IBM POUGHKEEPSIE

Diagnostic Engineering Publication

1410/7010

Subject: **Diagnostic Program** C020B
1410 CPU Error Detection
Sequence Numbers 011, 012, 013, 014
Replaces C020A

I. C020B obsoletes 1410 CPU Error Detection Program C020A. The general philosophies of C020B are the same as those of C020A with significant changes made to many routines. In addition, changes were incorporated into C020B to insure compatibility with 1410/7010 Tape Control Program TC50 ( ).

II. The first data card of each of the four phases of C020B is a System Control Card and furnishes information to the program concerning CPU storage capacity.

III. C020B consists of four phases, each independent of the other, except that TAD information is passed on from one phase to the next. The four phases are separated from each other by Branch Execute cards and Core Clear cards.

Enclosures: 167 **Pages**
Card Deck for CARD ONLY SYSTEMS (as punched by UP51)
11 **Cards - Card Loader (1-7) and** 4 **Core Clear**
624 **Cards No.** 001-624 **Data Cards**
4 **Cards** Branch **Execute Card**

Distribution: x **1410** 10K and 20K systems only
7010
Other

C020B

1410 CPU ERROR DETECTION PROGRAM

CONTENTS OF C020B WRITEUP AND LISTING

2.02.00.0 TEST DESCRIPTION

00.1 MODIFICATIONS

C020B obsoletes and replaces 1410 CPU Error Detection Program C020A. Important changes were made to many of the routines that existed in C020A and several tests were added to increase the effectiveness of the program. Rearrangement of routines in the first three phases resulted in more efficient utilization of storage, enabled the inclusion of the necessary new routines without increasing the number of sections of the program, and made for a more logical presentation of the program listing. The most significant differences between C020A and C020B are described below.

A. Subroutine No. 10.16 was added to insure that the Zero Balance indicator is turned on only by a zero result.

B. Subroutine No. 11.02 was modified to insure that one-hundred positions of storage can be cleared to blanks by a Clear Storage instruction.

C. Initialization of the I-address of a Restart- Branch instruction at location 00001 was changed in the first two phases. Subroutine No. 12.00 typifies the method used.

D. All subroutines under No. 13.00 were modified in favor of a shorter method to initialize the contents of the index registers.

E. Subroutine No. 14.01 was added to test a somewhat more complex method of addressing by indexing and to prove that an indexed Store Address Register instruction has no effect on the operation.

F. Subroutine Nos. 18.02 through 18.05 of C020A were consolidated into two subroutines (Nos. 18.02 and 18.03) in C020B.

G. Subroutine No. 21.01 was added to force the High and Low Compare Status Indicators to alternate rapidly and for a sustained period of time.

H. C020B must be run from cards or in conjunction with Tape Control Program TC50 ( ). If input is from tape, C020B makes use of certain data that are available within TC50( ) as well as one closed subroutine within TC50 ( ) for back-spacing tape.

00.2 DESCRIPTION

C020B was written to provide a thorough error detection test of the 1410 CPU Main Frame. This test begins with the simplest of instructions and those which are prerequisite to all following instructions and operations. In building-block fashion, the basic operations are used to prove instructions and operations of increasing complexity. After all operation codes are tested, the program concludes with a test of the ability to chain all possible operations followed by an optional test of certain resets and then followed by two routines which are intended to prove the reliability of a great number of chained D-ops and indexed Branch and Store B Register instructions.

The entire program is divided into routines and subroutines. When an operation or small group of operations is to be checked for the first time, a new routine number is assigned. Routine numbers are of the form MN.00 where MN specifies the number of the routine in numeric sequence. Subroutines under MN.00 are identified MN.XY where XY specifies the number of the subroutine in numeric sequence. The term "subroutine", as used here, is more properly a "subsection" of a larger routine. These "subroutines" are, for the most part, complete program entities. Within the comments portion of the listing the terms "routine" and "subroutine" are occasionally used interchangeably to refer to the current subsection under consideration. It is anticipated that a CPU malfunction which occurs during the execution of Routine Nos. 01.00 through 04.00 will be accompanied by a SYSTEM CHECK error. An attempt is made to indicate, by means of the console printer, certain errors that may be experienced in Routine Nos. 05.00 through 07.03. These typeouts cannot be bypassed. Beginning with Routine No. 07.04 and continuing through the remainder of the program, normal TAD options are in effect. Generally speaking, troubles should be fixed at the time of occurrences; this is especially true of troubles that arise during the first part of the program.

C020B consists of four, distinct, essentially independent phases which have a certain limited ability to communicate with one another. Alterations to the TADs, for example, made during C020B-1 will remain in effect through the remaining three phases or until changed. It was necessary to write the program in four phases so that it could be run on a system having 10K storage capacity.

The operation of C020B is slightly different depending upon whether the program input is from card or tape. If the input is from cards and TAD 3 has been set to a "1", the phase currently under test will be repeated indefinitely. If input is from tape and TAD 3 has been set to a "1", individual phases will not be repeated but rather the program will proceed through C020B-1 to C020B-2 to C020B-3 to C020B-4 and then repeat the sequence. C020B should be thought of as one program in four parts, not as four programs connected together. It is for this reason that the same identification, C020B, applies to all phases. The console printer will identify the phases as they are run.

In order to complete a "PASS", each phase is repeated, or looped, a number of times. The number of loops that constitute a "PASS" is determined by a loop counter at locations 01006-01010. Certain card records in each of the phases set this value to +00100.

Within each of the phases there is at least one routine which, for various reasons, is executed only once per program "PASS". In phase 1, the tests of Halt and Halt-Branch are performed only once regardless of the number of passes. In phase 2 the test for Compare, and in phase 3 the test for Multiply are performed only once per pass because they are lengthy routines. For this same reason, two miscellaneous routines, 31.01 and 31.02 in phase 4, are performed but once per pass. Because they require operator intervention, subroutines 30.01 and 30.02 in phase 4 are not performed unless TAD 4 has been set to "1". If these subroutines are performed, #30.02 resets TAD 4 to prevent repeated testing of them.

00.3 EQUIPMENT REQUIRED

A. Card Reader or tape unit to load the program
B. Console Printer (assumed on E channel)

Although C020B was written specially for 1410s of 10K and 20K capacity, there is nothing within the test to preclude its operation on 1410s or 7010s of up to 100K capacity.
Installations with CPUs of greater than 20K storage capacity will be able to use C021B more advantageously.

00.4 CARD DECK

7 Cards ... Load Program L1A
4 Cards ... Core Clear Card (09999-01000)
4 Cards ... System Control Card (001, 184, 366, 549)
620 Cards ... Program C020B
(002-183, 185-365, 367-548, 550-624)
4 Cards ... Branch Execute Cards

00.5 ENGINEERING CHANGE LEVEL OF MACHINE

C020B will operate on 1410's of any EC level unless an Engineering Change modifies the function or operation of the standard instruction set. Certain routines will not work properly on machines using the European Edit Feature.

00.6 PROGRAM RUN TIMES

The running times listed below in tabular form apply to the 1410 and the 1410 with the Accelerator feature No. 1007. Values are given in seconds and are approximate. Running times for the 1410 of 60K, 80K, and 100K storage capacity as well as that for the 1410 Accelerator of 100K are estimated. Times do not include the time required to load the program. In each case the loop counter was intialized at +00100.

1410

	10K	20K	40K	60K	80K	100K
C020B-1	10.5 sec	10.5 sec	10.5 sec	10.5 sec	10.5 sec	10.5 sec
C020B-2	9	9	9	9	9	9
C020B-3	23	23	23	23	23	23
C020B-4	4	10	21	32	43	54

1410 Accelerator

	10K	20K	40K	60K	80K	100K
C020B-1	10 sec	10 sec	10 sec	10 sec	10 sec	10 sec
C020B-2	8	8	8	8	8	8
C020B-3	19	19	19	19	19	19
C020B-4	3.5	8	16	26	36	45

2.02.01.0 LOADING PROCEDURES

01.1 FROM CARDS

A. Clear storage to blanks
B. Display and Alter location 00000 as follows:

i. RL%1100011$. if reader is on E channel

ii. XL¤1100011$. if reader is on F channel

C. Set MODE switch to RUN, Computer Reset and Start.

01.2 FROM TAPE:

A. Clear storage to blanks
B. Display and Alter location 00000 as follows:

i. RL%B000011$. if tape unit is on E channel

ii. XL:B000011$. if tape unit is on F channel

C. Set MODE switch to RUN, Computer Reset and Start.

2.02.02.0 OPERATING PROCEDURES

No special instructions are necessary to run the program. Operation begins immediately upon reading the last record of each of the four phases.

All TADs are initialized to "not 1" by a card record and normal operation of C020B, described below, does not require that any TAD information be entered by the Customer Engineer. By "normal operation" is meant that all typeouts are allowed, no routine will loop on error, there will be no error halts, only one pass of each phase will be performed, and Routine Nos. 30.01 and 30.02, which require operator intervention, will be bypassed.

The significance of the TADs is as follows:

TAD	LOCATION	NOT 1 (NORMAL)	1
TAD0	01000	Allow all typeouts	Bypass all error typeouts
TAD1	01001	Not loop on error	Loop routine if error
TAD2	01002	Not halt on error	Halt on routine if error
TAD3	01003	One program pass	Repeat program indefinitely
TAD4	01004	Not perform #30.01 and #30.02	Perform #30.01 and #30.02

It is suggested that once, during the execution of C020B, TAD 4 at location 01004 be set to a "1" so that certain functions of the reset keys may be tested by routines #30.01 and #30.02. TAD 4 is the only special TAD used by this program.

Except for 10K systems, it is required that some character other than 0, ǂ, !, ?, b, ⊻, -, or & be placed in location 01257. This location is supplied by column 14 of the System Control Cards and normally will indicate the ten-thousands order of the greatest storage address.

2.02.03.0 OPERATING HINTS AND COMMENTS

As mentioned earlier, C020B consists of four separate phases which are essentially independent of each other. The card deck contains an unnumbered Execute-Branch card and a 9K Core Clear card between each of the phases. Except for the TADs, which are saved and restored from phase to phase, no essential information is carried over from one phase into the next.

When running C020B, it is recommended that all phases of the program be executed, but if the situation demands, the Customer Engineer may run,for example, only C020B-4 and not the phases 1 through 3. In this case, it is important to realize precisely which cards constitute the separate phases; this information is tabulated below:

PHASE	CARD NUMBERS
C020B-1	001 through 183
C020B-2	184 through 365
C020B-3	366 through 548
C020B-4	549 through Last Execute Card

To run any phase independently of the others it is necessary only to locate and remove the cards comprising the desired phase, together with the Load Program. The selected section of C020B may then be loaded in the normal manner and run independently.

