013000	000026	22
ETB	013400	000027	23
CAN	014000	000030	24
EM	014400	000031	25
SUB	015000	000032	26
ESC	015400	000033	27
FS	016000	000034	28
GS	016400	000035	29
RS	017000	000036	30
US	017400	000037	31
SPACE	020000	000040	32
!	020400	000041	33
"	021000	000042	34
=	021400	000043	35
\$	022000	000044	36
%	022400	000045	37
&	023000	000046	38
'	023400	000047	39
(	024000	000050	40
)	024400	000051	41
•	025000	000052	42
+	025400	000053	43
,	026000	000054	44
-	026400	000055	45
.	027000	000056	46
/	027400	000057	47
:	035000	000072	58
;	035400	000073	59
<	036000	000074	60
=	036400	000075	61
>	037000	000076	62
?	037400	000077	63
@	040000	000100	64
[	055400	000133	91
\	056000	000134	92
]	056400	000135	93
^	057000	000136	94
_	057400	000137	95
`	060000	000140	96
{	075400	000173	123
	076000	000174	124
~	076400	000175	125
DEL	077000	000176	126
	077400	000177	127

OCTAL: DECIMAL CONVERSION

2'S COMP		0	1	2	3	4	5	6	7
0	0	0	1	2	3	4	5	6	7
177770	10	8	9	10	11	12	13	14	15
177760	20	16	17	18	19	20	21	22	23
177750	30	24	25	26	27	28	29	30	31
177740	40	32	33	34	35	36	37	38	39
177730	50	40	41	42	43	44	45	46	47
177720	60	48	49	50	51	52	53	54	55
177710	70	56	57	58	59	60	61	62	63
177700	100	64	65	66	67	68	69	70	71
177670	110	72	73	74	75	76	77	78	79
177660	120	80	81	82	83	84	85	86	87
177650	130	88	89	90	91	92	93	94	95
177640	140	96	97	98	99	100	101	102	103
177630	150	104	105	106	107	108	109	110	111
177620	160	112	113	114	115	116	117	118	119
177610	170	120	121	122	123	124	125	126	127
177600	200	128	129	130	131	132	133	134	135
177570	210	136	137	138	139	140	141	142	143
177560	220	144	145	146	147	148	149	150	151
177550	230	152	153	154	155	156	157	158	159
177540	240	160	161	162	163	164	165	166	167
177530	250	168	169	170	171	172	173	174	175
177520	260	176	177	178	179	180	181	182	183
177510	270	184	185	186	187	188	189	190	191
177500	300	192	193	194	195	196	197	198	199
177470	310	200	201	202	203	204	205	206	207
177460	320	208	209	210	211	212	213	214	215
177450	330	216	217	218	219	220	221	222	223
177440	340	224	225	226	227	228	229	230	231
177430	350	232	233	234	235	236	237	238	239
177420	360	240	241	242	243	244	245	246	247
177410	370	248	249	250	251	252	253	254	255
177400	400	256	257	258	259	260	261	262	263
177370	410	264	265	266	267	268	269	270	271
177360	420	272	273	274	275	276	277	278	279
177350	430	280	281	282	283	284	285	286	287
177340	440	288	289	290	291	292	293	294	295
177330	450	296	297	298	299	300	301	302	303
177320	460	304	305	306	307	308	309	310	311
177310	470	312	313	314	315	316	317	318	319
177300	500	320	321	322	323	324	325	326	327
177270	510	328	329	330	331	332	333	334	335
177260	520	336	337	338	339	340	341	342	343
177250	530	344	345	346	347	348	349	350	351
177240	540	352	353	354	355	356	357	358	359
177230	550	360	361	362	363	364	365	366	367
177220	560	368	369	370	371	372	373	374	375
177210	570	376	377	378	379	380	381	382	383

OCTAL: DECIMAL CONVERSION

2'S COMP		0	1	2	3	4	5	6	7
177200	600	384	385	386	387	388	389	390	391
177170	610	392	393	394	395	396	397	398	399
177160	620	400	401	402	403	404	405	406	407
177150	630	408	409	410	411	412	413	414	415
177140	640	416	417	418	419	420	421	422	423
177130	650	424	425	426	427	428	429	430	431
177120	660	432	433	434	435	436	437	438	439
177110	670	440	441	442	443	444	445	446	447
177100	700	448	449	450	451	452	453	454	455
177070	710	456	457	458	459	460	461	462	463
177060	720	464	465	466	467	468	469	470	471
177050	730	472	473	474	475	476	477	478	479
177040	740	480	481	482	483	484	485	486	487
177030	750	488	489	490	491	492	493	494	495
177020	760	496	497	498	499	500	501	502	503
177010	770	504	505	506	507	508	509	510	511
177000	1000	512	513	514	515	516	517	518	519
176770	1010	520	521	522	523	524	525	526	527
176760	1020	528	529	530	531	532	533	534	535
176750	1030	536	537	538	539	540	541	542	543
176740	1040	544	545	546	547	548	549	550	551
176730	1050	552	553	554	555	556	557	558	559
176720	1060	560	561	562	563	564	565	566	567
176710	1070	568	569	570	571	572	573	574	575
176700	1100	576	577	578	579	580	581	582	583
176670	1110	584	585	586	587	588	589	590	591
176660	1120	592	593	594	595	596	597	598	599
176650	1130	600	601	602	603	604	605	606	607
176640	1140	608	609	610	611	612	613	614	615
176630	1150	616	617	618	619	620	621	622	623
176620	1160	624	625	626	627	628	629	630	631
176610	1170	632	633	634	635	636	637	638	639
176600	1200	640	641	642	643	644	645	646	647
176570	1210	648	649	650	651	652	653	654	655
176560	1220	656	657	658	659	660	661	662	663
176550	1230	664	665	666	667	668	669	670	671
176540	1240	672	673	674	675	676	677	678	679
176530	1250	680	681	682	683	684	685	686	687
176520	1260	688	689	690	691	692	693	694	695
176510	1270	696	697	698	699	700	701	702	703
176500	1300	704	705	706	707	708	709	710	711
176470	1310	712	713	714	715	716	717	718	719
176460	1320	720	721	722	723	724	725	726	727
176450	1330	728	729	730	731	732	733	734	735
176440	1340	736	737	738	739	740	741	742	743
176430	1350	744	745	746	747	748	749	750	751
176420	1360	752	753	754	755	756	757	758	759
176410	1370	760	761	762	763	764	765	766	767

OCTAL: DECIMAL CONVERSION

2'S COMP		0	1	2	3	4	5	6	7
176400	1400	768	769	770	771	772	773	774	775
176370	1410	776	777	778	779	780	781	782	783
176360	1420	784	785	786	787	788	789	790	791
176350	1430	792	793	794	795	796	797	798	799
176340	1440	800	801	802	803	804	805	806	807
176330	1450	808	809	810	811	812	813	814	815
176320	1460	816	817	818	819	820	821	822	823
176310	1470	824	825	826	827	828	829	830	831
176300	1500	832	833	834	835	836	837	838	839
176270	1510	840	841	842	843	844	845	846	847
176260	1520	848	849	850	851	852	853	854	855
176250	1530	856	857	858	859	860	861	862	863
176240	1540	864	865	866	867	868	869	870	871
176230	1550	872	873	874	875	876	877	878	879
176220	1560	880	881	882	883	884	885	886	887
176210	1570	888	889	890	891	892	893	894	895
176200	1600	896	897	898	899	900	901	902	903
176170	1610	904	905	906	907	908	909	910	911
176160	1620	912	913	914	915	916	917	918	919
176150	1630	920	921	922	923	924	925	926	927
176140	1640	928	929	930	931	932	933	934	935
176130	1650	936	937	938	939	940	941	942	943
176120	1660	944	945	946	947	948	949	950	951
176110	1670	952	953	954	955	956	957	958	959
176100	1700	960	961	962	963	964	965	966	967
176070	1710	968	969	970	971	972	973	974	975
176060	1720	976	977	978	979	980	981	982	983
176050	1730	984	985	986	987	988	989	990	991
176040	1740	992	993	994	995	996	997	998	999
176030	1750	1000	1001	1002	1003	1004	1005	1006	1007
176020	1760	1008	1009	1010	1011	1012	1013	1014	1015
176010	1770	1016	1017	1018	1019	1020	1021	1022	1023

OCTAL: DECIMAL CONVERSION

(ASSUME 16 BIT POSITIVE INTEGER)

OCTAL DECIMAL		OCTAL DECIMAL		OCTAL DECIMAL	
0	0	60000	24576	140000	49152
1000	512	61000	25088	141000	49664
2000	1024	62000	25600	142000	50176
3000	1536	63000	26112	143000	50688
4000	2048	64000	26624	144000	51200
5000	2560	65000	27136	145000	51712
6000	3072	66000	27648	146000	52224
7000	3584	67000	28160	147000	52736
10000	4096	70000	28672	150000	53248
11000	4608	71000	29184	151000	53760
12000	5120	72000	29696	152000	54272
13000	5632	73000	30208	153000	54784
14000	6144	74000	30720	154000	55296
15000	6656	75000	31232	155000	55808
16000	7168	76000	31744	156000	56320
17000	7680	77000	32256	157000	56832
20000	8192	100000	32768	160000	57344
21000	8704	101000	33280	161000	57856
22000	9216	102000	33792	162000	58368
23000	9728	103000	34304	163000	58880
24000	10240	104000	34816	164000	59392
25000	10752	105000	35328	165000	59904
26000	11264	106000	35840	166000	60416
27000	11776	107000	36352	167000	60928
30000	12288	110000	36864	170000	61440
31000	12800	111000	37376	171000	61952
32000	13312	112000	37888	172000	62464
33000	13824	113000	38400	173000	62976
34000	14336	114000	38912	174000	63488
35000	14848	115000	39424	175000	64000
36000	15360	116000	39936	176000	64512
37000	15872	117000	40448	177000	65024
40000	16384	120000	40960	177777	65535
41000	16896	121000	41472		
42000	17408	122000	41984		
43000	17920	123000	42496		
44000	18432	124000	43008		
45000	18944	125000	43520		
46000	19456	126000	44032		
47000	19968	127000	44544		
50000	20480	130000	45056		
51000	20992	131000	45568		
52000	21504	132000	46080		
53000	22016	133000	46592		
54000	22528	134000	47104		
55000	23040	135000	47616		
56000	23552	136000	48128		
57000	24064	137000	48640		

2^n	n	2^{-n}	2^n		n	2^{-n}					
1	0	1.0	2	097 152	21	0.00000	04768	37158	20312	5	
2	1	0.5	4	194 304	22	0.00000	02384	18579	10156	25	
4	2	0.25	8	388 608	23	0.00000	01192	09289	55078	125	
8	3	0.125	16	777 216	24	0.00000	00596	04644	77539	0625	
16	4	0.0625	32	554 432	25	0.00000	00298	02322	38769	53125	
32	5	0.03125	67	108 864	26	0.00000	00149	01161	19384	76562 5	
64	6	0.01562 5									
128	7	0.00781 25	134	217 728	27	0.00000	00074	50580	59692	38281 25	
256	8	0.00390 625	268	435 456	28	0.00000	00037	25290	29846	19140 625	
			536	870 912	29	0.00000	00018	62645	14923	09570 3125	
512	9	0.00195 3125									
1 024	10	0.00097 65625	1 073	741 824	30	0.00000	00009	31322	57461	54785 15625	
2 048	11	0.00048 82812 5	2 147	483 648	31	0.00000	00004	65661	28730	77392 57812 5	
			4 294	967 296	32	0.00000	00002	32830	64365	38696 28906 25	
4 096	12	0.00024 41406 25									
8 192	13	0.00012 20703 125	8 589	934 592	33	0.00000	00001	16415	32182	69348 14453 125	
16 384	14	0.00006 10351 5625	17 179	869 184	34	0.00000	00000	58207	66091	34674 07226 5625	
			34 359	738 368	35	0.00000	00000	29103	83045	67337 03613 28125	
32 768	15	0.00003 05175 78125	68 719	476 736	36	0.00000	00000	14551	91522	83668 51806 64062 5	
65 536	16	0.00001 52587 89062 5	137 438	953 472	37	0.00000	00000	07275	95761	41834 25903 32031 25	
131 072	17	0.00000 76293 94531 25	274 877	906 944	38	0.00000	00000	03637	97880	70917 12951 66015 625	
			549 755	813 888	39	0.00000	00000	01818	98940	35458 56475 83007 8125	
262 144	18	0.00000 38146 97265 625									
524 288	19	0.00000 19073 48632 8125									
1 048 576	20	0.00000 09536 74316 40625									





COMMUNICATIONS CONTROLLERS AND MODEMS

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HP 3000 COMMUNICATION CONTROLLERS**30032B ASYNCHRONOUS TERMINAL CONTROLLER**

The HP 30032B Asynchronous Terminal Controller is a controller interface for low-speed bit-serial asynchronous devices. The controller can accommodate up to 16 devices which may be hardwired or on modems or any mix thereof. This device is used with the normal log-on type devices.

Features

- 75 to 2400 bits/sec transfer rate programmable. MPE operating system provided speeds are: 110, 150, 300, 600, 1200, 2400 baud.
- Will operate in full duplex, half duplex and split speed modes (usually European modems).
- Character sizes vary from 5 to 11 bits including start and stop bits.
- Supports 103A2, 103A3, 113B, 202S, 202T modems. Additional modems have been used but have not been verified/certified by GSD. This list will be expanded in the future.
- Supports the RS232 and CCITT.V24 interface specifications.
- Supports 801A (Western Electric) auto dialer (hardware only; no system software).
- Odd or even parity is maintained on transmitted data, no parity checking on received data.
- Operates in direct I/O mode, i.e., one CPU instruction for each character sent/received.

Basic Configuration

HP 30032B	ATC provides full duplex I/O transfers for up to 16 hard-wired bit serial devices (and 202T modems).
HP 30032B-001	Provides I/O transfer for up to 16 type 103 or hardwired devices.
HP 30032B-002	Provides I/O transfers for up to 16 type 202C and 202S data sets or up to eight 801 automatic dialing units. With the -002 option, any mix of hardwire, 103, 202, or 801 may be utilized in the subsystem type devices.

ASYNCHRONOUS TERMINAL CONTROLLER HP 30032B DRIVER IOTERM0

TYPE? 16

SUBTYPE?

- Subtype 0 Directly connected terminals requiring speed sensing.
- Subtype 1 Asynchronous full duplex modems such as Bell 103's and CCITT V21 modems requiring speed sensing.
- Subtype 2 Asynchronous half duplex modems with reverse channels (such as Bell 202S and CCITT V23 modems). Automatic speed sensing is implemented and "Data Rate Select" (RS232 "CH"-CCITT111) is set ON.
- Subtype 3 Identical to subtype 2 except that "Data Rate Select" is set OFF.
- Subtype 4 Identical to subtype 0 except that automatic speed sensing is disabled. This subtype is intended for operation with leased-line full duplex modems which can be configured to operate without control signals (i.e., 202T).
- Subtype 5 Identical to subtype 1 except that automatic speed sensing is disabled.
- Subtype 6 Identical to subtype 2 except that automatic speed sensing is disabled.
- Subtype 7 Identical to subtype 3 except that automatic speed sensing is disabled.

NOTE: Logon must be at the preconfigured bit rate for subtypes 4 thru 7.

TERM TYPE?

See the table of terminal types on the following page.

RECORD WIDTH?

36 (words). Default varies with terminal

OUTPUT DEVICE?

Class name or Ldev #

ACCEPT JOBS/SESSIONS? YES

ACCEPT DATA? YES

INTERACTIVE? YES

DUPLICATIVE? YES

INITIALLY SPOOLED? NO

TERMINAL TYPES

TERMINAL TYPES TABLE

Terminal Model	Type	Will Cursor Backspace ?	Response To cti-H (delete)	Responds To Form Feed (%14)	Requires Time Delay?	Number of Time Delay Characters (#LF/#CR) By Speed (CPS)					Parity Checking?
ASR 33	0	no	\\(%134)	no (LF used)	yes	-	-	-	-	0/1	yes
ASR 37	1	yes	LF	yes	yes	-	-	-	0/2	-	yes
ASR 35	2	no	LF	yes	yes	-	-	-	-	0/1	yes
Execuport	3	yes	LF	yes	yes	-	-	-	0/3	0/1	yes
DataPoint	4	yes	ctl-Y (EM) ^h	no (LF used)	yes	4/0	4/0	4/0	4/0	0/0	yes
Memorex 1240	5	yes	LF	yes	yes	-	3/15	1/11	1/8	1/8	yes
Terminet	6	yes	LF	yes	yes	-	-	8/0	5/0	3/0	yes
MiniBEE	9	yes	null	yes	yes	4/0	4/0	4/0	4/0	4/0	yes
HP 2640B/44/45	10 ^a	yes	null	yes	no ^b	0/0	0/0	0/0	0/0	0/0	yes
HP 2640A/44/45 (full enter)	11 ^c	yes	null	yes	no ^b	0/0	0/0	0/0	0/0	0/0	yes
HP 2645K (8-bit word)	12 ^d	yes	null	yes	no ^b	0/0	0/0	0/0	0/0	0/0	no ^g
Telenet	13	yes	null	yes	no	0/0	0/0	0/0	0/0	0/0	yes
Pseudo Term Multipoint ^f	14	N/A	N/A	N/A	N/A	-	-	-	-	-	yes
HP 2635 (8-bit word)	15 ^d	yes	LF	yes	no ^b	0/0	0/0	0/0	0/0	0/0	no ^g
HP 2635 (7-bit word)	16	yes	LF	yes	no ^b	0/0	0/0	0/0	0/0	0/0	yes

NOTE: a. With program control of block mode.

b. Uses ENQ/ACK handshake when write to terminal is greater than 80 characters, else sends DC1 characters for handshaking.

c. Without program control of block mode.

d. 8-bit word with no parity.

e. Input parity checking is normally disabled; enable with FCONTROL 24.

f. Does not use ATC.

g. 8-bit data.

h. Non-displayable.

EIA RS232C AND CCITT.V26
PLUG/PIN DESIGNATIONS

PIN	NAME	DTE TO DCE DCE TO DTE	FUNCTION	CIRCUIT	
				(CCITT)	(EIA)
1	FG		FRAME GROUND	101	(AA)
2	TD	→	TRANSMITTED DATA . . .	103	(BA)
3	RD	←	RECEIVED DATA	104	(BB)
4	RTS	→	REQUEST TO SEND	105	(CA)
5	CTS	←	CLEAR TO SEND	106	(CB)
6	DSR	←	DATA SET READY	107	(CC)
7	SG		SIGNAL GROUND	102	(AB)
8	DCD	←	DATA CARRIER DETECT	109	(CF)
9		←	POSITIVE DC TEST VOLTAGE		
10		←	NEGATIVE DC TEST VOLTAGE		
11			UNASSIGNED		
12	(S)DCD	←	SEC. DATA CARRIER DETECT	122	(SCF)
13	(S)CTS	←	SEC. CLEAR TO SEND	121	(SCB)
14	(S)TD	→	SEC. TRANSMITTED DATA	118	(SBA)
15	TC	←	TRANSMITTER CLOCK	114	(DB)
16	(S)RD	←	SEC. RECEIVED DATA	119	(SBB)
17	RC	←	RECEIVER CLOCK	115	(DD)
18		←	RECEIVER DIBIT CLOCK		
19	(S)RTS	→	SEC. REQUEST TO SEND	120	(SCA)*
20	DTR	←	DATA TERMINAL READY	108.2	(CD)
21	SO	←	SIGNAL QUALITY DETECT.	110	(CG)
22	RI	←	RING INDICATOR	125	(CE)
23		←	DATA RATE SELECT.	111-112	(CH/CI)
24	(TC)	←	EXT. TRANSMITTER CLOCK	113	(DA)
25		←	BUSY		

NOTE: DCE – DATA COMMUNICATIONS EQUIPMENT

DTE – DATA TERMINAL EQUIPMENT

*SCA is on Pin 11 for 202C's.

INTERFACE VOLTAGE

NOTATION	NEGATIVE	POSITIVE
Binary State	1	0
Signal Condition	Marking	Spacing
Function	OFF	ON

ATC CABLE ASSEMBLIES

Modem/Hardwire Extension Cable Manufacturing Specifications (Cable, Unshielded).

The specification establishes requirements for a 25 conductor external low voltage computer cable with overall jacket: U.L. style 2560.

ELECTRICAL

Voltage Rating: 30V for Class 2 wiring systems only (220V rms test between conductors).

MECHANICAL

Construction Details

Singles: Twenty-five 26 (7 x 34) AWG tinned copper; tinned after stranding.

Insulation: PVC, seven-mil minimum wall thickness; rated at +60°C

Colors —	BLK	WHT/BLK	WHT/BLK/BRN
	BRN	WHT/BRN	WHT/BLK/RED
	RED	WHT/RED	WHT/BLK/ORN
	ORN	WHT/ORN	WHT/BLK/YEL
	YEL	WHT/YEL	WHT/BLK/GRN
	GRN	WHT/GRN	WHT/BLK/BLU
	BLU	WHT/BLU	
	VIO	WHT/VIO	
	GRA	WHT/GRA	
	WHT		

Cable Lay: Twist singles for flexibility and in the above color sequence. Fillers, cloth or nylon binding may be used for a smooth, round construction.

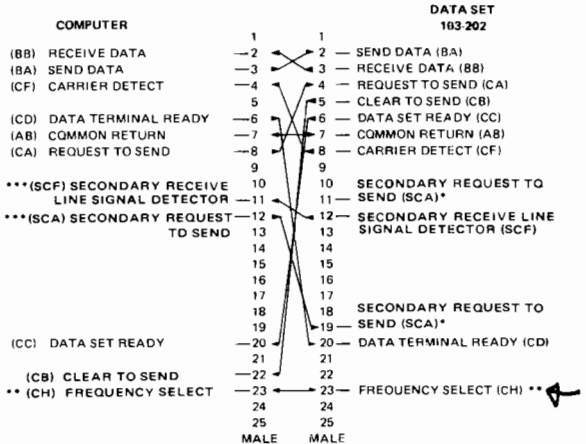
Jacket: PVC, 35-mil minimum wall thickness; rated at +60°C.

Color: Jade Gray per Visual Color Std., HP Part No. 6009-0021.

SUBSYSTEM INTERFACE CABLE ASSEMBLIES FOR THE ATC

CABLE DESCRIPTION	PART NUMBER
25 foot cable for connecting a data set to a connector panel.	30062-60020 *
25 foot cable for connecting a terminal directly to the connector panel.	30062-60006
50 foot cable for connecting a data set to the connector panel.	30062-60021 *
50 foot cable for connecting a terminal directly to the connector panel.	30062-60009
100 foot cable for connecting a terminal directly to the connector panel.	30062-60012
* This cable is not compatible with 202C without wiring changes.	

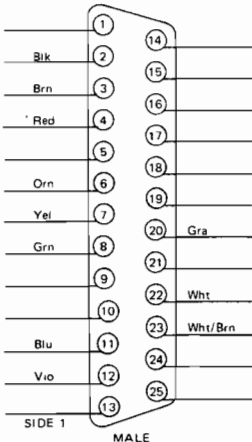
ASYNCHRONOUS TERMINAL CONTROLLER MODEM CABLE PIN CONNECTIONS



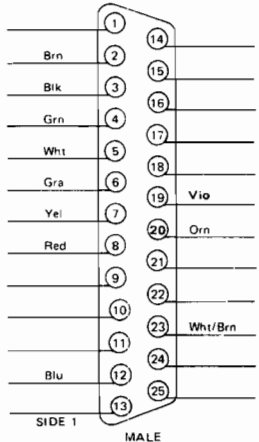
* Required for 202S data sets only - physically strapped together in the modem. The DTE can control SCA from either pin 11 or pin 19.

** European modems only.

*** For 202C modems; Pin 11 is Supervisory Transmitted Data (SBA) at the DCE.
Pin 12 is Supervisory Receive Data (SBB) at the DCE.
Cross connect pins 11-12 and 12-11 for 202C.



COMPUTER



DATA SET
103-202

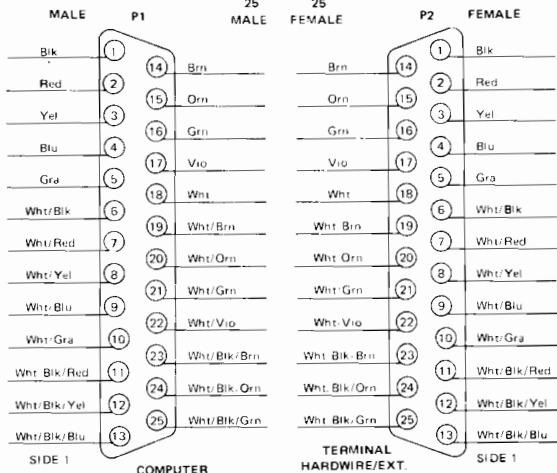
ATC HARDWIRED/EXTENSION CABLE

ASYNCHRONOUS TERMINAL CONTROLLER HARDWIRED/EXTENSION CABLE PIN CONNECTIONS

(DCE)
COMPUTER

(DTE)
EIA COMPATIBLE
DEVICE

(BA) SEND DATA	1	1	2 - SEND DATA (BA)
(BB) RECEIVE DATA	-2	3	3 - RECEIVE DATA (BB)
(CA) REQUEST TO SEND	-3	4	4 - REQUEST TO SEND (CA)
(CB) CLEAR TO SEND	-4	5	5 - CLEAR TO SEND (CB)
(CC) DATA SET READY	5	6	6 - DATA SET READY (CC)
(AB) COMMON RETURN	-6	7	7 - COMMON RETURN (AB)
(CF) CARRIER DETECT	-7	8	8 - CARRIER DETECT (CF)
	9	9	
	10	10	
	11	11	
(SCF) SECONDARY CARRIER DETECT	-12	12	12 - SECONDARY CARRIER DETECT (SCF)
	13	13	
	14	14	
	15	15	
	16	16	
	17	17	
	18	18	
(SDA) SECONDARY REQUEST TO SEND	-19	19	19 - SECONDARY REQUEST TO SEND (SCA)
(CD) DATA TERMINAL READY	-20	20	20 - DATA TERMINAL READY (CD)
	21	21	
	22	22	
(CH) FREQUENCY SELECT	-23	23	23 - FREQUENCY SELECT (CH)
	24	24	
	25	25	



ASYNCHRONOUS MODEMS

Following are the recommended asynchronous modems and options to be used in conjunction with the 30032B sub-system. Note that these options are those required *at the CPU end* (local). To insure successful communication with the distant end, different options in the distant data set may be required.

For further definition of these options/modem capabilities refer to the relevant "Bell System Technical Reference" publication that is available from your local Bell System Representative.

BELL 103A3 MODEM

0-300 bits/sec, Asynchronous

(Replaces 103A2 which may still be available in some instances.)

Full Duplex on 2-wire operation. No reverse channel is available. The 103 works with another 103, 113, or 212A modem.

OPTION	DESCRIPTION	RECOMMENDATIONS	
		COMPUTER	TERMINAL
A	1. Rotary Dial 2. Touch Tone Dial	Area Optional	Area Optional
B	3. With Card Dialer 4. Without Card Dialer	Customer Decisions	
C (Note 1)	5. Loss of CXR on Disconnect 6. No Loss of CXR Disconnect	C5	C5
D (Note 2)	7. Send Space Disconnect 8. Send No Space Disconnect	D7	D7
E	9. Receive Space Disconnect 10. No Receive Space Disconnect	E9	E9
F (Note 3)	11. Auto Answer Permanent 12. Auto Answer Select	F11	F12
Note 1: CXR Disconnect. Data set disconnects with carrier loss for more than 160 msec. Note 2: Space Disconnect. A Space Disconnect is initiated by removal of DTR - the associated CPU space will result in modem disconnect. Note 3: Auto Answer. Permanent on CPU side but selectable on terminal side - this means the call to the terminal must be manually answered if F12 is selected.			

ASYNCHRONOUS MODEMS

BELL 103J AND 113D MODEMS

0-300 Bits/sec, Asynchronous
Interchangeable with 103A3
Full duplex on 2-wire operation
Works with another 103, 113, or 212A Modem

OPTION	DESCRIPTION	RECOMMENDATIONS	
		COMPUTER	TERMINAL
A1 A2	Send Space Disconnect No Space Disconnect	A1	A1
B3 B4	Receive Space Disconnect No Receive Space Disconnect	B3	B3
C5 C6	Loss of Carrier Disconnect No Loss of Carrier Disconnect	C5	C5
D7 D8	Fail Safe State on CN Circuit OFF Fail Safe State on CN Circuit ON	D7	D7
E9 E10	Auto Answer YES Auto Answer NO	E9	
F11 F12	EIA Interface Customer Select	F11	F11

BELL 113B MODEM

0-300 Bits/sec, Asynchronous
An "answer only" modem
Auto Dialing and calling is not available.
Full duplex on 2-wire operation. No reverse channel is available.
The 113B works with other 100 series data sets that have originate capabilities.

OPTION	DESCRIPTION	RECOMMENDATIONS
U	Dummy Load	Required for 10
V	Common	Not installed
W	Common CB/CF	In
X	Ignore data terminal make busy	In
Y	Make busy implementation	In
Z	Data terminal controls disconnect	In

The 113B-L1 is an answer only modem which is rack mounted
with auto seek for open port.

ASYNCHRONOUS MODEMS

BELL 202C MODEM

0 to 1200 bits/sec, Asynchronous

The HP 3000 requires reverse channel in 2-wire half duplex transmission for switched network service.

Not supported on Series I. Use instead, 212A.

Not supported on Series II. Use instead, 202S.

OPTION	DESCRIPTION	RECOMMENDATIONS		COMMENTS
		COMPUTER	TERMINAL	
A1 A2	EIA Interface Contact Interface	A1	A1	Required
B3 B4	With 801 ACU Without 801 ACU	B4	B4	
C5 C6	With Auto Answer Without Auto Answer	C5	C6	If C6 installed no D option apply
D1 D8	Auto Answer Only Auto Answer Key Control	D7	—	D options depend on C options
E9 E10	Carrier Soft Turn Off (In) Carrier Soft Turn Off (Out)	E9	E9	*
*Note: E9 normally used — when request to send is turned off, carrier frequency drops from 1200 Hz to 900 Hz. This can cause noise or transmission problems in a polling environment or on private lines; therefore, in these conditions, "E10" should be specified.				

ASYNCHRONOUS MODEMS

BELL 202S MODEM

Asynchronous, half duplex, with Reverse Channel, in switched network applications.

Speed 1200 bits per second.

Subtype 6 is preferred for configuration without speed sense (subtype 2 may also be used, however, noisy line or power failure may cause potential trouble with speed sense).

OPTION	DESCRIPTION	RECOMMENDATIONS	
		COMPUTER	TERMINAL
A1 A2	Local copy on primary channel No local copy on primary channel	A2	A1
B3 B4	Local copy on Reverse channel No local copy on Reverse channel	34 Note 1	
C5 C6	Telephone company engineered timing options Customer engineered timing options a. Received data squelch 156 Msec (C5) 9 Msec 0 Msec b. Soft carrier turn-off 24 Msec (C5) 8 Msec OUT (quick turn-off) c. Clear to send 180 Msec (C5) 60 Msec 30 Msec 8 Msec d. Carrier detector acquisition timing IN (turn-on 7 Msec; turn-off 5 Msec) OUT (turn-on 23 Msec; turn-off 10 Msec) (C5) e. Received Data Clamp IN (BB clamped mark whenever CF is off) (C5) OUT	C5	C5
D7 D8	Data Set Ready Interface Lead ON in Analog Loopback test mode. Data Set Ready Interface Lead OFF in Analog Loopback test mode	DB	DB
E9 E10	Automatic Answer IN (Note 2) Automatic Answer OUT	E9	E10
F11 F12	Signal ground connected to Frame Ground Signal ground not connected to Frame Ground	F11	F11
Notes: 1. If terminal has internal echo capability to provide local copy use B4, otherwise specify B3 for local copy. 2. Auto answer depends on application. Generally, the terminal is dialed manually, and the computer auto answers.			

BELL 202T MODEM

Asynchronous Modem, provides Self Test, Analog Loopback and Remote Test capabilities.

Generally, used with HP 3000 at 1200 bits per second, full duplex on normal 3002 channel 4-wire service (no reverse channel).

Subtype 4 is preferred for configuration without speed sense. (Subtype 0 may also be used, however, noisy line or power failure may cause potential trouble with speed sense.)

OPTION	DESCRIPTION	RECOMMENDATIONS	
		COMPUTER	TERMINAL
A1 A2	Non point to point Point to point	A2	A2
B3 B4	2-wire leased line 4-wire leased line	B4	B4
C5 C6	Continuous Carrier/master station Carrier controlled by Req to Send (CA) or remote station	C5	C5
D7 D8	Fast turn-around Normal turn-around	Note 1 D8 D8	
E9 E10	Telephone Company Engineered Timing options Customer Engineered timing options a. Received data squelch 156 Msec (E9) 9 Msec 0 Msec b. Soft carrier turn-off 24 Msec (E9) 8 Msec OUT (quick turn-off) c. Clear to send 180 Msec (E9) 60 Msec 30 Msec 8 Msec d. Carrier detector acquisition timing IN (turn-on 7 Msec; turn-off 5 Msec OUT (turn-on 23 Msec; turn-off 10 Msec) (E9) e. Received Data clamp IN (8B clamped mark whenever CF is off) (E9) OUT	E9	E9
F11 F12	Operation 1200 bits per second or less Operation greater than 1200 bits per second	F11	F11
Notes: 1. With continuous carrier on 4-wire leased line, D7 and D8 have no effect. 2. The 202T modem may be used in: 2-wire application (3002 channel) with reverse channel to 1200 bits per second. It is specified at 1800 bits per second with C2 conditioning, however, this speed is not supported on the HP 3000. 4-wire applications (3002 channel) full duplex up to 1200 bits per second. It is specified as 1800 bits per second with C2 conditioning, however, this speed is not supported on the HP 3000.			

