CENTRAL PROCESSOR INSTRUCTION EXECUTION TIMES

(Times Listed in Minor Cycles)

A. I. Hurson

BRANCH UNIT

00	STOP		—
01	RETURN JUMP to K		14
02	GO TO K + Bi (Note 1)		14
030	GO TO K if Xj = zero	Note 2	9*
031	GO TO K if Xj ≠ zero		9*
032	GO TO K if Xj = positive		9*
033	GO TO K if Xj = negative		9*
034	GO TO K if Xj is in range		9*
035	GO TO K if Xj is out of range		9*
036	GO TO K if Xj is definite		9*
037	GO TO K if Xj is indefinite		9*
04	GO TO K if Bi = Bj	Note 1	8*
05	GO TO K if Bi ≠ Bj		8*
06	GO TO K if Bi ≧ Bj		8*
07	GO TO K if Bi < Bj		8*

Note 1. GO TO K + Bi and GO TO K if Bi . . .
tests made in increment unit
Note 2. GO TO K if Xj . . . tests made in long add unit

* Add 6 minor cycles to branch time for a branch to an instruction which is out of the stack (no memory conflict considered)

BOOLEAN UNIT

10	TRANSMIT Xj to Xi	3
11	LOGICAL PRODUCT of Xj and Xk to Xi	3
12	LOGICAL SUM of Xj and Xk to Xi	3
13	LOGICAL DIFFERENCE of Xj and Xk to Xi	3
14	TRANSMIT Xk COMP. to Xi	3
15	LOGICAL PRODUCT of Xj and Xk COMP to Xi	3
16	LOGICAL SUM of Xj and Xk COMP to Xi	3
17	LOGICAL DIFFERENCE of Xj and Xk COMP to Xi	3

SHIFT UNIT

20	SHIFT Xi LEFT jk places	3
21	SHIFT Xi RIGHT jk places	3
22	SHIFT Xi NOMINALLY LEFT Bj places	3
23	SHIFT Xi NOMINALLY RIGHT Bj places	3
24	NORMALIZE Xk in Xi and Bj	4
25	ROUND AND NORMALIZE Xk in Xi and Bj	4
26	UNPACK Xk to Xi and Bj	3
27	PACK Xi from Xk and Bj	3
43	FORM jk MASK in Xi	3

ADD UNIT

30	FLOATING SUM of Xj and Xk to Xi	4
31	FLOATING DIFFERENCE of Xj and Xk to Xi	4
32	FLOATING DP SUM of Xj and Xk to Xi	4
33	FLOATING DP DIFFERENCE of Xj and Xk to Xi	4
34	ROUND FLOATING SUM of Xj and Xk to Xi	4
35	ROUND FLOATING DIFFERENCE of Xj and Xk to Xi	4

LONG ADD UNIT

36	INTEGER SUM of Xj and Xk to Xi	3
37	INTEGER DIFFERENCE of Xj and Xk to Xi	3

DIVIDE UNIT

44	FLOATING DIVIDE Xj by Xk to Xi	29
45	ROUND FLOATING DIVIDE Xj by Xk to Xi	29
46	PASS	—
47	SUM of 1's in Xk to Xi	8

MULTIPLY UNIT*

40	FLOATING PRODUCT of Xj and Xk to Xi	10
41	ROUND FLOATING PRODUCT of Xj and Xk to Xi	10
42	FLOATING DP PRODUCT of Xj and Xk to Xi	10

INCREMENT UNIT*

50	SUM of Aj and K to Ai	3
51	SUM of Bj and K to Ai	3
52	SUM of Xj and K to Ai	3
53	SUM of Xj and Bk to Ai	3
54	SUM of Aj and Bk to Ai	3
55	DIFFERENCE of Aj and Bk to Ai	3
56	SUM of Bj and Bk to Zi	3
57	DIFFERENCE of Bj and Bk to Zi	3
60	SUM of Aj and K to Bi	3
61	SUM of Bj and K to Bi	3
62	SUM of Xj and K to Bi	3
63	SUM of Xj and Bk to Bi	3
64	SUM of Aj and Bk to Bi	3
65	DIFFERENCE of Aj and Bk to Bi	3
66	SUM of Bj and Bk to Bi	3
67	DIFFERENCE of Bj and Bk to Bi	3
70	SUM of Aj and K to Xi	3
71	SUM of Bj and K to Xi	3
72	SUM of Xj and K to Xi	3
73	SUM of Xj and Bk to Xi	3
74	SUM of Aj and Bk to Xi	3
75	DIFFERENCE of Aj and Bk to Xi	3
76	SUM of Bj and Bk to Xi	3
77	DIFFERENCE of Bj and Bk to Xi	3

*Duplexed units—instruction goes to free unit
Octal Code at left of instruction
Comp—Complement
DP—Double Precision

Dr. A. Hurson
Dept. of Electrical Engineering
The Pennsylvania State University
121 Electrical Engineering East
University Park, PA 16802