With the understanding that the CE occasionally wishes to enter his own instruction sequence and data for the purpose of testing a specific condition, and yet leave the main program undisturbed, the following "safe" areas in the various phases are listed. Note that no location below address 01000 can be considered "safe" since the load program or TC50 ( ) resides there and the areas not used by the load program or TC50( ) are used as work areas by all phases of C020B.

PHASE	AREAS AVAILABLE FOR PATCHING
C020B-1	All locations above and including 09995
	01995-01999
	01220-01229
C020B-2	All locations above and including 09998
	01967-01999
	01220-01229
C020B-3	All locations above and including 09991
	01931-01999
	01220-01229
C020B-4	04545 - 04899
	01992 - 01999
	01220 - 01229

TADs or other data within the program may be altered in the following manner:

(1) Depress Inquiry Request key
(2) When "I" types, enter five numeric characters which specify the address of the high-order location, i.e., low memory address, to be altered
(3) Depress Inquiry Release key
(4) Depress Inquiry Request key
(5) Enter desired information
(6) Depress Inquiry Release key

If an error is made while keying in an address or data (steps 2 or 5), depress the Inquiry Cancel key and resume from the step which preceded the error.

2.02.03.0 OPERATING HINTS AND COMMENTS (Continued)

Because of space limitations, the opportunity to recognize an Inquiry Request is provided only once per phase loop. Furthermore, because the first loop of the latter three phases requires considerably more time than succeeding loops, there may be a considerable delay between depression of the Inquiry Request key and its acknowledgement.

In compiling and revising this program, considerable effort was spent toward making the listing easier to follow. Very little change was made to the fourth phase which was, and still is, largely sequential in its presentation. With regard to the first three phases, however, a certain standard pattern was adopted for clarity: Each phase begins at location 02000 and proceeds straightforward toward end-of-memory location 09999. At a convenient spot in the program, prior to end-of-memory, the test branches to the lowest location available, 01289, and from there proceeds towards location 02000. This is the instruction sequence that is followed in cyclic fashion as the phases are repeated. Constants and work areas are assigned immediately following the last instruction at the highest storage location and appear as the last part of the listing of any phase.

Note especially that TAD 1, if set to "1", provides for looping on an error subroutine only so long as that subroutine is in error. If a subroutine only intermittently causes errors and the CE wishes to increase its frequency of occurrence in any given time period, he is advised to alter the program, temporarily, so that it does not proceed beyond the suspect subroutine. Perhaps the simplest method, although not necessarily the shortest one, is to change the first instruction of the next subroutine in sequence to an unconditional Branch to the start of the error-causing subroutine.

If the program is stopped and the instruction address register reset to location 00001 and then restarted at any time except when the CE is specifically directed to do so, operation will resume as though the phase under test is begun anew. Two additional exceptions are as follows: (1) the program and phase identification is not retyped and (2) during phase 1 a considerable number of routines must be executed one time before sufficient circuitry has been verified to allow the placement of a restart address at location 00001.

It is essential that C020B be loaded by means of the 7-card loader L1A or the Tape Control Program TC50( ). Proper operation of all aspects of C020B depend on the contents of storage locations that are only set by L1A or TC50 ( ).

Pay especial attention to the comments portion of the listing. These notes are provided to give some insight into the method of test and the expected results.

2.02.04.0 PROGRAM STOPS AND RESTARTS

There are only two normal stops that occur during the running of C020B; these are experienced when Halt and Halt-Branch operations are tested and are accompanied by informative typeouts. Press the Start key to continue.

If TAD 4 is set to "1", two stops will occur in the fourth phase. The Console Printer will direct the Customer Engineer to depress a reset key and Start.

During most of the time that C020B is being run, an appropriate restart Branch instruction is located at 00001. The restrictions on this condition are noted in the previous section of this write-up.

2.02.05.0 TYPEOUTS

A. NORMAL TYPEOUTS

1. C020B-X, where "X" is the phase under test.
2. -PASS-. Typed at the conclusion of a predetermined number of program loops.
   Note: This typeout appears at the end of the separate phases if the input is on cards. It is given only at the end of C020B-4 if the input is on tape.
3. PROG HLT. PRESS START. This typeout appears when the Halt instruction is tested.
4. PROG HLT/BR. PRESS START. This typeout is given when the Halt-and-Branch instruction is tested.
5. PRESS PROGRAM RESET AND START.
   Associated with subroutine # 30.01. Typed only if TAD 4 is set to "1".
6. PRESS COMPUTER RESET AND START.
   Associated with subroutine #30.02. Typed only if TAD 4 is set to "1".

B. ERROR TYPEOUTS

Most routines and subroutines within C020B provide an error typeout of the form #MN.XY where MN specifies the section or routine number and XY the subsection or subroutine number. Sections of the program labeled in this manner which do not provide this typeout are 01.00 through 04.00, 10.17, 12.00 and 31.02. In many subroutines, the subroutine number will be typed if any of several errors occur; for example, #19.57, test of the SCNRM operation, will be typed if the A- or B-address is incorrect after the scan is performed with either the record mark or group mark-word mark as the terminal character. If any data are moved by the SCNRM, the typeout #19.57 will also occur. In cases of the type just described, it is left to the ingenuity of the Customer Engineer to determine precisely where the test failed.

Subroutines # 18.01, #23.01, #24.02, #30.01 and #30.02 provide error typeouts in addition to their respective subroutine numbers. These additional typeouts are discussed in some detail below.

18.01
VS ERR W X Y Z

The two asterisks (*) represent the A- and B- fields, in that order, of the single character compare operation which was found in error. The letters W X Y Z represent one or more of the ten possible error types that are tested by #18.01 and will be printed as a numeric digit (or digits) 1 through 9 or an alphabetic "X" (for Roman numeral "10"). The CE is referred to the COMPARE flow chart for the significance of the error numbers.

#23.01
AB PROD XYZ; S/B ZERO

A and B represent the A-field multiplicand and the B-field multiplier, respectively. They may be any of the 64 possible legitimate characters. The product of AB is given by XYZ and should have been zero; either the product of AB was not zero or the zero balance indicator did not come on.

#23.01
AB PROD XYZ; S/B NZ

Similar to the example just described. Neither factor A nor B was zero or any of its equivalents. The product of AB should not have been zero but a test of the zero balance indicator found it on.

#23.01
AB PROD XYZ; S/B NEG

The factors A and B were so signed that a product with only a B bit in the units position was expected. The product of AB did not yield the anticipated negative result.

#23.01
AB PROD XYZ; S/B POS

Similar to the example just described. The product of AB did not yield the anticipated positive result.

#23.01
AB PROD UVW; NE BA PROD XYZ

The product of any two characters should yield the same result regardless of which character is the multiplier or the multiplicand. This typeout indicates that UVW, the product of A and B, was not equal to XYZ, the product of B and A. The products of both factors are given for comparison.

#24.02
B/A EQ Q, REM R; NEQ [A][Q]PLUS R

B, A, Q and R represent signed integers but A is not allowed to be equal to zero. This typeout indicates a failure to recover the dividend B when the product of the divisor A and quotient Q is algebraically added to the remainder R.

#24.02
00B/A CAUSED DIV OFLOW

A test of the Divide Overflow indicator found it on after performing the indicated division. Since A is never zero, the indicator should never come on.

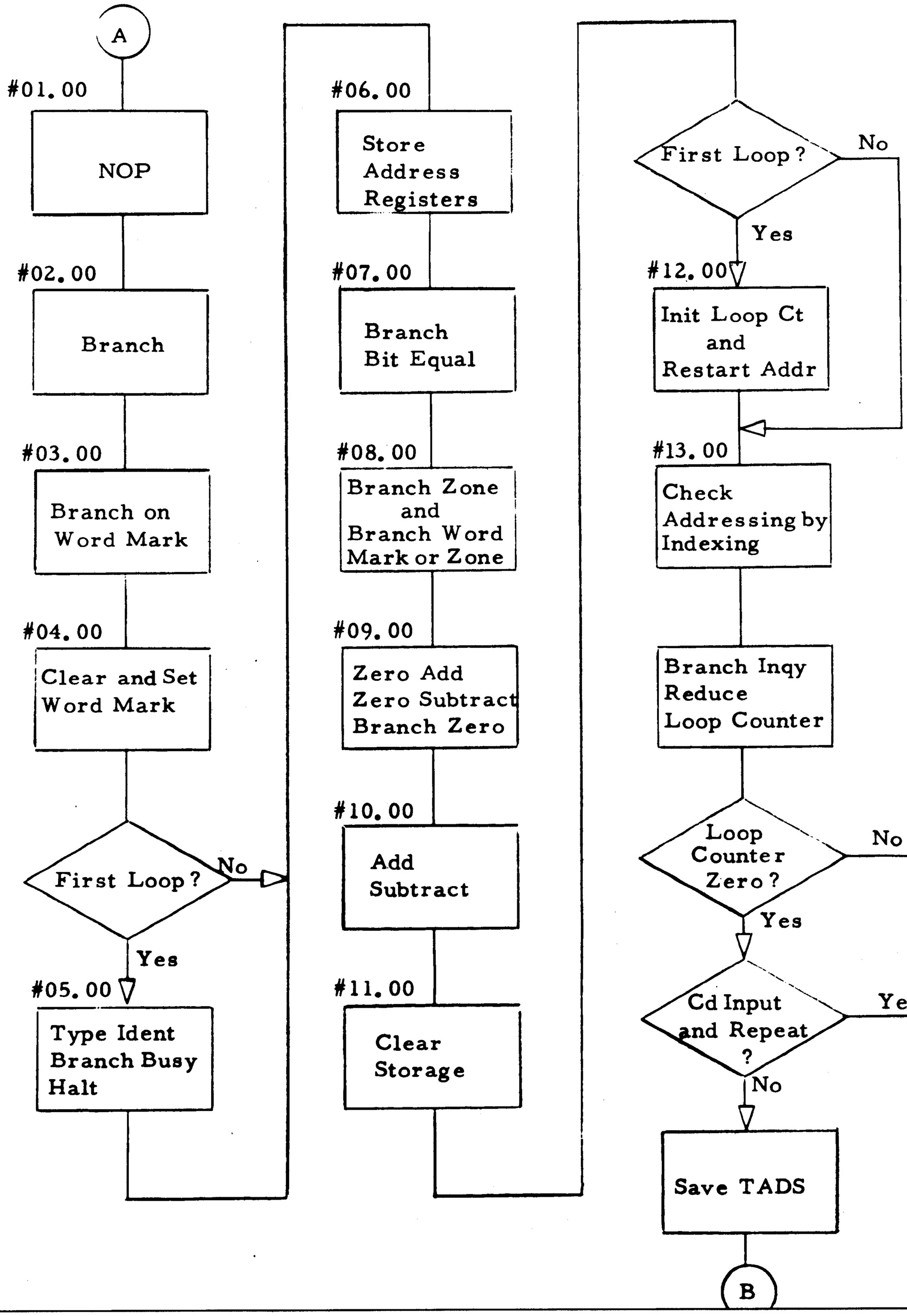
#30.01
B EQUAL A RESET
ARITH OFLOW RESET
DIV OFLOW RESET
ZERO BAL RESET

Subroutine # 30.01 tests certain functions of the Program Reset key. This typeout points out that one or more of the specified indicators was reset by the Program Reset key.