NOTE: The 202T may be used with the ATC, and does not require the additional board(s) in Option 001 or 002.

ASYNCHRONOUS MODEMS

BELL 212A MODEM

0-300 bits per second asynchronous

1200 bits per second asynchronous

Compatible with 103/113 type modem at 300 bits per second, and 212 type modem at 1200 bits/second full duplex type operation.

Use subtype 1.

OPTION	DESCRIPTION	RECOMMENDATIONS		
		DESIG- NATION	COM- PUTER	TER- MINAL
A1 A2	Factory supplied disconnect option Customer selected disconnect options a. Send space disconnect 1 IN 2 OUT b. Receive space disconnect 1 IN 2 OUT c. Loss of carrier disconnect 1 IN 2 OUT 	T (A1) U V (A1) Y S (A1) R	 A2 T Y R	 A2 U V S
B3 B4	Automatic Answer YES Automatic Answer NO (no buttons, option functional at all times)	ZH	ZH	
C5 C6	Factory supplied EIA interface and ground options Customer selected EIA interface and ground options a. Data set ready (CC) indication for analog loop 1 ON 2 OFF b. Clear to send (CB) and carrier detector (CF) indications 1 common 2 separate c. Signal ground to frame connection 1 IN 2 OUT d. Answer mode indication (CE) 1 ON 2 OFF 	 ZF (C5) ZE A (C5) B Q (C5) P X W (C5)	 C6 ZE A Q W	 C6 ZE A Q W
D7 D8	Factory Supplied dual mode character formatted operation Customer selected modes of operation a. 1200 bps operation 1 asynchronous/start-stop 2 synchronous b. Character length (required for YG, not active for YH) 1 9 bit 2 10 bit c. Transmitter timing 1 internal 2 external 3 slave d. Speed mode 1 high (1200 bps only permitted) 2 dual (1200 bps or 0-300 bps) e. Receiver responds to digital loop 1 IN 2 OUT f. Interface speed indications 1 IN 2 OUT 	 YG (D7) YH YI YJ (D7) YC (D7) YD WI YO YP (D7) YK (D7) YL YQ YR (D7)	 YG YJ YC YP YL YR	 YG YJ YC YO DON'T CARE YR

ASYNCHRONOUS MODEMS

BELL 212A MODEM (Continued)

OPTION	DESCRIPTION	RECOMMENDATIONS		
		DESIG- NATION	COM- PUTER	TER- MINAL
E9	Make busy/analog Loop (CN) circuit en- abled (IN)	YE		
E10	Make Busy/Analog Loop (CN) circuit dis- abled (OUT)	YF	YF	YF
	TELCO Option Table			
	tip-ring make busy (Note 1)			
	IN	E	DON'T CARE	
	OUT	E		E
Notes: 1. Also requires option ZX on 40A2 data mounting. The tip-ring make busy is important for line hunting arrangements for terminate only lines. Should not be used for non-line hunting installations where the "DON'T AN- SWER" condition is a proper out-of-service indication.				

SSLC

30055A SYNCHRONOUS SINGLE LINE CONTROLLER

The HP 30055A SSLC is a controller interface for high speed bit-serial synchronous devices. The controller can accommodate one modem device and is utilized with the RJE/3000, DS/3000, MRJE/3000, and MTS/3000 subsystems. With MTS/3000 (Multipoint Terminal Software), the SSLC board may optionally be used for asynchronous transmissions.

Features

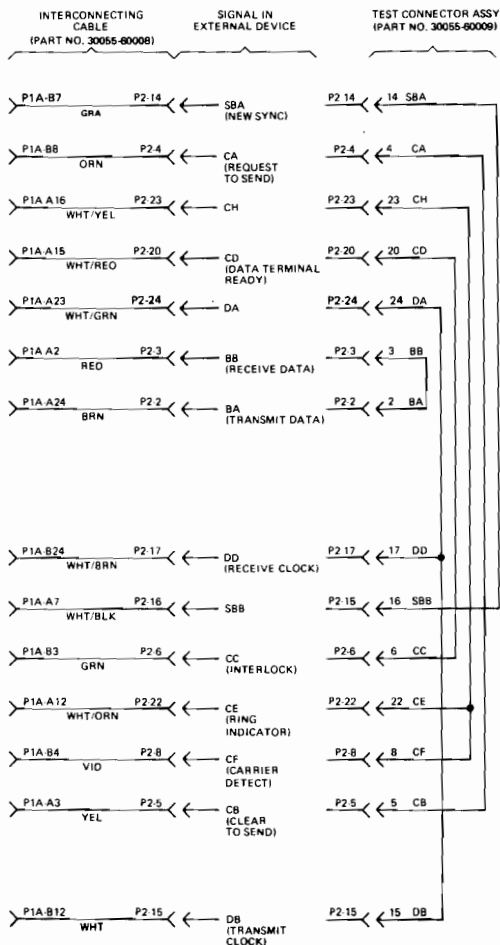
- 75 to 19,200 bits/sec. 9600 bps max certified for use with modems to date.
- Operates on a 2-wire (half duplex) or 4-wire (full duplex) circuit and/or split-speed.
- Transmission is always half duplex, IBM binary synchronous protocol.
- May be utilized in a leased or dial up environment.
- Data communications may be point-to-point (RJE/3000, DS/3000, and MRJE/3000) or multipoint (MTS/3000).
- Character size may be six to nine bits in length.
- Support 201C, 208A, 208B, 209 and RACAL MILGO 26 modems. Additional modems have been used but have not been verified/certified by GSD. This list will be expanded in the future.
- Supports the standard EIA RS232C and CCITT.V24 interface specifications.
- Odd or even parity may be specified. Under System Software, additional LRC and CRC parity is provided.
- Double character buffering.
- Special character recognition.
- Operates in SIO transfer mode.
- Maximum number of SSLC's per CPU is 7.

Basic Configuration

Synchronous Single Line Control kit includes one PC board (30055-60001), cable assembly (30055-60008), and test connector (30055-60009). On previously installed systems, obsolete interface cable 30055-60003 and obsolete test connector 30055-60005 may be present. Within the United States this combination will work for synchronous testing. Outside the USA, only the 30055-60008 cable and 30055-60009 test connector combination is recommended for synchronous mode. (Note that the test connectors are designed for use with a particular cable and thus are not interchangeable.)

For asynchronous communication under MTS/3000, use cable assembly 30055-60010.

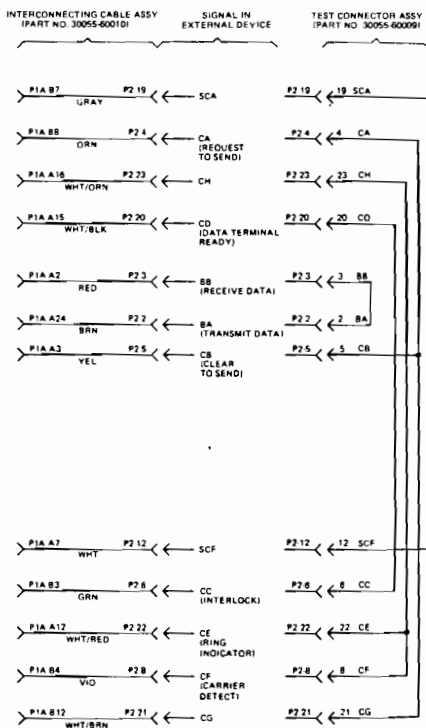
HP 30055-60008 CABLE AND TEST CONNECTOR WIRING DIAGRAM



NOTE: Obsolete SSLC cable (Part No. 30055-60003) has DA signal presented on pin 13.

Obsolete test connector (Part No. 30055-60005) has pins 13, 15, and 17 tied together.

HP 30055-60010 CABLE AND TEST CONNECTOR WIRING DIAGRAM



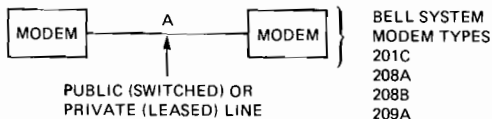
SYNCHRONOUS MODEMS

The following synchronous modem recommendations and options are for use with the 30055A Synchronous Single Line Controller (SSLC). Further definition of these options and capabilities can be obtained from the relevant "Bell System Technical Reference" publication, which is available from your local Bell System Representative.

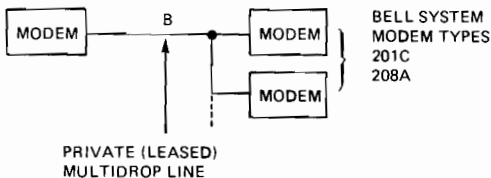
MODEM CONFIGURATIONS

Modems can be connected in one of two basic configurations:

CONFIGURATION A Point-to-Point Connection



CONFIGURATION B Multidrop Connection



SYNCHRONOUS MODEMS

BELL 201A3 MODEM

Type of Modem: Bell System Type 201A3 Data Set
Type of Line: Public Telephone Network (Switched)
Transmission Rate: 2000 bits-per-second

OPTION NUMBER	DESCRIPTION	RECOMMENDATION
A1 A2	EIA interface Contact Interface	A1 (required)
B3 B4	With alternate voice Without alternate voice	B3*
C5 C6	With new sync. Without new sync.	C6 (required)
D7 DB	Half duplex (2-wire). Full duplex (4-wire).	D7
E9 E10	4-wire continuous carrier 4-wire carrier controlled by REQUEST TO SEND.	**
*If option B3 is selected and automatic answering is to be used, the automatic answering capability is normally provided as a key-controlled function. If you want the automatic answer to be permanently wired, then state so in the Remarks column on the Bell System order form. **If option D7 is selected, the E options have no meaning and should be ignored.		

NOTE: This modem is no longer recommended because it does not provide test features, and because the 150-200 msec Request-to-Send — Clear-to-Send delay impacts performance.

BELL 201B3 MODEM

Type of Modem: Bell System Type 201B3 Data Set

Type of Line: Private Leased Line

Transmission Rate: 2400 bits-per-second

OPTION NUMBER	DESCRIPTION	RECOMMENDATION
A1 A2	EIA interface. Contact interface.	A1 (required)
B3 B4	With alternate voice. Without alternate voice.	B3*
C5 C6	With new sync. Without new sync.	C6 (required)
D7 D8	Half duplex (2-wire). Full duplex (4-wire).	D8
E9 E10	4-wire continuous carrier. 4-wire carrier controlled by REQUEST TO SEND.	E9**
*If option B3 is selected and automatic answering is to be used, the automatic answering capability is normally provided as a key-controlled function. If you want the automatic answer to be permanently wired, then state so in the Remarks column on the Bell System order form. **If option D7 is selected, the E options have no meaning and should be ignored.		

NOTE: This modem is no longer recommended because it does not provide test features.

SYNCHRONOUS MODEMS

BELL 201C MODEM, PUBLIC SWITCHED LINE

Type of Modem: Bell System Type 201C Data Set (Also called DATAPHONE 2400)
Type of Line: Public Telephone Network (Switched Line)
Transmission Rate: 2400 bits-per-second
HP Products: RJE/3000 (2780/3780), MRJE/3000, DS/3000, and MTS/3000 — Configuration A.

OPTION NUMBER	DESCRIPTION	RECOMMENDATION
A1	Transmitter internally timed.	A1 (required)
A2	Transmitter externally timed.	
B3	Without 801 Automatic Calling Unit.	B3
B4	With 801 Automatic Calling Unit.	
C5	EIA interface.	C5 (required)
C6	Contact interface.	
D7	Without automatic answer	D8
D8	With automatic answer.	
E9	Automatic answer permanently wired.	Either *
E10	Automatic answer key-controlled.	

*If option D7 is selected, the E options have no meaning and should be ignored.

NOTE: In half duplex operation, this modem provides a 150 msec Request-to-Send — Clear-to-Send delay.

BELL 201C MODEM, PRIVATE LEASED LINE, POINT-TO-POINT

Type of Modem: Bell System Type 201C Data Set (Also called DATA-PHONE 2400)
 Type of Line: Public Telephone Network
 Private Leased Line
 Transmission Rate: 2400 bits-per-second
 HP Products: RJE/3000 (2780/3780), MRJE/3000, DS/3000, and
 MTS/3000 – Configuration A

OPTION NUMBER	DESCRIPTION	RECOMMENDATION
A1	EIA interface.	A1 (required)
A2	Contact interface	
B3	Alternate voice	customer defined
B4	Without alternate voice.	
C5	With new synch.	C6 (computer and terminal)
C6	Without new synch.	
D7	2-wire circuit.	D8 (required)
D8	4-wire circuit.	
E9	4-wire private line continuous carrier 7-millisecond delay 0-millisecond delay	E9 (computer and terminal)
E10	4-wire private line switched carrier	
	Transmitter internally timed. Transmitter externally timed.	Required

SYNCHRONOUS MODEMS

BELL 201C MODEM, PRIVATE LEASED LINE – MULTIDROP

Type of Modem: Bell System Type 201C Data Set (Also called DATA-PHONE 2400)

Type of Line: Public Telephone Network
Private Leased Line

Transmission Rate: 2400 bits-per-second

HP Products: MTS/3000 – Configuration B

OPTION NUMBER	DESCRIPTION	RECOMMENDATION
A1	EIA interface.	Required
A2	Contact interface.	
B3	Alternate voice.	Customer Defined
B4	Without alternate voice.	
C5	With new synch.	C5 (computer)
C6	Without new synch.	C6 (terminal)
D7	2-wire circuit.	D8 (required)
D8	4-wire circuit.	
E9	4-wire private line continuous carrier 7-millisecond delay. 0-millisecond delay.	E9 (computer)
E10	4-wire private line switched carrier.	E10 (terminal)
	Transmitter internally timed.	Required
	Transmitter externally timed.	

BELL 208A MODEM, PRIVATE LEASED LINE, POINT-TO-POINT

Type of Modem: Bell System Type 208A Data Set (Also called DATAPHONE 4800)
 Type of Line: Private Leased Line
 Transmission Rate: 4800 bits-per-second
 HP Products: RJE/3000 (2780-3780, MRJE/3000, DS/3000, MTS/3000 – Configuration A

OPTION NUMBER	DESCRIPTION	RECOMMENDATION
A1	Transmitter internally timed.	A1 (required)
A2	Transmitter externally timed.	
B3	Continuous carrier.	B3
B4	Switched carrier.	
C5	Switched REQUEST TO SEND.	C6
C6	Continuous REQUEST TO SEND.	
D7	One second holdover used.	D7
D8	One second holdover not used.	
E9	With new sync.	E10 (required)
E10	Without new sync.	
F11	CC ON when analog loop is present.	F11
F12	CC OFF when analog is present.	

SYNCHRONOUS MODEMS

BELL 208A MODEM, PRIVATE LEASED LINE – MULTIDROP

Type of Modem: Bell System Type 208A Data Set (Also called
DATAPHONE 4800)

Type of Line: Private Leased Line

Transmission Rate: 4800 bits-per-second

HP Products: MTS/3000 – Configuration B

OPTION NUMBER	DESCRIPTION	RECOMMENDATION
A1	Transmitter internally timed.	A1 (required)
A2	Transmitter externally timed.	
B3	Continuous carrier.	B3 (computer)
B4	Switched carrier.	B4 (terminal)
C5	Switched REQUEST TO SEND.	C5 (terminal)
C6	Continuous REQUEST TO SEND.	C6 (computer)
D7	One-second holdover used.	D7 (terminal)
D8	One-second holdover not used.	D8 (computer)
E9	With new sync.	E9 (computer)
E10	Without new sync.	E10 (terminal)
F11	CC ON when analog loop is present	F11
F12	CC OFF when analog loop is present	

BELL 208B MODEM

Type of Modem: Bell System Type 208B Data Set (Also called DATAPHONE 4800)
 Type of Line: Public Telephone Network (Switched)
 Transmission Rate: 4800 bits-per-second
 HP Products: RJE/3000 (2780/3780), MRJE/3000, DS/3000, MTS/3000 -- Configuration A

OPTION NUMBER	DESCRIPTION	RECOMMENDATION
A1	Transmitter internally timed.	A1 (required)
A2	Transmitter externally timed.	
B3	Without 801 Automatic Calling Unit.	B3
B4	With 801 Automatic Calling Unit.	
C5	CC OFF when analog is present.	C6
C6	CC ON when analog loop is present.	
D7	Without automatic answer.	D8
D8	With automatic answer.	
E9	Desk mounting	Either
E10	Rack or cabinet mounting.	

NOTE: Switch controlled 50 or 150 msec Request-to-Send -- Clear-to-Send delay.

SYNCHRONOUS MODEMS

BELL 209A MODEM

Type of Modem: Bell System Type 209A Data Set (Also called DATAPHONE 9600)
Type of Line: Private Leased Line (3002 Type 4-wire) with D1 conditioning (no C conditioning)
Transmission Rate: 9600 bits-per-second.
HP Products: RJE/3000 (2780/3780), MRJE/3000, DS/3000, MTS/3000 — Configuration A

Note that this modem will accept four simultaneous devices as long as their aggregate speed does not exceed 9600 bits/sec.

OPTION	DESCRIPTION	RECOMMENDATIONS
A1	Transmitter timing supplied by data set.	A1 required
A2	Transmitter timing supplied by computer/term.	
B3	Data Set Ready interface lead ON for Analog Loopback mode.	B3
B4	Data Set Ready interface lead OFF for Analog Loopback mode.	
C5	Transmitter timing slaved by receiver.	C6
C6	Transmitter timing NOT slaved by receiver.	
D7	Elastic Store option enabled (IN).	D8
D8	Elastic Store option disabled (OUT).	
E9 E10	Continuous carrier operation. Switched carrier operation.	E9
F11 F12	Switched Req-to-Send operation. Continuous Req-to-Send operation.	F12*
	Grounding: Protective ground to signal ground	AA to AB
	With alternate voice. Without alternate voice.	either**
* If option E10 is selected, the F options have no meaning and should be ignored. ** The data set normally is supplied without a hand set.		

SELF TESTS FOR WESTERN ELECTRIC SYNCHRONOUS MODEMS

GENERAL

The majority of the supported modems under DS/3000 and 2780/3780 Emulator have built-in test capabilities which can be utilized by a customer to isolate transmission problems to the data set(s), transmission facility and in some cases the data terminal equipment. The test procedures should be used prior to calling the Telephone Company Repair Center or when assistance is required by the Repair Center.

Note that on those modems that are on dial-up lines, the relevant "down line" tests will only indicate the given dialed connection is either good or bad and is no guarantee that all calls will be the same.

MODEM TYPE: 201A3

No customer test features or Telephone Company remote tests are available with this modem.

MODEM TYPE: 201C

Customer Tests

TEST 1. Analog Loopback Self-Test (Used for either 2- or 4-wire data sets).

- Step 1 — Press the AL button
- Step 2 — Press the ST button
- Step 3 — At this point the MC lamp should be off and all other lamps should be on.
- Step 4 — If the MC lamp blinks on or remains on or if any of the other lamps are off, the data set is defective. The lamps should be observed for at least 30 seconds to be confident that the data set is working properly.
- Step 5 — To check that the transmitter turns off, press the R0 button. The RS and CS lamps should go off and the MC lamp should go on. The C0 lamp should go off if the data set is optioned for switched carrier operation, or on if for continuous carrier operation.
- Step 6 — To return the data set to normal operation, release the R0, ST, and AL buttons. Check that the TM lamp goes off.

TEST 2. End-To-End Self-Test

- Step 1 — Press the ST button on each data set.
- Step 2 — Establish a line connection between the data sets, i.e., go to DATA mode. After the line connection is made, the MC lamp should be off and all other lamps on each data set should be on.
- Step 3 — The MC lamp on each data set will blink on if an error occurs in the received data signal from the other end. An average of two blinks per minute or less at each end indicates satisfactory operation. If more blinks than this are observed, or if the MC lamp is on continuously, or if any other status lamps are off, the data set or telephone facilities are the source of trouble.

SYNCHRONOUS MODEM TESTS

Step 4 — To return each data set to normal operation, the ST button should be released at both ends. This should turn the TM lamp off.

TEST 3. 2-Wire Data Set End-to-End Self-Test

Step 1 — Press the ST button on both data sets. Decide which data set is to receive data. Press the R0 button on that data set.

Step 2 — Establish a line connection between the data sets. At the transmitting data set, the C0 lamp should be off and all other lamps should be on. At the receiving data set, the RS, CS, and MC lamps should be off and the remaining lamps should be on.

Step 3 — At the receiving data set the MC lamp will blink on if an error occurs. Satisfactory operation is indicated by an average of two blinks per minute or less. If the number of blinks is excessive, or if the MC lamp is on continuously, or if the status of any of the lamps on either data set is not as specified in Step 2, then the data sets or telephone facilities are the source of trouble. For switched network service, due to the statistical nature of performance on dial connections, several connections must be tested before a valid indication of unsatisfactory operation can be determined.

Step 4 — This same test should be repeated in the opposite direction by releasing the R0 button on one data set and pressing the R0 button on the other data set. Then repeat Steps 2 and 3.

Step 5 — To return the data sets to normal operation, release the ST button on each data set and R0 button at the receiving data set to release them from TEST mode. The TM lamp on each data set should go off.

Telephone Company Remote Test

Further testing should be done through the telephone company if no errors have yet been detected and modem is still suspect.

MODEM TYPE: 208A

Customer Tests:

TEST 1. Analog Loopback Self-Test

Step 1 — Press the AL button

Step 2 — Press the ST button to place the data set in self-test. Ignore flashes on ER while the ST button is being operated.

Step 3 — At this point the ON, RS, CS, and C0 lamps should be on and the MR and ER lamps should be off.

Step 4 — If the ER lamp flashes one or more times or remains on or if any of the other lamps do not agree with the conditions in Step 3, the data set is defective. The lamps should be observed for at least 30 seconds to be confident that the data set is or is not working.

Step 5 — To return the data set to normal operation, release the ST and AL buttons.

TEST 2. End-to-End Self-Test

- Step 1 — With an attendant at each station, manually establish a voice link between them by means of a separate voice channel. (If alternate voice service is provided, the private line to be tested can serve as the initial voice link as long as no discussion is desired during the test interval.)
- Step 2 — Have the attendants agree on when to start the test and when to end it, then transfer from the TALK to the DATA mode (if necessary).
- Step 3 — Press the ST button on both data sets. Note that the data set whose ST button is depressed first may show error indications until the ST button on the other set is pressed.
- Step 4 — After a few seconds have the attendant at each data set check that ON, RS, CS, and CO lamps are on and that the MR and ER lamps are off.
- Step 5 — The ER lamp at each data set will flash if errors occur. Satisfactory operation is indicated by an average of three flashes per minute or less. At either end, if the number of flashes of ER exceeds an average of three per minute, or if the ER lamp is on continuously, or if the status of any of the lamps on either data set is not correct per Step 4, the receiver of that data set, the transmitter of the other data set, or the interconnecting facilities is not providing proper performance. Each data set may be tested using TEST 1 to isolate the trouble further.
- Step 6 — To return the data sets to normal operation, release the ST button on each data set to release them from the TEST mode.

MODEM TYPE: 208B

Customer Tests

TEST 1. Analog Loopback Self-Test

- Step 1 — Press the AL button.
- Step 2 — Press the ST button to place the data set in the self-test mode.
- Step 3 — At this point the MR and ER lamps should be off and all other lamps except TR should be on. The TR lamp may be on or off depending on the state of the Data Terminal Ready circuit provided by the data terminal equipment.
- Step 4 — If the ER lamp flashes one or more times or remains on or if any of the lamps do not agree with the conditions in Step 3, the data set is defective. The lamps should be observed for at least 30 seconds to be confident that the data set is or is not working.
- Step 5 — To return the data set to normal operation, release the ST and AL buttons.

The data set's power supply is equipped with an overvoltage protection circuit which limits the output voltage should it rise excessively. When this occurs, the data set fails the analog loopback self-test. To reset the power supply, the power cord must be unplugged and replugged into the ac outlet.

SYNCHRONOUS MODEM TESTS

TEST 2. End-to-End Self-Test

- Step 1 — With an attendant at each station, manually establish a call between the two data sets to be tested.
- Step 2 — Have the attendants agree on when to start and end the test. Decide which data set will receive data first. The R0 button on the receiving data set will be depressed in Step 3.
- Step 3 — Depress the ST button on both data sets and the R0 button on the receiving data set.
- Step 4 — Transfer both data sets to the DATA mode in the normal way.
- Step 5 — After a few seconds have the attendant at the transmitting data set check that the ON, RS, CS, and ER lamps are on and the MR and C0 lamps are off. The attendant at the receiving data set should check that the ON and C0 lamps are on and that the MR, RS, CS, and ER lamps are off. The TR lamp on either data set may be on or off depending on the state of the data terminal.
- Step 6 — At the receiving data set the ER lamp will flash if an error occurs. Satisfactory operation is indicated by an average of three flashes per minute or less. If the number of flashes or ER exceeds an average of three per minute, or if the ER lamp is on continuously, or if the status of any of the lamps on either data set is not correct per Step 5, then the data sets or the particular telephone facilities involved in the call are not providing proper performance.
- Step 7 — If no problems are indicated in Step 6, this same test should be repeated in the opposite direction of transmission by releasing the R0 button on one data set and pressing the R0 button on the other data set. Then Steps 5 and 6 should be repeated.
- Step 8 — To return the data sets to normal operation, release the ST button on each data set and the R0 button at the receiving data set to release them from the TEST mode.

If the transmission test on at least two calls fails to meet the limit of three error indications per minute or the data set lamps are not providing the proper indication in Step 5, then the customer should notify the Telephone Company of the problem.

Telephone Company Remote Test

Further testing should be done through the telephone company if no errors have yet been detected and modem is still suspect.

MODEM TYPE: 209A

Customer Tests

TEST 1 Analog Loopback Self Test

- Step 1 — Depress the AL switch. The TM lamp should light.
- Step 2 — Depress the ST switch to place the data set in self test mode.
- Step 3 — At this point the MR and ER lamps should be off and all other lamps should be on.
- Step 4 — If the ER lamp flashes one or more times or remains lit or if any of the other lamps do not agree with the conditions in Step 3, the data set is defective. The lamps should be observed for at least 30 seconds to be confident that the data set is or is not working.
- Step 5 — To return the data set to normal operation, release the ST and AL switches.

TEST 2 Digital Loopback Self-Test

- Step 1 — After assuring that the AL and ST switches are released, depress the DL switch on the *remote* data set. The TM lamp should light on that data set.
- Step 2 — Depress the ST switch on the *local* data set to place it in the self test mode. The TM lamp should light on the *local* data set. The test is controlled from this data set.
- Step 3 — At this point the MR and ER lamps on the *local* data set should be out and the remaining lamps should be lit. On the *remote* data set, the lamps should be in the same states except it should be noted that the ER lamp indicates equalizer retrain periods and not errors. Lamp indications other than these denote data set malfunction or transmission problems on the channel.
- Step 4 — At the *local* data set the ER lamp will flash if errors occur. Five one minute observations should be made. If the number of flashes of ER over these 5 minutes exceeds 30, the error performance objective is not being met by the data sets and the channel.
- Step 5 — To return to normal operation, release the ST switch on the *local* data set and the DL switch on the *remote* data set.

Telephone Company Remote Test

Further testing should be done through the telephone company if no errors have yet been detected and modem is still suspect.

30360A HARDWIRED SERIAL INTERFACE

The HP 30360A is a controller interface which uses modified IBM binary synchronous protocol for high speed asynchronous data communications between HP 3000 CPUs and/or the HP 1000 systems used with the DS/3000 subsystem. (The 2780/3780 Emulator will also run using this controller between two HP 3000 Systems.) The connection between machines is via a pair of coaxial cables.

Features

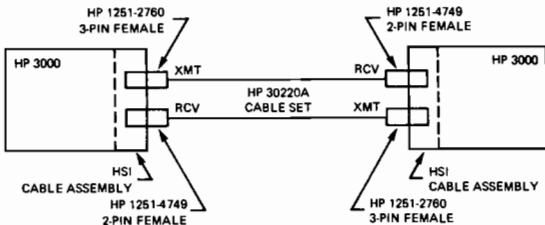
- 2.5 Mega-bits per second transfer rate up to 1000 ft. cable lengths.
- 1.25 Mega-bits per second transfer rate up to 2000 ft. cable lengths.
- Transmission is half duplex in a full duplex environment in point-to-point mode.
- CRC parity checking on the controller.
- Speed is system configurable.
- Operates in SIO mode.
- Four separate transmit/receive channels, only one of which may be open at any one time.
- Maximum number of active HSIs per CPU is two.

Basic Configuration

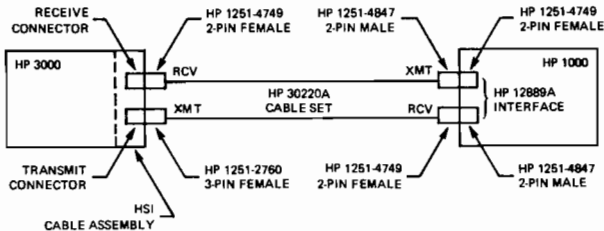
Hardwired Serial Interface Kit includes one PC board (30360-60001), cable connector panel (30360-60003), and one coaxial cable as follows:

30220A	25 ft.
Opt. -001	100 ft.
Opt. -002	250 ft.
Opt. -003	500 ft.
Opt. -004	1000 ft.
Opt. -005	2000 ft.

HSI LINK – 3000 TO 3000



HSI LINK – 3000 TO 1000





BINARY SYNCHRONOUS COMMUNICATIONS PROTOCOL "BISYNC"

For official information about Bisync Protocol refer to:

- IBM General Information — Binary Synchronous Communications (part number GA27-3004-2)

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BISYNC CONTROL CHARACTERS

CHAR	NAME	(octal values)	
		ASCII	EBCDIC
ACK0	Even Acknowledgement	DLE 0 20.60	DLE 20.160
ACK1	Odd Acknowledgement	DLE 1 20.61	DLE / 20.141
BEL	Bell	7	57
DLE	Data Link Escape	20	20
ENQ	Enquiry	5	55
EOT	End of Transmission	4	67
ETB	End of Text Block	27	46
ETX	End of Text	3	3
NAK	Negative Acknowledgement	25	75
PAD	Trailing Pad	377	377
RVI	Reverse Interrupt	DLE< 20.74	DLE@ 20.174
SOH	Start of Header	1	1
STX	Start of Text	2	2
SYN	Sync Character	26	62
TTD	Temp. Text Delay	STX.ENQ 2.5	STX.ENQ 2.55
US/IUS	Information Unit Separator	37	37
WACK	Wait Before Transmit	DLE; 20.73	DLE, 20.153

END TO END CONTROL CHARACTERS

CHAR	NAME	(octal values)	
		ASCII	EBCDIC
DC/ESC	Component Select (Refer to 2780/3780 RJE)	21/22 33.*	21/22 47.*
ESC	Carriage Control (Refer to 2780/3780 RJE)	33.*	47.*
GS/IGS	Group Separator	35	35
HT	Horizontal Tab	11	5
RS/IRS	Intermediate Record Separator	36	36
VT	Vertical Tab	13	13
* An appropriate character.			

BISYNC CONTROL CHARACTERS

ACK	(Affirmative Acknowledge) reply to station selection, receipt of message sent.
*DLE	(Data Link Escape) provides supplementary line control expansions; control or DLE sequences.
*ENQ	(Inquiry) Interrogates terminal to status or I.D. (control). Message state; request retransmission of acknowledgement or preceding block to be ignored.
EOT	(End of Transmission) ends a transmission, all stations go to control mode; negative response to a poll.
*ETB	(End of Transmission Block) terminates a message block, indicating additional message blocks to be sent. Requires a reply.
*ETX	(End of Text) terminates last block of a message. Requires a reply.
NAK	(Negative Acknowledge) indicates a message error by receiving terminal; reply to a selection sequence by a non-ready device; response to a TTD.
RVI	(Reverse Interrupt) sent by receiving station to terminate prematurely operation in progress.
SOH	(Start of Heading) precedes header records.
*STX	(Start of Text) precedes text records.
*SYN	(Synchronous Idle) used as a "fill" to maintain sync.
TTD	(Temporary Text Delay) sent by transmitting station to indicate a delay or initiate an abort in transmission.
*US/IUS	Terminates an intermediate block of characters, BCC is sent, no line turnaround occurs. This character may also be called ITB (Intermediate Text Block Separator).
WACK	(Wait Before Transmit Positive Acknowledge) sent by receiving station to indicate not ready to receive.
* Follows a DLE to indicate control characters while in TRANS-PARENT TEXT mode.	

END TO END CONTROL CHARACTERS

DC/ESC	(Component Selection) The 3780 uses DC1 for selecting printer and DC2 or DC3 for selecting punch. The 2780 uses ESC 4 for selecting punch and any valid carriage control sequence ESC * for selecting printer. (Refer to 2780/3780 RJE)
ESC	(Carriage control) The 2780/3780 uses a two-character ESC sequence to provide carriage control. (Refer to 2780/3780 RJE).
GS/IGS	(Group Separator) used for space compression within a record to represent repetitive consecutive characters. (In 3780, allowed for blanks.)
HT	(Horizontal Tab) requires a tab format message which defines tab positions. Allows tabbing to next tab position.
RS/IRS	(Intermediate Record Separator) In 3780 RJE non-transparent mode, allows record separation and blank truncation.
VT	(Vertical Tab) terminates buffer loading, initiates print cycle, and skips to printer tape channel 2.

BISYNC

CRC Cyclic Redundancy Check

A 16-bit longitudinal check performed on all significant characters following SOH or STX, including the End-of-Block character.

Also referred to as BCC Block Check Character.

Used in EBCDIC mode or ASCII Transparent.



VRC Vertical Redundancy Check

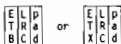
Provides odd parity for each character (including LRC character).

Used in ASCII mode.

LRC Longitudinal Redundancy Check

Computed on each block following SOH or STX but including an End-of-Block character.

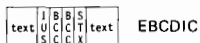
Used in ASCII mode.



IUS Information Unit Separator

IUS (EBCDIC), US (ASCII), (2780 Protocol)

Serves as an Intermediate Block Check. It is followed by the BCC character.



IRS Inter Record Separator

IRS (EBCDIC), RS (ASCII), (3780 Protocol)

In non-transparent mode each record normally terminates with IRS/RS, each block with ETB. The last block in data set is terminated with an ETX. Allows record blank truncation.

IRS also terminates line for print control.

SUMMARY OF RESPONSES

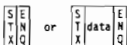
EOT

Sent by receiver as an error response for printer error; parity error; buffer overrun.

Sent by sender to indicate End-of-Data set, or abort.

NAK

Sent by receiver as an error response for incorrect CRC or VRC/LRC check, or received ENQ in text.



ENQ

Sent in text by sender if buffer parity error occurs, or transparency check is detected by communications adapter.

STX ENQ →

← NAK

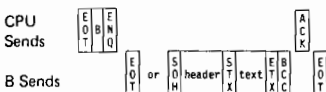
STX ENQ EOT →

An abort sequence for card reader error or input parity error.

NOTE: The EOT is a blind transmission. It does not require a response. If the EOT is not received, it may produce anomalous results.

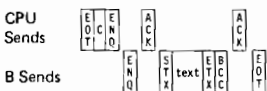
BINARY SYNCHRONOUS CONTROL CHARACTER SEQUENCES

POLLING (Centralized)

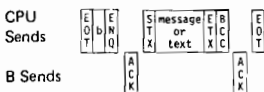


* Note that polling address is upper case.

POLLING AND BROADCAST (Non-Centralized)



SELECTION SEQUENCE



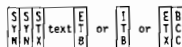
* Note that selection address is lower case.

FRAMING

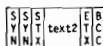
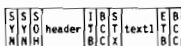
Heading Block



Text Block



Combined Heading and Text Blocks



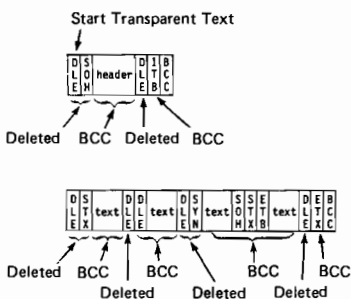
STX may or may not be sent

Response

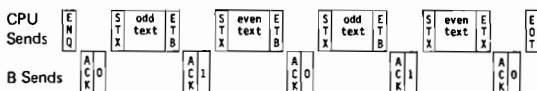
Response

**BINARY SYNCHRONOUS
CONTROL CHARACTER SEQUENCES
(continued)**

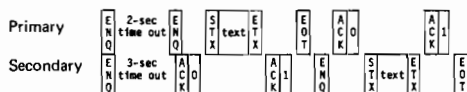
BCC ACCUMULATION - TRANSPARENT MODE



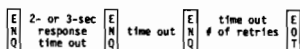
NORMAL MESSAGE



ENQ-ENQ CONTENTION

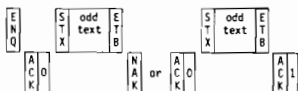


UNANSWERED LINE BID

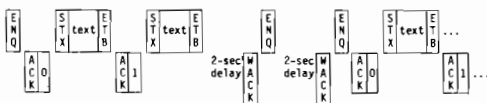


BINARY SYNCHRONOUS CONTROL CHARACTER SEQUENCES (continued)

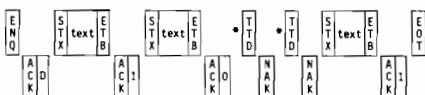
RETRANSMISSION



RECEIVE-INITIATED TRANSMISSION DELAY (WACK)

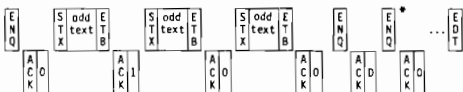


TRANSMITTER - INITIATED TRANSMISSION DELAY (TTD)



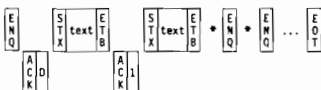
* Up to a 20-second delay

IMPROPER ACK



*The text block may be retransmitted.

NO-RESPONSE



*3-second response time out

BISYNC HANDSHAKING

ENQ

p	S	S	E	p
a	Y	Y	N	a
d	N	N	Q	d

ACK

p	S	S	D	p
a	Y	Y	L	a
d	N	N	E	d

or

p	S	S	D	p
a	Y	Y	L	a
d	N	N	E	d

STX

p	S	S	S
a	Y	Y	T
d	N	N	X

text

NAK

p	S	S	N	p
a	Y	Y	A	a
d	N	N	K	d

TTD

p	S	S	S	E	p
a	Y	Y	T	N	a
d	N	N	X	Q	d

WACK

p	S	S	D	p
a	Y	Y	L	a
d	N	N	E	d

or

D	p
L	a
E	d

ETB

text	E	B	B	p
	T	C	C	a
	B	C	C	d

or

E	p
T	a
B	d

ETX

text	E	B	B	p
	T	C	C	a
	X	C	C	d

or

E	p
T	a
X	d

RVI

S	S	S	D	p
Y	Y	Y	L	a
N	N	N	E	d

or

D	p
L	a
E	d

EOT

S	S	S	E	p
Y	Y	Y	O	a
N	N	N	T	d

BEL

S	S	S	B	p
Y	Y	Y	E	a
N	N	N	L	d

BISYNC

RJE PECULIARITIES

Buffer overruns may result in NAK, or in failure to alternate ACK.

Attempted sign-on to a remote already in use may result in line disconnect rather than NAK or error message.

Some installations send EOT every 10 or 15 seconds so wait=m,s fails to time out.

COMMENTS ON BLOCK FORMAT

2780 and 3780 RJE Emulators may use either non-transparent or transparent mode.

The MRJE subsystem uses transparent mode. The transmission block requires control parameters for data control, stream identification, repetitive character compression, etc.

The DS/3000 subsystem uses transparent mode. The transmission block contains an 8-word header and an optional appendage for parameter values and DS control information.

RJE/3000 REMOTE JOB ENTRY 2780/3780 EMULATOR

For official information about RJE refer to IBM manuals:

- Component Information for the IBM 3780 Data Communications Terminal (Part Number GA27-3063-2)
- Component Description IBM 2780 Transmission Terminal (Part Number GA27-3005-3)

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Timeouts	D-9
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RJE EMULATOR

RJE/3000 — HP 30130E

CS Driver CSSBSC0 HP 30131
SSLC Interface Board 30055A

Capability Requirements		Procedures
Account	CS	PM
Group		PM
User	CS	PM

:RJE

:RJE [command file] [, [input file] [, [list file] [, [punch file]]]

command file RJECON (Default: \$STDINX)

File or device containing Emulator commands.

FOPTS %2054 if unspecified
%7 if user-specified

AOPTS %0

input file RJEIN (Default: \$STDIN)

File or device containing input data (to be transmitted to remote computer).

FOPTS %2054 if unspecified
%7 if user-specified

AOPTS %0

list/out file RJEList (Default: \$STDList)

File or device to which list/out from remote computer is routed.

FOPTS %2514 if unspecified
%507 if user-specified file
%504 if user-specified device

AOPTS %1

punch file RJPUNCH (Default: \$OLDPASS)

File or device to which punch output from the remote computer is routed.

FOPTS %2132 if unspecified
%3 if user-specified

AOPTS %102

Used for routed output with # RJOUT with no file, device or procedure specified.

If opened for # RJPUNCH command:

FOPTS %3 if file name
%0 if device

AOPTS %102

File Code = 1060

source file SOURCE=parameter

File containing data for offline # RJList or # RJPUNCH operation

FOPTS %7

AOPTS not passed

#RJLINE

Defines communication link.

#RJLINE { 2780 } { 3780 } ;LINECODE = { ASCII } { EBCDIC }

;CONNECT = { DIAL [,XXX-YYYY] } { ANSWER }

;MAXPRB = block factor

Default

	xparent	
	yes	no
2780	4	7
3780	6	255

;ID = local term I.D.

;RIN = RIN [,password]

;CHNL3 = printer channel # <<def: 8>>

;XEND <<ignore DLE EOT>>

;TRACE = [ALL] [,mask] [,numentries] [,WRAP]]

Default Values

trace errors only

mask = %37

numentries = 25

no wrap

<< Trace Comments – Purge CSTRACE and allow the subsystem to build a new trace file in your group to insure correct parameters. Recommended parameters for RJE:

;TRACE = ALL,,128 >>

;DEV = logical device number

;LOCK = { YES } { NO } <<lock stack or allow memory management>>

;PRI = { HIGH } { NORMAL } <<HIGH = 150; otherwise PRI of job or session>>

#RJIN

Initiates transmission of input data set to the remote computer.

RJIN [input file]

;REC = [start rec #] [,end rec #]

;COMPRESS = { YES } { NO }

Default

2780	no
3780	yes

<<Compress repetitive blanks>>

;XPARENT = { YES } { NO }

<<If yes send as is; use different BISYNC protocol.>>

;TRUNCATE = { YES } { NO }

<<Chop off trailing blanks.>>

RJE EMULATOR

;INCDEF = { $\left\{ \begin{array}{l} \text{ASCII} \\ \text{EBCDIC} \\ \text{BINARY} \end{array} \right\}$

<< INCDEF = ASCII/EBCDIC and LINECODE = ASCII/EBCDIC provide code conversion if required.

INCDEF = BINARY useful with input procedure so emulator will leave data as is. >>

;MAXSIZE = nnn

<< Extend 80-byte limit to 128 words (-256 bytes). >>

;XEOF Default: abort on input; file read error.

<< useful for mag tape. >>

#RJOUT

Initiates receipt of routed output data sets from remote computer.

RJOUT [output file] [,# of data sets]

;WAIT = [min] [,sec] Default: 3 min.
Maximum: 32767 sec.
0 = ∞ (untimed)

;OUTCODE = { $\left\{ \begin{array}{l} \text{ASCII} \\ \text{EBCDIC} \\ \text{BINARY} \end{array} \right\}$

<< OUTCODE = ASCII/EBCDIC and LINECODE = ASCII/EBCDIC provide code conversion if required. OUTCODE = BINARY useful with output procedure so Emulator will leave data as is. >>

;OUTSIZE = nnn

<< Significant in 3780 mode - XPARENT. Default arbitrarily divides records into 80-byte records. This extends size to the 128-word (-256 byte) maximum. >>

#RJLIST

Initiates receipt of unrouted output, and routed output to list file from remote computer, and initiates offline list from source file.

RJLIST [list file] [,count]

;WAIT = [min] [,sec] Default: 3 min.
0 = ∞ (untimed)

;SOURCE = source file

<< For offline operation, the following parameters not allowed:
count, WAIT =, OUTCODE =, and AUTOPAGE =. >>

;OUTCODE = { $\left\{ \begin{array}{l} \text{ASCII} \\ \text{EBCDIC} \\ \text{BINARY} \end{array} \right\}$

<< Refer to note in # RJOUT. >>

;FORMSMMSG = message

<< Prompts operator with a forms message while printing spoolfile. >>

;OUTSIZE = nnn

<< Refer to note in # RJOUT. >>

;AUTOPAGE = { $\left\{ \begin{array}{l} \text{YES} \\ \text{NO} \end{array} \right\}$

<< Allows automatic page eject. >>

#RJPUNCH

Initiates receipt of unrouted output data sets and routed data sets to the punch from the remote, and initiates offline punch from source file. #RJPUNCH does not insert control functions, and is useful for transferring binary files.

RJPUNCH [punch file] [,count]

;WAIT = [min] [,sec] Default: 3 min.

;SOURCE = source file 0 = ∞ (untimed)

;OUTCODE = { ASCII
 EBCDIC }
 BINARY }

<< Refer to note in #RJOUT.>>

;OUTSIZE = nn

<< Refer to note in #RJOUT.>>

<< For offline operations the following parameters are not allowed: count, WAIT=, and OUTCODE=,>>

#RJEOD

Terminates the #RJIN buffer and sends EOT to remote computer. Consecutive #RJIN commands allow file concatenation. #RJEOD provides End of File.

#RJEND

Terminates Emulator Subsystem.

#RJIO message

Equivalent to #RJIN followed by #RJOUT. Useful for sending HASP commands from a job. Not required in session mode where /*\$DA type commands are appropriate.

#RJINFO

Initiates display of communications line tombstone. Prints to \$STDLIST.

#RJDEBUG

Sets the Emulator into debug mode allowing the user access to the debugging facility. Used for debugging user input and output procedures.

RJE EMULATOR

SPACE COMPRESSION

Operational in 3780 with non-transparent mode.

Each group of 2 or more consecutive space characters (≤ 63) are replaced by an IGS (EBCDIC) or GS (USASCII) character followed by the space count character.

TRANSPARENCY

Treats data as binary, allowing all 256-bit combinations.

Requires DLE STX at the beginning of each transparent record. A DLE precedes any valid data-link control character. With no preceding DLE character, the binary representation is considered to be data. The exception to this rule is DLE itself; a binary byte equivalent to a DLE must be preceded by a DLE in order to be considered data.

In transparent mode, each record is normally terminated with an ETB instead of IRS.

CARRIAGE CONTROL 2780/3780

Two-character escape sequence (first two characters in record) controls carriage control on line printer.

	ASCII	EBCDIC	CARRIAGE OPERATION
2780 3780	ESC O	ESC /	Single Space
	ESC R	ESC S	Double Space
	ESC S	ESC T	Triple Space
	ESC A	ESC A	Skip to Chan 1 (Form Feed)
	ESC B	ESC B	Skip to Chan 2 (Vert Tab)
	ESC C	ESC C	Skip to Chan 3
	ESC D	ESC D	Skip to Chan 4
	ESC E	ESC E	Skip to Chan 5
	ESC F	ESC F	Skip to Chan 6
	ESC G	ESC G	Skip to Chan 7
	ESC H	ESC H	Skip to Chan 8
	ESC I	ESC I	Skip to Chan 9
	ESC J	ESC J	Skip to Chan 10
	ESC K	ESC K	Skip to Chan 11
	ESC L	ESC L	Skip to Chan 12
	ESC M	ESC M	Suppress Space

NOTE: These channels must be configured on the line printer to be functional.

The carriage action required by the escape character sequence is not executed until an NL (new line) or IRS (inter record separator) character has been received and caused a print cycle.

COMPONENT SELECTION

Provides automatic routing between list and punch output files.

The component select character must be the first text character of the first block of text following ENQ and ACK0, or first block of a conversational reply, or first block following an ETX block.

3780 Emulator

CHARACTER	FILE
DC1	Printer
DC2/DC3	Punch

2780 Emulator

ESC followed by any CCTL character specifies printer.

ESC 4 specifies punch.

SPECIAL FORMS

The use of special forms is accomplished by the capabilities of the HASP/ASP/JES subsystem of the host computer, and by the spooler subsystem of the HP 3000.

The job (on the host) may include a print to a device.

```
WRITE (7, 1020) X, Y, Z
```

The JCL can define this device with a forms parameter (note the actual JCL is installation dependent).

```
//STP7.F107F001 DD SYSOUT=(C,,C325),
//          DCB=(RECFM=UA,BLKSIZE=133,LRECL=133)
```

The HASP system indicates the special forms as follows:

```
#/*$DF
$19.50.19 OUT 30 F=C325 C=6 T=**** CLS C=1
```

The output to the special form is selected by operator-controlled mode.

```
#/*$T RM30.PR1,F=C325,Q=C
$20.09.22 OK
```

The output file is then transmitted to the 3000 with a forms message.

```
#RJLIST *LP;FORMSMMSG=F513
```

Upon receipt of the data set, the spooler prompts the operator for mounting the form and for form alignment.

```
20:18/J189/14/FORMS: F513
?20:18/J189/14/SP #6 IS #S101;LP ON LOEV #6 (Y/N)?
=REPLY 14,Y
?20:22/J189/14/LDEV #S6 FORMS ALIGNED OK? (Y/N)?
=REPLY 14,Y
```

RJE EMULATOR

2780/3780 COMPARISON

The following comparison describes "real" 2780/3780 equipment.

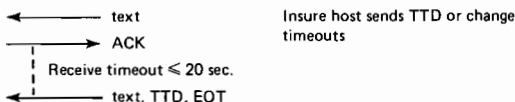
- Half Duplex Protocol on Point-to-Point 2- or 4-wire, leased or switched networks.
- Support ASCII or EBCDIC codes.
ASCII — odd VRC and 8-bit LRC.
EBCDIC — 16-bit CRC
- Horizontal or vertical tabs.

Differences	2780	3780
Buffer Size	400 byte	512 byte
Short Record Truncation	Yes, must supply EM	Yes, automatic
Blank compression	No	Yes, automatic
Maximum block factor	2 (Opt 7)	Non-xparent 216 Xparent 1 (Opt 6)
Generate WACK, TTD	No	Yes
Intermediate Block Terminator (logical record separator)	US BCC (ASCII) IUS BCC (EBCDIC)	RS (no BCC) IRS (no BCC) (will accept IUS BCC)
Component Select X=carriage control	ESC X (printer)	DC1
	ESC 4 (punch)	DC2/DC3
SOH	Treated as STX	not recognized

TIMEOUTS (CONFIGURATION)

Receive Timeout Default = 20 sec.

This timeout is set when the ACK is sent to the remote. Additional communications is expected from the remote in the form of text, EOT, or TTD. In case of timeout, a batch job aborts.



Local Timeout Default = 20 sec.

This timeout serves to make effective use of the line by timing between requests to the driver. In job mode, timeout results in aborting job. It is the time from the completion of a CS intrinsic until the receipt of the next one (i.e., CCONTROL, CREAD, or CWRITE).

Connect Timeout

The connect timeout times the interval until the Data-Set-Ready signal is provided indicating the communications link is established. In Session mode, if CONNECT = ANSWER the timeout is disabled.

Response Timeout

The Response timeout is determined by local mode: primary or secondary contention station (Primary = 2 sec; Secondary = 3 sec).

If the response from the remote is not received within the allowable time period, the local sends ENQ and retransmits. This is repeated until the number of retries is exhausted. It is used to resolve ENQ-ENQ conflicts.

Wait Timeout

Used in # RJOUT, # RJLIST, or # RJPUNCH.

The ;WAIT = m, s parameter can be specified. It establishes the maximum amount of time to wait for the remote computer to bid for the line. If the timeout is exceeded, the command completes and the next command executes.

RJE ERRORS

****CS ERROR: x, yy, zz****

- x 0 Line open
 1 Line read
 2 Line write

yy Refer to the CS ERRORS in Section I.

zz Code
 (Decimal)

Meaning

0	No recoverable error occurred.
1	Invalid ID sequence received.
2	Received unintelligible sequence.
3	Block check character error.
4	Remote did not respond to text.
5	Received incorrect acknowledgment.
6	Remote attempted to bid for the line.
7	No response to line bid.
8	Received unintelligible sequence after sending text.
9	Received enquiry character after sending text.
10	Remote requested a resend of local's last response.
11	Remote requested a resend of last text.
12	Received end-of-transmission character while line was in control state.
13	Received text overflow.
14	Data overrun occurred on SIO multiplexer.
15	Transfer error occurred on the SIO multiplexer.

MRJE/3000 MULTILEAVING REMOTE JOB ENTRY

CONTENT	PAGE
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MRJE/3000 COMMANDS

MRJE/3000 – PRODUCT NO. HP 32192A

Capability Requirements	MRJE/3000 User	MRJE/3000 Manager
Account	default	OP*
Group	default	default
User	default	OP*

*The manager's user id must be **MANAGER.SYS** in order to use the **NEW** and **PURGE ALL** commands.

:MRJE

Initiates the subsystem.

For listing **\$STDLIST** to an optional file, precede the command with a file equation.

:FILE LISTING=filename

MANAGER'S COMMANDS SUMMARY

**#A[LTER] { item#
itemlist }**

Specifies items in the configuration file that are to be changed.

item# The number assigned an entry in the configuration file. Range 1 through 32.

itemlist A list of item numbers.

**#C[ANCEL] [J[OBS]] { job#
jobname
joblist }**

Cancels one or more jobs and notes the event in the joblog file. MRJE/3000 manager can cancel any job being handled by the subsystem regardless of ownership.

JOBS Optional parameter, provided for consistency with the **DISPLAY** command. Omitting **JOBS** has no effect.

job# The number MRJE/3000 assigned to a job at submission.

jobname The name on a JOB card in an input file.

joblist A list of jobnames and/or jobnumbers.

#D[ISPLAY]	{	H[OST]	}	
		J[OBLOG]		[,job#
				,jobname
				,joblist
		O[LDJOBS]		
		S[TATUS]		
		C[ONFIG]	[,item#	
			,itemlist	

Displays job and system information.

HOST Lists the current host machine. Machine is referenced by SUBMIT, DISPLAY, ALTER, PURGE, and CANCEL commands until a HOST command selects another machine.

JOBLOG Displays information about jobs. If neither job#, jobname, nor joblist is specified, displays the entire joblog file for the current machine. JOBLOG is the default.

OLDJOBS Displays canceled or timed-out jobs. (A timed-out job has been in the joblog file longer than the limit established during host machine configuration.)

STATUS Reports communications line state (connected or disconnected).

CONFIG Lists contents of the configuration file. If you include item numbers, only those items are displayed.

#N[EW] [hostid]

Creates the configuration, joblog, and directory files for a given host machine.

You must log on MANAGER.SYS in order to use this command.

In a single-host environment, the hostid parameter should not be specified, otherwise hostid designates the name of a non-default host.

hostid Used only in multi-host environments. Hostid can have up to eight alphanumeric characters. If several machines are defined, each hostid must have a unique first character.

#P[URGE] { O[LDJOBS]
A[LL] }

Purges entries from a joblog file.

OLDJOBS Purges jobs that were canceled or timed out.

ALL Purges all entries from a joblog file.

You must log on MANAGER.SYS in order to use this command.

MRJE/3000 COMMANDS

USER'S COMMANDS SUMMARY

#D[ISPLAY]	{	H[OST]	}
		J[OBLOG] { ,job# }	
		S[TATUS] { ,jobname }	
		C[ONFIG] { ,joblist }	
		[,item#]	
		,itemlist	

Displays job and system information

- HOST** Lists the current host machine. Machine is referenced by SUBMIT, DISPLAY, and CANCEL commands until a HOST command selects another machine.
- JOBLOG** Displays information about jobs that were submitted. Specify either a job number, a job name, or a job list, but job# is preferred.
- STATUS** Reports communications line state (connected or disconnected).
- CONFIG** Lists the configuration file for the current host. If you include item numbers, only those entries are displayed.

#C[ANCEL] [J[OBS]]	{	job#	}
		jobname	
		joblist	

Cancels one or more jobs and notes the event in the joblog file. As an MRJE/3000 user, you may cancel only your own jobs.

- JOBS** Optional parameter, provided for consistency with the DISPLAY command. Omitting JOBS has no effect.
- job#** The number MRJE/3000 assigned to your job at submission.
- jobname** The name on a JOB card in your input files.
- joblist** A list of jobnames and/or jobnumbers.

#E[XIT]

Terminates MRJE/3000 and returns control to MPE.

#H{OST} [hostid]

Selects a particular host machine to be the current host machine. The machine specified in the HOST command is referenced by all subsequent MRJE/3000 commands.

hostid Name of a host machine that was configured by the MRJE/3000 manager. Spell out or abbreviate.

Omit this parameter to select the default host machine for command processing.

**#S{UBMIT} infile1[{N}] [,infile2[{N}]] ... [,infile5[{N}]]
 [:R[EADER] =pseudo reader] [:PR[INT] =printfile[{N}]]
 [:PU[NCH] =punchfile[{N}]] [:F[ORMS] =formfile[{N}]]**

Submits a job or several jobs for transmission.

The files are transmitted to the current host machine.

[N] The NOTRANSLATE parameter requests "no translation" for a file when its contents are transmitted or received. Default translation is ASCII to EBCDIC for input files and EBCDIC to ASCII for output files.

You cannot specify no translation for \$STDIN or \$STDINX input files.

infile Five infiles may be specified. They are transmitted in the sequence they appear within the SUBMIT command. Infile can be:

- Logical device number of a real MPE input device.
- The device class name of a real MPE input device enclosed in quotation marks (for example "TAPE").
- An optionally qualified actual file designator.
- \$STDIN, \$STDINX, or \$OLDPASS.
- A formal file designator which has been equated to an actual file designator, a logical device number, a device class name, \$STDIN, \$STDINX, or \$OLDPASS.

pseudo reader Specifies the particular MRJE/3000 pseudo reader on which the jobs in the input files will be submitted. Pseudo reader can be:

- The logical device number assigned an MRJE/3000 pseudo reader.
- A pseudo reader device class name enclosed in quotation marks, but only if the reader you want to use has been configured with a unique device class name.

If the READER= parameter is omitted, the default pseudo reader listed in the current host machine's configuration file is used.

MRJE/3000 COMMANDS

printfile
punchfile
formfile

These parameters specify files that are to receive the results of job processing. One of each can be specified by:

- The logical device number of an MPE output device.
- An MPE device class name enclosed in quotation marks.
- An unqualified actual file designator.

The default output devices for print and punch files are given in the configuration file for the current host machine. The default for formfile is always identical to the printfile default.

CONSOLE OPERATOR'S COMMANDS SUMMARY

=MRJE START[,hostid]

Initiates a remote transmission session.

START Requests connection to the default host machine.

START,hostid Requests connection to a machine other than the default host machine.

=MRJE SIGNOFF[,hostid]

Requests ending a remote transmission session.

SIGNOFF Requests disconnection from the default host machine.

SIGNOFF,hostid Request disconnection from a machine other than the default host machine.

=MRJE KILL[,hostid]

Immediately terminates a remote transmission session.

KILL Disconnects the default host machine.

KILL,hostid Disconnects a machine other than the default host machine.

JOB INPUT

A job stream is composed of MPE job control cards, HASP or JES2 job control cards, executable programs, and data.

80-column card images are stored in one or more HP 3000 files. One card image constitutes one record in a file.

Files that are merged to form a job stream can contain any number of separate jobs.

Three levels of input files permitted:

- Infiles Named in a SUBMIT command.
- Level-one FD files Named on ##FD cards in infiles.
- Level-two FD files Named on ##FD cards in level-one FD files.

No "looping" between any input files permitted. Infiles and FD files must constitute a valid job (or jobs) according to host system requirements.

FD files and infiles are identical in that they may contain the same kind of information and are constructed in the same way; they are merely referenced differently.

Five infiles are permitted in any one SUBMIT command. A file name in the command may be one of the following:

- Actual File Designator (qualified or unqualified)
- Formal File Designator
- Device Class Name
- Logical Device Number
- \$STDIN, \$STDINX, or \$OLDPASS

##FD filename [(N)] [comment]

File definition cards may appear in infiles and level-one FD files to reference additional files. The ##FD cards themselves are not transmitted. ##FD must occur in columns 1 through 4.

filename The file designator can be:

- Actual File Designator (qualified or unqualified)
- Formal File Designator
- Device Class Name
- Logical Device Number
- \$STDIN, \$STDINX, or \$OLDPASS

(N) Optional parameter. Requests that the FD files be transmitted without translation. (Refer to the SUBMIT command for more about translation and the N parameter.)

comment Optional parameter. If you build a file that requests input from \$STDIN or \$STDINX, use the comment field on the ##FD card to identify the type of input that is expected. Subsequently, when you are in session mode, the comment is printed at your terminal before the standard MRJE/3000 message: ENTER INPUT ENDING WITH MRJEOD.

PLANNING JOBS FOR MRJE/3000

MRJEOD

For input (infile or FD files) that originates from \$STDIN or \$STDINX, MRJEOD in columns 1 through 6 indicates the end of file. The record is never sent to the host.

JOB OUTPUT

Output can be routed to a disc file or to an output device by naming the output files in the SUBMIT command.

File record size:	Print file	}	133 characters per record
	Special Forms file		
	Punch file		

If SUBMIT command names a disc file, build the file with sufficient extents allocated as MRJE/3000 will not allocate additional ones should the need arise.

In the SUBMIT command, specify output files using one of the following:

- An unqualified actual file designator
- The logical device number of an MPE output device
- An MPE device class name.

CARRIAGE CONTROL

When output is written to a disc file, a carriage control character prefixes line printer and special forms records. MRJE/3000 translates the characters as follows:

HOST SYSTEM CONTROL	HP 3000 CONTROL CODE
Skip immediately n spaces ($n < 3$)	%101 (if necessary) %2nn ($nn < 3$)
Skip immediately to channel n ($n < 13$)	%101 (if necessary) %3nn ($2 < nn < 12$) or %61 (for channel 1)
Space n lines after print ($n < 3$)	%100 (if necessary) %2nn ($nn < 3$)
Skip to channel n after print ($n < 13$)	%100 (if necessary) %3nn ($2 < nn < 12$) or %61 (for channel 1)
Suppress space	%53
All other host system control codes	Single space

MRJE/3000 CONFIGURATION FILE FORMATS

ITEM NO. AND DESCRIPTION	DATA TYPE*	ASCII BYTES	DEFAULT** VALUE	NOTES***
1. Host machine	an	8	—	1
2. Pseudo console device (logical device number)	n 999	3	—	
3. Pseudo line monitor device (logical device number)	n 999	3	—	
4. Signon card image	—	80	—	2
5. Host system	HASP or JES2	4	—	
6. User host command		10	—	3
7. Host system command character	n or special	1	\$ \$	4
8. Number of lines to check for print banner	n 0-999	3	10 60	4
9. Number of cards to check for punch banner	n 0-999	3	1 1	4
10. Column where host number appears in the print banner	n 6-129	3	33 19	4
11. Column where job name appears in print banner	n 0-124	3	79 25	4,5
12. Column where host number appears in in the punch banner	n 1-76	2	44 44	4
13. Column where job name appears in punch banner	n 0-72	2	0 0	4,6
14. Column where "SETUP" or "LOAD" appears for print special forms	n 1-120	3	10 21	4
15. Column where "JOB" appears in console job message definition	n 1-99	2	11 10	4
16. Column where job-name appears in console job message definition	n 1-99	2	35 28	4
17. Column where "ON" appears in console message definition	n 1-99	2	20 37	4

MRJE/3000 CONFIGURATION FILE FORMATS

ITEM NO. AND DESCRIPTION	DATA TYPE*	ASCII BYTES	DEFAULT** VALUE	NOTES***
18. Maximum number of joblog entries	n 25-1000	4	100	1
19. Default MRJE input device (LDN or DC)	•	10	"MRDR1"	
20. Print output device (LDN, DC or AFD)	•	10	"LP"	
21. Unsolicited print disposition (LDN, DC or AFD)	•	26	"LP"	
22. Punch output device (LDN, DC or AFD)	•	10	"LP"	
23. Unsolicited punch disposition (LDN, DC or AFD)	•	26	"LP"	
24. MRJE output process priority	BS, CS or DS	1	CS	
25. Number of characters to test in jobname	n 0-8	1	8	
26. Translate type	EBCDIC or EBCDIK	1	EBCDIC EBCDIK	
27. Phone number in MRJE START command	—	16	—	
28. Time line activated (set by =MRJE START)	—	6	—	1
29. Time Line Deactivated (set by =MRJE SIGNOFF)	—	7	—	1
30. Maximum time job remains in joblog after transmittal (days, hrs, min)	n	6	1/0/0	
31. Host buffer size (bytes)	n 100-2000	5	400	
32. Trace activated	YES or NO	1	NO	

***DATA TYPE**

- an Alphanumeric data
- n Numeric data
- LDN Logical device number
- DC Device class name, within quotation marks
- AFD Actual file designator

****DEFAULT VALUE**

If two values appear, the upper value is the default for HASP and the lower value is for JES2.

*****NOTES**

1. The item cannot be altered following initial configuration.
2. The item is not displayed to users.
3. The first character of the User Host Command must be identical to Item 7. MRJE automatically alters the character when the manager alters Item 7.
4. The item is host-system dependent. MRJE automatically alters the item when Item 5 is altered. The default column shows the HASP/JES2 values.
5. A value of zero indicates no job name.
6. A value of zero indicates no job name. Non-zero indicates non-special punch codes.

CONFIGURING A HOST SYSTEM FOR MRJE/3000

CONFIGURING A HASP SYSTEM

- Terminal type: System/360 model 25 or higher.
- Line printer width: 132 characters or less.
- Console support: YES
- Transparency: YES
- Communications line:
 - a. Full or half duplex (4-wire, full duplex reduces line turn around time to a minimum).
 - b. Speed: less than or equal to 9600 bits per second.
 - c. EBCDIC and transparent.
- Multileaving buffer size: Not to exceed 2000 characters.
- All other generation parameters should be specified consistent with practices at the host site.