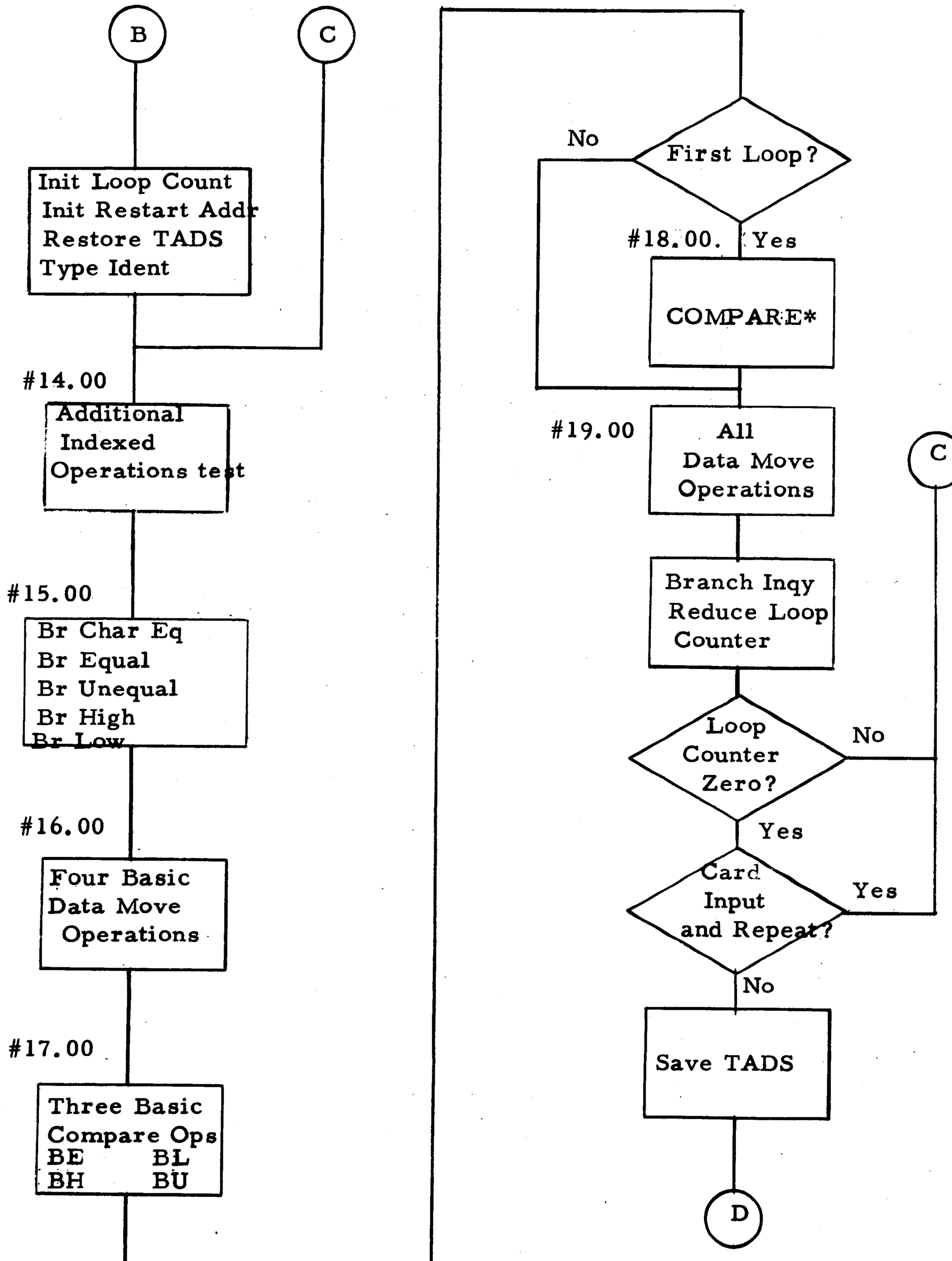
#30.02
FAIL TO SET B<A
ARITH OFLOW NOT RESET
DIV OFLOW NOT RESET
ZERO BAL NOT RESET

In a manner similar to that just described in the preceding example, some functions of the Computer Reset key are tested. The typeout will indicate which of the error indications was detected.

C020 B-1

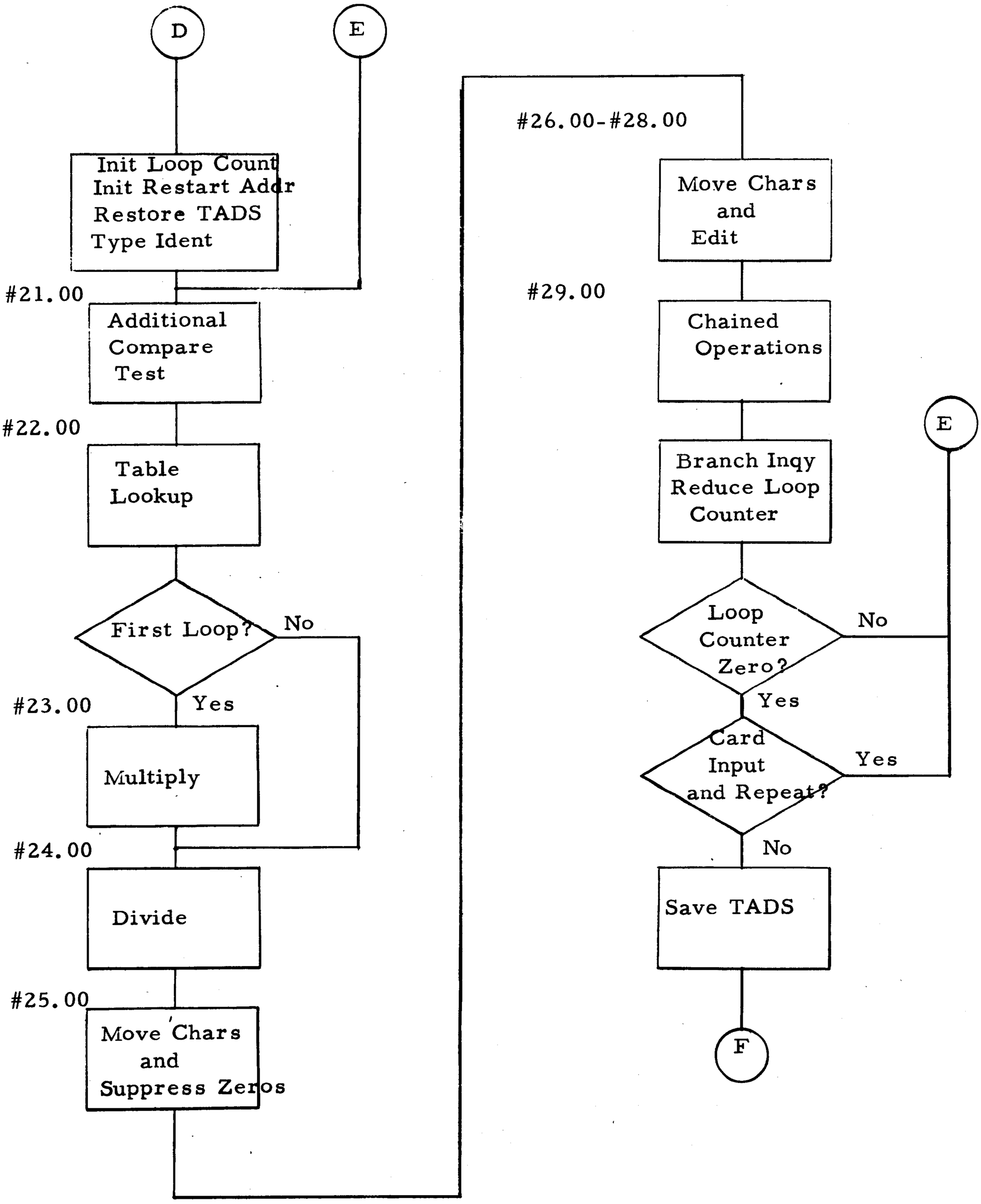

A
#01.00
NOP
#02.00
Branch
#03.00
Branch on Word Mark
#04.00
Clear and Set Word Mark
First Loop?
No
Yes
#05.00
Type Ident Branch Busy Halt
#06.00
Store Address Registers
#07.00
Branch Bit Equal
#08.00
Branch Zone and Branch Word Mark or Zone
#09.00
Zero Add Zero Subtract Branch Zero
#10.00
Add Subtract
#11.00
Clear Storage
First Loop?
No
Yes
#12.00
Init Loop Ct and Restart Addr
#13.00
Check Addressing by Indexing
Branch Inqy Reduce Loop Counter
Loop Counter Zero?
No
Yes
Cd Input and Repeat ?
Yes
No
Save TADS
B
A