CONFIGURING A JES2 SYSTEM

- Remote terminal type: S/360.
- Terminal should be specified as having:
 - a. A console.
 - b. A multileaving interface.
 - c. The text transparency feature.
- For each remote printer configured at a remote terminal:
 - a. Automatic forms mode.
 - b. Automatically started printer.
 - c. No FCB support.
 - d. Separator pages.
 - e. Printer width: 132 characters or less.
- For each remote card punch configured at a remote terminal:
 - a. Automatic forms mode.
 - b. Automatically started punch.
 - c. Separator cards.
- For each remote card reader configured at a remote terminal:
 - a. Automatically started (hot) card reader.
- A standard forms name of "STD." in the standard forms parameter or use "STD." as the name of standard forms for both printers and punches.
- Communication line:
 - a. Full or half duplex (4-wire, full duplex reduces line turn around delays to a minimum).
 - b. Speed: less than or equal to 9600 bits per second.
 - c. EBCDIC and transparent.
- Multileaving buffer size: Not to exceed 2000 characters.
- All other generation parameters should be specified consistent with practices at the host site.

NOTE

An asterisk (*) adjacent to a message indicates the error causes program termination if MRJE/3000 is being run non-interactively.

"ALL" OR "OLDJOBS" ARE ONLY VALID PURGE PARAMETERS.*

A PURGE parameter other than ALL or OLDJOBS was entered. Reenter PURGE command with no parameter (for OLDJOBS) or with ALL or OLDJOBS.

"BS" OR "CS" OR "DS" REQUIRED.*

BS, CS, or DS are the only valid values for output process priority in the Configuration file. Reenter correctly.

```
{ jobname } CANCELED.
{ job#   }
```

Specified job has been canceled as requested.

```
{ jobname } CAN'T BE CANCELED.*
{ job#   }
```

Named job cannot be canceled because of a read or write Joblog error. Retry the CANCEL.

```
{ $CJ host#, host# } CANCEL COMMAND WILL BE SENT TO HOST.
{ $CJ host#, P     }
```

When an interactive user/manager CANCELS a job which has been transmitted to the host and the host is online, MRJE/3000 automatically sends the given host cancel command and prints the host response.

COMMA OR NUMBER REQUIRED.*

Comma or number is required. Reenter correctly.

COMMA OR SLASH REQUIRED TO SEPARATE PARAMETERS.*

Comma or slash required to separate parameters in a joblist or itemlist. Reenter with correct separator.

COMMA REQUIRED TO SEPARATE PARAMETERS.*

Comma is required to separate positional parameters, DAYS, HOURS, MINUTES. Reenter with correct separator.

```
{ DEFAULT HOST } CONFIGURATION FILE SET CANNOT BE ASSESSED.*
{ HOST hostname }
```

Named host Configuration file set cannot be accessed because of an open or read error. Determine the reason for the I/O failure from the MPE file error number.

CONTINUATION LINE EXPECTED.*

When an ampersand (&) is entered at the end of a line in a SUBMIT command, MRJE expects a continuation of the command. One blank line is permitted. Reenter the entire SUBMIT command with continuation lines as required.

MRJE/3000 USER MESSAGES

CONTROL-Y IS THE ONLY VALID INPUT DURING HOST COMMAND PROCESSING.*

A user (non-manager) may only enter control-Y during host console command processing. (Control-Y halts output.) Any other input causes this error message and returns the $\neq$ prompt. If all output has not been received, reenter the host console command.

filename RECORD m CTRANSLATE FAILED.*

An error occurred while translating a SUBMIT input file from ASCII to EBCDIC (or EBCDIK, depending on the translate type). This is an internal software failure. Contact your local HP representative.

(current command char) MUST BE FIRST CHAR IN USER HOST CMD.*

The specified command character must be the first character in the user host command (in the configuration file). For example, if the host system command character is a dollar sign (\$), the user host command cannot be %DA. Reenter correctly.

DAYS, HOURS, MINS CAN'T BE ZERO

The maximum time a job remains in the Joblog after transmittal cannot be zero. Reenter correctly.

DEFAULT HOST ASSUMED

If no hostname is given in a HOST or NEW command, MRJE/3000 assumes the default host.

DIGIT OR SPECIAL CHARACTER REQUIRED.*

Host command character must be a digit or special character. Reenter command with correct parameters.

n DIGITS ARE THE MAX ALLOWED FOR THIS NUMBER.*

A number with too many digits has been entered. Reenter command with correct parameter.

\$DJ host# DISPLAY COMMAND WILL BE SENT TO HOST.

When an interactive user/manager DISPLAYs a job that has been transmitted to the host and the host is online, MRJE automatically sends the given host display command and prints the host response.

jobname: DUPLICATE JOB NAMES IN JOBLOG. CANCEL REFUSED. A DISPLAY OF JOBS WITH THIS NAME WHICH YOU OWN (IF ANY) FOLLOWS:

A CANCEL by jobname is refused if duplicate names exist in the Joblog. Reenter the CANCEL command, specifying job# rather than jobname.

"EBCDIC" OR "EBEDIK" REQUIRED.*

EBCDIC and EBCDIK are the only valid translate types. Reenter correctly.

EMBEDDED BLANKS NOT ALLOWED IN QUALIFIED NAME.*

A qualified actual file designator may not contain embedded blanks. Reenter correctly.

END OF FILE ON \$STDINX. FURTHER INPUT IMPOSSIBLE. FATAL ERROR!*

End-of-file on standard input device (for example, a user enters :EOD while submitting from \$STDINX) makes further input impossible. MRJE/3000 terminated. Rerun the job and do not use :EOD or :EOF in SUBMIT. Use MRJEOD.

ENTER INPUT ENDING WITH "MRJEOD"

This message followed by a prompt (>) requests input from \$STDIN/\$STDINX during SUBMIT. If \$STDIN/\$STDINX is an FD file, any comment on the ##FD card appears before this message. For example, assume infile DATA1 contains the record

```
##FD $STDIN      This input is for file DATA1.
```

When this ##FD card is read by MRJE/3000, the following appears on the terminal:

```
      This input is for file DATA1.
      ENTER INPUT ENDING WITH "MRJEOD"
      >
```

EXTRANEIOUS INFORMATION AFTER VALID ITEM.*

Some extra information has been included that MRJE/3000 does not recognize. Reenter with only the required information.

##FD CARDS NOT PERMITTED IN LEVEL 2 FILE.*

File Definition cards may be contained only in an infile (level 0) or a first level FD file. Remove the ##FD card from the named level 2 file, reconstruct input files as required, and re-SUBMIT.

FILE ERROR #n, filename CAN'T BE CLOSED.

Named SUBMIT file (input or output) cannot be closed. SUBMIT processing continues. Determine the reason for the failure from MPE file error number.

FILE ERROR #n, filename CAN'T BE CLOSED. FATAL ERROR!*

Named file (Configuration, Directory, Joblog, or Host Console Device) cannot be closed. MRJE/3000 Terminated. Determine the reason for the failure from MPE file error number.

FILE ERROR #n, filename CAN'T BE OPENED.*

Named file cannot be opened. Determine the reason for the failure from MPE file error number.

FILE ERROR #n, filename CAN'T BE OPENED. FATAL ERROR!*

Named list file (if other than \$STDLIST) cannot be opened. MRJE/3000 terminated. Determine the reason for the failure from MPE file error number.

FILE ERROR #n, MRJEJOBx RECORD m CAN'T BE POSTED.*

Record m of Joblog MRJEJOBx cannot be physically transferred from the I/O buffer to the disc file. Determine the reason for the I/O failure from MPE file error number.

MRJE/3000 USER MESSAGES

FILE ERROR #n { filename RECORD m
HOST CONSOLE OUTPUT } CAN'T BE READ.*
STANDARD INPUT FILE

Named file (record m) cannot be read. Determine the reason for the I/O failure from the MPE file error number.

FILE ERROR #n, filename RECORD m CAN'T BE WRITTEN.*

Record m of the named file cannot be written. Determine the reason for the I/O failure from the MPE file error number.

FILE ERROR #n, filename RECORD m CAN'T BE WRITTEN. FATAL ERROR!*

An output record cannot be written to the named list file. MRJE/3000 terminated. Determine the reason for the I/O failure from the MPE file error number.

FILE ERROR #n, { filename RECORD m } CAN'T BE WRITTEN TO HOST
MONITOR CARD } READER.*

Designated record of the SUBMIT input file or the monitor card (an MRJE record which associates a host job with a pseudo reader) cannot be written to the host reader. Determine the reason for the I/O failure from the MPE file error number.

FILE ERROR #n, CAN'T CLOSE \$STDINX. HOST CONSOLE COMMANDS CAN'T BE SENT.*

\$STDINX (standard input device) must be closed, then reopened for NOWAIT I/O, in order to send host console commands. Determine the reason for the failure from the MPE file error number (#n).

FILE ERROR #n, HOST CONSOLE CAN'T BE OPENED.*

Host pseudo console device specified in the Configuration file cannot be opened. Determine the reason for the failure from MPE file error number.

FILE ERROR #n, HOST CONSOLE COMMAND CAN'T BE WRITTEN.*

Host console command cannot be written to the host pseudo console device specified in the configuration file. Determine the reason for the I/O failure from the MPE file error number.

FILE NAME, DEVICE CLASS, OR LOGICAL DEVICE NUMBER REQUIRED.*

File name, device class, or logical device number are the only valid inputs. Reenter correctly.

hostname FILES CREATED

The Configuration file set for the named host has been created as requested by the NEW command.

FOLLOWING MUST BE INITIALIZED IN CONFIGURATION FILE:

When creating a NEW Configuration file set, certain items that do not have default values must be initialized.

FORMS SPECIFIED TWICE.*

FORMS file specified twice in SUBMIT command. Reenter SUBMIT command correctly.

GET PRIVILEGED MODE FAILURE. FATAL ERROR!*

An error occurred in the GETPRIVMODE intrinsic. This is an internal software failure. Contact your local HP representative.

GET USER MODE FAILURE. FATAL ERROR!*

An error occurred in the GETUSERMODE intrinsic. This is an internal software failure. Contact your local HP representative.

HOSTNAME MUST START WITH SAME CHAR AS HOSTID.*

The first character of hostname must be the same as the first character of the hostid given in the NEW command. Reenter correctly.

jobname IN DIRECTORY (ENTRY n) BUT NOT IN JOBLOG. FATAL ERROR!*

Named job has been found in Directory entry n, but cannot be found in the Joblog. MRJE/3000 terminated.

This is an internal software failure. Do not permit further jobs to be submitted to this Joblog. When all jobs in it have completed, use FCOPY to list the Directory and Joblog as follows:

```
: FILE L;DEV=LP
: RUN FCOPY
> FROM=MRJEJOBx;TO=*L
> FROM=MRJEDIRx;TO=*L
> EXIT
```

Keep this listing for your local HP representative. Use the PURGE ALL command to re-initialize the Directory and Joblog.

INPUT FILE NAME(S) REQUIRED.*

SUBMIT requires at least one input filename. Reenter the command correctly.

INPUT MUST BE NUMERIC

Numeric input required. Reenter correctly.

INTERACTIVE TERMINAL REQUIRED FOR HOST CONSOLE COMMANDS

User/manager must run MRJE/3000 interactively in order to send host console commands.

INVALID ACTUAL FILE DESIGNATOR.*

Valid actual file designator has the form

name1/name2. name3. name4 or name1. name2. name3

where names can be a maximum of eight alphanumeric characters, starting with alpha. No embedded blanks are permitted. Reenter correctly.

INVALID COMMAND.*

MRJE/3000 does not recognize the input as a command. Enter a valid MRJE/3000 or HASP/JES2 console command.

MRJE/3000 USER MESSAGES

INVALID DEVICE CLASS SPECIFICATION.*

Valid device class has the form

"name"

where name can be a maximum of eight alphanumeric characters, starting with alpha. No embedded blanks are permitted and quotation marks are required. Reenter correctly.

INVALID HOST SYSTEM.*

HASP and JES2 are the only valid host job entry subsystems. Reenter correctly.

INVALID HOSTID. MUST BE ALPHANUMERIC, <= 8 CHARS.*

Valid hostid is a maximum of eight alphanumeric characters. Reenter correctly.

INVALID JOBNAME—TOO LONG.*

Eight characters is the maximum length for host job name. Reenter correctly.

INVALID KEYWORD.*

Valid keywords are READER, PRINT, PUNCH, FORMS. Reenter SUBMIT command correctly.

INVALID OCTAL NUMBER.*

Octal number cannot contain blanks nor the digits 8 and 9. Reenter correctly.

INVALID PARAMETER FOR DISPLAY COMMAND.*

Valid DISPLAY parameters are CONFIGURATION, DIRECTORY, HOST, JOBLLOG, OLDJOBS, STATUS. Reenter DISPLAY command with correct parameter.

INVALID SPECIAL CHARACTER.*

Reenter using only valid special characters as follows:

, \$ # @ / = " ' () > * % ; : & ! < > ^ + - ' "

INVALID SUBMIT PARAMETER.*

Valid SUBMIT parameters are infiles and keywords. Reenter SUBMIT command correctly.

device IS AN INVALID PSEUDO LINE MONITOR DEVICE. FATAL ERROR!*

MRJE/3000, in determining whether the host is on or offline, has found that the pseudo line monitor logical device number in the Configuration file is invalid. Ensure that the logical device number in the Configuration file correctly indicates the pseudo line monitor device configured on the 3000.

jobname IS NOT YOUR JOB.*

Requested job will not be CANCELED or DISPLAYed because the user's logon id does not match that in the JOBLLOG entry. Reenter CANCEL or DISPLAY with correct jobname or job#.

hostname IS OFFLINE.

Named host is offline.

hostname IS OFFLINE. HOST CONSOLE COMMAND CAN'T BE SENT.

Host console command cannot be sent because named host is offline. Reenter command when host is online.

hostname IS OFFLINE. JOB CAN'T BE CANCELED AT HOST.*

Job to be CANCELED has been transmitted to host, but the host is now offline, so a host cancel command cannot be sent. However, the cancel flag in the joblog entry is set so that any output for the job will be flushed.

hostname IS ON LINE.

Named host is online.

hostname IS THE CURRENT HOST MACHINE

Named host is the current host to which all succeeding commands are directed.

n IS THE MAX LEVEL OF NAMES IN THIS ACTUAL FILE DESIGNATOR.*

An actual file designator may have several levels of qualification, for example name1. name2 has two levels. Reenter a valid actual file designator.

n IS THE MAXIMUM NUMBER OF CHARACTERS FOR THIS PARAMETER.*

Certain inputs, such as phone number in the Configuration file cannot exceed a specified length. Reenter correctly.

command IS THE ONLY VALID CONSOLE COMMAND.*

The user is permitted to use only that host console command designated by the manager in the Configuration file. Reenter correctly.

m TO n IS THE VALID RANGE FOR THIS PARAMETER.*

The number specified is not within valid range. Reenter correctly.

ITEM 4 ONLY DISPLAYED FOR MANAGER.

Item 4 in the Configuration file (host signon image) is displayed only for the manager for security reasons.

ITEM NUMBER REQUIRED.*

When ALTERing or DISPLAYing Configuration file, item number is required. Reenter correctly.

MRJE/3000 USER MESSAGES

JOB ALREADY CANCELED.

A CANCEL request has been entered for a job which has already been canceled. The Joblog entry is displayed.

JOB CAN'T BE CANCELED AT HOST FOR NON-INTERACTIVE USER.*

Job to be CANCELED has been transmitted to the host, but since the user/manager is not running MRJE/3000 interactively the host cancel command cannot be sent. However, the cancel flag in the joblog entry is set so that any output for the job will be discarded.

JOB NOT CANCELED.

When user/manager requests that a job be CANCELED, the Joblog entry is displayed. In an interactive session MRJE/3000 then asks for verification of the CANCEL. If the response is anything other than "YES", the job is not canceled.

n JOBS ARE IN THE JOBLOG. VERIFY PURGE WITH "YES"

When the manager enters the PURGE ALL command MRJE/3000 checks to see whether there are any jobs in the Joblog. (These may or may not have completed.) If there are remaining jobs and if the manager is running interactively he is asked to verify the PURGE request by typing YES.

JOB#n NO JOBLOG ENTRY.

No Joblog entry exists for the job# specified in a CANCEL or DISPLAY command. DISPLAY by jobname to determine the correct job#.

LOGICAL DEVICE NUMBER OR DEVICE CLASS REQUIRED.*

A logical device number or device class is the only valid output. Reenter correctly.

MANAGER CAPABILITY IN EFFECT

The person running MRJE/3000 has System Supervisor (OP) capability.

MANAGER CAPABILITY REQUIRED FOR THIS COMMAND.*

This command is not available to a user without System Supervisor (OP) capability.

MAXIMUM OF 5 INPUT FILES ALLOWED.*

SUBMIT will accept a maximum of five input files. Reenter the SUBMIT command correctly.

MISSING RIGHT PARENTHESIS.*

Closing right parenthesis has been omitted from the NOTTRANSLATE option. Reenter the SUBMIT command correctly.

MRJECON[x] FILE ALREADY EXISTS. REPLY "YES" TO RECREATE.

The host named in a NEW command already has a Configuration file set. In an interactive session the manager is asked to verify that the existing set be deleted and a new set created. Reply YES to delete the existing Configuration file set. Any other response retains the existing set.

MRJECON[x] NOT ALTERED

No change has been made to the named Configuration file because of an I/O error, invalid input, or no new value being entered when requested. If a change is required, reenter the ALTER command correctly.

MRJECON[x] SUCCESSFULLY ALTERED

The named Configuration file has been successfully ALTERed as requested.

MRJEJOB[x] COMPLETELY PURGED.

Named joblog has been completely purged as requested.

MRJEJOB[x] DIRECTORY FULL. NO FURTHER JOBS CAN BE SUBMITTED.*

Directory of the named Joblog indicates that the Joblog is full. PURGE the named Joblog.

MRJEJOB[x] DIRECTORY/JOBLOG UPDATE CAN'T BE COMPLETED. FATAL ERROR!*

Some or all entries have been deleted from the Joblog during PURGE, but the Joblog or Directory cannot be updated because of an I/O error. MRJE/3000 terminated. Rebuild the Configuration file set for this host using the NEW command.

MRJEJOB[x] END OF FILE

End-of-file has been reached in search of named Joblog.

MRJEJOB[x] n JOBLLOG ENTRIES CLEARED. m FREE ENTRIES NOW EXIST.

A PURGE command cleared n entries from the named Joblog file by:

- deleting canceled jobs
- deleting timed-out jobs
- clearing directory entries that were reserved for jobs that failed during SUBMIT.

MRJEJOB[x] JOBLLOG IS EMPTY.

Named Joblog is empty. This response may be given to a DISPLAY DIRECTORY, DISPLAY JOBLLOG, or PURGE command.

MRJEJOB[x] NOT PURGED.

The named Joblog has not been PURGED because the manager negated his request or an I/O error occurred. If PURGE is required, determine the reason for failure from the MPE file error number given in the I/O error message and reenter the PURGE command.

MRJEJOB[x] n OLD JOBS IN THIS FILE.

The named Joblog contains n OLDJOBS — those which have timed-out or been canceled and are therefore subject to purging.

MRJE/3000 USER MESSAGES

MRJEOB[x] n OLD JOBS PURGED THUS FAR.

An error has occurred during PURGE processing which makes Directory/Joblog update impossible. However, n OLDJOBS have already been deleted from the Joblog. Rebuild the Configuration file set for this host using the NEW command.

NO BLANKS ALLOWED IN FORMAL FILE DESIGNATOR.*

Embedded blanks are not permitted within a back reference file designator. Reenter correctly.

NO CLOSING QUOTE ON DEVICE CLASS NAME.*

Valid device class must be enclosed in quotes. Reenter correctly.

NO FILE DESIGNATOR ON ##FD CARD.*

A ##FD card with no file designator has been found in a SUBMIT input file. Correct the ##FD card and re-SUBMIT.

NO JOB CARD FOUND.*

MRJE/3000 has read and spooled or transmitted all SUBMIT input (infiles and FD files) without finding a host job card with the form:

//jobname JOB optional information

Add a valid host job card and re-SUBMIT.

NO NEW FILES CREATED.*

If an error occurs or the manager enters control-Y during NEW command processing, no new Configuration file set is created. If new files are required, determine the reason for failure from the MPE file error number given in the I/O error message and reenter the NEW command.

NO PARAMETERS ALLOWED.*

No parameters are allowed in this command. Reenter the command correctly.

jobname NOT FOUND.

The job named in a CANCEL or DISPLAY command is not in the Joblog. Ensure that jobname is correct and reenter the command. The manager may DISPLAY the entire Joblog to check jobnames.

{ JOB } NOT SUBMITTED. { jobname }

The named job (or "JOB" if MRJE/3000 did not find a host card) was not submitted to the host because of the error described in the preceding message. Correct the error and re-SUBMIT.

NOTTRANSLATE CAN'T BE SPECIFIED FOR \$STDIN/\$STDINX.*

Input from the standard input file is always translated from ASCII to EBCDIC or EBCDIK, depending on translation type. Reenter SUBMIT command, deleting the NOTTRANSLATE option from \$STDIN/\$STDINX.

"NOTTRANSLATE" REQUIRED.*

(NOTTRANSLATE) is the only parenthesized parameter allowed in the SUBMIT command. Reenter SUBMIT command correctly.

NUMERIC PARAMETER EXPECTED.*

Numeric input is expected after a comma. Reenter correctly.

ONLY 3 PARAMETERS ARE ALLOWED.*

Only three values (days, hours, minutes) can be given to specify maximum time a job remains in the Joblog after transmittal. Reenter correctly.

outfile : OUTPUT FILE DOES NOT EXIST.*

The named output file (PRINT, PUNCH, or FORMS file) has been given in a SUBMIT command, but has not yet been created. Build the named outfile and re-SUBMIT.

PARAMETERS REQUIRED.*

The given command requires parameters. Reenter the command correctly.

PRINT SPECIFIED TWICE.*

PRINT file specified twice in SUBMIT command. Reenter SUBMIT command correctly.

PUNCH SPECIFIED TWICE.*

PUNCH file specified twice in SUBMIT command. Reenter SUBMIT command correctly.

reader READER CANNOT BE CLOSED.*

The named host pseudo reader cannot be closed. Determine the reason for the failure from MPE file error number.

READER SPECIFIED TWICE.*

READER file specified twice in SUBMIT command. Reenter SUBMIT command correctly.

STANDARD INPUT FILE CAN'T BE OPENED. FATAL ERROR!*

\$STDINX cannot be opened. MRJE/3000 terminates. Determine the reason for the failure from MPE file error number.

STANDARD INPUT FILE CAN'T BE OPENED FOR NOWAIT I/O.*

\$STDINX must be opened for NOWAIT I/O in order to send host console commands. Determine the reason for the failure from MPE file error number.

\$STDIN, \$STDINX, \$OLDPASS ARE ONLY SYSTEM INPUT FILES ALLOWED.*

System files (those beginning with "\$") other than \$STDIN, \$STDINX, and \$OLDPASS cannot be named as input files (infile or FD files) in SUBMIT. Reenter SUBMIT with valid input files.

MRJE/3000 USER MESSAGES

THIS ITEM NOT DYNAMICALLY CONFIGURABLE.*

Certain items in the Configuration file cannot be ALTERed after the file has been created. In order to change these items, use the NEW command to reconstruct the Configuration file set.

USER CAPABILITY IN EFFECT

The person running MRJE/3000 does not have System Supervisor (OP) capability.

VALID RESPONSE MUST BE GIVEN.*

When creating a NEW Configuration file set, items that do not have default values must be initialized. MRJE continues to ask for a valid response until one is given or until the manager enters control-Y, in which case no new files are created.

VERIFY CANCEL WITH "YES".

When user/manager requests that a job be CANCELed, the Joblog entry is displayed. In an interactive session MRJE then asks for verification of the CANCEL. Reply YES to CANCEL the job.

WARNING: HOST COMMAND CARD FOUND IN INPUT – NOT TRANSMITTED.

A host command has the form:

/*command (for example, /*\$TI)

MRJE/3000 did not transmit the record to the host. SUBMIT processing continues.

WARNING: MRJEOD CARD FOUND IN INPUT – NOT TRANSMITTED.

An MRJEOD card is only required when an input file (infile or FD file) is \$STDIN or \$STDINX. If a MRJEOD card is found in any other input file it is not transmitted to the host. SUBMIT processing continues.

WARNING: SIGNOFF CARD FOUND IN INPUT – NOT TRANSMITTED.

A signoff card has the form:

/*SIGNOFF

MRJE/3000 did not transmit this record to the host. SUBMIT processing continues.

"YES" OR "NO" REQUIRED.*

YES or NO is the only valid response. Reenter correctly.

YOU MUST LOG ON MANAGER.SYS TO CREATE/PURGE CONFIG FILES.*

You must be running on the SYS account to create a Configuration file set (NEW command) or to PURGE ALL entries from the Joblog since the files are in PUB.SYS.

MRJE/3000 sends messages to the system console in the format:

$$\text{time/pin/} \left\{ \begin{array}{l} \text{MRJE} \\ \text{MRJE (hostid)} \\ \text{MRJE (ldn)} \end{array} \right\} \left\{ \begin{array}{l} \text{message} \\ \text{WARNING: message} \\ \text{ERROR: message} \end{array} \right\}$$

where "message" can be any of the following:

ACTIVATE FAILURE ON MRJEMON

Internal software error. Contact your HP representative.

CONFIGURED BUFFER SIZE INVALID

Buffer size in the MRJE/3000 Configuration file is invalid. The MRJE/3000 manager must ALTER the item in the Configuration file to agree with the host system's buffer size.

CONSMRJE, OPEN FAILURE (nn) ON SNULL

Internal software error. Contact your HP representative.

CONSMRJE, OPEN FAILURE (nn) ON MRJECON[x]

The specified MRJE/3000 Configuration file could not be opened. Determine the cause of the failure from the file system error number (nn) and take corrective action.

CONSMRJE, READ FAILURE (nn) ON MRJECON[x]

Internal software error. Contact your HP representative.

CONSMRJE, WRITE FAILURE (nn) ON MRJECON[x]

Internal software error. Contact your HP representative.

CREATE FAILURE ON MJOBLOGR

A joblogging process could not be created. Insure that MRJELOGR is present in PUB.SYS.

CREATE FAILURE ON MRJEMON

An MRJE/3000 monitor process could not be created. Insure that MRJEMON is present in PUB.SYS.

CREATE FAILURE ON MRJEOUT

An MRJE/3000 output process could not be created. Insure that MRJEOUT is present in PUB.SYS.

DATA RECEIVED FOR INVALID UNIT #nn

The host system has sent data to an unconfigured pseudo device.

1. Backspace the host unit (nn).
2. Drain host unit (nn),
3. As soon as convenient, reconfigure the MRJE/3000 pseudo I/O devices so that both the host and your system have the same configuration.

MRJE/3000 pseudo devices should be configured with the following units numbers:

- | | |
|------------|-------------------------------|
| 2 | Pseudo console |
| 3 thru 9 | Pseudo line printers 1 thru 7 |
| 10 thru 16 | Pseudo punches 1 thru 7 |

MRJE/3000 CONSOLE OPERATOR MESSAGES

DIAL REMOTE number

The communications link has been initially established. Dial the number shown in the message and complete the connection. This message is printed only if the SSLC is configured as a dial-up (not a leased) line.

HOST BLOCK SEQUENCE. (nn, nn)

A block sequence error occurred on the CS device. If the problem is severe, contact your HP representative.

HOST BUFFER SIZE (nnnn) EXCEEDS MAXIMUM

The value specified in the MRJE/3000 Configuration file for the host buffer size is greater than 2000. The MRJE manager should ALTER this item in the Configuration file.

HOST # NOT ENTERED FOR 3000 JOB =nnn

All output received for job nnn was sent to the unsolicited output device specified in MRJE/3000 Configuration file.

INVALID BUFFER RECEIVED FROM HOST

The last buffer of data received from the host had contradictory or invalid control information. Contact your HP representative.

INVALID DEVICE FOR MRJE0

The logical device number configured in the MRJE/3000 Configuration file for the Pseudo line is not the same number configured into MPE for IOMRJE0. Using the NEW command, the MRJE/3000 manager must build a new Configuration file and enter the correct logical device number for the Pseudo line as defined during MPE configuration.

KILL ALREADY REQUESTED

You issued an =MRJE KILL [,hostid] command but it was not successful. Subsequent KILL commands for the same hostid cause this message. To terminate the communication line, =SHUTDOWN the system. Contact your HP representative.

LOCKSEG FAILURE

LOCKSEG intrinsic failure. Internal software problem. Contact your HP representative.

MRJE BLOCK SEQUENCE (n, n)

While data was being transmitted to the host, a block sequence error occurred. If the problem is severe, contact your HP representative.

MRJELOGR, FINFO FAILURE (nn) ON MRJEDIR [x]

Internal software error. Contact your HP representative.

MRJELOGR, JOB TRANSMITTED TO WRONG HOST

In HP systems configured with two or more MRJE/3000 subsystems, jobs can be transmitted to the wrong host if the same pseudo card reader is configured in more than one MRJE/3000 Configuration file.

MRJELOGR, OPEN FAILURE (nn) ON \$NULL

Internal software error. Contact your HP representative.

MRJELOGR, OPEN FAILURE (nn) ON MRJECON[x]

Internal software error. Contact your HP representative.

MRJELOGR, OPEN FAILURE (nn) ON MRJEDIR[x]

Internal software error. Contact your HP representative.

MRJELOGR, OPEN FAILURE (nn) ON MRJEJOB[x]

Internal software error. Contact your HP representative.

MRJELOGR, READ FAILURE (nn) ON MRJECON[x]

Internal software error. Contact your HP representative.

MRJELOGR, READ FAILURE (nn) ON MRJEDIR[x]

Internal software error. Contact your HP representative.

MRJELOGR, READ FAILURE (nn) ON MRJEJOB[x]

Internal software error. Contact your HP representative.

MRJELOGR, WRITE FAILURE (nn) ON MRJEDIR[x]

Internal software error. Contact your HP representative.

MRJELOGR, WRITE FAILURE (nn) ON MRJEJOB[x]

Internal software error. Contact your HP representative.

MRJEMON, OPEN FAILURE (nn) ON CS DEVICE

The MRJE monitor could not open the line. The CS error number (nn) references the reason for the failure. CS error codes are listed in Section I.

MRJEMON, OPEN FAILURE (nn) ON \$NULL

Internal software error. Contact your HP representative.

MRJEMON, OPEN FAILURE (nn) ON MRJEO

The MRJE pseudo line monitor file could not be opened. (nn) specifies the MPE file system error number which references a reason for the failure.

MRJEMON, OPEN FAILURE (nn) ON MRJECON[x]

Internal software error. Contact your HP representative.

MRJEMON, READ FAILURE (nn) ON CS DEVICE

The communication link to the host failed. The CS error number (nn) references the reason for the failure. CS errors are listed in Section I. If the problem is severe, contact your HP representative.

MRJEMON, READ FAILURE (nn) ON MRJEO

Internal software error. Contact your HP representative.

MRJE/3000 CONSOLE OPERATOR MESSAGES

MRJEMON, READ FAILURE (nn) ON MRJECON[x]

Internal software error. Contact your HP representative.

MRJEMON, WRITE FAILURE (nn) ON CS DEVICE

If this message appears as a **WARNING**, a communication problem developed and MRJE sent a **SIGNOFF** command prior to the line disconnect. Probably the host system has accepted the command and is terminating the communication link.

If this message appears as an **ERROR**, the communication link failed unexpectedly. Irrecoverable communication error codes are listed in Section I. The CS error number references the reason for the failure. Contact your HP representative, if such errors persist.

MRJEMON, WRITE FAILURE (nn) ON MRJE0

Internal software error. Contact your HP representative.

MRJEMON, WRITE FAILURE (nn) ON MRJECON[x]

Internal software error. Contact your HP representative.

MRJEOUT, CLOSE FAILURE (nn) ON MRJECON[x]

Internal software error. Contact your HP representative.

MRJEOUT, FINFO FAILURE (nn) ON MRJE'PNLP

Internal software error. Contact your HP representative.

MRJEOUT, FINFO FAILURE (nn) ON MRJEOUT

Internal software error. Contact your HP representative.

MRJEOUT, OPEN FAILURE (nn) ON SNUL

Internal software error. Contact your HP representative.

MRJEOUT, OPEN FAILURE (nn) ON MRJE'PNLP

Internal software error. Contact your HP representative.

MRJEOUT, OPEN FAILURE (nn) ON MRJECON[x]

Internal software error. Contact your HP representative.

MRJEOUT, OPEN FAILURE (nn) ON MRJEDIR[x]

Internal software error. Contact your HP representative.

MRJEOUT, OPEN FAILURE (nn) ON MRJEJOB[x]

Internal software error. Contact your HP representative.

MRJEOUT, OPEN FAILURE (nn) ON MRJEOUT

MRJE/3000 couldn't open a user's output file. Output destined for the file is irrecoverable. Notify MRJE users that output was lost.

MRJEOUT, READ FAILURE (nn) ON MRJE'PNLP

Internal software error. Contact your HP representative.

MRJEOUT, READ FAILURE (nn) ON MRJECON[x]

Internal software error. Contact your HP representative.

MRJEOUT, READ FAILURE (nn) ON MRJEDIR[x]

Internal software error. Contact your HP representative.

MRJEOUT, READ FAILURE (nn) ON MRJEJOB[x]

Internal software error. Contact your HP representative.

MRJEOUT, WRITE FAILURE (nn) ON MRJE'PNLP

Internal software error. Contact your HP representative.

MRJEOUT, WRITE FAILURE (nn) ON MRJEOUT

MRJE/3000 couldn't write to a user's file. Output destined for the file is irrecoverable. Notify MRJE users that output was lost. Contact your HP representative.

NO 3000# FOR HOST JOB# nnn, jobname

Internal software problem. All output received for JOB# nnn was sent to the unsolicited output devices specified in the MRJE/3000 Configuration file. If the problem is severe, contact your HP representative.

NO SYSTEM BUFFER FOR SIGNOFF

A SIGNOFF command failed because no system buffers are available.

To print lost data:

1. =DOWN all MRJE pseudo card readers.
2. Drain all host printers and punches.
3. Enter the =MRJE KILL [,hostid] command.

PRINTER 0 TERMINATING

Internal software error. An output process terminated but MRJE/3000 cannot determine which one. Contact your HP representative.

PRINTER n TERMINATING

Internal software error. The MRJE/3000 output process corresponding to printer n terminated.

1. Backspace host printer n to the beginning of the data set.
2. Drain all host printers and punches.
3. Enter the =MRJE SIGNOFF [hostid] command.
4. Contact your HP representative.

PUNCH n TERMINATING

Internal software error. The MRJE/3000 output process corresponding to punch n terminated.

1. If no SIGNON COMPLETED message has been received, enter the =MRJE KILL [,hostid] command.
2. If a SIGNON COMPLETED message has been received, backspace host punch n to the beginning of the data set.
3. Drain all host printers and punches.
4. Enter the =MRJE SIGNOFF [,hostid] command.
5. In either case, contact your HP representative.

MRJE/3000 CONSOLE OPERATOR MESSAGES

SIGNOFF ALREADY REQUESTED

You have already entered a SIGNOFF command. (If the host is transmitting when you signoff, transmitting continues until the current data set has been transmitted and then the line is disconnected.)

SIGNON COMPLETED

Your SIGNON command successfully executed and the communication link is now established. If jobs have been submitted, MRJE automatically begins transmitting data and accepting output.

SYSTEM ALREADY ACTIVE

You entered an =MRJE START command for a host that is already connected.

SYSTEM NOT ACTIVE

You entered an =MRJE SIGNOFF (or KILL) command for a host that is not connected.

TERMINATING

The MRJE/3000 monitor process terminated. When printed alone (that is, without an accompanying ERROR or WARNING message), the termination was normal.

UNLOCKSEG FAILURE

The UNLOCKSEG intrinsic failed. Internal software error.

1. COOLSTART the system (to reclaim the line monitor's stack).
2. Contact your HP representative.

ZSIZE ERROR

The ZSIZE intrinsic failed. Internal software error. Contact your HP representative.

DS/3000

DISTRIBUTED SYSTEMS

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DS/3000 COMMANDS

OPENING A LINE FROM AN OPERATOR CONSOLE

=DSL	LINE	ldn,	$\left\{ \begin{array}{l} \left\{ \begin{array}{l} \text{OPEN} \\ \text{SHUT} \end{array} \right\} \left[\begin{array}{l} \left\{ \begin{array}{l} \text{MASTER} \\ \text{SLAVE} \end{array} \right\} \text{[,speed]} \end{array} \right] \\ \text{TRACE,} \left\{ \begin{array}{l} \text{ON} \text{[,ALL] [,mask] [,numentries] [,WRAP] [,filename] } \\ \text{OFF} \end{array} \right\} \\ \left[\begin{array}{l} \left\{ \begin{array}{l} \text{COMP} \\ \text{NOCOMP} \end{array} \right\} \end{array} \right] \end{array} \right\}$
------	------	------	--

ldn	Ldn of IODS0 device. (Required parameter.)
OPEN	Allows DS line to OPEN corresponding CS line. (Required parameter.)
SHUT	Allows DS line to CLOSE corresponding CS line. (Required parameter.)
MASTER	Allows local HP 3000 to process only local master requests.
SLAVE	Allows local HP 3000 to process only remote slave requests.
	If neither MASTER or SLAVE is specified, default is both MASTER and SLAVE processing allowed.
speed	Transmission speed (char/sec). Parameter is effective if sys gen selected SPEED changeable. Effective only for the HSI.
TRACE	Allows CS TRACE to be activated or deactivated. (Required parameter.)
ON	Allows TRACE to be activated. (Required parameter.)
OFF	Allows TRACE to be deactivated. (Required parameter.)
ALL	Generates trace records for line activity. If ALL not specified, the trace record is written only when a transmission error occurs.
mask	Octal integer preceded by percent sign (%nn). Default: %37
numentries	Decimal integer for maximum number of trace entries in a trace record (not greater than 255). Default: 25
WRAP	Causes trace entries that overflow the trace area (greater than numentries) to overlay the prior trace entries. Default: no wrap
filename	Trace filename (default file CSTRACE in PUB. SYS).
COMP	Allows data compression facility to be activated.
NOCOMP	Allows data compression facility to be deactivated.

OPENING A LINE FROM A USER TERMINAL/JOB

```

:DSLLINE dsdevice
    [;LINEBUF = buffer size]
    [;LOCID = local-id-sequence]
    [;REMID = remote-id-sequence1 [,remote-id-sequence2] ... ]
    [;PHNUM = telephone-number]
    [;EXCLUSIVE]
    [;COMP]
    [;NOCOMP]
    [;QUIET]

```

dsdevice	Device class name or ldn assigned to DS/3000 communications driver IODS0 during system configuration. Parameter specifies the device (line) opened. (Required parameter.)
buffer-size	Decimal integer (size in words) of the DS/3000 line buffer. Default is the CS buffer size specified during system configuration.
local-id-sequence	ASCII character string within quotation marks or octal numbers separated by commas and contained within parentheses.
remote-id-sequence	Same format as local-id-sequence.
telephone-number	Telephone number consisting of digits and dashes. Maximum length permitted (including both digits and dashes) is 20 characters.
COMP	Overrides the current system default and activates data compression. Sets mode of operation for subsequent DS/3000 activity. (Optional parameter.)
NOCOMP	Overrides system default and deactivates data compression. (Optional parameter.)
QUIET	This parameter causes the message that identifies the DS line number to be suppressed. Messages associated with subsequent REMOTE HELLO and REMOTE BYE commands will also be suppressed. (Optional parameter.)

LOCID, REMID, and PHNUM defaults are the values specified during HP 3000 I/O System configuration — if any values were specified.

DS/3000 COMMANDS

CLOSING A LINE FROM A USER TERMINAL

=DSL	LINE	<table border="1"><tr><td>dsdevice</td></tr><tr><td>@</td></tr></table>	dsdevice	@	;CLOSE
dsdevice					
@					

dsdevice Device class name or ldn specified in the DSLINE command that opened the particular HSI or SSLC line.

@ Specifies that all lines currently open should be closed.

;CLOSE Closes the specified line(s). (Required parameter.)

If no line identifier (dsdevice, or @) is specified, DS/3000 closes the line most recently opened.

FILE COMMANDS FOR REMOTE FILES

Issue a file command on the local system (in the illustration, System 1) for a file resident on the first remote system (System 2).

```
:FILE name;DEV=classname#DISC
```

Example

```
:FILE B;DEV=HDS1#DISC
```

Issue a file command on the local system for a file resident on the second remote system (in the illustration, System 3).

```
:FILE name;DEV=classname#classname#DISC
```

Example

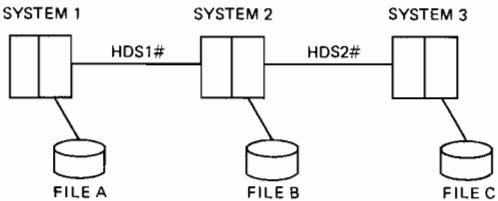
```
:FILE C;DEV=HDS1#HDS2# (Note that DISC is the default.)
```

With a remote session established, issue a file command on remote system (System 2) to indicate file is resident on the original system (System 1).

```
:REMOTE FILE name;DEV=#
```

Example

```
:REMOTE FILE A;DEV=#
```



DS/3000 SPL PTOP INTRINSICS

COMMON PARAMETERS

bufsize	integer by value (optional). Size in words of the communications buffer that is to be established by the remote DS/3000 software. Parameter defines the maximum number of words of data that can be transmitted by a PWRITE or PREAD intrinsic call. Default: Same size as the line buffer defined by the DSLINE command (LINEBUF=) for the first DSLINE issued to the dsdevice. Will never be smaller than 304 words. If no LINEBUF= is specified then the default configuration length is used.
dsdevice	byte array (required). Contains an ASCII character string terminated by a space. String must be the device class name or ldn used in the DSLINE or REMOTE HELLO command that opened the communications line you will be using.
dsnum	integer by value (required). The link identifier returned by the particular POPEN intrinsic call which initiated communication with the remote slave program.
entryname	byte array (optional). Contains an ASCII character string terminated by a space. String is the name of the entry point (label) at which execution of the remote slave program is to begin. Default: Primary entry point.
flags	logical by value (optional). NOTE: The following bits (0:4) are used only when the bit pair (5:2) is 01. Otherwise, these bits are ignored. Bit (0:1) Not used. Bit (1:1) Q:63 to S-bit. If on, the portion of the stack from Q:63 to S is dumped. Bit (2:1) Q1 to S bit. If on, the portion of the stack from Q1 to S is dumped. Bit (3:1) DL to Q1 bit. If on, the portion of the stack from DL to Q1 is dumped. Bit (4:1) Should be set to zero. Bit (5:2) STACKDUMP bits. 00 — Enables only if enabled at father level. 01 — Enables unconditionally. 10 — Same as 00. 11 — Disables unconditionally for new process. Bit (7:2) Should be set to zero. Bit (9:1) NOCB bit. Bit (10:2) LIBSEARCH bits. 00 — System Library 01 — Account Public, System Library Bit (13:1) DEBUG bit. Bit (14:1) LOADMAP bit. Bit (15:1) (Always set on.)

icode	integer (optional). PCHECK returned code that specifies the completion status of the most recently executed DS/3000 intrinsic.
il	integer (optional). A word that has meaning only when a PREAD or PWRITE request is received from the remote master program. For a PREAD request, il contains an integer specifying the number of words requested by the remote master program. For a PWRITE request, il contains an integer specifying the number of words transmitted from the remote master program to the DS/3000 buffer.
ionumber	integer (optional). A word that has meaning only when the condition code CCG and an ifun of 5 are returned. In that case, ionumber contains the MPE-II File System file number associated with the completed I/O without wait request.
itag	integer array (optional). A twenty-word array used for transmitting and receiving tag fields. Format of the tag field is defined as part of the user's application. Default: A tag field of all zeros is sent; the returned tag field (if any) is not available to the master program.
param	integer by value (optional). A word used to transfer control information to the new process. Any instruction in the outer block of code in the new process can access this information in location Q-4.
programe	byte array (required). Contains an ASCII character string terminated by a space. String is the name (with optional group and account names) of an MPE program file (residing on a disc connected to the remote HP 3000) containing the remote slave program.
stacksize	integer by value (optional). An integer (Z - Q) denoting the number of words assigned to the local stack area bounded by the initial Q and Z registers. An integer (DB - DL) denoting the number of words in the user-managed stack area bounded by the DL and DB registers. Default: The same as that specified in the program file. maxdata integer by value (optional). The maximum size allowed for the process' stack (Z - DL) area in words. When specified, this value overrides the one established at program-preparation time. Default: If not specified and not specified in program file either, MPE assumes the stack will remain the same size.
target	integer array (required). The array into which data received/transmitted to/ from the remote slave program will be deposited.
tcount	integer by value (required). The requested number of words (if positive) or bytes (if negative) of data.

DS/3000 SPL PTOP INTRINSICS

CONDITION CODES

CCE	Request accepted (by slave program) or completed successfully.
CCG	Request rejected (POPEN) by slave or request denied. Not returned (PCLOSE, ACCEPT, REJECT, PCHECK).
CCL	Request denied; an error occurred. Issue a PCHECK to determine error. PCHECK request denied because DSNUM was invalid.

POPEN

```
I          BA    BA    IA    BA    IV
dsnum:=POPEN(dsdevice,progrname,itag,entryname,param,
              L    IV    IV    IV    IV
              flags,stacksize,dsize,maxdata,bufsize);
```

PREAD

```
I          IV    IA    IV    IA
lgth:=PREAD(dsnum,target,tcount,itag);
```

PWRITE

```
IV    IA    IV    IA
PWRITE(dsnum,target,tcount,itag);
```

PCONTROL

```
IV    IA
PCONTROL(dsnum,itag);
```

PCLOSE

```
IV
PCLOSE(dsnum);
```

GET

```

      I      IA I      I
ifun:=GET(itag,il,ionumber);

```

The GET intrinsic receives the next request from the remote master program and accepts an optional tag field (available in itag).

When the GET intrinsic executes, it returns to the slave program a number (ifun) specifying what type of request was received from the remote master program, as follows:

- 0 An error occurred. This value is returned only when the condition code CCL is also returned. Issue a PCHECK intrinsic call (with a dsnum parameter of zero) to determine what happened.
- 1 POPEN request received.
- 2 PREAD request received.
- 3 PWRITE request received.
- 4 PCONTROL request received.
- 5 This value is returned only when the condition code CCG is also returned. It indicates that a pending MPE File System I/O without wait request was completed (instead of a DS/3000 remote I/O request). ionumber contains the file number associated with the completed I/O request.

ACCEPT

```

      IA  IA  IV
ACCEPT(itag,target,tcount);

```

REJECT

```

      IA
REJECT(itag);

```

DS/3000 SPL PTOP INTRINSICS

PCHECK

I	IV
icode:=PCHECK(dsnum);	

Note that dsnum is 0 if issued from a slave program.

INTERFACE CONVENTIONS

Parameters in COBOL calling sequences can be:

Integer	Picture 9 through 9(4) or Picture S9(3) computational
Character string	Picture X(n) or Picture A(n)

In the following calls, the parameters not specifically defined as character strings are assumed to be integers.

COMMON PARAMETERS

Parameters whose use is the same for all procedures are:

CCODE	The condition code returned by the PTOP intrinsic: - 1 CCL 0 CCE 1 CCG
DSNUM	The DS communication line number returned by CPOPEN.
ITAG	A 40-byte character field sent and received from the remote program.
TARGET	The character field used for reading or writing data.
TCOUNT	The number of words or bytes to be read or written: A positive integer for words. A negative integer for bytes.

CPOPEN

The COBOL callable interface to POPEN.

CALL "CPOPEN" USING CCODE, DSNUM, DSDEVICE, PROGRAMNAME,
ITAG, ENTRYNAME, PARAM, FLAGS,
STACKSIZE, DLSIZE, MAXDATA,
BUFFSIZE

DSDEVICE	A character field containing the device class or logical device number of the desired DS line.
PROGRAMNAME	A character field containing the name (terminated by a space) of the remote slave program.
ENTRYNAME	The character field specifying the secondary entry point (or spaces) where the remote program will begin execution. ENTRYNAME is ignored if the slave system is an RTE system.

DS/3000 COBOL PTOP CALLS

PARAM An integer value to be placed in Q-4 of the slave program. It is ignored if the slave system is an RTE system.

FLAGS
STACKSIZE These are all MPE parameters used to specify program loading. They are ignored if the slave system is an RTE system.
DLSIZE
MAXDATA

BUFFSIZE An integer specifying the maximum number of words which will be transferred by the PTOP intrinsic.

CPREAD

The COBOL callable interface to PREAD.

CALL "CPREAD" USING CCODE, DSNUM, LENGTH, TARGET,
TCOUNT, ITAG

LENGTH The actual number of words or bytes (depending on the value of TCOUNT) read into TARGET.

CPWRITE

The COBOL callable interface to PWRITE.

CALL "CPWRITE" USING CCODE, DSNUM, TARGET, TCOUNT, ITAG

CPCONTROL

The COBOL callable interface to PCONTROL.

CALL "CPCONTROL" USING CCODE, DSNUM, ITAG

CPCLOSE

The COBOL callable interface to PCLOSE.

CALL "CPCLOSE" USING CCODE, DSNUM

CGET

The COBOL callable interface to GET.

CALL "CGET" USING CCODE, IFUN, ITAG, IL, IONUMBER

IFUN The function number of the current pending PTOP operation.

IL The number of words sent by a PWRITE or the number of words requested by a PREAD.

IONUMBER The file number of a non-DS file which completed an I/O without wait.

CACCEPT

The COBOL callable interface to ACCEPT.

CALL "CACCEPT" USING CCODE, ITAG, TARGET, TCOUNT

CREJECT

The COBOL callable interface to REJECT.

CALL "CREJECT" USING CCODE, ITAG

CPCHECK

The COBOL callable interface to PCHECK.

CALL "CPCHECK" USING CCODE, DSNUM, ICODE

ICODE An integer identifying the last error encountered.

DS/3000 BASIC PTOP CALLS

INTERFACE CONVENTIONS

For each BASIC CALL statement, a parameter table contains the following:

1. The number of parameters.
2. A code word for each parameter, specifying data type and dimensioning.
3. A reference pointer to each parameter.

A BASIC/3000 slave program must be compiled and PREP'ed. A master program can be compiled or it can run on the HP 3000 Interpreter.

COMMON PARAMETERS

Parameters whose use is the same for all procedures are:

CCODE integer (required). The condition code returned by the PTOP intrinsic:

- 3 Not enough user stack for data transfer
- 2 Illegal calling parameter
- 1 CCL
- 0 CCE
- 1 CCG

DSNUM integer (required). The DS/3000 communication line number. Analogous to the FOPEN file number.

ITAG integer (optional). A 20-word array.

param list (optional). A parameter list can consist of one parameter or multiple parameters separated by commas. A parameter can be any BASIC-supported data type. The same number of parameters must be specified on the master and slave and the data types must correspond.

BPOPEN

The BASIC callable interface to POPEN.

```
CALL BPOPEN(CCODE,DSNUM,DSDEVICE,PROGNAME
[ {,ITAG} [ {,ENTRYNAME}
[ {,0} ] [ {,0} ]
[ {,PARAM} [ {,FLAGS} [ {,STACKSIZE} [ {,DLSIZE}
[ {,0} ] [ {,0} ] [ {,-1} ] [ {,-1} ]
[ {,MAXDATA} [ {,BUFSIZE} ] ] ] ] ] ] )
```

DSDEVICE string (required). The DS line class name or logical device number. The string must be terminated with a blank.

PROGNAME string (required). The name of a remote slave program, terminated with a blank.

ENTRYNAME	string (optional). A secondary entry point into the slave program, terminated with a blank.
PARAM	integer (optional). The value placed in Q-4 of the slave program stack.
FLAGS	These are all MPE parameters used to control program loading.
STACKSIZE	
DLSIZE	
MAXDATA	
BUFSIZE	integer (optional). The maximum number of words per PTOP transfer.

BPREAD

The BASIC callable interface to PREAD.

```
CALL BPREAD(CCODE,DSNUM,LGTH
  [ { ,ITAG } [ ,param list ] ] )
```

LGTH integer (required). The number of words received in the transfer.

BPWRITE

The BASIC callable interface to BPWRITE.

```
CALL BPWRITE(CCODE,DSNUM, [ { ,ITAG } [ ,param list ] ] )
```

BPCONTROL

The BASIC callable interface to PCONTROL.

```
CALL BPCONTROL(CCODE,DSNUM[,ITAG])
```

BPCLOSE

The BASIC callable interface to PCLOSE.

```
CALL BPCLOSE(CCODE,DSNUM)
```

DS/3000 BASIC PTOP CALLS

BGET

The BASIC callable interface to GET.

CALL BGET(CCODE,IFUN [{ ,ITAG } [{ ,IL } [,IONUMBER]]])

- IFUN** integer (required). The function code from the request issued by the remote master program.
- IL** integer (required). The number of words sent by a BPWRITE or the number requested by a BPREAD.
- IONUMBER** integer (required). Valid if both CCODE=1 and IFUN=5. The file number of an I/O completed without wait.

BACCEPT

The BASIC callable interface to ACCEPT.

CALL BACCEPT(CCODE,IFUN [{ ,ITAG } [,param list]])

BREJECT

The BASIC callable interface to REJECT.

CALL BREJECT(CCODE[,ITAG])

BPCHECK

The BASIC callable interface to PCHECK.

CALL BPCHECK(CCODE,DSNUM,ICODE)

DS/3000 SUBSYSTEM ERROR MESSAGES

ERROR NUMBER	MESSAGE
201	REMOTE DID NOT RESPOND WITH THE CORRECT REMOTE ID. (DSERR 201)
202	SPECIFIED PHONE NUMBER IS INVALID. (DSERR 202)
203	REMOTE ABORT/RESUME NOT VALID WHEN DOING PROGRAM-TO-PROGRAM COMMUNICATION. USE LOCAL ABORT/RESUME. (DSWARN 203)
204	UNABLE TO ALLOCATE AN EXTRA DATA SEGMENT FOR DS/3000. (DSERR 204)
205	UNABLE TO EXPAND THE DS/3000 EXTRA DATA SEGMENT. (DSERR 205)
206	SLAVE PTOP FUNCTION ISSUED FROM A MASTER PROGRAM. (DSERR 206)
207	SLAVE PTOP FUNCTION OUT OF SEQUENCE. (DSERR 207)
208	MASTER PTOP FUNCTION ISSUED BY A SLAVE PROGRAM. (DSERR 208)
209	SLAVE PROGRAM DOES NOT EXIST OR IS NOT A PROGRAM FILE. (DSERR 209)
210	WARNING. .INVALID MAXDATA OR DLSIZE FOR A SLAVE PROGRAM. SYSTEM DEFAULTS USED. (DSWARN 210)
211	SLAVE ISSUED A REJECT TO A MASTER PTOP OPERATION. (DSWARN 211)
212	FILE NUMBER RETURNED FROM IOWAIT IS NOT A DS LINE NUMBER. (DSWARN 212)
213	EXCLUSIVE USE OF A DS LINE REQUIRES BOTH ND AND CS CAPABILITY. (DSERR 213)
214	THE REQUESTED DS LINE HAS NOT BEEN OPENED WITH A USER :DSLNE COMMAND OR A REQUIRED :REMOTE HELLO HAS NOT BEEN DONE. (DSERR 214)
215	THE DSLNE CANNOT BE ISSUED BACK TO THE MASTER COMPUTER. (DSERR 215)
216	MESSAGE REJECTED BY THE REMOTE COMPUTER. (DSERR 216)
217	INSUFFICIENT AMOUNT OF USER STACK AVAILABLE. (DSERR 217)
218	INVALID PTOP FUNCTION REQUESTED. (DSERR 218)
219	MULTIPLE POPEN. ONLY ONE MASTER PTOP OPERATION CAN BE ACTIVE ON A DS LINE. (DSERR 219)
221	INVALID DS MESSAGE FORMAT. (INTERNAL DS ERROR) (DSERR 221)
222	MASTER PTOP FUNCTION ISSUED PRIOR TO A POPEN. (DSERR 222)
223	REQUEST TO TRANSFER MORE DATA THAN SPECIFIED IN THE POPEN. (DSERR 223)
240	THE LOCAL COMMUNICATIONS LINE HAS NOT BEEN OPENED BY THE OPERATOR. (DSERR 240)
241	THE DS LINE IS IN USE EXCLUSIVELY OR BY ANOTHER SUBSYSTEM. (DSERR 241)
242	INTERNAL DS SOFTWARE MALFUNCTION. (DSERR 242)
243	THE REMOTE COMPUTER IS NOT RESPONDING. (DSERR 243)
244	COMMUNICATIONS INTERFACE ERROR. THE REMOTE COMPUTER RESET THE LINE. (DSERR 244)

DS/3000 SUBSYSTEM ERROR MESSAGES

ERROR NUMBER	MESSAGE
245	COMMUNICATIONS INTERFACE ERROR. RECEIVE TIMEOUT. (DSERR 245)
246	COMMUNICATIONS INTERFACE ERROR. REMOTE HAS DISCONNECTED. (DSERR 246)
247	COMMUNICATIONS INTERFACE ERROR. LOCAL TIME OUT. (DSERR 247)
248	COMMUNICATIONS INTERFACE ERROR. CONNECT TIME OUT. (DSERR 248)
249	COMMUNICATIONS INTERFACE ERROR. REMOTE REJECTED CONNECTION. (DSERR 249)
250	COMMUNICATIONS INTERFACE ERROR. CARRIER LOST. (DSERR 250)
251	COMMUNICATIONS INTERFACE ERROR. THE LOCAL DATA SET FOR THE DS LINE WENT NOT READY. (DSERR 251)
252	COMMUNICATIONS INTERFACE ERROR. HARDWARE FAILURE. (DSERR 252)
253	COMMUNICATIONS INTERFACE ERROR. NEGATIVE RESPONSE TO THE DIAL REQUEST BY THE OPERATOR. (DSERR 253)
254	COMMUNICATIONS INTERFACE ERROR. INVALID IO CONFIGURATION. (DSERR 254)
255	COMMUNICATIONS INTERFACE ERROR. ANTICIPATED ERROR CONDITION. (DSERR 255)

DS/3000 SYNTAX ERROR MESSAGES

ERROR NUMBER	MESSAGE
1300	REMOTE JOBS ARE NOT ALLOWED !. (CIERR 1300)
1301	DSLINE CANNOT CONTAIN BOTH OPEN AND CLOSE. (CIERR 1301)
1302	DSLINE REQUIRES AT LEAST ONE PARAMETER. (CIERR 1302)
1303	DSNUMBER SPECIFICATION MUST BE A NUMBER FROM 1 THRU 255. (CIERR 1303)
1304	DSLINE #L ! DOES NOT IDENTIFY AN OPEN DS LINE. (CIERR 1304)
1305	EXPECTED LINEBUF, PHNUM, LOCID, REMID, OPEN, CLOSE, QUIET, COMP, NOCOMP OR EXCLUSIVE. (CIERR 1305)
1306	MULTIPLE USE OF ! IS NOT ALLOWED. (CIERR 1306)
1307	THE SYNTAX FOR ! REQUIRES AN = SIGN FOLLOWED BY DATA. (CIERR 1307)
1308	PHNUM IS 1 TO 20 DIGITS AND DASHES. (CIERR 1308)
1309	! LIST CAN CONTAIN ONLY ONE ELEMENT. (CIERR 1309)
1310	THE SPECIFIED LOGICAL DEVICE IS NOT OPEN. (CIERR 1310)
1311	THE FIRST CHARACTER OF AN ID SEQUENCE MUST BE A " OR A (. (CIERR 1311)
1312	THE ID SEQUENCE MUST TERMINATE WITH A). (CIERR 1312)
1313	THE ID SEQUENCE MUST TERMINATE WITH A ". (CIERR 1313)
1314	A NUMERIC ID SEQUENCE ELEMENT MUST BE 1 THRU 255 (OR %377). (CIERR 1314)
1315	LINEBUF MUST BE A NUMERIC VALUE FROM 304 THRU 4096. (CIERR 1315)
1316	UNABLE TO COMPLETE THE REMOTE COMMAND. (CIERR 1316)
1317	NOT A CURRENTLY AVAILABLE DSLINE. (CIERR 1317)
1318	USE OF EXCLUSIVE REQUIRES BOTH ND AND CS CAPABILITY. (CIERR 1318)
1319	THE DS LINE #L! IS IN USE BY A PROGRAM OR SUB- SYSTEM AND CANNOT BE CLOSED. (CIERR 1319)
1320	EXPECTED RESPONSE OF YES, Y, NO OR N. (CIERR 1320)
1321	UNABLE TO OPEN THE DSLINE ON DEVICE !. (CIERR 1321)
1322	@ IS INVALID IN THIS CONTEXT. (CIERR 1322)
1323	A DSLINE OPEN REQUIRES A VALID DS DEVICE NAME AS THE FIRST PARAMETER. (CIERR 1323)
1393	COMPRESSION REQUEST NOT HONORED. REMOTE DOES NOT SUPPORT THIS FEATURE. (CIERR 1393)
1394	COMPRESSION PARAMETER RESPECIFIES AND OVER- RIDES PREVIOUS OPEN PARAMETER. (CIERR 1394)
1395	OPEN PARAMETERS ENTERED ON A CLOSE REQUEST ARE IGNORED. (CIERR 1395)
1396	AN ID LIST MUST CONTAIN 255 OR LESS ELEMENTS. (CIWARN 1396)
1397	AN UNNECESSARY DELIMITER IS IGNORED. (CIWARN 1397)
1398	THERE ARE NO DS LINES OPEN. (CIWARN 1398)
1399	MULTIPLE USE OF ! IS REDUNDANT AND IGNORED. (CIWARN 1399)





DS/3000 TO DS/1000 DISTRIBUTED SYSTEMS

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SYSTEM LIMITS

DS/3000 TO DS/1000 DISTRIBUTED SYSTEMS

HSI link up to 2000 feet.

Supports: Remote Commands
RFA
DEXEC
Program-to-Program Communication

Reference Material

DS/3000 Reference Manual (32190-90001)
DS/3000 to DS/1000 Reference Manual for HP 3000 Users (32190-90005)
Software Pocket Guide (30000-90049)
MPE Intrinsic Reference Manual (30000-90010)
DS/1000 Guide for New Users (91740-90015)
DS/1000 Programmer's Reference Manual (91740-90002)
DS/1000 Network Manager's Manual (91740-90003)
RTE and Batch Spool Monitor Pocket Guide (92060-90010)

Buffer Sizes

PTOP	3000 Master/1000 Slave	512 words
PTOP	1000 Master/3000 Slave	4096 words
RFA	DWRIT, DREAD, FWRIT, and FREAD	512 words

Number of Files (LSTEN Parameter)

The number of open files (RFA 3000 to 1000) plus the number of 1000 slave programs (depends on memory size and SAM).

Virtual Sessions

The number of virtual sessions (1000 to 3000) depends on the number of virtual terminals configured on the 3000 and the number of Transaction Control Blocks (TCB) on the 1000.

TCBs are used for:

- Remote session on the 3000 from HELLO to BYE.
- Each outstanding master request and command.
- Each uncompleted slave request.

The number of TCBs is specified when running LSTEN.

Software Requirements

DS/3000 HP32190A Standard DS/3000 includes link to System 1000.

DS/1000 HP91740A includes 1000 network.

91741A adds software for 3000 link.

HP 3000 END OF THE COMMUNICATIONS LINK

30360A HSI

HSI 30360-60001

Manual 30360-90001

Cable Assembly (Board Hood and Connector Assy) 30360-60003

Board Settings: Group Interrupt Mask (W1) = ENABLE
 Service Request Priority (W2)
 Device Number DRT (W3B - W3H)
 Missing Jumper = Logic level 1
 (DRT parity jumper = odd parity)

Configure speed to 250,000 or 125,000 characters per second.

HP 1000 END OF THE COMMUNICATIONS LINK

12889A HSI

HSI 12889-60001

Manual 12889-90001

Crystal (15 Mhz) 1813-0046

250,000 char per sec up to 1000 feet

Crystal (7.5 Mhz) 1813-0052

125,000 char per sec 1000 to 2000 feet

Cable 12889-60004

Interfacing Coaxial Cables

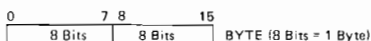
30220A	Cable Kit	25 feet
	Option 001	100 feet
	Option 002	250 feet
	Option 003	500 feet
	Option 004	1000 feet
	Option 005	2000 feet

8120-2404 COAX (Beldon 9259) UL 1354

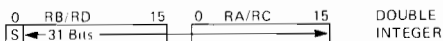
75 ohm, 17.3 pf/ft, 0.24 in. OD, stranded center, solid copper strands,
22 AWG (6 x 30) (1 x 29).

The cables are fabricated on site. Refer to the HP 30360A Hardwired Serial Interface Installation and Service Manual (30360-90001) for fabrication instructions.

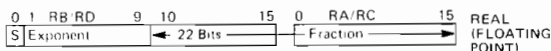
HP 3000 DATA TYPES



$$-32768 \leq X \leq 32767$$



$$2,147,483,648 \leq X \leq 2,147,483,647$$



Exp. Excess 256 (Range 0 to 511)

Normalized Form Implied 1 in Bit 9 preceding fraction, making 23 bits total.