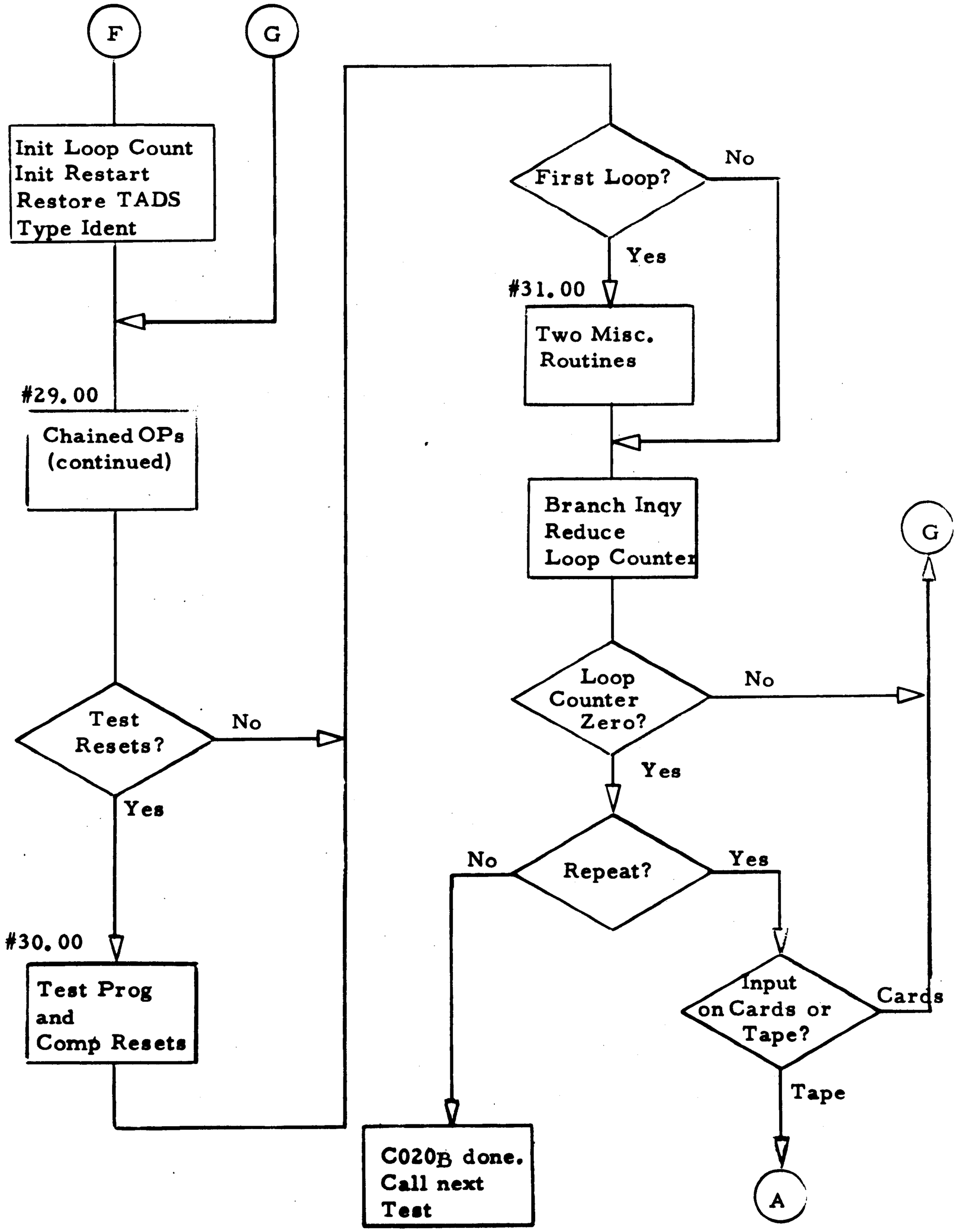
C020B-2



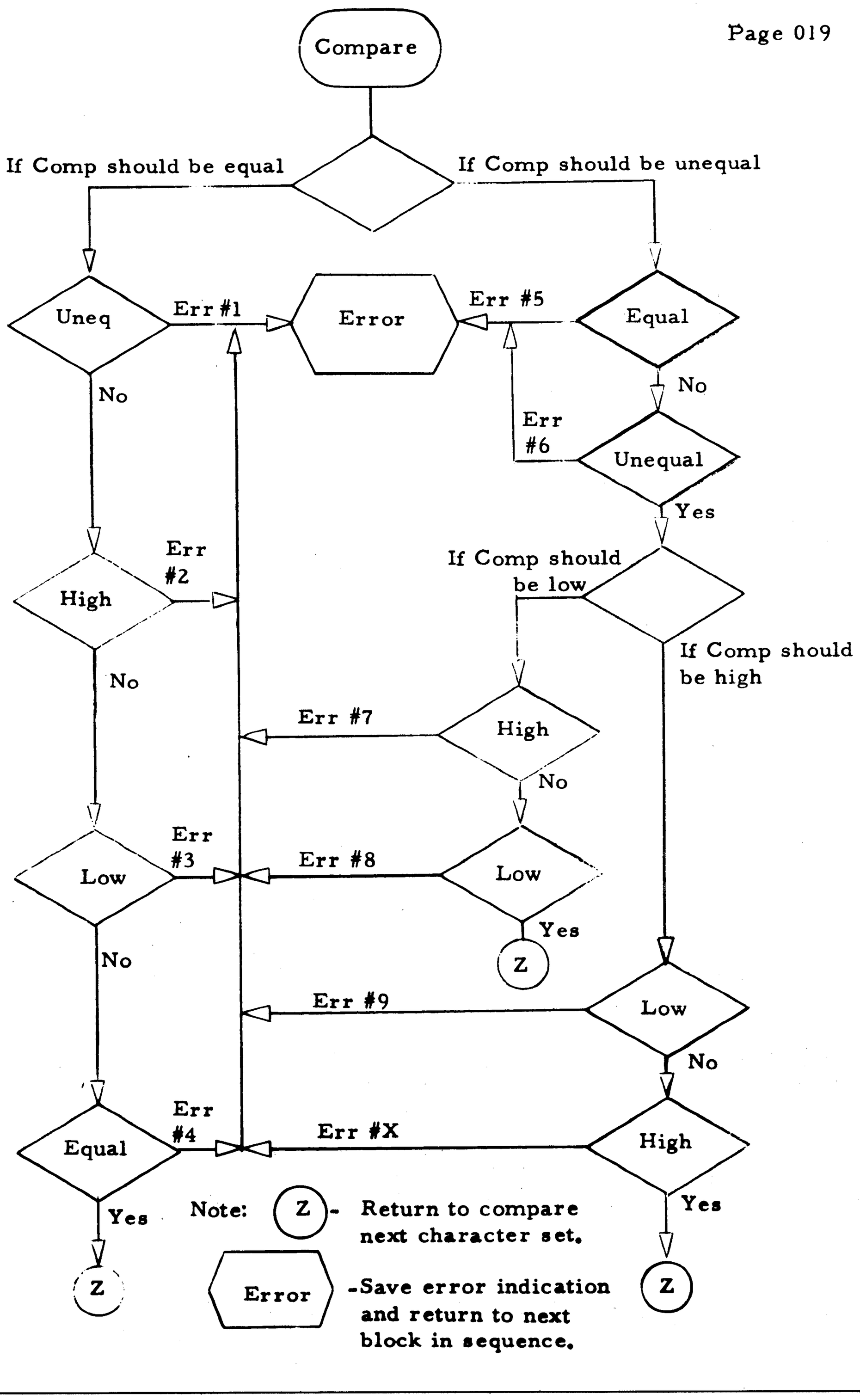
* See detailed COMPARE flow chart

C020B-3


D
E
Init Loop Count
Init Restart Addr
Restore TADS
Type Ident
#21.00
Additional Compare Test
#22.00
Table Lookup
First Loop?
No
Yes
#23.00
Multiply
#24.00
Divide
#25.00
Move Chars and Suppress Zeros
#26.00-#28.00
Move Chars and Edit
#29.00
Chained Operations
Branch Inqy Reduce Loop Counter
Loop Counter Zero?
No
Yes
Card Input and Repeat?
Yes
No
Save TADS
E
F


F
G
Init Loop Count
Init Restart
Restore TADS
Type Ident
#29.00
Chained OPs
(continued)
Test
Resets?
No
Yes
#30.00
Test Prog
and
Comp Resets
First Loop?
No
Yes
#31.00
Two Misc.
Routines
Branch Inqy
Reduce
Loop Counter
Loop
Counter
Zero?
No
Yes
Repeat?
No
Yes
Input
on Cards or
Tape?
Cards
Tape
G
A
C020B done.
Call next
Test

COMPARE flow chart to be used in analyzing error typeouts.



```
PGLIN     LABEL      OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
1002                 CTL    3
1003                 LOAD
1004                 LINES  35
1005      LOADER     EQU    400
1006      TAD0       EQU    1000
1007      TAD1       EQU    1001
1008      TAD2       EQU    1002
1009      TAD3       EQU    1003
1010      TAD4       EQU    1004
1011      PCC        EQU    1010
1012      PCCWK      EQU    1015
1013      HOLDA1     EQU    1020
1014      HOLDA2     EQU    1020
1015      HOLDA3     EQU    1020
1016      HOLDA4     EQU    1020
1017      HOLDB1     EQU    1025
1018      HOLDB2     EQU    1025
1019      HOLDB3     EQU    1025
1020      HOLDB4     EQU    1025
1021      TYPE       EQU    1026
1022      TYPCK      EQU    TYPE&45
1023      INQ        EQU    TYPE&131
1024      GPMK       EQU    SPECL1
1025      QUOT       EQU    SPECL2
1026      TPMK       EQU    SPECL3
1027      DELT       EQU    SPECL4
1028      CTLIND     EQU    1230
1029      IDENT      EQU    1250
1030      SYSCTL     EQU    1256
1031      MEMSIZ     EQU    1257
1032      LOWLCC     EQU    1289
1033      START      EQU    2000
```

```
PGLIN    LABEL    OPCOD  OPERAND                                                    CT  ADDRS  INSTRUCTION

                  ORG    SYSCTL  NOTE -- THE ONLY POSITION IN THE SYSTEM                01256
                                  CONTROL CARD REQUIRED BY THIS PROGRAM
                                  IS STORAGE LOCATION 01257.  THIS INFOR-
                                  MATION COMES FROM CARD 001, COLUMN 14,
                                  AND MUST BE PUNCHED WITH A NUMERIC
                                  CHARACTER EQUAL TO THE TEN-THOUSANDS
                                  DIGIT OF THE HIGHEST STORAGE ADDRESS.

                  DC     @                               ‡@                         33  01288

                  ORG    CTLIND                                                         01230
                  DC     @         @                                                 9  01238
                  DCW    @1.12.101J0Z@        10K OR 20K, SEQ NO. 011,              11  01249
                                              DUMP TO 09999 ON TAPE
                  ORG    1000                                                           01000

                  DC     @ @                  ALLOW ALL TYPEOUTS                     1  01000
                         @ @                  DO NOT LOOP ON ERROR                   1  01001
                         @ @                  DO NOT HALT ON ERROR                   1  01002
                         @ @                  PERFORM ONLY ONE PASS                  1  01003
                         @ @,G                DO NOT TEST TWO ROUTINES, PHASE 4      1  01004

                  DCW    &00100               PASS COUNT CONSTANT                    5  01010
                         @    @               PASS COUNT WORK AREA                   5  01015

                  DCW    @    @               . COMMON AREA FOR STORING              5  01020
                         @    @               . ADDRESS REGISTERS                    5  01025
```

```
PGLIN    LABEL    OPCOD  OPERAND                                         CT  ADDRS  INSTRUCTION

1063              SBR    *&9          COMMON TYPE ROUTINE                 7  01026  G 01041 B
1064              WCP    0                                               10  01033  M %TO 00000 W
1065              SBR    *&20                                             7  01043  G 01069 B
1066              BCB1   *-23                                             7  01050  R 01033 2
                                                                                            G
1067              BA1    *&1                                              7  01057  R 01064 M
1068              B      0                                                7  01064  J 00000
1069
1070              SBR    *&39         TYPE & TAD CHECK ROUTINE            7  01071  G 01116 B
1071              SBR    *&65                                             7  01078  G 01149 B
1072              A      *-17,*&54                                       11  01085  A 01078 01149
1073              BBE    *&25,TAD0,1                                     12  01096  W 01132 01000 1
1074              WCP    0                                               10  01108  M %TO 00000 W
1075              BCB1   *-16                                             7  01118  R 01108 2
                                                                                            G
1076              BA1    *&1                                              7  01125  R 01132 M
1077              BBE    *&8,TAD2,1                                      12  01132  W 01151 01002 1
1078              B      0                                                7  01144  J 00000
1079              H      *-12                                             6  01151  . 01144
1080
1081              RCP    *&26         COMMON ADDRESS ALTER ROUTINE       10  01157  M %TO 01192 R
                                                                                            S
1082              BNT1   *&39                                             7  01167  R 01212 B
                                T                                                           T
1083              BEX1   *-23,M                                           7  01174  R 01157 M
                                                                                            G
1084              BA1    *&1                                              7  01181  R 01188 M
1085              RCPW   0                                               10  01188  L %TO 00000 R
                                S                                                           S
1086              BEX1   *-16,M                                           7  01198  R 01188 M
                                                                                            G
1087              BA1    *&1                                              7  01205  R 01212 M
1088              B      REDUCE                                           7  01212  J 01866
                          G
1089     GMWM     DCW    @M@                                              1  01219
1090
1091              ORG    IDENT                                              01250
1092
1093              DCW    @C020B@,G    PROGRAM IDENTIFICATION              5  01254
```

```
PGLIN     LABEL      OPCOD  OPERAND                                            CT  ADDRS  INSTRUCTION

                     ORG    START              PHASE 1 BEGINS HERE                 02000

            ROUTINE 01.00   CHECK LONG NO-OP INSTRUCTION
                     NOP                                                        1  02000  N
                                       .GTS               WBS
                     DC     @ 1234567890#@.TMB/STUVWXYZ‡,%SSM@                 32  02032
                                      ,  R.D             Q  LLG
                            @-JKLMNOPQR.$*B,L&ABCDEFGHIM.¤BTM@                 32  02064

            ROUTINE 02.00   CHECK UNCOND BR INST.  THIS ROUTINE ASSUMES THAT
                            WM-BL WILL GIVE INSTRUCTION CK IF BRANCH FAILS

                     B      *&1                SET AND STEP IAR TO SAME ADDRESS     7  02065  J 02072
                     B      *&2                SHOULD SKIP FOLWNG INVALID OPCODE    7  02072  J 02080
                     DCW    @ @                                                 1  02079

            ROUTINE 03.00   CHECK BRANCH ON WORD MARK INSTRUCTION
          AC         BW     AD,AD              SHOULD NOT BR, INST CK IF IT DOES   12  02080  V 02105 02105 1
                     BW     AE,*&1             SHOULD BRANCH, INST CK IF NO BR     12  02092  V 02106 02104 1
                     DCW    @ @                                                 1  02104
                             G
          AD         DC     @M@                                                 1  02105

            ROUTINE 04.00   CHECK CLEAR AND SET WORD MARK INSTRUCTIONS

          AE         CW     AC,AE              TRY TO CLEAR WMS AT TWO PLACES      11  02106  ¤ 02080 02106
                     BW     AF-1,AC            SHOULD NOT BR, INST CK IF IT DOES   12  02117  V 02165 02080 1
                     BW     AF,AE              DITTO                               12  02129  V 02166 02106 1
                     SW     AE,AC              RESTORE WMS PREVIOUSLY CLEARED      11  02141  , 02106 02080
                     BW     *&4,AE             TEST AE FOR WORD MARK               12  02152  V 02167 02106 1
          AF         DCW    @ 12@              INSTRUCTION CK IF NO WM AT AE        3  02166
                     BW     *&2,AC             TEST AC FOR WORD MARK               12  02167  V 02180 02080 1
                     DCW    @ @                INSTRUCTION CK IF NO WM AT AC        1  02179
```

```
PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
1126        ROUTINE 05.00   TYPE IDENT, CK TYPEWR BUSY, HALT, HALT/BR.
1127                        THESE OPS PERFORMED ONLY FIRST TIME THROUGH
1128
1129                NOPWM                                                     1  02180  N
1130                B       AJ              THIS BR NOT TAKEN FIRST TIME THRU 7  02181  J 02371
1131                SW      *-12                                              6  02188  , 02181
1132      AG        WCP     PGMID           TYPE PROGRAM IDENTIFICATION      10  02194  M %TO 02306 W
1133                BA1     *&1             RESET I/O INTERLOCK               7  02204  R 02211 MG
1134                WCP     BUSYNG          TRY TO INDICATE FAILURE          10  02211  M %TO 02315 W
1135                BCB1    *&2             SHOULD BR BUSY, RESET I/O INTLK   7  02221  R 02229 2
1136                DCW     @ @             INSTR CK IF TYPEWR FAIL RAISE BSY 1  02228
1137      AH        NOPWM                                                     1  02229  N
1138                B       AJ              PUT WM HERE FOR NONSTOP OPERATION 7  02230  J 02371
1139                BW      AJ,997                                           12  02237  V 02371 00997 1
1140                WCP     GOMSG1                                           10  02249  M %TO 02322 W
1141                BCB1    *-16                                              7  02259  R 02249 2G
1142                BA1     *&1                                               7  02266  R 02273 M
1143                H                       SHOULD HALT                       1  02273  .
1144                WCP     GOMSG2                                           10  02274  M %TO 02345 W
1145                BCB1    AI              TAKE THIS ONLY IF HALT FAILS      7  02284  R 02305 2G
1146                BA1     *&1                                               7  02291  R 02298 M
1147                H       AJ              SHOULD HALT/BR.  INST CK IF NOT   6  02298  . 02371
1148      AI        DCW     @ 1@                                              2  02305
1149
1150       PGMID    DC      @ C020B-1@,G                                      8  02306
1151       BUSYNG             @#05.00@,G      TYPED IF TYPEWRITER BUSY FAILURE 6  02315
1152       GOMSG1             @PROG HLT.  PRESS START@,G                      22  02322
1153       GOMSG2             @PROG HLT/BR.  PRESS START@,G                   25  02345
```

PGLIN	LABEL	OPCOD	OPERAND		CT	ADDRS	INSTRUCTION
1155	ROUTINE 06.00		CHECK OPERATION OF SAR AND SBR INSTRUCTIONS				
1156							
1157	AJ	B	AK	I-ADDR MODIFIED WITHIN ROUTINE	7	02371	J 02378
1158	AK	NOPWM		NOTE. BR TO 00000 INDICATES SBR FAILURE	1	02378	N
1159		B	AL	. BR TO 00001 INDICATES SAR FAILURE	7	02379	J 02431
1160		SW	AK&1		6	02386	, 02379
1161		CW	1,AN&1	SET UP A & B ADDR REGISTERS	11	02392	¤ 00001 02501
1162		SBR	AJ&5		7	02403	G 02376 B
1163		SAR	AJ&5		7	02410	G 02376 A
1164		SBR	AJ&5		7	02417	G 02376 B
1165		B	AJ		7	02424	J 02371
1166	AL	WCP	ER0600		10	02431	M %TO 02493 W
1167		BCB1	*-16		7	02441	R 02431 2 G
1168		BAI	*&1		7	02448	R 02455 M
1169		H			1	02455	.
1170	AM	CW	1,2		11	02456	¤ 00001 00002
1171		SAR	ABHOLD		7	02467	G 02492 A
1172		SBR	ABHOLD		7	02474	G 02492 B
1173		B	AM		7	02481	J 02456
1174	ABHOLD	DCW	00000		5	02492	
1175	ER0600		@#06.00@,G	BOTH SAR & SBR FAIL. PRESS START	6	02493	
1176				TO LOOP. FIX BEFORE PROCEEDING.			
1177	AN	CW	AO&1,2	SET UP A & B ADDR REGISTERS	11	02500	¤ 02540 00002
1178		SAR	AJ&5		7	02511	G 02376 A
1179		SBR	AJ&5		7	02518	G 02376 B
1180		SAR	AJ&5		7	02525	G 02376 A
1181		B	AJ		7	02532	J 02371
1182	AO	CW	AK&1	RESET NOP/BR SWITCH	6	02539	¤ 02379
1183		SAR	AJ&5	RESTORE I-ADDR OF AJ	7	02545	G 02376 A
1184		SW	1	SET WM BACK IN LOC 00001	6	02552	, 00001

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PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION

1186        ROUTINE 07.00   CHECK OPERATION OF BRANCH BIT EQUAL INSTRUCTION
1187
1188        SUB-RTN 07.01
1189                 BBE    AP,*,1              SHOULD BRANCH                12  02558  W 02621 02569 1
1190                 WCP    ER0701                                           10  02570  M %TO 02614 W
1191                 BCB1   *-16                                              7  02580  R 02570 2
1192                 BA1    *&1                                               7  02587  R 02594 M G
1193                 H                                                        1  02594  .
1194                 BBE    *&1,*,1               THESE INSTRUCTIONS PROVIDE 12  02595  W 02607 02606 1
1195                 B      *-18                TIGHT LOOP IN EVENT OF FAILURE  7  02607  J 02595
1196       ER0701    DCW    @#07.01@,G    BBE 1 EQ 1 FAILS.  PRESS START      6  02614
1197                                      TO LOOP.  FIX BEFORE PROCEEDING.
1198        SUB-RTN 07.02
1199       AP        BBE    *&8,AQ&11,1         SHOULD NOT BRANCH            12  02621  W 02640 02702 1
1200                 B      AQ                                                7  02633  J 02691
1201                 WCP    ER0702                                           10  02640  M %TO 02684 W
1202                 BCB1   *-16                                              7  02650  R 02640 2
1203                 BA1    *&1                                               7  02657  R 02664 M G
1204                 H                                                        1  02664  .
1205                 BBE    *&1,AQ&11,1           THESE INSTRUCTIONS PROVIDE 12  02665  W 02677 02702 1
1206                 B      *-18                TIGHT LOOP IN EVENT OF FAILURE  7  02677  J 02665
1207       ER0702    DCW    @#07.02@,G    BBE FAILURE.  PRESS START TO LOOP.  6  02684
1208                                      FIX THIS BEFORE PROCEEDING.
1209        SUB-RTN 07.03
1210       AQ        BBE    *&8,AP&11,L/T       SHOULD NOT BRANCH            12  02691  W 02710 02632 L/T
1211                 B      AR                                                7  02703  J 02761
1212                 WCP    ER0703                                           10  02710  M %TO 02754 W
1213                 BCB1   *-16                                              7  02720  R 02710 2
1214                 BA1    *&1                                               7  02727  R 02734 M G
1215                 H                                                        1  02734  .
1216                 BBE    *&1,AP&11,L/T         THESE INSTRUCTIONS PROVIDE 12  02735  W 02747 02632 L/T
1217                 B      *-18                TIGHT LOOP IN EVENT OF FAILURE  7  02747  J 02735
1218       ER0703    DCW    @#07.03@,G    SAME AS #07.02 ABOVE                6  02754
1219        SUB-RTN 07.04
1220       AR        BBE    AU,*,2              SHOULD BRANCH                12  02761  W 02831 02772 2
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PGLIN   LABEL   OPCOD  OPERAND                                    CT  ADDRS  INSTRUCTION