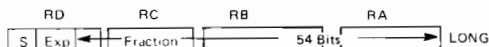
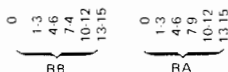
Mantissa Range 1.000000 to 1.99999976

$$\text{Range } \pm 8.63616 \times 10^{-78} \leq X \leq 1.1579208 \times 10^{77}$$

Accuracy 6-7 Digits

FLOATING POINT EXAMPLES

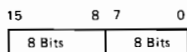
Exp-256	exponent		
2 ⁻²⁵⁶	S 0 0 0 0 0	0 0 0 0 0 0	= Zero (by definition)
2 ⁻²⁵⁶	S 0 0 0 0 0	0 0 0 0 0 1	= 8.63616 * 10 ⁻⁷⁸
2 ⁻²²⁴	S 0 4 0 0 0	0 0 0 0 0 0	= 3.70921 * 10 ⁻⁶⁸
2 ⁻¹⁹²	S 1 0 0 0 0	0 0 0 0 0 0	= 1.59312 * 10 ⁻⁵⁸
2 ⁻¹⁶⁰	S 1 4 0 0 0	0 0 0 0 0 0	= 6.84228 * 10 ⁻⁴⁹
2 ⁻¹²⁸	S 2 0 0 0 0	0 0 0 0 0 0	= 2.93823 * 10 ⁻³⁹
2 ⁻⁹⁶	S 2 4 0 0 0	0 0 0 0 0 0	= 1.26218 * 10 ⁻²⁹
2 ⁻⁶⁴	S 3 0 0 0 0	0 0 0 0 0 0	= 5.42101 * 10 ⁻²⁰
2 ⁻³²	S 3 4 0 0 0	0 0 0 0 0 0	= 2.32831 * 10 ⁻¹⁰
2 ⁰	S 4 0 0 0 0	0 0 0 0 0 0	= 1.00000
2 ³²	S 4 4 0 0 0	0 0 0 0 0 0	= 4.29497 * 10 ⁹
2 ⁶⁴	S 5 0 0 0 0	0 0 0 0 0 0	= 1.84467 * 10 ¹⁹
2 ⁹⁶	S 5 4 0 0 0	0 0 0 0 0 0	= 7.92282 * 10 ²⁸
2 ¹²⁸	S 6 0 0 0 0	0 0 0 0 0 0	= 3.40282 * 10 ³⁸
2 ¹⁶⁰	S 6 4 0 0 0	0 0 0 0 0 0	= 1.46150 * 10 ⁴⁸
2 ¹⁹²	S 7 0 0 0 0	0 0 0 0 0 0	= 6.27710 * 10 ⁵⁷
2 ²²⁴	S 7 4 0 0 0	0 0 0 0 0 0	= 2.69600 * 10 ⁶⁷
2 ²⁵⁶	S 7 7 7 7 7	1 7 7 7 7 7	= 1.15792 * 10 ⁷⁷



LONG FLOATING POINT

$$\text{Range } 8.636168555114 \times 10^{-78} \leq X \leq 1.157920892372 \times 10^{77}$$

Accuracy 16-17 Digits



BYTE (8 Bits = 1 Byte)

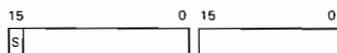


LOGICAL



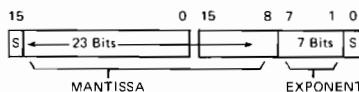
INTEGER

$$-32,768 \leq X \leq 32,767$$



DOUBLE INTEGER

$$-2,147,483,648 \leq X \leq 2,147,483,647$$



REAL
(FLOATING POINT)

Mantissa (±23 bit fraction)

Exponent (±7 bit integer 2^x power)

Range $\pm 1.701411 \cdot 10^{-38} \leq X \leq \pm 1.701411 \cdot 10^{38}$

Accuracy 6 - 7 Digits

EXAMPLES

Mantissa	Exponent	Value (±)
.77777 776	0	.99999 988
.5	-32	1.16415 *10 ⁻¹⁰
.5	-16	7.62939 *10 ⁻⁶
.5	- 8	1.95312 *10 ⁻³
.5	- 2	1.25 *10 ⁻¹
.5	0	.5
.5	2	2.0
.5	8	1.28 *10 ²
.5	16	3.2768 *10 ⁴
.5	32	2.1475 *10 ⁹
+0	+0	ZERO

ROUND OFF ERROR

Number	Exponent	Maximum Error
8,388,607.0	23	1.0
1,048,474.87	20	.125
32,767.996	15	.0039
1,023.99988	10	.00012 2
31.99999 52	5	.00000 38
.99999 9881	0	.00000 012

PTOP CALLS – 3000 MASTER

PTOP COMMUNICATIONS

For DS/3000 to DS/1000 Program-to-Program communication:

- Programs residing on the 3000 must be written in SPL, FORTRAN, COBOL, or BASIC.
- Programs residing on the 1000 must be written in FORTRAN or Assembly language.

Calls in this section are shown in FORTRAN.

COMMON PARAMETERS – 3000 PTOP CALLS

DSNUM	Master link identifier returned by POPEN. Required by all PTOP intrinsics.
ITAG	A 20-word tag array.
TARGET	Integer array from which data is read, or into which data is returned.

PCHECK

Returns completion code of most recently completed DS/3000 intrinsic.

I	IV
ICODE = PCHECK (DSNUM)	

ICODE	Completion Code:
206	Specified slave function from a master program.
207	Slave function out of order (GET followed by ACCEPT or REJECT).
208	Specified master function.
209	Slave program does not exist (POPEN).
211	Slave rejected request.
212	Wrong ID number (slave did no-wait IO).
213	Error on first GET issued by slave.
219	Too many POPENs (refer to LSTEN parameter).
222	Must do POPEN first.
223	Invalid PTOP buffer size (larger than specified in POPEN).

Condition Codes:	CCL Denied. Invalid DSNUM.
	CCE Accepted by slave.
	CCG Not returned.

PCLOSE

Forces termination of the slave program when it does next GET.

IV
CALL PCLOSE (DSNUM)

Condition Codes: CCL Denied. Issue PCHECK for information.
 CCE Accepted by slave.
 CCG Not returned.

PCONTROL

Exchanges tag fields.

IV IA
CALL PCONTROL (DSNUM, ITAG)

Condition Codes: CCL Error. Issue PCHECK for information.
 CCE Accepted by slave.
 CCG Rejected by slave.

POPEN

Opens a slave program.

I	BA	BA	IA
DSNUM = POPEN (DSDEVICE, PROGNAME, ITAG)			

DSDEVICE ASCII string terminated by a space. Specifies DSLINE or logical device number, or device class name.

PROGNAME ASCII slave name, up to 5 characters.

Condition Codes: CCL Error. Issue PCHECK for information.
 CCE Accepted by slave.
 CCG Rejected by slave.

PTOP CALLS – 3000 MASTER

PREAD

Reads a buffer from slave and exchanges tag field.

I	IV	IA	IV	IA
LGTH = PREAD (DSNUM, TARGET, TCOUNT, ITAG)				

LGTH Returns number of words transferred.

TCOUNT Positive (+) for words, negative (–) for bytes. The number of words transferred. Up to slave to indicate whether number is valid through tag field. (Cannot exceed 512 words to the HP 1000.)

Condition Codes: CCL Error. Issue PCHECK for information.
 CCE Accepted by slave.
 CCG Rejected by slave.

PWRITE

Transmits a block of data and exchanges tag field.

IV	IV	IV	IA
CALL PWRITE (DSNUM, TARGET, TCOUNT, ITAG)			

TCOUNT Positive (+) for words, negative (–) for bytes. The number of words transferred, up to 512 words to the HP1000.

Condition Codes: CCL Error. Issue PCHECK for information.
 CCE Accepted by slave.
 CCG Rejected by slave.

GET

Receives the PTOP intrinsic from the master program.

I	IA	I	I
IFUN = (ITAG, IL, IONUMBER)			

IFUN Function from the master program:

- 0 An error occurred (CCL)
- 1 POPEN
- 2 PREAD
- 3 PWRITE
- 4 PCONTROL
- 5 CCG (I/O without wait)

IL For PREAD, the number of words requested.
For PWRITE, the number of words transmitted.

IONUMBER Has meaning only for CCG (IFUN = 5). The MPE file number for I/O without wait.

Condition Codes: CCL Error. Issue PCHECK for information.
CCE Request was successful.
CCG Implicit I/O call completed pending MPE I/O without wait instead of DS remote I/O request.

ACCEPT

Completes the request of the most recent GET and transfers tag field. For PREAD, transfers bufsize words from target; for PWRITE, moves bufsize words from DS buffer to target.

IA	IA	IV
CALL ACCEPT (ITAG, TARGET, LENGTH)		

LENGTH Number of words to be transferred. 4096 maximum.

PREAD Length of data buffer to be transmitted to remote master.

PWRITE Number of words to be transferred from DS buffer to slave target.

REJECT

Rejects most recent GET intrinsic from master program.

IA
CALL REJECT (ITAG)

Condition Codes: CCL Error. Issue PCHECK for information.
CCE Request was successful.
CCG Not returned.

PTOP SUMMARY – 3000

	PARAM	TAG	DATA	CCL	CCE	CCG
POPEN	DSNUM	Send Receive	–	DSNUM Invalid	OK	Not Returned
PREAD	LGTH	Send Receive	Receive	Error (PCHECK)	OK	Rejected by Slave
PWRITE	–	Send Receive	Send	Error (PCHECK)	OK	Rejected by Slave
PCONTROL	–	Send Receive	–	Error (PCHECK)	OK	Rejected by Slave
PCLOSE	–	–	–	Denied	OK	Not Returned
PCHECK	ICODE	–	–	Denied Bad DSNUM	OK	Not Returned
GET	IFUN	Receive	–	Error (PCHECK)	OK	Refer to Manual
ACCEPT	–	Send	Note 1	Error (PCHECK)	OK	Not Returned
REJECT	–	Send	–	Error (PCHECK)	OK	Not Returned
NOTE 1: Depends on the master intrinsic; required for a PREAD or PWRITE call.						

Program-to-Program errors are returned by the PCHECK intrinsic.

CCE	No error.
CCL	Error condition. Refer to PCHECK.
CCG	May not be returned, but generally indicates a reject by the slave program.
3	Not enough parameters.
5	Parameter address violation at the HP 3000.
72	Invalid DS line, or failure to do POPEN first.
205	No room at the 1000 to initiate communication.
206	Specified slave function from master program.
207	Slave function out of sequence (do GET first).
208	Specified master PTOP function on same line as slave functions.
209	Program does not exist on the 1000.
211	Slave program has issued reject (CCG).
213	Remote slave program not opened properly.
214	Missing :DSLIME command.
216	Remote computer has rejected request. May be due to timeout.
218	Invalid PTOP operation.
219	Too many POPENs issued (greater than 4).
222	First do POPEN before other PTOP request.

PTOP CALLS – 1000 MASTER

COMMON PARAMETERS – 1000 PTOP CALLS

- IPCB Control block. A 4-word array filled by POPEN.
- IERR Error code returned.
- ITAG A 20-word tag array.

PCLOS

Terminates the slave program when the slave executes a GET, and terminates the logical communication link established by the POPEN.

```
      IA    I  
CALL PCLOS (IPCB, IERR)
```

Slave programs are terminated immediately (does not wait for GET).

PCONT

Provides an exchange of tag fields between master and slave programs.

```
      IA    I    IA  
CALL PCONT (IPCB, IERR, ITAG)
```

POPEN

Opens a slave program on the 3000 system.

```
      IA    I    IA    I    IA    IA    I  
CALL POPEN (IPCB, IERR, NAME, NODE, ITAG [, IENAM [, IPRAM  
      |            |  
      [, IFLAG [, IBFSZ] ] ] ] )
```

- NAME 4-word array containing ASCII name of slave.
- NODE Node number where slave program resides (negative LU of HSI).
- IENAM DS/3000 program entry point.
- IPRAM DS/3000 program control.
- IFLAG DS/3000 loading options.
- IBFSZ DS/3000 communications buffer size.

PREAD

Reads a buffer from slave and transfers tag fields.

IA	I	IA	I	IA
CALL PREAD (IPCB, IERR, IBUF, IL, ITAG)				

IBUF Data buffer, equal to or less than IL.

IL Data length in words (4096 maximum).

PWRIT

Transmits a buffer to slave program and transfers tag fields.

IA	I	IA	I	IA
CALL PWRIT (IPCB, IERR, IBUF, IL, ITAG)				

IBUF Data buffer, equal to or greater than IL.

IL Length in words (4096 maximum).

PTOP CALLS – 1000 SLAVE

GET

Determines the PTOP intrinsic requested by the master program.

IA

I

I

I

IA

I

CALL GET (ICLAS, IERR, IFUNC, ITAG, IL)

- ICLAS
- Slave PTOP class. Value passed as parameter number 1. Use RMPAR.
- IFUNC
- Function requested by the master program:

1

POPEN

2

PREAD

3

PWRIT

4

PCONT
- IL
- For IFUNC = 2 PREAD, maximum size buffer expected.
For IFUNC = 3 PWRIT, the number of words transferred.

ACCEPT

Accepts and completes the master request and sends tag field.

IA

I

IA

CALL ACCEPT (ITAG, IERR [,IBUF])

- IBUF
- Optional data buffer for PREAD or PWRIT.

REJCT

Rejects the master request and sends tag field.

IA

I

CALL REJCT (ITAG, IERR)

PTOP errors returned to the master or slave program. Note these are negative numbers.

-40	Not enough parameters.	
-41	Remote program not defined (POPEN).	
-42	No room to initiate (POPEN), no class number available.	
-44	Remote program not opened.	
-46	Sequence error.	
-47	Communication line error, NRV incorrect:	
	RTE: IOnn, RNnn, SCnn error.	
-48	Abortive communication error.	
-50	Local node not initialized.	
-51	Communication line parity.	DS01
-52	Communication line time-out.	DS02
-53	Illegal record size.	DS03
-54	Illegal node address.	DS04
-55	Request time-out.	DS05
-56	Illegal request.	DS06
-57	System table error.	DS07
-58	Remote busy.	DS08
-59	Illegal or missing parameter.	DS09

DEXEC CALLS – 3000 TO 1000

COMMON PARAMETERS – DEXEC CALLS

- LDEST A 5-word logical array. Words 1 through 4 contain an ASCII LU name, word 5 contains DSLINE number.
- PROG A 5-character ASCII program name.

DEXEC 1 – READ, DEXEC 2 – WRITE

Reads or writes a record from or to a remote I/O device.

DI	LA	IV	IV	BA	IV
ABREG = DEXEC (LDEST, ICODE, CONTWD, BUFFER, BUFLen, IV IV O-V OPT1, OPT2)					

- ABREG Upon return, word 1 (displayed in A-register):
8:8 Status information
2:6 EQT type code
0:2 Availability indicator; 0 = up, 1 = down

 Upon return, word 2 (displayed in B-register):
 Positive number of words or characters read (depends on BUFLen).
- ICODE 1 Read, 2 Write
- CONTWD Control word:
11:1 Interactive write/read
10:6 LU
9:1 M bit 0 = ASCII, 1 = binary
8:1 U bit
7:1 K bit } Refer to RTE manual for meaning
6:1 A bit
5:1 X bit
0:5 Must be 0
- BUFFER Byte array to contain the information read. Insure size is adequate.
- BUFLen Positive (+) for words, negative (–) for bytes. Maximum size is 512 words.
- OPT1 Required for certain drivers. See the appropriate manual.
- OPT2

DEXEC 3 – I/O CONTROL

Performs an I/O control operation on a remote I/O device.

DI	LA	IV	IV	IV	O-V
ABREG = DEXEC (LDEST, ICODE, CONTWD, PARAM)					

ABREG Upon return, word 1 (displayed in A-register) contains status
EQT word 5.

Word 2 (displayed in B-register) is meaningless.

ICODE 3 for I/O control.

CONTWD Control word:

10:6 LU number

5:5 Function code:

00	Clear device	
01	Write EOF	MT/CTU
02	Backspace 1 record	MT/CTU
03	Forwardspace 1 record	MT/CTU
04	Rewind	MT/CTU
05	Rewind/Standby	MT/CTU
06	Dynamic Status	MT
07	Set EOT, leader skipped	PT
10	Generate leader	PT
	Write EOF	CTU
11	Skip line	LP
12	Write 3-inch gap	MT
13	Forward space file	MT/CTU
14	Backspace file	MT/CTU
15	Conditional form feed	LP
20	Enable terminal	
21	Disable terminal	
22	Set term time-out parameter	
23	Ignore further term action	
24	Restore term output processing	
26	Write EOF	CTU
27	Locate file	CTU

PARAM Used with CONTWD 11, 22, and 27:

11	+n	Space n lines	LP
	-n	Top of Form	
	0	No line feed	
22		Time-out parameter value	
27		File number (<256)	CTU

DEXEC CALLS – 3000 TO 1000

DEXEC 10 – PROGRAM SCHEDULE

Schedules dormant remote program for execution.

DI	LA	IV	IA	IV	IV	IV
ABREG = DEXEC (LDEST, ICODE, PROG, OPT1, OPT2, OPT3,						
		IV	IV	O-V		
		OPT4, OPT5)				

ABREG Upon return, word 1 value (displayed in A-register)

- 0 Good return
- 1 Program was already scheduled
- 2 I/O suspend
- 3 Program in wait state
- 4 Unavailable memory suspend
- 5 Disc allocation suspend
- 6 Operator or program suspend

Word 2 (displayed in B-register) upon execution contains address of 5-word parameter array.

ICODE 10 Program schedule.

OPT1 to Optional parameters passed to program.
OPT5

DEXEC 11 – TIME REQUEST

Requests the RTE system clock values.

DI	LA	IV	LA
ABREG = DEXEC (LDEST, ICODE, TIME)			

ICODE 11 Time request.

TIME 5-word logical array:

- 1 Tens of milliseconds
- 2 Seconds
- 3 Minutes
- 4 Hours
- 5 Day of year (Julian)

DEXEC 12 - PROGRAM EXECUTION (OFFSET)

Schedules a remote program for execution at specified time intervals, starting after an initial offset time. Program is placed in the time list.

DI	LA	IV	LA	IV	IV
ABREG = DEXEC (LDEST, ICODE, PROG, RESOLUTION, MULTIPLE, IV OFFSET)					

ICODE 12 Program execution time.

RESOLUTION Time units:
 1 Tens of milliseconds (0-99)
 2 Seconds (0-59)
 3 Minutes (0-59)
 4 Hours (0-23)

MULTIPLE Number of time units ($1 \leq n \leq 4095$)
 Time interval = resolution * multiple
 0 = Run only once

OFFSET Indicates number of time units to wait before initial program execution (must be negative value).

DEXEC 12 - PROGRAM EXECUTION (ABSOLUTE)

Schedules a remote program for execution at specified intervals, starting initially at a specified time.

DI	LA	IV	LA	IV	IV
ABREG = DEXEC (LDEST, ICODE, PROG, RESOLUTION, MULTIPLE, IV IV IV IV O-V HOURS, MINUTES, SECONDS, MSECONDS)					

ICODE 12 Program execution time.

RESOLUTION Time units:
 1 Tens of milliseconds (0-99)
 2 Seconds (0-59)
 3 Minutes (0-59)
 4 Hours (0-23)

MULTIPLE Number of time units ($1 \leq n \leq 4095$)
 0 = Run only once

HOURS 0 - 23

MINUTES 0 - 59

SECONDS 0 - 59

MSECONDS 0 - 99 (tens of milliseconds)

DEXEC CALLS – 3000 TD 1000

DEXEC 13 – I/O STATUS

Obtains status of remote I/O device.

DI	LA	IV	IV	L	L	O-V
ABREG = DEXEC (LDEST, ICODE, CONTWD, STATUS1, STATUS2)						

ICODE	13	I/O status.
CONTWD	Control word:	
	10:6	LU number
	5:5	0
STATUS1	Logical	
	0:2	0 Available
		1 Disabled (down)
		2 Busy
		3 Waiting for DMA
	2:6	Equipment type code
	8:8	Status (Physical or simulated status at end of each operation.)
STATUS2	Logical EQT word 4	
	0:1	D DMA
	1:1	B Autobuffering used
	2:1	P Driver process power fail
	3:1	S Driver process timeouts
	4:1	T Device timed out
	5:5	Unit number last subchannel addressed
	10:5	I/O select code

Errors in the DEXEC intrinsics are tested by the use of the condition codes and the values are returned in the double variable.

CCE No error in intrinsic.

CCL Error at the HP 3000. ABREG contains binary information:

- 3 Not enough parameters.
- 5 Parameter address violation at the HP 3000.
- 72 Invalid DSLINE.

CCG Error on remote HP 1000 computer. ABREG contains a 4-character ASCII code:

- DS03 Illegal record size
- DS06 Illegal request
- DS07 System table error
- DS09 Illegal or missing parameter
- IO01 Illegal or missing parameter
- IO02 Illegal logical unit
- IO03 Logical unit not assigned
- IO04 Illegal user buffer
- IO07 Call rejected by driver
- SC01 Missing parameter
- SC02 Illegal parameter
- SC03 Program cannot be scheduled
- SC05 Program cannot be defined
- SC06 No resolution code in DEXEC call

RFA INTRINSICS – 3000 TO 1000

This section on Remote File Access intrinsics covers the 3000 to 1000 direction. For more information about 1000 FMP calls, refer to the Batch-Spool Monitor Reference Manual (92060-90013), Section III.

ERROR CONDITIONS

Test condition code for satisfactory completion of an RFA intrinsic. In case of an error, refer to the value of IERR.

- CCL Failure at the HP 3000 end. Refer to "RFA Error Codes – 3000 to 1000" for error code meanings.
- CCE Satisfactory completion.
- CCG Failure at the HP 1000 end. Refer to "RFA Error Codes – 3000 to 1000" for error code meanings.

COMMON PARAMETERS – 3000 TO 1000 INTRINSICS

- DCB 4-word logical array. The array is filled at DOPEN or DCRET time. The data is used by the system and should not be changed by the user.
- IERR Normally returns 0 for valid completion. Exceptions: DCRET and DOPEN.

DAPOS

Positions disc file to a record (reference DLOCF).

LA	I	IV	IV	IV	O-V
DAPOS (DCB, IERR, RECNM [,BLOCKNUM [,WORDNUM]])					

- RECNM Sequential record number (reference DLOCF).
- BLOCKNUM Next sequential block number (block = 128 words, 2 physical disc sectors).
- WORDNUM Word offset within block for beginning of a new record. Omitted for files with fixed length records. ($0 \leq n \leq 127$)

DCLOS

Closes file and makes file available for other access. Optionally truncate.

LA	I	IV	O-V
DCLOS (DCB, IERR [,TRUNCATE])			

- TRUNCATE Truncate parameter:
- =0 File closed without truncation
 - <0 Truncate extents only
 - >0 Number of blocks to be deleted

DCONT

Provides I/O control to an I/O device (type 0 file).

LA	I	IV	IV	O-V
DCONT (DCB, IERR, CONTROL [,CONT2])				

CONTROL Function code (refer to DEXEC 13 for codes).

CONT2 Auxiliary control parameter for 11, 22, and 27.

DCRET

Creates a disc file, makes file directory entry, and allocates disc space.

LA	I	LA	LA	IV	IV	IA	O-V
DCRET (DCB, IERR, NAME, SIZE, TYPE [, [SECURITY] [,CRTNM]])							

IERR >0 Number of sectors allocated
 <0 An error occurred

NAME 3-word ASCII name.

SIZE 2-word array. Word 1 contains size requested in blocks
 (<0 allocates rest of cartridge). Word 2, (for type-2 files)
 contains record length.

TYPE File type ($1 \leq \text{type} \leq 32767$). Types 1 through 7 are FMGR
 defined.

SECURITY Security code ($1 \leq \text{security} \leq 32767$).
 = 0 No security (default)
 >0 Write protect only
 <0 Read/write protect

CRTNM Cartridge number. If 0, use any available cartridge; if > 0,
 cartridge reference number; if <0, LU of cartridge.
 Words 2 through 5 ASCII DSLINE.

DLOC

Retrieves status and pointer information on an open file.

LA					
DLOCK (DCB, IERR, RECNM [,BLOCKNUM, WORDNUM, SECNM,					
			O-V		
[LU, TYPE, RECSIZE])					

RECNM Returns number of next sequential record.

BLOCKNUM Returns number of current block (starts at 0). Type-0 file not
 returned; type-1 file = RECNM.

RFA INTRINSICS -- 3000 TO 1000

WORDNUM	Returns word offset within current block to beginning of next record.
SECNM	Returns number of sectors in the main file.
LU	Returns the LU number of the file on disc (not type-0).
TYPE	Returns the file type.
RECSIZE	Returns record size in words (for type-0: bit 15 = 1 read, bit 15 = 0 write).

DNAME

Renames an existing file. If security is non-zero, it must be specified.

LA	I	LA	LA	IV	LA	O-V
DNAME (DCB, IERR, NAME, NEWNAME [,SECURITY, CRTNM])						

NAME	3-word ASCII name.
NEWNAME	3-word ASCII name.
SECURITY	Security code ($1 \leq \text{sec} \leq 32767$). Omit or equal 0, if file created without security code.
CRTNM	Cartridge reference ($1 \leq \text{crtm} \leq 32767$). If 0 or omitted, first file with NAME is renamed.

DOPEN

Opens the named file to the program.

LA	I	LA	IV	IV	LA	O-V
DOPEN (DCB, IERR, NAME [,OPTN, SECURITY, CRTNM])						

IERR	>0 File type <0 An error occurred
NAME	3-word ASCII name.
OPTN	Open option: (default = 0) 15:1 E 0 = exclusive, 1 = shared 14:1 U 0 = standard, 1 = update 13:1 T 0 = file type as created, 1 = force type-1 For remainder of bits, refer to FMGR manual.
SECURITY	= 0 No security (default) >0 Any may read, specify to write <0 Specify to read/write
CRTNM	5-word logical array. Word 1, cartridge reference number. If omitted, opens first file found. Words 2 through 5, ASCII DSLINE number.

DPOSN

Positions file pointer forward or backward relative to current position.

LA	I	IV	IV	O-V
DPOSN (DCB, IERR, RECSKP [,FLAG])				

RECSKP Number of records to be skipped:

= 0 No operation

>0 Forward

<0 Backward

FLAG If non-zero, position to absolute number specified (no skip).

DPURG

Deletes the file and all extents.

LA	I	LA	IV	LA	O-V
DPURG (DCB, IERR, NAME [,SECURITY, CRTNM])					

NAME 3-word ASCII name.

SECURITY Must be specified if created with security code. Otherwise, may omit. (default = 0)

CRTNM Cartridge reference number. If specified, searches only that cartridge. Otherwise, purges first file found with proper name.

DREAD

Reads a record from open file to user's buffer.

LA	I	LA	IV	I	IV	O-V
DREAD (DCB, IERR, BUFFER, SIZE [,LENGTH, RECNM])						

BUFFER User buffer. Insure size is greater than or equal to length.

SIZE Number of words maximum.

LENGTH Reads full record or up to size words if size is less than record. If omitted, reads 1 record. If type-1 file, length is read; if type-0 file, up to LENGTH words are read.

RECNM Record number for random access type-1 and type-2 files.

= 0 Transfer starts at current pointer position

>0 Transfer starts at absolute record position

<0 Transfer starts at current position

RFA INTRINSICS - 3000 TO 1000

DSTAT

Returns status of all mounted cartridges.

LA	I	LA
DSTAT (STATUS, IERR, DSLINE)		

STATUS 125-word buffer:

- 1 LU number
- 2 Last FMGR track
- 3 Cartridge reference number
- 4 0 = non-locked ID segment address of locking program

Four-word entry repeated for each cartridge, up to 31 maximum.

DSLINE 4-word array. ASCII DSLINE name or LU.

DWIND

Places file pointer to first record in disc file. Rewinds type-0 files.

LA	I
DWIND (DCB, IERR)	

DWRIT

Writes a record from a user's buffer to open file. For type-0 and 3, writes specified number of words (LENGTH).

LA	I	LA	IV	IV	O-V
DWRIT (DCB, IERR, BUFFER, LENGTH [,RECNM])					

BUFFER User buffer array containing a record.

LENGTH Number of words to write. If omitted, zero length record is written. Type-1 and type-2 files, one record is written.

RECNM Record number of type-1 and type-2 files:

- = 0 Transfer starts at current pointer (default)
- > 0 Transfer starts at absolute record position
- < 0 Transfer starts at current pointer position

Test condition code for satisfactory completion of an RFA intrinsic. In case of error, refer to the value of IERR.

CCE No error IERR = 0

CCL Error was on the HP 3000:

- 3 Not enough parameters
- 5 Parameter address violation on the 3000
- 72 Invalid DSLINE

CCG Error was on the HP 1000. Value of IERR:

- 000 No error
- 001 Disc error (disc down)
- 002 Duplicate file name
- 003 Device cannot be backspaced
- 004 File too long, or record size error
- 005 Invalid record, or record too long
- 006 Cartridge Reference Number not found, or no room
- 007 Invalid security code
- 008 File open, lock rejected
- 009 Tried to open type-0 as type-1, or to position type-0
- 010 Missing or illegal parameter
- 011 DCB unopened
- 012 EOF or SOF
- 013 Cartridge is locked
- 014 Directory full
- 015 Illegal file name
- 016 Illegal type code, tried to purge type-0, zero length file
- 017 Illegal read/write/position type-0 file
- 018 Destination node does not have FMP
- 25 Bad FCODE (internam RFAM error)
- 26 Bad entry number in RFAM (DCB destroyed)
- 28 No internal table space in RFAM
- 53 Illegal record size
- 56 Illegal request
- 57 System table error
- 59 Illegal or missing parameter

RFA INTRINSICS – 1000 TO 3000

This section on Remote File Access intrinsics covers the 1000 to 3000 direction.

ERROR CONDITIONS

To test condition code following a 1000 to 3000 RFA call:

```
CALL intrinsic name  
IF (ICC(n)) label <, label =, label >
```

where *n* is a dummy parameter.

For CCL and CCG, use the FCHEK intrinsic to determine the error code. Refer to the MPE Intrinsics Reference Manual for a list of error codes associated with the MPE FCHECK intrinsic.

COMMON PARAMETERS – 1000 TO 3000 RFA INTRINSICS

- FILNM File number returned by FOPEN. Required for all file intrinsics.
- TARGET Array from which data is read, or into which data is returned.
- RECNM Logical record number (starts at 0).

FCHEK

Provides information about the RFA intrinsic that failed. FILNM = 0 for a POPEN error.

IV	I	I	D	I
CALL FCHEK (FILNM, IERR, TLOG, BLKNM, NMREC)				

- IERR Returns the error code. Refer to MPE intrinsics.
- TLOG Transmission log. Specifies words left over (not read or written) as result of input or output error.
- BLKNM Relative block number.
- NMREC Number of logical records in the bad block.

Condition Codes: CCL Denied. Invalid FILNM, or bounds violation.
 CCE Request granted.
 CCG Not returned.

FOPEN

Opens or creates a file and returns the file number required for all other file intrinsics. Specify INTEGER FOPEN.

I	A	LV	LV	IV	BA	BA
FILNM = FOPEN (FNAME, FOPTS, AOPTS, RECSZ, DEV, FRMSG,						
	IV	IB	IV	DV	IV	IV
ULABL, BLKFR, NBUF, FILSZ, NMEXT, IALLC,						
	IV	O-V				
FCODE)						

FNAME Fully qualified file name. Begins with alphabetic, contains alphanumeric, slash, and period.

FOPTS F-options parameter.

AOPTS A-options parameter.

All other parameters are used in creating a file. Refer to MPE intrinsics.

Condition Codes: CCL Request rejected. Refer to FCHEK.
CCE File opened.
CCG Not returned.

FCLOS

Closes the file, releases MPE buffers, and may change the disposition.

IV	IV	IV
CALL FCLOS (FILNM, DISP, SCODE)		

DISP Disposition: (default = 0)

13:3	0	No change
	1	Permanent file
	2	Temporary job file (rewound)
	3	Temporary job file (not rewound)
	4	Release (delete) file
12:1	0	Retains all space.
	1	Returns space beyond EOF

SCODE Security code: (default = 0)

0	Unrestricted access
1	Private file creator

Condition Codes: CCL File not closed.
CCE File closed successfully.
CCG Not returned.

RFA INTRINSICS – 1000 TO 3000

FCNTL

Provides control operations of file or device.

IV	IV	L
CALL FCNTL (FILNM, CCODE, PARAM)		

CCODE Control code.

PARAM Used for CCODE 0 to 9.

Condition Codes: CCL Request denied.
 CCE Request granted.
 CCG Not returned.

FINFO

Returns file access and status information. Refer to MPE intrinsics for information on parameters.

IV	BA	L	L	I	I
CALL FINFO (FILNM, FNAME, FOPTS, AOPTS, RECSZ, DTYPE,					
L	L	I	D	D	D
LDEVN, HWADR, FCODE, RECPT, EOF, FLIM, LCNT,					
D	I	L	I	I	BA
PHCNT, BLKSZ, EXTSZ, NMEXT, ULABL, CRTID,					
D	O-V				
LADDR)					

Condition Codes: CCL Request denied due to error.
 CCE Request granted.
 CCG Not returned.

FLOCK

Dynamically locks a file.

IV	LV
CALL FLOCK (FILNM, LOCKC)	

LOCKC Lock condition:
 15:1 1 TRUE Unconditional lock. Suspends until file
 is locked.
 0 FALSE Locks if RIN is not currently locked. If
 RIN is used, returns CCG.

Condition Codes: CCL Denied. File not opened with dynamic locking, or
 needs multiple RIN capability.
 CCE Request granted.
 CCG Denied. File was locked by another process.

FPOINT

Sets record pointer to a logical record (fixed-length only).

	IV	DV
CALL FPOINT (FILNM, RECNM)		

Condition Codes:	CCL	Request denied for various reasons.
	CCE	Request granted.
	CCG	Request denied. Beyond physical EOF.

FREAD

Reads a logical record from the current record pointer.
Specify INTEGER FREAD.

I	IV	LA	IV
LGTH = FREAD (FILNM, TARGT, TCNT)			

LGTH Returns length of data read (units are words/bytes per TCNT).

TCNT Maximum size of data transfer (>0 words, <0 bytes).

Condition Codes:	CCL	Data not read due to error.
	CCE	Data was read.
	CCG	Encountered End-of-Data.

FRDIR

Reads the specified logical record (fixed or undefined length).

	IV	LA	IV	DV
CALL FRDIR (FILNM, TARGT, TCNT, RECNM)				

TCNT Maximum size for data (>0 words, <0 bytes).

Condition Codes:	CCL	Not read due to error.
	CCE	Data was read.
	CCG	End End-of-Data.

RFA INTRINSICS - 1000 TO 3000

FRDSK

Provides anticipatory read from disc file to buffer prior to FRDIR. File must allow I/O buffering and have fixed or undefined length.