1221            BBE    AS,TADO,1                                  12  02773  W 02799 01000 1
1222            B      TYPE                                        7  02785  J 01026
1223            DCW    @#07.04@,G        BBE 2 EQ 2 FAILURE        6  02797
1224    AS      BBE    AT,TAD2,1                                  12  02799  W 02818 01002 1
1225            B      *&2                                         7  02811  J 02819
1226    AT      H                                                  1  02818  .
1227            BBE    AR,TAD1,1                                  12  02819  W 02761 01001 1
1228      SUB-RTN 07.05
1229    AU      BBE    *&8,AX&11,2       SHOULD NOT BRANCH        12  02831  W 02850 02919 2
1230            B      AX                                          7  02843  J 02908
1231            BBE    AV,TADO,1                                  12  02850  W 02876 01000 1
1232            B      TYPE                                        7  02862  J 01026
1233            DCW    @#07.05@,G        BBE NOT-2 & 2 BITS        6  02874
1234    AV      BBE    AW,TAD2,1                                  12  02876  W 02895 01002 1
1235            B      *&2                                         7  02888  J 02896
1236    AW      H                                                  1  02895  .
1237            BBE    AU,TAD1,1                                  12  02896  W 02831 01001 1
1238      SUB-RTN 07.06
                                 L                                                          L
1239    AX      BBE    *&8,AU&11,B       SHOULD NOT BRANCH        12  02908  W 02927 02842 B
1240            B      BA                                          7  02920  J 02985
1241            BBE    AY,TADO,1                                  12  02927  W 02953 01000 1
1242            B      TYPE                                        7  02939  J 01026
1243            DCW    @#C7.06@,G        BBE 2 & NOT-2 BITS        6  02951
1244    AY      BBE    AZ,TAD2,1                                  12  02953  W 02972 01002 1
1245            B      *&2                                         7  02965  J 02973
1246    AZ      H                                                  1  02972  .
1247            BBE    AX,TAD1,1                                  12  02973  W 02908 01001 1
1248      SUB-RTN 07.07
1249    BA      BBE    BD,*,4            SHOULD BRANCH            12  02985  W 03055 02996 4
1250            BBE    BB,TADO,1                                  12  02997  W 03023 01000 1
1251            B      TYPE                                        7  03009  J 01026
1252            DCW    @#C7.07@,G        BBE 4 EQ 4 FAILURE        6  03021
1253    BB      BBE    BC,TAD2,1                                  12  03023  W 03042 01002 1
1254            B      *&2                                         7  03035  J 03043
1255    BC      H                                                  1  03042  .
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PGLIN     LABEL      OPCOD  OPERAND                                CT  ADDRS  INSTRUCTION
1256                 BBE    BA,TAD1,1                              12  03043  W 02985 01001 1
1257       SUB-RTN 07.08
1258      BD         BBE    *&8,BG&11,4       SHOULD NOT BRANCH    12  03055  W 03074 03143 4
1259                 B      BG                                      7  03067  J 03132
1260                 BBE    BE,TAD0,1                              12  03074  W 03100 01000 1
1261                 B      TYPE                                    7  03086  J 01026
1262                 DCW    @#07.08@,G        BBE NOT-4 & 4 BITS    6  03098
1263      BE         BBE    BF,TAD2,1                              12  03100  W 03119 01002 1
1264                 B      *&2                                     7  03112  J 03120
1265      BF         H                                              1  03119  .
1266                 BBE    BD,TAD1,1                              12  03120  W 03055 01001 1
1267       SUB-RTN 07.09
1268      BG         BBE    *&8,BD&11,.       SHOULD NOT BRANCH    12  03132  W 03151 03066 .
1269                 B      BJ                                      7  03144  J 03209
1270                 BBE    BH,TAD0,1                              12  03151  W 03177 01000 1
1271                 B      TYPE                                    7  03163  J 01026
1272                 DCW    @#07.09@,G        BBE 4 & NOT-4 BITS    6  03175
1273      BH         BBE    BI,TAD2,1                              12  03177  W 03196 01002 1
1274                 B      *&2                                     7  03189  J 03197
1275      BI         H                                              1  03196  .
1276                 BBE    BG,TAD1,1                              12  03197  W 03132 01001 1
1277       SUB-RTN 07.10
1278      BJ         BBE    BM,*,8            SHOULD BRANCH        12  03209  W 03279 03220 8
1279                 BBE    BK,TAD0,1                              12  03221  W 03247 01000 1
1280                 B      TYPE                                    7  03233  J 01026
1281                 DCW    @#07.10@,G        BBE 8 EQ 8 FAILURE    6  03245
1282      BK         BBE    BL,TAD2,1                              12  03247  W 03266 01002 1
1283                 B      *&2                                     7  03259  J 03267
1284      BL         H                                              1  03266  .
1285                 BBE    BJ,TAD1,1                              12  03267  W 03209 01001 1
1286       SUB-RTN 07.11
1287      BM         BBE    *&8,BP&11,8       SHOULD NOT BRANCH    12  03279  W 03298 03367 8
1288                 B      BP                                      7  03291  J 03356
1289                 BBE    BN,TAD0,1                              12  03298  W 03324 01000 1
1290                 B      TYPE                                    7  03310  J 01026
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PGLIN   LABEL    OPCOD  OPERAND                                            CT  ADDRS   INSTRUCTION

1291             DCW    @#07.11@,G       BBE NOT-8 & 8 BITS                 6  03322
1292    BN       BBE    BO,TAD2,1                                          12  03324   W 03343 01002 1
1293             B      *&2                                                 7  03336   J 03344
1294    BO       H                                                          1  03343   .
1295             BBE    BM,TAD1,1                                          12  03344   W 03279 01001 1
1296      SUB-RTN 07.12
1297    BP       BBE    *&8,BM&11,G      SHOULD NOT BRANCH                 12  03356   W 03375 03290 G
1298             B      BS                                                  7  03368   J 03433
1299             BBE    BQ,TAD0,1                                          12  03375   W 03401 01000 1
1300             B      TYPE                                                7  03387   J 01026
1301             DCW    @#07.12@,G       BBE 8 & NOT-8 BITS                 6  03399
1302    BQ       BBE    BR,TAD2,1                                          12  03401   W 03420 01002 1
1303             B      *&2                                                 7  03413   J 03421
1304    BR       H                                                          1  03420   .
1305             BBE    BP,TAD1,1                                          12  03421   W 03356 01001 1
1306      SUB-RTN 07.13
                              S                                                                    S
1307    BS       BBE    BV,*,B           SHOULD BRANCH                     12  03433   W 03503 03444 B
1308             BBE    BT,TAD0,1                                          12  03445   W 03471 01000 1
1309             B      TYPE                                                7  03457   J 01026
1310             DCW    @#07.13@,G       BBE A EQ A BIT FAILURE             6  03469
1311    BT       BBE    BU,TAD2,1                                          12  03471   W 03490 01002 1
1312             B      *&2                                                 7  03483   J 03491
1313    BU       H                                                          1  03490   .
1314             BBE    BS,TAD1,1                                          12  03491   W 03433 01001 1
1315      SUB-RTN 07.14
                                   S                                                               S
1316    BV       BBE    *&8,BY&11,B      SHOULD NOT BRANCH                 12  03503   W 03522 03591 B
1317             B      BY                                                  7  03515   J 03580
1318             BBE    BW,TAD0,1                                          12  03522   W 03548 01000 1
1319             B      TYPE                                                7  03534   J 01026
1320             DCW    @#07.14@,G       BBE NOT-A EQ A BIT                 6  03546
1321    BW       BBE    BX,TAD2,1                                          12  03548   W 03567 01002 1
1322             B      *&2                                                 7  03560   J 03568
1323    BX       H                                                          1  03567   .
1324             BBE    BV,TAD1,1                                          12  03568   W 03503 01001 1
1325      SUB-RTN 07.15
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PGLIN     LABEL      OPCOD  OPERAND                          CT  ADDRS  INSTRUCTION
1326      BY         BBE    *&8,BV&11,L(C)   SHOULD NOT BRANCH  12  03580  W 03599 03514 L(D)
1327                 B      CB                                   7  03592  J 03657
1328                 BBE    BZ,TADO,1                           12  03599  W 03625 01000 1
1329                 B      TYPE                                 7  03611  J 01026
1330                 DCW    @#07.15@,G       BBE A EQ NOT-A BITS 6  03623
1331      BZ         BBE    CA,TAD2,1                           12  03625  W 03644 01002 1
1332                 B      *&2                                  7  03637  J 03645
1333      CA         H                                           1  03644  .
1334                 BBE    BY,TAD1,1                           12  03645  W 03580 01001 1
1335        SUB-RTN 07.16
1336      CB         BBE    CE,*,-           SHOULD BRANCH      12  03657  W 03727 03668 -
1337                 BBE    CC,TADO,1                           12  03669  W 03695 01000 1
1338                 B      TYPE                                 7  03681  J 01026
1339                 DCW    @#07.16@,G       BBE B EQ B BIT FAILURE 6 03693
1340      CC         BBE    CD,TAD2,1                           12  03695  W 03714 01002 1
1341                 B      *&2                                  7  03707  J 03715
1342      CD         H                                           1  03714  .
1343                 BBE    CB,TAD1,1                           12  03715  W 03657 01001 1
1344        SUB-RTN 07.17
1345      CE         BBE    *&8,CH&11,-      SHOULD NOT BRANCH  12  03727  W 03746 03815 -
1346                 B      CH                                   7  03739  J 03804
1347                 BBE    CF,TADO,1                           12  03746  W 03772 01000 1
1348                 B      TYPE                                 7  03758  J 01026
1349                 DCW    @#07.17@,G       BBE NOT-B EQ B BIT  6  03770
1350      CF         BBE    CG,TAD2,1                           12  03772  W 03791 01002 1
1351                 B      *&2                                  7  03784  J 03792
1352      CG         H                                           1  03791  .
1353                 BBE    CE,TAD1,1                           12  03792  W 03727 01001 1
1354        SUB-RTN 07.18
1355      CH         BBE    *&8,CE&11,M(S)   SHOULD NOT BRANCH  12  03804  W 03823 03738 M(S)
1356                 B      CK                                   7  03816  J 03881
1357                 BBE    CI,TADO,1                           12  03823  W 03849 01000 1
1358                 B      TYPE                                 7  03835  J 01026
1359                 DCW    @#07.18@,G       BBE B EQ NOT-B BITS 6  03847
1360      CI         BBE    CJ,TAD2,1                           12  03849  W 03868 01002 1
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PGLIN     LABEL     OPCOD  OPERAND                                                CT  ADDRS  INSTRUCTION

1361                B      *&2                                                     7  03861  J 03869
1362      CJ        H                                                              1  03868  .
1363                BBE    CH,TAD1,1                                              12  03869  W 03804 01001 1
1364        SUB-RTN 07.19
1365      CK        BBE    *&8,*,                SHOULD NOT BRANCH                12  03881  W 03900 03892
1366                B      CN                                                      7  03893  J 03958
1367                BBE    CL,TAD0,1                                              12  03900  W 03926 01000 1
1368                B      TYPE                                                    7  03912  J 01026
1369                DCW    @#07.19@,G            BBE FAILURE, NO-BITS CAUSED BR    6  03924
1370      CL        BBE    CM,TAD2,1                                              12  03926  W 03945 01002 1
1371                B      *&2                                                     7  03938  J 03946
1372      CM        H                                                              1  03945  .
1373                BBE    CK,TAD1,1                                              12  03946  W 03881 01001 1
1374        SUB-RTN 07.20
1375      CN        BBE    *&8,CQ&11,            SHOULD NOT BRANCH                12  03958  W 03977 04046
1376                B      CQ                                                      7  03970  J 04035
1377                BBE    CO,TAD0,1                                              12  03977  W 04003 01000 1
1378                B      TYPE                                                    7  03989  J 01026
1379                DCW    @#07.20@,G            BBE ALL-BITS VS NO-BITS           6  04001
1380      CO        BBE    CP,TAD2,1                                              12  04003  W 04022 01002 1
1381                B      *&2                                                     7  04015  J 04023
1382      CP        H                                                              1  04022  .
1383                BBE    CN,TAD1,1                                              12  04023  W 03958 01001 1
1384        SUB-RTN 07.21
                                  G                                                                          G
1385      CQ        BBE    *&8,CN&11,M           SHOULD NOT BRANCH                12  04035  W 04054 03969 M
1386                B      DA                                                      7  04047  J 04112
1387                BBE    CR,TAD0,1                                              12  04054  W 04080 01000 1
1388                B      TYPE                                                    7  04066  J 01026
1389                DCW    @#07.21@,G            BBE NO-BITS VS ALL BITS           6  04078
1390      CR        BBE    CS,TAD2,1                                              12  04080  W 04099 01002 1
1391                B      *&2                                                     7  04092  J 04100
1392      CS        H                                                              1  04099  .
1393                BBE    CQ,TAD1,1                                              12  04100  W 04035 01001 1
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PGLIN     LABEL      OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
1395        ROUTINE 08.00   CHECK OPERATION OF BRANCH ZONE & BRANCH WM/ZONE
1396
1397        SUB-RTN 08.01
1398      DA           BZN   DD,TPMK,          SHOULD BRANCH        12  04112  V 04182 09903 2
1399                   BBE   DB,TAD0,1                             12  04124  W 04150 01000 1
1400                   B     TYPE                                   7  04136  J 01026
1401                   DCW   a#08.01a,G                             6  04148
1402      DB           BBE   DC,TAD2,1                             12  04150  W 04169 01002 1
1403                   B     *£2                                    7  04162  J 04170
1404      DC           H                                            1  04169  .
1405                   BBE   DA,TAD1,1                             12  04170  W 04112 01001 1
1406        SUB-RTN 08.02
1407      DD           BZN   *£8,QUOT,          SHOULD NOT BRANCH    12  04182  V 04201 09897 2
1408                   B     DG                                     7  04194  J 04259
1409                   BBE   DE,TAD0,1                             12  04201  W 04227 01000 1
1410                   B     TYPE                                   7  04213  J 01026
1411                   DCW   a#08.02a,G                             6  04225
1412      DE           BBE   DF,TAD2,1                             12  04227  W 04246 01002 1
1413                   B     *£2                                    7  04239  J 04247
1414      DF           H                                            1  04246  .
1415                   BBE   DD,TAD1,1                             12  04247  W 04182 01001 1
1416        SUB-RTN 08.03
1417      DG           BZN   *£8,DELT,          SHOULD NOT BRANCH    12  04259  V 04278 09909 2
1418                   B     DJ                                     7  04271  J 04336
1419                   BBE   DH,TAD0,1                             12  04278  W 04304 01000 1
1420                   B     TYPE                                   7  04290  J 01026
1421                   DCW   a#08.03a,G                             6  04302
1422      DH           BBE   DI,TAD2,1                             12  04304  W 04323 01002 1
1423                   B     *£2                                    7  04316  J 04324
1424      DI           H                                            1  04323  .
1425                   BBE   DG,TAD1,1                             12  04324  W 04259 01001 1
1426        SUB-RTN 08.04
1427      DJ           BZN   *£8,GPMK,          SHOULD NOT BRANCH    12  04336  V 04355 09891 2
1428                   B     DM                                     7  04348  J 04413
1429                   BBE   DK,TAD0,1                             12  04355  W 04381 01000 1
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PGLIN     LABEL      OPCOD  OPERAND                          CT  ADDRS  INSTRUCTION
1430                 B      TYPE                              7  04367  J 01026
1431                 DCW    @#08.04@,G                        6  04379
1432      DK         BBE    DL,TAD2,1                        12  04381  W 04400 01002 1
1433                 B      *&2                               7  04393  J 04401
1434      DL         H                                        1  04400  .
1435                 BBE    DJ,TAD1,1                        12  04401  W 04336 01001 1
1436        SUB-RTN 08.05
1437      DM         BZN    DP,QUOT,*      SHOULD BRANCH     12  04413  V 04483 09897 S
1438                 BBE    DN,TAD0,1                        12  04425  W 04451 01000 1
1439                 B      TYPE                              7  04437  J 01026
1440                 DCW    @#08.05@,G                        6  04449
1441      DN         BBE    DO,TAD2,1                        12  04451  W 04470 01002 1
1442                 B      *&2                               7  04463  J 04471
1443      DO         H                                        1  04470  .
1444                 BBE    DM,TAD1,1                        12  04471  W 04413 01001 1
1445        SUB-RTN 08.06
1446      DP         BZN    *&8,TPMK,*     SHOULD NOT BRANCH 12  04483  V 04502 09903 S
1447                 B      DS                                7  04495  J 04560
1448                 BBE    DQ,TAD0,1                        12  04502  W 04528 01000 1
1449                 B      TYPE                              7  04514  J 01026
1450                 DCW    @#08.06@,G                        6  04526
1451      DQ         BBE    DR,TAD2,1                        12  04528  W 04547 01002 1
1452                 B      *&2                               7  04540  J 04548
1453      DR         H                                        1  04547  .
1454                 BBE    DP,TAD1,1                        12  04548  W 04483 01001 1
1455        SUB-RTN 08.07
1456      DS         BZN    *&8,DELT,*     SHOULD NOT BRANCH 12  04560  V 04579 09909 S
1457                 B      DV                                7  04572  J 04637
1458                 BBE    DT,TAD0,1                        12  04579  W 04605 01000 1
1459                 B      TYPE                              7  04591  J 01026
1460                 DCW    @#08.07@,G                        6  04603
1461      DT         BBE    DU,TAD2,1                        12  04605  W 04624 01002 1
1462                 B      *&2                               7  04617  J 04625
1463      DU         H                                        1  04624  .
1464                 BBE    DS,TAD1,1                        12  04625  W 04560 01001 1
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PGLIN     LABEL      OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
1465        SUB-RTN 08.08
1466      DV         BZN    *&8,GPMK,*        SHOULD NOT BRANCH      12  04637  V 04656 09891 S
1467                 B      DY                                       7  04649  J 04714
1468                 BBE    DW,TAD0,1                               12  04656  W 04682 01000 1
1469                 B      TYPE                                     7  04668  J 01026
1470                 DCW    @#08.08@,G                               6  04680
1471      DW         BBE    DX,TAD2,1                               12  04682  W 04701 01002 1
1472                 B      *&2                                      7  04694  J 04702
1473      DX         H                                               1  04701  .
1474                 BBE    DV,TAD1,1                               12  04702  W 04637 01001 1
1475        SUB-RTN 08.09
1476      DY         BZN    EB,DELT,-         SHOULD BRANCH          12  04714  V 04784 09909 K
1477                 BBE    DZ,TAD0,1                               12  04726  W 04752 01000 1
1478                 B      TYPE                                     7  04738  J 01026
1479                 DCW    @#08.09@,G                               6  04750
1480      DZ         BBE    EA,TAD2,1                               12  04752  W 04771 01002 1
1481                 B      *&2                                      7  04764  J 04772
1482      EA         H                                               1  04771  .
1483                 BBE    DY,TAD1,1                               12  04772  W 04714 01001 1
1484        SUB-RTN 08.10
1485      EB         BZN    *&8,TPMK,-        SHOULD NOT BRANCH      12  04784  V 04803 09903 K
1486                 B      EE                                       7  04796  J 04861
1487                 BBE    EC,TAD0,1                               12  04803  W 04829 01000 1
1488                 B      TYPE                                     7  04815  J 01026
1489                 DCW    @#C8.10@,G                               6  04827
1490      EC         BBE    ED,TAD2,1                               12  04829  W 04848 01002 1
1491                 B      *&2                                      7  04841  J 04849
1492      ED         H                                               1  04848  .
1493                 BBE    EB,TAD1,1                               12  04849  W 04784 01001 1
1494        SUB-RTN 08.11
1495      EE         BZN    *&8,QUOT,-        SHOULD NOT BRANCH      12  04861  V 04880 09897 K
1496                 B      EH                                       7  04873  J 04938
1497                 BBE    EF,TADO,1                               12  04880  W 04906 01000 1
1498                 B      TYPE                                     7  04892  J 01026
1499                 DCW    @#C8.11@,G                               6  04904
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PGLIN     LABEL      OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
1500      EF         BBE    EG,TAD2,1                                12  04906  W 04925 01002 1
1501                 B      *&2                                       7  04918  J 04926
1502      EG         H                                                1  04925  .
1503                 BBE    EE,TAD1,1                                12  04926  W 04861 01001 1
1504        SUB-RTN 08.12
1505      EH         BZN    *&8,GPMK,-      SHOULD NOT BRANCH        12  04938  V 04957 09891 K
1506                 B      EK                                        7  04950  J 05015
1507                 BBE    EI,TAD0,1                                12  04957  W 04983 01000 1
1508                 B      TYPE                                      7  04969  J 01026
1509                 DCW    @#08.12@,G                                6  04981
1510      EI         BBE    EJ,TAD2,1                                12  04983  W 05002 01002 1
1511                 B      *&2                                       7  04995  J 05003
1512      EJ         H                                                1  05002  .
1513                 BBE    EH,TAD1,1                                12  05003  W 04938 01001 1
1514        SUB-RTN 08.13
1515      EK         BZN    EN,GPMK,&       SHOULD BRANCH            12  05015  V 05085 09891 B