IV	DV
CALL FRDSK (FILNM, RECNM)	

Condition Codes: CCL Read failed due to error.
CCE Request granted.
CCG Logical EOF encountered.

FRLAB

Reads a user-defined file label.

IV	LA	IV	IV
CALL FRLAB (FILNM, TARGET, TCNT, LABID)			

TCNT Size in words (128 maximum).

LABID Label ID number (default = 0)

Condition Codes: CCL Label not read due to error.
CCE Label was read.
CCG Referenced a label beyond the last written label on the file.

FRNAM

Changes a file name.

IV	BA
CALL FRNAM (FILNM, NNAME)	

NNAME New file name, fully qualified.

Condition Codes: CCL Request denied due to error.
CCE Request granted.
CCG Not returned.

FRLAT

Determines whether a file pair is interactive and/or duplicative.
Specify INTERGER INTDU.

I	IV	IV
INTDU = FRLAT (INFIL, LISTF)		

INTDU Returns information on the two files:

15:1 1 = Form interactive pair

0:1 1 = Form duplicative pair

INFIL File number of the input file.

LISTF File number of the list file.

Condition Codes: CCL Denied due to error.
CCE Request granted.
CCG Denied. One of the files corresponds to \$NULL.

FSPAC

Forward or backward spaces a disc file by changing logical record pointer. On magnetic tape, spaces physical records.

IV	IV
CALL FSPAC (FILNM, DISPL)	

DISPL Displacement from current record position
(>0 forward, <0 backward).

Condition Codes: CCL Denied due to error, or file on device that prohibits spacing.
CCE Request granted.
CCG Logical EOF encountered. For disc file, pointer unchanged. For magnetic tape, positioned beyond file mark.

RFA INTRINSICS - 1000 TO 3000

FSTMD

Activates or deactivates the access modes: automatic error recovery, critical output verification, and terminal control by the user.

IV	IV
CALL FSTMD (FILNM, MODEF)	

MODEF Mode flags:

14:1	Critical output verification
13:1	Terminal control by user
12:1	Tape error recovery

Condition Codes:

CCL	Request denied due to error.
CCE	Request granted.
CCG	Not returned.

FUNLOCK

Dynamically unlocks the file (RIN) that had been locked with FLOCK.

IV
CALL FUNLOCK (FILNM)

Condition Codes:

CCL	Denied. File was not opened with dynamic locking AOPTIONS, or FILNM invalid.
CCE	Request granted.
CCG	Denied. File had not been locked.

FUPDT

Updates the record in the disc file which was last referenced.

IV	LA	IV
CALL FUPDT (FILNM, TARGT, TCNT)		

TCNT Number of words/bytes to be written (>0 words, <0 bytes).

Condition Codes:

CCL	Request denied due to error.
CCE	Request granted.
CCG	EOF encountered.

FWRIT

Writes a logical record to a file, and updates the pointer.

IV	LA	IV	LV
CALL FWRIT (FILNM, TARGET, TCNT, CONTL)			

TCNT Size of record (>0 words, <0 bytes)

CONTL Carriage control code for appropriate file opened with CCTL.

Condition Codes: CCL Denied due to error.
 CCE Request granted.
 CCG Denied. Physical limits exceeded.

FWDIR

Writes specified record to a disc file (fixed or undefined length). Pads binary with zeros, ASCII with blanks.

IV	LA	IV	DV
CALL FWDIR (FILNM, TARGET, TCNT, RECNM)			

TCNT Size of record (>0 words, <0 bytes).

Condition Codes: CCL Request denied due to error.
 CCE Request granted.
 CCG Physical EOF encountered.

FWLAB

Writes a user-defined label onto a disc file.

IV	LA	IV	IV	O-V
CALL FWLAB (FILNUM, TARGET, TCNT, LABID)				

TCNT Size of label in words. (default = 128)

LABID Number of the label. First label = 0. (default = 0)

Condition Codes: CCL Denied due to error.
 CCE Request granted.
 CCG Denied; would exceed limit established in FOPEN.

LOAOR - SYSTEM/1000

:RU,LOADR[, [command] [, [input] [, [listoutput] [, [opcode]
[, [format] [, [partition] [, [size]]]]]]]

command	File NAMR , interactive input device. Non-interactive input device, where commands are entered.																											
input	Relocatable file NAMR , LU of relocatable input.																											
listoutput	LU device (default = 6), list file name.																											
opcode	Operation code: <table><tr><td>Program Type</td><td>BG</td><td>Background (default)</td></tr><tr><td></td><td>RT</td><td>Real time</td></tr><tr><td>Common</td><td>SC</td><td>System common</td></tr><tr><td></td><td>RC</td><td>Reverse common</td></tr><tr><td></td><td>NC</td><td>Local common (default)</td></tr><tr><td></td><td>SS</td><td>SSGA (required for DS prog)</td></tr><tr><td>Load Type</td><td>PE</td><td>Permanent</td></tr><tr><td></td><td>TE</td><td>Temporary (default)</td></tr><tr><td></td><td>RP</td><td>Replace</td></tr></table>	Program Type	BG	Background (default)		RT	Real time	Common	SC	System common		RC	Reverse common		NC	Local common (default)		SS	SSGA (required for DS prog)	Load Type	PE	Permanent		TE	Temporary (default)		RP	Replace
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format	Format specifications: <table><tr><td>DB</td><td>Debug</td></tr><tr><td>LE</td><td>List entry points (default)</td></tr><tr><td>NL</td><td>No list</td></tr><tr><td>RS</td><td>Reset scan (of library)</td></tr></table>	DB	Debug	LE	List entry points (default)	NL	No list	RS	Reset scan (of library)																			
DB	Debug																											
LE	List entry points (default)																											
NL	No list																											
RS	Reset scan (of library)																											
partition	Specifies a particular partition number. Default: Any of sufficient size.																											
size	Specifies the number of pages desired. Provides for larger address space, permits dynamic buffering.																											

INTERACTIVE LOADER

AS,nn	Assign to partition number (nn).
SZ,nn	Specifies number of pages (nn).
LL,namr	Specifies the logical list device (namr).
OP,opcode	Specifies opcode (up to 6 letters).
FM,format	Specifies format parameters (up to 6).
SE	Search system disc library for undefined externals.
SE,namr	Search file (namr) for undefined externals.
RE,name	Load file (prog, subroutine, segment).
FO	Force load, ignore undefined externals.
DI	Display undefined externals
EC	Echo input commands to list device.
END	Terminate input phase, complete loading.
/A	Abort immediately.
*	Denotes comment line.

L01	Checksum error.
L02	Illegal record.
L03	Memory overflow.
L04	Base page linkage area overflow.
L05	Symbol table overflow.
L06	Common block error.
L07	Duplicate entry points
L08	No transfer address.
L09	Record out of sequence.
L10	Illegal parameter in loadr schedule request.
L11	Attempted to replace or purge memory resident program.
L14	Compiler/Assembler produced illegal relocatable code, or undefined external.
L16	Illegal partition number, or corrupt map table.
L17	Partition too small.
L18	Requires greater than 32 pages of memory.
L23	Tried to load segmented program into real time partition.
L24	Needs SSGA, but it was not declared.
L25	LI or PU in batch (these are interactive only).
L26	Needs ID segment.
W17	Program page requirements too large.

Additional Opcodes for Interactive Loading

LI	List programs (loaded in system).
PU	Purge program from system.

Examples: :RU,LOADR,,,6,LI
 :RU,LOADR,,,1,PU

DEBUG - SYSTEM/1000

This section contains a subset of the RTE-IV DEBUG capabilities.

INITIALIZATION

address <P: Set to start of user program so that P relative addresses match program listing.

Example 52002 <P:

EXAMINE OR MODIFY MEMORY

address/ Open or examine memory location, then system prints current contents.

address/ contents newvalue cr Modify contents.

Example 53012/ ADA 2745

Example P+51/17630 177777 cr

LF (ctf J) Advance to next location and print its contents.

^ Open and print previous location.

PRINTING MODES

escS Symbolic mode (default).

escC Octal constant mode.

escH ASCII print mode.

= Converts and prints last quantity displayed in octal form.

! Prints last quantity as symbolic instruction.

' (Apostrophe) Prints last quantity as ASCII.

- (Underline) Prints last quantity as symbolic address.

LABELS

address/contents LABEL: Establishes a symbolic label. 1- or 2-letter name provides wider relative range. Helps to relate to FTN mixed, or ASMB listings, and array addressing.

Example 53012/LDA 2345, I J:cr (Do not use instruction mnemonics or "C" or "I" for label.)

SET BREAKPOINT

address/ contents escB

Set breakpoint at address currently opened. When breakpoint is reached, prints ADDRESS (contents) A B X Y EO STATUS.

Example

52023/ STA 2365,I escBcr

CONTINUE EXECUTION

escP Proceed with execution.

n escP Proceed with execution and stop after nth execution breakpoint.

Example escP

EXECUTE NEXT INSTRUCTION

escT Execute next instruction, then break.

n escT Trace next n instructions

Example escT

CHANGE RADIX

radix escR Change primary mode to new radix.

10. escR Number printed will be decimal.

16. escR Number printed will be hexadecimal.

8. escR Number printed will be octal.

2. escR Number printed will be binary.

NOTE

For input data, a following decimal indicates decimal value.
For example: 2555. is a decimal value; 2555 is an octal value.

ADDRESS RELATIVE TO P

— (Underline) Prints address relative to P (as established during initialization).

Example P+54/ 10200 —2000,I

TRANSFER CONTROL TO NEW CODE LOCATION

address escG Start execution at new code location.

WARNING

Use care in repeating a section of code.

Example 54311 escG

EXIT EXEC

escD Get out of EXEC and back to DBUG if you have gotten RTE attention (due to typing too fast).

MEMORY SEARCH AND CLEAR

n< Set lower search limit.

n> Set upper search limit.

n escW Search within limits for all words equal to mask word n.

n escN Search within limits for all words not equal to mask word n.

n esc escZ Set memory within limits to value n (default = 0).

Example n1<n2>n3 escW Search between n1 and n2 for all words equal to mask n3.

Example P+1466<P+1600>escN Search for all words within limits unequal to 0.

Example n1<n2>n3 esc escZ Store word n3 between limits.

SYMBOLS

n/	Examine specified location.
!	Print last quantity as symbolic instruction.
=	Print last quantity as constant.
'	(apostrophe) Print last quantity as ASCII.
. or *	Current value of DBUF location counter.
n_	(underline) Print value as an address
+ or blank	Add.
-	Subtract
,	(comma) Inclusive OR.
esc	Control character, refer context.
n escB	Set breakpoint.
escC	Set print mode constant.
n escG	Go to location and start execution.
escH	Set print mode ASCII.
escM/	Examine or modify mask.
escP	Proceed with program execution.
n escR	Set radix.
escS	Set print mode symbolic instruction.
n escT	Execute and trace n lines.
n escW	Search equal.
n escN	Search unequal.
n esc escZ	Set memory.
escD	Exit RTE back to DBUF.
n cr	Change value and close location.
cr	Close current location, do not change value.
If (ctlJ)	Open and print next location.
^	Open and print previous location.
n.	Decimal value.

REGISTER LOCATIONS

0	A-register
1	B-register
escM+1	Bit 0, overflow; bit 1, extend
escM+3	X-register
escM+4	Y-register

DEBUG ERRORS - 1000

CHK	Checksum error.	
DM?	Attempted to access memory that is not contained within the user partition.	
IN?	Debug can't trace certain instruction. Move breakpoint and proceed.	
MP?	Detected possibly legal instruction that cannot be traced without violating memory protect. Move breakpoint and proceed.	
P?	Page error. Instruction referenced address not on current page or base page. Change current page by opening address within desired page.	
TP?	Attempted to trace or set breakpoint into DEBUG.	
U	Symbol undefined, ignored input.	
X	Pressed RUB OUT key, ignored previous partial expression.	
*	Got attention of RTE. Now type escD.	
?	Unassigned control character, ignored input.	

MTS/3000 MULTIPOINT TERMINAL SOFTWARE

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MTS/3000 GENERAL INFORMATION

MULTIPOINT TERMINAL SOFTWARE (MTS/3000) HP PRODUCT NUMBER 32193A

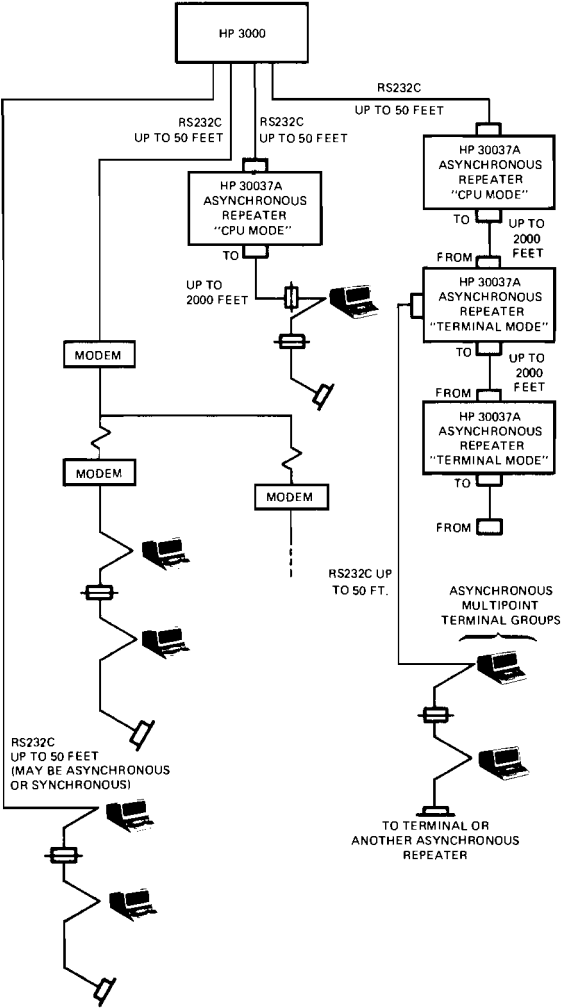
REFERENCES

MTS/3000 Reference Manual (32193-90002)
264X Display Station Reference Manual (02645-90005)
2648A Graphics Terminal Reference Manual (02848-90002)
HP 30037A Asynchronous Repeater Manual (30037-90003)
MTS/3000 Site Prep and Installation Manual (32193-90001)

OPERATIONAL FEATURES

- Shared communication resources.
- Wide variety of terminal network configurations and modems.
- Terminals may be used as log-on (interactive) or data entry devices.
- All data transfers are in page mode up to 9600 bits per second.
- Transmission of data may be either synchronous or asynchronous.
- All communications occur in a half duplex mode.
- Variable length record transfers:
 - From CPU to terminal — maximum buffer length, 4000 bytes.
 - From terminal to CPU — maximum buffer length, 2000 bytes.
- Comprehensive error checking/recovery on transmitted/received data.
Line protocol characters are VRC while data is CRC checking.
- Data transfers are in ASCII and/or ASCII Transparent mode.
- Polling is on a group basis to reduce overhead.
- Selection is on an individual/terminal basis.
- Fault isolation aids to help reduce down-time:
 - Stand-alone SSLC diagnostic.
 - 264x terminal self tests.
 - Asynchronous repeater self tests.
 - MTS/3000 network verification tests.
 - CS trace facility.

MTS/3000 HARDWARE CONFIGURATION



MTS/3000 HARDWARE SPECIFICATIONS

SYNCHRONOUS SINGLE-LINE CONTROLLER SPECIFICATIONS

Number of lines per controller:	One
Number of controllers per CPU:	Maximum of five
Hardwired connection data rates:	9600 bits per second maximum
Modem connection data rates:	2400 to 9600 bits per second
Modems supported:	201C (switched), 201C (non-switched), 208A (non-switched), 208B (switched), 209A (non-switched)
Line Protocol:	
Synchronous communications	IBM Binary Synchronous protocol
Asynchronous communications	Similar to BSC protocol
Communications facilities:	Half-duplex

LIMITATIONS ON SYNCHRONOUS COMMUNICATIONS

TERMINALS (number per line)	TRANSMISSION RATE (bits per second)			
	2400	4800	9600	
2	2000	2000	2000	} Maximum number of feet between terminals
8	2000	2000	1200	
16	2000	1200	480	
32	1200	480	120	

LIMITATIONS ON ASYNCHRONOUS COMMUNICATIONS

At 9600 bits per second, the maximum distance between only terminal is 2000 feet.

MTS/3000 TERMINALS

Supported HP terminals:	2641A, 2645A/S, 2648A
Data rates:	9600 bits per second maximum
Communication interfaces:	Optional synchronous multipoint or asynchronous multipoint
Terminal peripheral devices:	Keyboard, display, cartridge tapes, selected line printers

MULTIPOINT TERMINAL STRAPPING OPTIONS

KEYBOARD INTERFACE PCA STRAPS FOR MULTIPOINT

STRAP

SETTING FOR MTS/3000

A, B, C

don't care

D

OPEN

E, F, G, H

don't care

J

OPEN

K, L, M, N, P, Q

don't care

R

OPEN — Terminal is first after an AR

CLOSED — Terminal is not first after an AR

S

don't care

T

CLOSED

U

CLOSED

V

OPEN — for ASYNC multipoint operation

don't care — for SYNC multipoint operation

W, X, Y

don't care

Z

OPEN

MULTIPOINT TERMINAL STRAPPING OPTIONS

HP 13260C ASYNCHRONOUS MULTIPOINT COMMUNICATIONS PCA STRAPS

STRAP	SETTING FOR MTS/3000															
J17 - J16	Buffer size must be at least as large as SSLC preferred buffer size <table><tr><th>J17</th><th>J16</th><th>Buffer Size</th></tr><tr><td>CLOSED</td><td>CLOSED</td><td>500 bytes</td></tr><tr><td>CLOSED</td><td>OPEN</td><td>1000 bytes</td></tr><tr><td>OPEN</td><td>CLOSED</td><td>2000 bytes</td></tr><tr><td>OPEN</td><td>OPEN</td><td>4000 bytes</td></tr></table>	J17	J16	Buffer Size	CLOSED	CLOSED	500 bytes	CLOSED	OPEN	1000 bytes	OPEN	CLOSED	2000 bytes	OPEN	OPEN	4000 bytes
J17	J16	Buffer Size														
CLOSED	CLOSED	500 bytes														
CLOSED	OPEN	1000 bytes														
OPEN	CLOSED	2000 bytes														
OPEN	OPEN	4000 bytes														
J15	OPEN — Cursor addressing disabled CLOSED — Cursor addressing enabled															
J14 - J10	Device ID must be unique within a group (see J04 - J00). Example for Device ID 6: <table><tr><td>J14, J13</td><td>CLOSED</td><td rowspan="3">}</td><td rowspan="3">= CC00C = 6</td></tr><tr><td>J12, J11</td><td>OPEN</td></tr><tr><td>J10</td><td>CLOSED</td></tr></table>	J14, J13	CLOSED	}	= CC00C = 6	J12, J11	OPEN	J10	CLOSED							
J14, J13	CLOSED	}	= CC00C = 6													
J12, J11	OPEN															
J10	CLOSED															
J07	CLOSED															
J06	OPEN															
J05	CLOSED — Extended text mode disabled OPEN — Extended text mode enabled															
J04 - J00	Group ID must be unique within an MTS/3000 network. Example for Group ID 7: <table><tr><td>J04, J03</td><td>CLOSED</td><td rowspan="2">}</td><td rowspan="2">= CC000 = 7</td></tr><tr><td>J02 - J00</td><td>OPEN</td></tr></table>	J04, J03	CLOSED	}	= CC000 = 7	J02 - J00	OPEN									
J04, J03	CLOSED	}	= CC000 = 7													
J02 - J00	OPEN															
INT	OPEN															
PL6 - PL0	All OPEN															
A4	CLOSED															
A11 - A9	All OPEN															
-12	OPEN Terminal is first on a line; or terminal is not first and is not connected by an HP 13232T Power Protect cable. CLOSED Terminal is not first on a line and is connected by an HP 13232T Power Protect cable.															
2S8	CLOSED															

MULTIPOINT TERMINAL STRAPPING OPTIONS

HP 13260D SYNCHRONOUS MULTIPOINT COMMUNICATIONS PCA STRAPS

STRAP	SETTING FOR MTS/3000		
J17 - J16	Buffer size must be at least as large as SSLC preferred buffer size.		
	J17	J16	Buffer Size
	CLOSED	CLOSED	500 bytes
	CLOSED	OPEN	1000 bytes
	OPEN	CLOSED	2000 bytes
	OPEN	OPEN	4000 bytes
J15	OPEN — Cursor addressing disabled CLOSED — Cursor addressing enabled.		
J14 - J10	Device ID must be unique within a group (see J04 - J00). Example for Device ID 6:		
	J14, J13	CLOSED	} = CC00C = 6
	J12, J11	OPEN	
	J10	CLOSED	
J07	CLOSED		
J06	OPEN		
J05	CLOSED — Extended text mode disabled OPEN — Extended text mode enabled		
J04 - J00	Group ID must be unique within an MTS/3000 network. Example for Group ID 7:		
	J04, J03	CLOSED	} = CC000 = 7
	J02 - J00	OPEN	
-12	OPEN	The terminal is first on its line; or the terminal is not first on its line and is not connected by an HP 13232T Power Protect cable.	
	CLOSED	The terminal is not the first on its line and is connected by an HP 13232T Power Protect cable.	
A4	CLOSED		
A9 - A11	All OPEN		
RCLK	OPEN	All terminals except the first on a line; or the terminal is first on a line and clocking is provided by an external device.	
	CLOSED	The terminal is first on a line and clocking is not provided by an external device.	
2400 or 4800 or 9600	OPEN	If RCLK is OPEN, set all three OPEN	
	CLOSED	If RCLK is CLOSED, set <i>only</i> one strap CLOSED to match the appropriate line speed.	
19K	OPEN		
1200	Label has no strap. Ignore.		

MULTIPOINT TERMINAL KEYBOARD SWITCHES

RANGE Switch	Synchronous Communications, switch has no effect. Asynchronous communications, HI selects speeds 1200 and above while LO selects speeds 600 and below on the BAUD RATE switch.	
BAUD RATE Switch	Selects transmission rate. All terminals on the same line must be set to the same rate.	
PARITY Switch	ODD	
DISPLAY FUNCTIONS Key	Off; key should be in the up position.	
BLOCK MODE Key	Either position — key has no effect.	
REMOTE Key	On; key must be in the down position.	
CAPS LOCK Key	Either position — no special consideration for MTS/3000.	
MEMORY LOCK Key	Either position — no special consideration for MTS/3000.	
AUTO LP Key	Either position — no special consideration for MTS/3000.	

30037A ASYNCHRONOUS REPEATER

The HP 30037A Asynchronous Repeater is a stand-alone device which converts standard EIA RS232C communications signals to levels which are compatible with HP terminals that are operating in the asynchronous multipoint communications mode.

- With the AR, the first terminal can be located up to 609.6 meters (2000 feet) from the computer. This removes the 15.24 meter (50 foot) limitation imposed when an RS232C direct connect interface is used.
- The AR can be used in a daisy-chain connection of terminals to extend distance between terminals or to permit more flexible physical configurations.
- Two ARs can be used, one at the computer and the other at a single asynchronous RS232C terminal, to extend the distance permitted between the computer and the terminal.

The AR has two test modes:

1. Self test checks the internal operation of the AR.
2. Loop test is used with the data communications self test feature of the asynchronous multipoint terminals to verify a daisy-chain network.

AR CONNECTOR SIGNALS – TO TERMINALS

Pin No.	Mnemonic	Signal Name
1	BBO+	Received Data Out+
2	BBO-	Received Data Out-
3	BAI+	Transmitted Data In+
4	BAI-	Transmitted Data In-
5	CBO+	Clear to Send Out+
6	CBO-	Clear to Send Out-
7	CAI+	Request to Send In+
8	CAI-	Request to Send In-
9	—	Frame and Shield Ground
10 thru 14	—	Not Used

30037A ASYNCHRONOUS REPEATER

AR CONNECTOR SIGNALS – FROM TERMINALS

Pin No.	Mnemonic	Signal Name
1	BBI+	Received Data In+
2	BBI-	Received Data In-
3	BAO+	Transmitted Data Out+
4	BAO-	Transmitted Data Out-
5	CBI+	Clear to Send In+
6	CBI-	Clear to Send In-
7	CAO+	Request to Send Out+
8	CAO-	Request to Send Out-
9 thru 15	—	Not Used

AR CONNECTOR SIGNALS – DTE

Pin No.	Mnemonic	Signal Name
1	—	Not Used
2	BA	Transmitted Data
3	BB	Received Data
4	CA	Request to Send
5	CB	Clear to Send
6	CC	Data Set Ready
7	AB	Signal Ground
8	CF	Received Line Signal Detector
9, 10	—	Not Used
11, 19	SCA	Secondary Request to Send
12 thru 18	—	Not Used
20	CD	Data Terminal Ready
21 thru 25	—	Not Used

CABLE ASSEMBLY SUMMARY

HP PRODUCT NUMBER	HP CABLE		CONNECTORS (See NOTE below*)			LENGTH M=metres F=feet
	PART NUMBER	FUNCTION NAME	A	B	C	
(none)	30055-60008	Synch. I/O	I/O female	none	RS232C male	4.57M 15F
(none)	30055-60010	Asynch. I/O	I/O female	none	RS232C male	4.57M 15F
13232P	02640-60132	Modem-to- Multipoint	RS232C Hood male		Multi- point female	4.57M 15F (each leg)
13232O	02640-60133	Standard Multipoint	Multi- point male	Hood	Multi- point female	4.57M 15F (each leg)
13232R	02640-60134	Extension Cable	Multi- point male	none	Multi- point female	30.50M 100F
13232T	02640-60151	Power- Protect Multipoint	Multi- point male	Hood	Multi- point female	4.57M 15F (each leg)
13232U	5061-2403	Modem- Bypass**	RS232C female	none	RS232C female	1.52M 5F

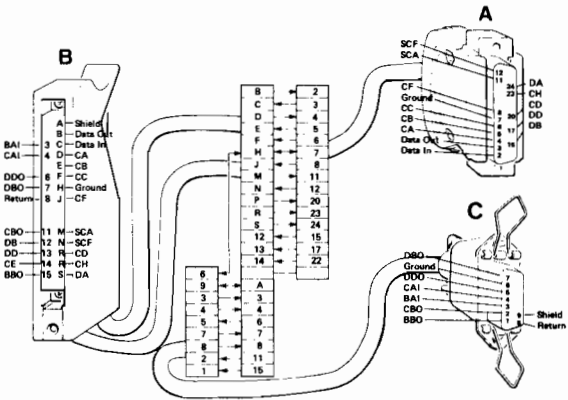
NOTES: *Install connectors A electrically toward the computer;
install connectors B onto the rear of a terminal;
install connectors C electrically away from the computer.

**Cable 13232U (5061-2403) connector A is marked "TO
COMPUTER" and must be installed correctly.

MTS/3000 CABLE ASSEMBLIES

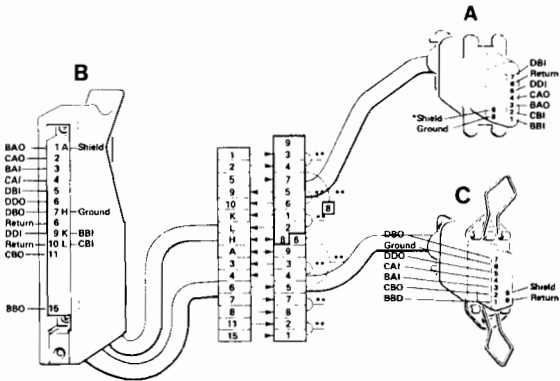
13232P (2640-60132) MODEM/MULTIPOINT CABLE

Use: First terminal in a synchronous multipoint drop
Length: 4.5 meters (15 feet)



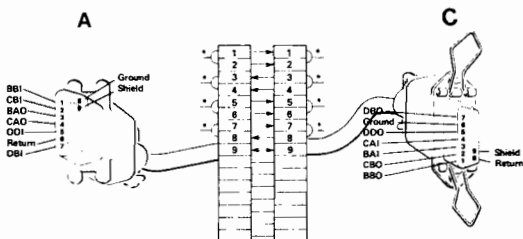
13232Q (2640-60133) STANDARD MULTIPOINT CABLE

Use: Connects asynchronous or synchronous multipoint terminals
Length: 4.5 meters (15 feet)



13232R (02640-60134) MULTIPOINT EXTENSION CABLE

Use: Extends distance between multipoint terminals. Connects to 13232Q.
 Length: 30 meters (100 feet)

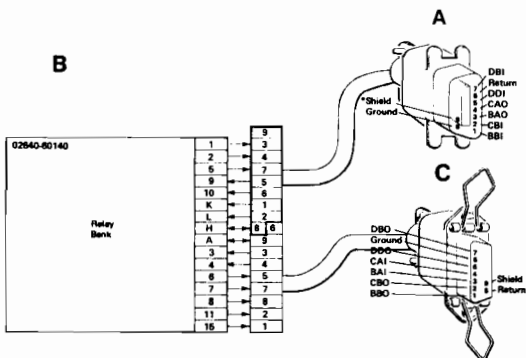


*Same twisted pair.

NOTE: Cable may be customer fabricated up to 2000 feet. See MTS/3000 Site Preparation and Installation Manual.

13232T (2640-60151) POWER-PROTECT MULTIPOINT CABLE

Use: Same as 13232Q except this cable has terminal power-down re-routing relays. If a terminal using this loses power, other terminals will not be affected.
 Length: 9 meters (30 feet)



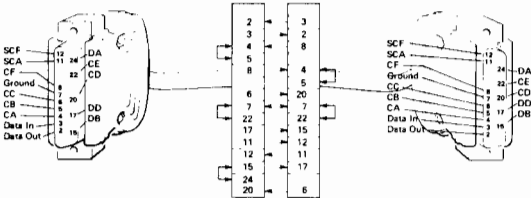
MTS/3000 CABLE ASSEMBLIES

13232U (5061-2403) MODEM BYPASS CABLE

Use: For hardwired local synchronous multipoint. Eliminates modem.
Female to female.
Length: 1.5 meters (5 feet)

A

B



OPENING AND CLOSING AN MTS LINE

```
=MPLINE idn, { OPEN [,speed]
                SHUT
                TRACE, { ON [, [ALL] [, [mask] [, [numentries]
                        [, [WRAP] [, [filename] ] ] ] ]
                        OFF
                }
            }
```

Idn Logical device number of the Multipoint Supervisor that is associated with the line you want to open, close, or trace.

OPEN Opens the line and initiates MTS execution.

speed Transmission speed. Parameter is effective only if MPE system configuration selected SPEED CHANGEABLE and the speed of the physical line is changed.

BIT RATE	SPEED (IN CHARS PER SECOND) EQUALS BIT RATE / 8	RESULTING TRANSMISSION RATE (CHARS PER SECOND)	
		ASYNCHRONOUS	SYNCHRONOUS
9600	1200	960	1200
7200	900	720	900
4800	600	480	600
2400	300	240	300
2000	250	200	250

SHUT Terminates MTS execution and closes the line.

TRACE Specifies the CS trace facility is to be activated or deactivated.

ON Activates CS trace. A line must be opened before you can trace that line.

ALL Generates trace records for all line activity. If omitted, trace records are written only for transmission errors.

mask	An octal integer preceded by a percent sign (%nn). Specifies the type of trace entries. Default is %37.
------	---

numentries A decimal integer. Maximum number of entries in a trace record, not greater than 255. Once established, CS file must be purged in order to increase numentries. Default is 25.

WRAP	Causes trace entries that overflow the trace area (greater than numentries) to overlay the prior trace entries. If omitted, overflow entries are discarded.
------	---

filename	Trace file name. If omitted, trace creates a file named CSTRACE in PUB.SYS.
----------	---

OFF Deactivates the CS trace facility.

MTS/3000 EXECUTION CHARACTERISTICS

	ASCII TRANSFERS (DEFAULT) Can be explicitly enabled through FCONTROL, controlcode 26.	NDRMAL TERMINAL CONTROL DISABLED through FSETMODE	UNEQITED MODE with end-of-record character <> %137. Enabled through FCONTROL, con- trolcode 41.	UNEDITED MDDE with end-of-record character =%137. Enabled through FCONTROL, con- trolcode 41.	BINARY TRANSFERS Enabled through FCONTROL, control- code 27.
MTS checks for an MPE defined end-of-file condition (for example, HELLO; EOF; etc.)	YES	YES	YES	YES	NO
Straps D and J are opened before the first write when a session is logged on or the terminal is opened and allocated from a program.	YES	YES	Straps D and J are not altered by MTS when unedited mode is entered nor so long as the terminal stays in unedited mode.	Straps D and J are not altered by MTS when unedited mode is entered nor so long as the terminal stays in unedited mode.	NO
MTS/3000 normally follows each write with ESC _.	YES	YES	YES	NO	NO
GS as a last character is stripped from input data.	YES	YES	YES	NO	NO

	ASCII TRANSFERS (DEFAULT) Can be explicitly enabled through FCONTROL, controlcode 26.	NORMAL TERMINAL CONTROL DISABLED through FSETMODE	UNEDITED MODE with end-of-record character <> %137. Enabled through FCONTROL, con- trolcode 41.	UNEDITED MODE with end-of-record character = %137. Enabled through FCONTROL, con- trolcode 41.	BINARY TRANSFERS Enabled through FCONTROL, control- code 27.
Normal terminal control is enabled. Each read is followed by sending CR LF ESC_ to the terminal.	YES	NO	NO	NO	NO
CR and LF characters are stripped from input.	YES	YES	YES	NO	NO
MTS checks output data for incorrect or improperly terminated escape sequences. If any are found, the write is not followed by ESC _.	YES	YES	YES	NO	NO
NOTES: 1. MTS/3000 opens straps D and J to disable unedited mode when the terminal enters the break mode. 2. Normally an application program would enable only one of the above described modes at a time. If a program invokes more than one mode simultaneously, the mode listed in the column to the right of all other selected modes takes precedence. 3. There can be more than one file opened on a terminal at a given time (remember the ASCII file \$STDLIST is always open when a session logs on). Since binary mode is effective only for a particular file opened on the terminal, the unedited mode (with end-of-record character = %137) should be used if MTS functions are to be disabled for both system and terminal user.					

CONTROL CODES FOR FCONTROL

MTS/3000 returns those FCONTROL requests not applicable to a multipoint environment as successfully completed, even though they did not execute. In addition, if a program requests an operation not supported by a terminal, the request is returned as invalid.

CONTROL OPERATION	CONTROL CODE	RESULT UNDER MTS/3000
Set input speed and return previous speed.	10	Speed not changed; current speed is returned.
Set output speed and return previous speed.	11	Speed not changed; current speed is returned.
Enable echo.	12	No operation.
Disable echo.	13	No operation.
Disable system break.	14	Standard operation.
Enable system break.	15	Standard operation.
Disable subsystem break.	16	Standard operation.
Enable subsystem break.	17	Standard operation.
Disable tape mode option.	18	Invalid request.
Enable tape mode option.	19	Invalid request.
Disable terminal input timer.	20	Standard operation.
Enable terminal input timer.	21	Standard operation.
Read terminal input timer.	22	Standard operation.
Disable parity checking.	23	No operation.
Enable parity checking.	24	No operation.
Define line-termination character for terminal input.	25	Use is limited as described in MTS manual.
Disable binary transfers.	26	Standard operation.
Enable binary transfers.	27	Standard operation.
Disable user block mode transfers.	28	No operation.
Enable user block mode transfers.	29	No operation.
Disable line deletion echo suppression.	34	No operation.
Enable line deletion echo suppression.	35	No operation.
Set parity.	36	No operation.
Allocate a terminal.	37	Valid request for terminal types 0 and 14, invalid for any other terminal type.
Set terminal type.	38	
Obtain terminal type information.	39	Standard operation.
Obtain terminal output speed.	40	Returns the speed as entered in the =MPLINE command or the configured default speed.
Set unedited terminal mode.	41	Disables automatic MTS functions.

The following table includes console messages. It does not include CS error codes; these are given in Section I of this handbook. The errors users can receive are listed in the appropriate MPE documentation.

MTS sends messages to the system console in the format:

time/pin/MPLINE ldn - message

where "message" can be any of the following.

ERROR DETECTED WHEN TURNING TRACE OFF

MTS detected an error while turning off trace. Unusual condition. Report to HP representative.

ERROR DETECTED WHEN TURNING TRACE ON

MTS detected an error while turning on trace. Unusual condition. Report to HP representative.

INVALID LINE = RETURNED FROM READ OR WRITE

Communications software returned an invalid line number on a read or write. Unusual condition. Report to HP representative if problem persists.

LINE ALREADY OPEN

You tried to open a line that is already open.

LINE ALREADY SHUT

You tried to close a line that is currently closed.

LINE BEING SHUT

MTS in process of closing the line. Current multipoint sessions continue until they log off or until they are aborted by the console operator. No new sessions are accepted after a SHUT command.

LINE IS NOW SHUT

MTS/3000 line closing process has completed.

LINE MUST BE OPEN BEFORE ACCESSING TRACE

You tried to activate trace before opening the line. Open line and then turn on trace.

LINE WILL BE SHUT DUE TO IRRECOVERABLE ERROR

MTS is closing the line because it detected an irrecoverable CS error.

MULTIPOINT VERSION nnn nnn nnn nnn

Message is printed after the console operator opens a line. The four sets of numbers specify version numbers for modules MPMON, IPMPTRMO, IOMPSO, and MPMONCMD, respectively.

NOT A MULTIPOINT LINE

Invalid logical device number in =MPLINE command. Reenter correctly.

MTS/3000 CONSOLE ERROR MESSAGES

READ ERROR

Cause could be that a person working at a terminal entered an invalid control character. MTS cannot determine which multipoint terminal caused the problem.

READ ERROR (BAD STATION # RETURNED)

CS returned an invalid terminal address on a read operation. Report to HP representative if problem persists.

READ ERROR (CS ERR nnn)

CS detected a read error. Refer to CS Error Codes in Section I.

READ ERROR ON TERMINAL LDEV = ldn (CS ERR nnn)

Error while reading from the specified terminal. Refer to CS Error Codes in Section I.

SYSTEM ERROR (UNABLE TO CREATE MPMON PROCESS)

The CREATE intrinsic failed for the MPMON process. Unusual condition. Report to HP representative if problem persists.

TRACE ALREADY OFF

You tried to turn trace off but it is already off.

TRACE ALREADY ON

You tried to turn trace on but it is already on.

UNABLE TO ALLOCATE MULTIPOINT SUPERVISOR

MTS not able to allocate the Multipoint Supervisor through the FCONTROL intrinsic.

UNABLE TO OPEN MPMON FILE IN PUB.SYS ACCOUNT

The MPMON file may be missing from the PUB.SYS account.

UNABLE TO OPEN MULTIPOINT LINE (CS ERR nnn)

MTS unable to open the specified line. Refer to CS Error Codes in Section I.

UNABLE TO OPEN MULTIPOINT SUPERVISOR

MTS unable to open Multipoint Supervisor. Unusual condition. Report to HP representative if problem persists.

UNABLE TO READ FROM MULTIPOINT SUPERVISOR

A read request from MPMON to the Multipoint Supervisor failed. Unusual condition. Report to HP representative if problem persists.

MTS/3000 CONSOLE ERROR MESSAGES

WRITE ERROR ON TERMINAL LDEV # ldn

Error while writing to the specified terminal. Some data was lost.

WRITE ERROR ON TERMINAL LDEV # ldn (BAD LINE #)

CS returned an invalid line number on a write operation. Unusual condition. Report to HP representative if problem persists.

WRITE ERROR ON TERMINAL LDEV # ldn (CS ERR nnn)

Write error on the specified terminal. Refer to CS Error Codes in Section I.



CS TRACE FACILITY AND CS ERRORS



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Recoverable CS Errors	I-15
System Failures	I-15

TRACE

May be utilized by any subsystem that uses the CS drivers. Provides a recorded file of events that have occurred on the communications line.

CSTRACE FILE

System Default File Name: CSTRACE

User Defined File Name: FILE CSTRACE = oldfile name

File Parameters

PARAMETER	VALUE
formal file designator	CSTRACE
FOPTIONS (0:7)	0
(7:1)	0 (no carriage control)
(8:2)	1 (variable length records)
(10:3)	0 (use actual file designator)
(13:1)	0 (binary file)
(14:2)	11 (old file)
AOPTIONS (0:8)	0
(8:2)	0 (exclusive access)
(10:1)	0 (disallow dynamic locking/unlocking)
(11:1)	0 (no multi-record option)
(12:4)	1 (write only; purge old contents)
blockfactor	1

The trace file is opened for variable length records because each line using it may have different record size requirements.

If the trace file cannot be opened because it does not exist, then a new file will be opened in the system domain.

If an error occurs when trying to open the trace file, the particular COPEN intrinsic call will fail.

If a line being closed is the last one using the trace file, the CS/3000 trace facility issues an FCLOSE intrinsic call with the following parameters:

PARAMETER	VALUE
filenum	trace filenum
disposition	1 (save)
SECCODE	(0) unrestricted access

LIST FILE

```
:FILE LIST;DEV=LP      (LP is assumed to be the device class name
                        for one or more line printers)
```

```
:FILE LIST;DEV=filename (filename is assumed to be the name of an
old job or system disc file)
```

If a list file does not exist or is not defined by a :FILE command, and the run PARM is not a one, the trace dump program uses \$STDLIST as the list file. If the run PARM was set to one, then the dump program attempts to open the file, "LIST", as an old job or system file. If this fails because "LIST" does not exist, then "LIST" will be opened as a new file in the system domain. After the dump program has run, the contents of this file may be used by the HP Editor with the "/TEXT LIST, UNNUMBERED" command.

CSDUMP PROGRAM

Formats and lists the CSTRACE file and is invoked through:

```
:RUN CSDUMP.PUB.SYS[PARM=1]
```

INVOKING THE TRACE FACILITY

```
=DSLNE xx, TRACE, ON[, [ALL] [, [mask] [, [numentries] [, [WRAP] [, file-  
name]]]]
```

```
#RJLINE xx;TRACE=[ALL] [.mask] [.numentries] [.WRAP]]
```

Specify a mask that indicates the type of entries to be traced. The format of the trace mask is:

(2:6) 0 = use driver default trace mask

>0 = trace mask indicating what types of trace entries are to be generated. The format of the trace mask is as follows:

bit 2 = generate STN entries

bit 3 = generate OPR and EDT entries (default)

bit 4 = generate RCT entries (default)

bit 5 = generate RTX entries (default)

bit 6 = generate SCT, POL, SEL entries (default)

bit 7 = generate STX entries (default)

Note: CMP entries are automatically generated.

$0 \leq \text{mask} \leq \%77$ (right justified)

For DEFAULT mask and/or numentries, the following default conditions exist:

- Trace I/O errors only.
- Flush overflow trace entries.
- Generate all entry-types except STN.
- Maximum of 25 trace entries per trace record.

TRACE

TRACE FILE ENTRY TYPES

MNEMONIC	ENTRY TYPE	DEFINITION
OPR	Operation	This type of trace entry is generated each time the physical driver is called upon to perform an operation. The OPR trace entry tells what operation is to be performed.
STN	State Transition Entry	This type of trace entry is generated each time the driver transfers from one internal state to another. The STN trace entry tells what event just happened and what action is about to be performed.
EDT	Editor Entry	This type of trace entry is generated each time a text message or control character sequence is received from the remote station. In the case of a text message, the EDT trace entry shows the first 13 (for HSI) or 14 (for SSLC) words of the user's buffer; control characters, pad characters, and CRC parity sequences are omitted. In the case of a control character sequence, the EDT trace entry supplies a mnemonic phrase telling what was received.
RCT	Receive Control Sequence Entry	This type of trace entry is generated each time a control character sequence is received from the remote station. The RCT trace entry shows (in octal) byte-for-byte exactly what was received.
SCT	Send Control Sequence Entry	This type of trace entry is generated each time the driver sends a control character sequence to the remote station. The SCT trace entry shows (in octal) byte-for-byte exactly what was sent.
RTX	Receive Text Entry	This type of trace entry is generated each time a text message is received from the remote station. The RTX trace entry shows (in octal) byte-for-byte exactly what was received.

TRACE FILE ENTRY TYPES (Continued)

MNEMONIC	ENTRY TYPE	DEFINITION
STX	Send Text Entry	This type of trace entry is generated each time the driver sends a text message to the remote station. The STX entry shows (in octal) byte-for-byte exactly what was sent.
CMP	User Request Completed	This type of trace entry is generated each time a user request (i.e., a CREAD, CWRITE, driver-performed CCONTROL, or CCLOSE intrinsic call) is completed. The CMP trace entry summarizes the number of text messages sent and received, the number of errors that have occurred, etc.
POL	Send Polling Sequence Entry	This type of trace entry is generated each time the driver sends a polling sequence. The POL shows the sequence byte-for-byte. All BSC control characters (such as SYN, EOT, and ENQ) are not shown.
SEL	Send Selection Sequence Entry	This type of trace entry is generated each time the driver sends a selection sequence. The SEL shows the sequence byte-for-byte. All BSC control characters (such as SYN, EOT, and ENQ) are not shown.

TRACE DUMP ANALYSIS

HEADER

```

*** CS TRACE DUMP FACILITY ***  TUE, JAN 6, 1977, 12:32 AM
TRACE FILE IS CSTRACE.CS30.DC
LAST OPENED ON TUE, JAN 6, 1977, 12:01 AM
SYSTEM ID=02.66

```

At the start of the trace listing is a header message telling the date and time-of-day when the listing was printed and the fully-qualified name of the trace file being used. The meanings of the three remaining items in the header message are as follows:

- | | |
|---------------------|--|
| LAST OPENED ON etc. | This tells you the data and time-of-day when the trace was performed. |
| SYSTEM ID=xx.yy | This tells you the version number (xx) and fix level (yy) of the MPE/3000 operating system that was being used when the trace was performed. |
| CS ID=xx.yy | This tells you the version number (xx) and fix level (yy) of the CS/3000 subsystem that was being used when the trace was performed. |

TRACE

* BEGIN TRACING FOR DEVICE 13 *

-L-I-N-E---I-N-F-O-R-M-A-T-I-O-N---D-I-S-P-L-A-Y

* LINE NUMBER: 1 LOGICAL DEV. NUMBER: 13 *
* DEV. TYPE: 18 SUBTYPE: 3 VER: A.02.00 *
* 0123456789012345 *
* COPTIONS: 0001000011000010 *
* AOPTIONS: 0000000100001101 *
* DOPTIONS: 0100010100000000 *
* NUMBUFFERS: 1 BUFFSIZE: 4200 (BYTES) *
* INSPEED: 1200 OUTSPEED: 1200 *
* MISCARRAY: RECEIVE TIMEOUT: 20 SECS. *
* LOCAL TIMEOUT: 900 SECS. *
* CONNECT TIMEOUT: 900 SECS. *
* RESPONSE TIMEOUT: 3 SECS. *
* LINE BID TIMEOUT: 60 SECS. *
* NO. ERROR RETRIES: 7 *
* CLEAR-TO-SEND DELAY: 00.0 SECS. *
* DATA-SET-READY DELAY: DISABLED. *
* TRANSMISSION MODE: DUPLEX. *
* MMSTAT TRACE FACILITY: ENABLED. *
* POLL LOOP DELAY: 250 MSECS. *
* POLL REPEAT: 100 *
* POLL ENTRY DELAY: 0 MSECS. *
* DRIVERNAM: CSSBSCI *
* CTRACEINFO: ENTRIES=25 MASK=011111 *
* TYPE OF TRACE = ALL, WRAP *
* POLLIST: ENTRIES=1 INDEX=1 *
* 1 GRP = 1 *
* PHONELIST: ENTRIES=0 INDEX=0 *
* IDLIST: ENTRIES=0 INDEX=45 *
* SUPLIST: GROUPS=1 DESC=00000000 *
* GRP 1 STATIONS= 4 DESC=00000001 *
* POLL ID = 4141 *
* SEL ID = 6161 *
* GEN POLL ID= 2222 *
* STA 1 COMPONENTS= 1 TYPE=0 *
* CMP 0 POLL= 4141 *
* SEL= 4141 *
* STA 2 COMPONENTS= 1 TYPE=0 *
* CMP 0 POLL= 4242 *
* SEL= 4242 *
* STA 3 COMPONENTS= 1 TYPE=0 *
* CMP 0 POLL= 4343 *
* SEL= 4343 *
* STA 4 COMPONENTS= 1 TYPE=0 *
* CMP 0 POLL= 4444 *
* SEL= 4444 *
* ERRORCODE: RECOVERABLE=0 IRRECOVERABLE=0 *
* MSGSENT: 110 MSGRECV: 21 *
* RECOVERERRORS: 0 IRRECOVERERRORS: 0 *

Group Poll/Select
IDs (General)

Station/Device ID

One for Each
Group on a
"Line"

Stations in
the Group

BEGIN TRACING MESSAGE —**LINE NUMBER —**

AFT entry.

LOGICAL DEV. NUMBER —

Number as specified during system configuration.

DEV. TYPE —

As specified during system configuration. SSLC=18, HSI=19

SUBTYPE —

As specified during system configuration.

- 0 Point-to-point switched line (modem)
- 1 Point-to-point non-switched line (modem)
- 3 Point-to-point non-switched line (no modem)
- 7 Non-switched (hardwired) line with ASYNC mode.

VER —

CS driver version number.

OPTIONS —

A word describing the communications options associated with the line.

- (0:1) inhibit timeouts
 - = 0 allow timeouts
 - = 1 disable all timeouts
- (1:1) ID Sequence Verification
 - = 0 allow the use of ID sequences (both user-supplied and configured defaults)
 - = 1 inhibit the use of ID sequences. Any user-supplied or configured default ID sequences will be ignored (applies to both local and remote ID sequences).
- (2:1) CS trace
 - = 0 do not invoke CS trace facility.
 - = 1 invoke CS trace facility.
- (3:1) :CLINE override
 - = 0 allow CLINE command override
 - = 1 prohibit CLINE command override.
- (4:2) Speed Select (European modems only)
 - = 0 use configured default setting
 - = 1 set speed to low speed
 - = 2 set speed to high speed
 - = 3 reserved for future use. Specification of this value will cause a COPEN error.

TRACE

(6:4) Local Mode ("local" means the station at your end of the line)

- = 0 use configured default setting
- = 1 local is a primary contention station
- = 2 local is a secondary contention station
- = 3 local is a control station on a multipoint line
- = 4-15 reserved for HP use

A COPEN error will result if localmode is not compatible with either COPEN parameters or configured line values.

(10:6) Transmission code

- = 0 use configured default setting
- = 1 use automatic code sensing feature of driver
- = 2 ASCII
- = 3 EBCDIC
- = 4-63 reserved for HP use

AOPTIONS -

A word describing the access options associated with the line.

(0:8) Protocol

- = 0 use configured default protocol
- = 1 use BSC protocol
- = 2 use MRJE protocol (Conversational BSC)
- = 3-255 reserved for HP use

A COPEN error will result if protocol is not compatible with configured line specifications or driver capabilities.

(8:3) (Reserved for future use.)

(11:1) Inhibit Console Error Message

- = 0 allow CS to print hardware error message at operator console.
- = 1 inhibit CS from printing hardware error message at operator console.

(12:2) Dial type

- = 0 dial on write connect; answer on read connect
- = 1 answer on write connect; dial on read connect
- = 2 dial on write connect; dial on read connect
- = 3 answer on write connect; answer on read connect

(14:1) :CLINE buffer override

- = 0 allow :CLINE override for NUMBUFFERS and BUFFSIZE
- = 1 disallow buffer information override

(15:1) Wait mode

- = 0 perform all I/O using NCIO
- = 1 perform all I/O using CIO

Note: Only users executing in privileged mode may open a line with CIO and no buffering.

DOPTIONS —

A word describing driver-related options. For the SSLC Driver, the format of DOPTIONS is as follows:

- (0:1) Reserved for future use.
 - (1:1) Delay sequence wait.
 - = 0 Wait on received WACK/TTD sequences.
 - = 1 Do no wait on received WACK/TTD sequences.
 - (2:1) Poll termination sequence.
 - = 0 Before switching between stations, an RVI is transmitted to return the line to control mode.
 - = 1 Before switching between stations, an EOT is transmitted to return the line to control mode.
 - (3:1) Control state listen mode.
 - = 0 While in control state and between user requests the driver will listen for any control sequences from the remote.
 - = 1 While in control state and between user requests the driver will ignore any control sequences from the remote.
 - (4:2) Ending sequence:
 - = 0 Use BSC default (NSW=send EOT; SW = send DLE EOT)
 - = 1 send DLE EOT
 - = 2 send EOT
 - (6:1)
 - = 0 the remote will not send leading graphics
 - = 1 expect leading graphics from the remote
 - (7:1) Value of USASCII block check character (bcc).
 - = 0 VRC/LRC (non-transparent mode or transparent with header)
 - CRC-16 (transparent mode with no header)
 - = 1 VRC/CRC-16 (non-transparent mode) CRC-16 (transparent mode)
 - (8:1)
 - = 0 automatic generation of WACK
 - = 1 no WACK will be sent
 - (9:1)
 - = 0 automatic generation of TTD
 - = 1 no TTD will be sent
 - (10:1) = 0 do not expect to receive ITB sequences from the remote station
- Note: If an ITB sequence is received, the driver will require a retransmission to properly receive the message. The driver then sets this bit to a one.
- = 1 Expect ITB sequence from the remote station.
 - (11:2) Message Format Word (MFW)
 - = 0 MFW will not be placed into received text nor expected in sent text. CS will use an implicit MFW of 000000 for sent text.
 - = 1 MFW will not be placed into received text nor expected in sent text. CS will use an implicit MFW of 100000 for sent text.
 - = 2 MFW will be placed into received text and expected in sent text.
 - = 3 reserved for future use.

TRACE

- (13:1) Reserved for future use.
- (14:2) Number of leading SYNs
 - = 0 send four leading SYNs
 - = 1 send eight leading SYNs
 - = 2 send twelve leading SYNs
 - = 3 send sixteen leading SYNs

For the HSI Driver, the format of DOPTIONS is as follows:

- (0:1) Reserved for future use.
- (1:1) Delay sequence wait
- (2:1) Ignored
- (3:1) Control state listen mode
 - = 0 while in control state and between user requests the driver will listen for any control sequences from the remote. Receipt of a line bid will cause the line to be placed into text state.
 - = 1 while in control state and between user requests the driver will ignore any control sequences from the remote.
- (4:2) Ending sequence:
 - = 0 use BSC default (NSW=send EOT; SW=send DLE EOT)
 - = 1 send DLE EOT
 - = 2 send EOT
- (7:1) Ignored
- (8:1) = 0 automatic generation of WACK
 - = 1 no WACK will be sent
- (9:1) = 0 automatic generation of TTD
 - = 1 no TTD will be sent
- (10:3) Ignored
- (13:1) Reserved for future use.
- (14:2) Ignored

Note: Most of the remaining LID entries are self-explanatory.

NUMBUFFERS —

BUFFSIZE —

May differ from configured size due to subsystem requirements (i.e., RJE 3780 = 512 words, etc.).

INSPEED/OUTSPEED —

One character per second modem with internal clocking ignores these configured values.

MISCARRY —

The time out values may change during execution, and may not be operational depending on subsystem and function.

MISCARRY format is:

Logical Array

0 Number of words of parameter information following this word.

1 Parameter type.

Repeat the last two fields for each parameter type to be specified.

0 Receive Timeout (sec.) Default = 20*

1 Local Timeout (sec.) Default = 60*

2 Connect Timeout Default = 900*

3 Change Response Timeout Default = 3*

4 Change Line Bid Timeout Default = 60*

5 Number of Error Recovery Retries Default = 6

6 = 0 Clear-To-Send. Delay determined by modem.

<> Clear-To-Send. Delay value in tenths of seconds.

7 = 0 Data Set Ready. No stabilization time.

= 1 Data Set Ready. 100 msec stabilization time after it goes true.

8 = 0 Transmission mode = full duplex.

= 1 Transmission mode = half duplex.

9 = 0 Disable MMSTAT trace facility.

<> 0 Enable MMSTAT trace facility (Memory Management).

10 = 0 Disable outgoing fixed length blocking

<> 0 Enable fixed length blocking of outgoing text. Block size = parameter.

11 Poll Loop Delay. (.01 sec. each) Delay between iterations through Poll List (0 = ∞).

12 Poll Repeat. Number of iterations through Poll List (0 = ∞). Terminates when station responds or number of passes satisfied.

13 Poll Entry Delay. (.001 sec. each) Delay between polling entries in list. 0 disables timeout.

*A value of 0 will disable timeout.

DRIVERNAME —

As specified during system configuration.

CTRACEINFO —

Note the CSTRACE file must be purged and rebuilt to change these characteristics.

TRACE

POLLIST —

PHONELIST —

Note RJE does not use phone list.

IDLIST —

Note RJE does not use IDLIST.

SUPLIST —

ERRORCODE —

MSGSENT/MSGRECV —

Number of blocks correctly received or sent and acknowledged.

RECOVERERRORS —

Number of errors during entire **TRACE** duration.

IRRECOVERERRORS —

Note the subsystem may fail due to satisfactory BISYNC conditions which may abort the job, but still not be considered an irrecoverable error (i.e., receive a DLE EOT).

IRRECOVERABLE CS ERRORS

CODE (Decimal)	MEANING
0	Request completed successfully.
1	None or too many groups.
2	None or too many stations.
3	None or too many components.
4	Invalid poll/selection sequence length.
5	Not enough stack space for COPEN.
6	Invalid driver name.
7	Driver not in system.
8	Driver not compatible with line's attributes.
9	This line not configured to change drivers.
10	Undefined line.
11	Line not available.
12	Not CS line.
13	CS line is use.
14	ID sequence length greater than 16 characters.
15	Buffer size greater than 4096 words
17	Phone number length greater than 20 characters.
18	Character in phone number was not numeric or a hyphen.
19	Local mode not compatible with line type.
20	Invalid information type.
21	Invalid information value.
22	Invalid number of components.
23	Invalid entry in the Pollist.
24	Could not open trace file.
25	Trace file record size was too small.
26	User does not have CS capability.
27	Invalid line designator.
28	No line specified.
29	Too many files/lines.
30	No up entry in the Pollist.
31	Insufficient memory space.
32	Driver failed to open line.
33	Local mode was control station, but SUPLIST parameter was not specified.
48	No virtual memory available for trace and/or buffering.
49	DB not pointing at stack.
51	Invalid line number.
52	Invalid parameter value.
53	I/O error on trace file.
54	Not used.
55	Buffer or count not specified.
56	Invalid buffer count parameter.
57	Operator responded "no" to a dial message.
58	No phonelist for dial attempt.
59	Bad dial message (system problem).
60	Invalid array length parameter.
61	Bad CCONTROL code.
63	No I/O in progress for abort.
64	Abort ignored.
65	Logical group number invalid.
66	Logical station number invalid.

CS ERRORS

IRRECOVERABLE CS ERRORS (Continued)

CODE (Decimal)	MEANING
67	Logical component number invalid.
73	Parameter bounds violation.
77	Concurrent I/O in progress.
78	No I/O pending for any file/line.
79	No I/O pending for specified file/line.
101	Nonresponding Synchronous Single Line Controller (SSLC).
102	SIO transfer error.
103	Modem became not ready. Data Set not ready.
104	Carrier loss occurred on modem.
105	Data overrun on the HSI or SSLC.
151	Connect timeout occurred.
153	Remote station rejected the connection.
154	Power failure occurred.
155	Local timeout occurred.
156	An internal error was detected by the CS driver.
157	Remote protocol error occurred.
158	Remote station sent shutdown sequence and disconnected.
159	Remote sent shutdown sequence and disconnected before the last I/O request was issued.
160	An internal error was detected by MPE.
201	Current I/O operation aborted.
202	Invalid Emulator request was detected by CS driver.
203	Remote not ready to receive (remote sent a NAK sequence in response to local line bid).
204	Remote rejected the line bid.
205	Remote primary station bid for the line while local station was also bidding.
206	Remote has requested to send (an RVI sequence was received).
207	Retry count exhausted.
208	Unexpected text was received.
209	Receive timeout occurred while waiting for text from the remote station.
210	Remote sent end-of-transmission.
211	Remote sent end-of-transmission sequence and disconnected before the last I/O request was issued.
212	During execution of a conversational write with the output buffer specified or the input buffer, the remote station requested a resend of the output buffer but its contents had been modified while receiving from the remote.
213	Remote sent an ACK sequence in response to local acknowledgment.
214	Remote sent a NAK sequence in response to local acknowledgment.
215	Remote sent an RVI sequence in response to local acknowledgment.
216	Remote requested a download sequence be initiated.
217	No line bid was received from the remote.

IRRECOVERABLE CS ERRORS (Continued)

CODE (Decimal)	MEANING
218	Remote sent a delay sequence instead of expected text/ response.
219	Pollist entries polled required number of times. No station responded.
220	An EOT received before last block of multiblock trans- mission was sent.
221	After RVI sent, remote responded with text instead of expected EOT.
222	All stations on a multipoint line are down.
223	Buffer overflow.

RECOVERABLE CS ERRORS

CODE (Decimal)	MEANING
0	No recoverable error occurred.
1	Invalid ID sequence received.
2	Received unintelligible sequence.
3	Block check character field check sequence error.
4	Response timeout.
5	Received incorrect acknowledgment.
6	Remote attempted to bid for the line.
7	Remote did not respond to local's line bid.
8	Received unintelligible sequence after sending text.
9	Received enquiry character after sending text.
10	Remote requested a resend of local's last response.
11	Remote requested resend of last text block.
12	Received end-of-transmission character while in control state.
13	Received text overflow.
14	Data overrun occurred on SIO multiplexer.
15	Transfer error occurred on the SIO multiplexer.

SYSTEM FAILURES

CODE (Decimal)	MEANING
900	I/O request no longer associated with the user's process.
902	Unable to freeze or unfreeze segment in main memory.
903	Unable to lock or unlock segment in main memory.
904	Unable to increase data segment size.
905	Unable to decrease data segment size.
909	Invalid pointer to pollist area.



HP 2026 DATA ENTRY/COMMUNICATIONS SYSTEM

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HP 2026

HP 2026 — Product Number 22704A, Reference Manual 22704-90001

WHAT YOU CAN DO:

- Use the console on the HP 2026 as an interactive terminal on an HP 3000.
- Transfer files between an HP 3000 and an HP 2026.

WHAT YOU CANNOT DO:

- Initiate transfers from the HP 3000.
- Access 2026 files from an HP 3000 terminal.

SYSTEM HARDWARE

HP 2026:	Uses the 12618A Synchronous Communications Interface Kit which is standard on the HP 2026.
HP 3000:	Uses an SSLC with standard connection to a modem.
Between the Two:	Two modems and a transmission line, or a modem eliminator cable. There is no restriction on the line, whether half or full duplex, dialed or leased.

SYSTEM SOFTWARE

HP 2026	Part of the standard package. Foreground — :RU,DS Background — Program =21
HP 3000:	DS MIT 1745 or later. Program DS2026CN must be present, as well as DS/3000.

USING DS/2026 — ON THE HP 3000

- Configure the Subsystem.

Run DS2026CN.PUB.SYS to create and initialize the files QUE2026 and DS2026CF. DS2026CN asks for a file command for DSLOG. A carriage return/line feed response results in the default:

```
FILE DSLOG;DEV=LP;CCTL;REC=,1,U,ASCII
```

Also asks for the maximum number of records in the non-message and message files that are to be transmitted from the HP 2026 in the HP 3000 and for the maximum number of files to be queued from the HP 3000.

- Open the communications line using the DSLINE command.
- If files are to be queued on the HP 3000 for transmission to the HP 2026, make a queue entry in QUE2026 for each file to be queued:

Byte 0	M	A message file
	blank	A non-message file
Bytes 1-35	file name [/lockword] [.group] [.account]	
Bytes 36-55	Descriptive Data	

Queue entries may be made by a program or by the Editor.

USING DS/2026 – ON THE HP 2026

- :RU,DS (or run program #21 in the background).
- The first time DS is run, provide a default MPE HELLO command. Can be changed later with the HP DS/3000 command –RECON.
- DS signals it is waiting for your next command by displaying READY on the 2026 console.
- Specify commands as follows:

```
-command[,I[,HELLO. . .]]
```

where I specifies interactive mode so that the line is not terminated after the command completes. If HELLO is omitted, the default will be used.

MISCELLANEOUS NOTES

- When operating a remote session, the prompt for all HP 3000 MPE commands is #. If the user starts a command with a dash (-), the command is interpreted as a local HP 2026 command. If the command initiates a file transfer, interactive mode terminates without the line being dropped and the file transfer occurs.
- Control-Y and control-B (for break) must be followed by RETURN (carriage return, line feed) to complete the response.
- File IDs are used to create file names on the HP 3000. They are also written to DSLOG. The name given to a file being transmitted to the HP 3000 consists of the File ID (up to six bytes) plus the first two characters of the destination code.
- On the HP 2026, the Data Entry Application DSQUE is used for queuing DB files. If it is necessary to rebuild DSQUE (for example, to make it larger), run the CFILE program and respond to questions as follows:

a. Control Information	CN
b. Security Levels	ALL
c. Lockout	NO
d. Delete by Position	NO
e. Output Record Length	34

HP 2026

- f. Maximum Number of Records 1 + number desired
 - g. Output Blocking 1
 - h. Enter the blank records (same number as in response f. above), followed by /E. To enter a blank record on the HP 2026 console, type at least one space followed by RETURN.
- D1 and D2 are HP 2026 disc files reserved for use as I/O devices simulating magnetic tape.
 - T1 and T2 are the designated magnetic tape units. T1 corresponds to unit 0; T2 corresponds to unit 1.
 - Complete details on DS/2026 may be found in the HP 2026 Data Entry/Communication System Reference Manual (22704-90001).

HP 2026 DS COMMANDS

- INTER Establish an interactive session on the HP 3000.
- SEND Send a message file (from D1,D2,T1 or T2).
- MSEND Send one or more files automatically, each with an ID and routing information (from D1, D2, T1, T2 or DB files).
- QSEND Send the DB files listed in the DSQUE file (see below, DSQUE).
- RECV Receives a specifically named file from the HP 3000 (to D1, D2,T1 or T2).
- ARECV Receives multiple files queued on the HP 3000 without operator intervention (to D1,D2,T1 or T2). Autoanswer would allow multiple calls to be received.
- MS2AR Perform —MSEND followed by —ARECV without dropping the line.
- RECON Define a new default HELLO command.
- ADV Advance D1,D2,T1 or T2.
- BKSP Backspace D1,D2,T1 or T2.
- REW Rewind D1,D2,T1 or T2.
- EXIT Exit DS. Transmit a BYE command to the HP 3000 if in interactive mode.
- QRECV Receives multiple files, as the —ARECV function, and waits on-line for more data to be queued when the HP 3000 queue is empty