1516                 BBE    EL,TAD0,1                                12  05027  W 05053 01000 1
1517                 B      TYPE                                      7  05039  J 01026
1518                 DCW    @#08.13@,G                                6  05051
1519      EL         BBE    EM,TAD2,1                                12  05053  W 05072 01002 1
1520                 B      *&2                                       7  05065  J 05073
1521      EM         H                                                1  05072  .
1522                 BBE    EK,TAD1,1                                12  05073  W 05015 01001 1
1523        SUB-RTN 08.14
1524      EN         BZN    *&8,TPMK,&      SHOULD NOT BRANCH        12  05085  V 05104 09903 B
1525                 B      EQ                                        7  05097  J 05162
1526                 BBE    EO,TAD0,1                                12  05104  W 05130 01000 1
1527                 B      TYPE                                      7  05116  J 01026
1528                 DCW    @#C8.14@,G                                6  05128
1529      EO         BBE    EP,TAD2,1                                12  05130  W 05149 01002 1
1530                 B      *&2                                       7  05142  J 05150
1531      EP         H                                                1  05149  .
1532                 BBE    EN,TAD1,1                                12  05150  W 05085 01001 1
1533        SUB-RTN 08.15
1534      EQ         BZN    *&8,QUOT,&      SHOULD NOT BRANCH        12  05162  V 05181 09897 B
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PGLIN     LABEL      OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
1535                 B      ET                                        7  05174  J 05239
1536                 BBE    ER,TADO,1                                12  05181  W 05207 01000 1
1537                 B      TYPE                                      7  05193  J 01026
1538                 DCW    @#08.15@,G                                6  05205
1539      ER         BBE    ES,TAD2,1                                12  05207  W 05226 01002 1
1540                 B      *&2                                       7  05219  J 05227
1541      ES         H                                                1  05226  .
1542                 BBE    EQ,TAD1,1                                12  05227  W 05162 01001 1
1543        SUB-RTN 08.16
1544      ET         BZN    *&8,DELT,&        SHOULD NOT BRANCH      12  05239  V 05258 09909 B
1545                 B      EW                                        7  05251  J 05316
1546                 BBE    EU,TADO,1                                12  05258  W 05284 01000 1
1547                 B      TYPE                                      7  05270  J 01026
1548                 DCW    @#08.16@,G                                6  05282
1549      EU         BBE    EV,TAD2,1                                12  05284  W 05303 01002 1
1550                 B      *&2                                       7  05296  J 05304
1551      EV         H                                                1  05303  .
1552                 BBE    ET,TAD1,1                                12  05304  W 05239 01001 1
1553        SUB-RTN 08.17
1554      EW         BWZ    *&8,GPMK,         SHOULD NOT BRANCH      12  05316  V 05335 09891 3
1555                 B      EZ                                        7  05328  J 05393
1556                 BBE    EX,TADO,1                                12  05335  W 05361 01000 1
1557                 B      TYPE                                      7  05347  J 01026
1558                 DCW    @#08.17@,G                                6  05359
1559      EX         BBE    EY,TAD2,1                                12  05361  W 05380 01002 1
1560                 B      *&2                                       7  05373  J 05381
1561      EY         H                                                1  05380  .
1562                 BBE    EW,TAD1,1                                12  05381  W 05316 01001 1
1563        SUB-RTN 08.18  USE ILLEGAL OP MODIFIER TO TEST NO-BRANCH COND
1564      EZ         BWZ                      OP CODE                 1  05393  V
1565                 DC     EZ1              I-ADDRESS               5  05398  05412
1566                        GMWM             B-ADDRESS               5  05403  01219
1567                        @¤@              OP MODIFIER             1  05404
1568                 B      FC                                        7  05405  J 05470
1569      EZ1        BBE    FA,TADO,1                                12  05412  W 05438 01000 1
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PGLIN     LABEL     OPCOD  OPERAND                          CT  ADDRS  INSTRUCTION
1570                B      TYPE                              7  05424  J 01026
1571                DCW    @#C8.18@,G                        6  05436
1572      FA        BBE    FB,TAD2,1                        12  05438  W 05457 01002 1
1573                B      *&2                               7  05450  J 05458
1574      FB        H                                        1  05457  .
1575                BBE    EZ,TAD1,1                        12  05458  W 05393 01001 1
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PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
1577        ROUTINE 09.00   CK INSTRUCTIONS ZERO-ADD, ZERO-SUBTRACT, BR ZERO
1578
1579        SUB-RTN 09.01
1580      FC          ZA     QMARK,WORK1       ATTEMPT TO TURN ON ZERO BAL INDR  11  05470  QM 05564 09868
1581                  ZA     &8,WORK1          ATTEMPT TO TURN OFF ZERO BAL INDR 11  05481  QM 09924 09868
1582                  BZ     *&8               SHOULD NOT BRANCH                  7  05492  J 05506 V
1583                  B      QMARK                                                7  05499  J 05564
1584                  BBE    FD,TAD0,1                                           12  05506  W 05532 01000 1
1585                  B      TYPE                                                 7  05518  J 01026
1586                  DCW    @#09.01@,G                                           6  05530
1587      FD          BBE    FE,TAD2,1                                           12  05532  W 05551 01002 1
1588                  B      *&2                                                  7  05544  J 05552
1589      FE          H                                                           1  05551  .
1590                  BBE    FC,TAD1,1                                           12  05552  W 05470 01001 1
1591        SUB-RTN 09.02
1592      QMARK       ZA     QMARK,WORK1       TURN ZERO BALANCE INDICATOR ON    11  05564  QM 05564 09868
1593                  ZA     &8,WORK2           AND OFF                          11  05575  QM 09924 09869
1594                  ZA     WORK1,WORK2         AND BACK ON AGAIN               11  05586  QM 09868 09869
1595                  BZ     FH                SHOULD BRANCH                      7  05597  J 05662 V
1596                  BBE    FF,TAD0,1                                           12  05604  W 05630 01000 1
1597                  B      TYPE                                                 7  05616  J 01026
1598                  DCW    @#09.02@,G                                           6  05628
1599      FF          BBE    FG,TAD2,1                                           12  05630  W 05649 01002 1
1600                  B      *&2                                                  7  05642  J 05650
1601      FG          H                                                           1  05649  .
1602                  BBE    QMARK,TAD1,1                                        12  05650  W 05564 01001 1
1603        SUB-RTN 09.03   CK ZERO-ADD FOR PROPER ZONE GENERATION
1604      FH          ZA     -8,WORK2                                            11  05662  QM 09925 09869
1605                  ZA     &8,WORK2                                            11  05673  QM 09924 09869
1606                  BZN    FK,WORK2,&        SHOULD BRANCH                     12  05684  V 05754 09869 B
1607                  BBE    FI,TAD0,1                                           12  05696  W 05722 01000 1
1608                  B      TYPE                                                 7  05708  J 01026
1609                  DCW    @#09.03@,G                                           6  05720
1610      FI          BBE    FJ,TAD2,1                                           12  05722  W 05741 01002 1
1611                  B      *&2                                                  7  05734  J 05742
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PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
1612      FJ         H                                                        1  05741  .
1613                 BBE    FH,TAD1,1                                       12  05742  W 05662 01001 1
1614        SUB-RTN 09.04
1615      FK         ZA     -8,WORK2                                        11  05754  QM 09925 09869
1616                 BZN    FN,WORK2,-       SHOULD BRANCH                  12  05765  V 05835 09869 K
1617                 BBE    FL,TAD0,1                                       12  05777  W 05803 01000 1
1618                 B      TYPE                                             7  05789  J 01026
1619                 DCW    @#09.04@,G                                       6  05801
1620      FL         BBE    FM,TAD2,1                                       12  05803  W 05822 01002 1
1621                 B      *&2                                              7  05815  J 05823
1622      FM         H                                                        1  05822  .
1623                 BBE    FK,TAD1,1                                       12  05823  W 05754 01001 1
1624        SUB-RTN 09.05
1625      FN         ZA     @Y@,WORK2        SHOULD TREAT Y AS PLUS 8       11  05835  QM 09926 09869
1626                 BZN    FQ,WORK2,&       SHOULD BRANCH                  12  05846  V 05916 09869 B
1627                 BBE    FO,TAD0,1                                       12  05858  W 05884 01000 1
1628                 B      TYPE                                             7  05870  J 01026
1629                 DCW    @#09.05@,G                                       6  05882
1630      FO         BBE    FP,TAD2,1                                       12  05884  W 05903 01002 1
1631                 B      *&2                                              7  05896  J 05904
1632      FP         H                                                        1  05903  .
1633                 BBE    FN,TAD1,1                                       12  05904  W 05835 01001 1
1634        SUB-RTN 09.06
1635      FQ         ZA     -8,WORK2         SET SIGN NEGATIVE              11  05916  QM 09925 09869
1636                 ZA     @8@,WORK2        SHOULD TREAT NUMERIC 8 AS PLUS 8 11  05927  QM 09927 09869
1637                 BZN    FT,WORK2,&       SHOULD BRANCH                  12  05938  V 06008 09869 B
1638                 BBE    FR,TAD0,1                                       12  05950  W 05976 01000 1
1639                 B      TYPE                                             7  05962  J 01026
1640                 DCW    @#09.06@,G                                       6  05974
1641      FR         BBE    FS,TAD2,1                                       12  05976  W 05995 01002 1
1642                 B      *&2                                              7  05988  J 05996
1643      FS         H                                                        1  05995  .
1644                 BBE    FQ,TAD1,1                                       12  05996  W 05916 01001 1
1645        SUB-RTN 09.07    CHECK ZERO-SUBTRACT FOR PROPER ZONE GENERATION
1646      FT         ZS     &8,WORK2                                        11  06008  :  09924 09869
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PGLIN     LABEL     OPCOD  OPERAND                                                  CT  ADDRS  INSTRUCTION

1647                BZN    FW,WORK2,-        SHOULD BRANCH                          12  06019  V 06089 09869 K
1648                BBE    FU,TADO,1                                                12  06031  W 06057 01000 1
1649                B      TYPE                                                      7  06043  J 01026
1650                DCW    @#09.07@,G                                                6  06055
1651      FU        BBE    FV,TAD2,1                                                12  06057  W 06076 01002 1
1652                B      *&2                                                       7  06069  J 06077
1653      FV        H                                                                1  06076  .
1654                BBE    FT,TAD1,1                                                12  06077  W 06008 01001 1
1655        SUB-RTN 09.08
1656      FW        ZS     -8,WORK2                                                 11  06089  ; 09925 09869
1657                BZN    FZ,WORK2,&        SHOULD BRANCH                          12  06100  V 06170 09869 B
1658                BBE    FX,TADO,1                                                12  06112  W 06138 01000 1
1659                B      TYPE                                                      7  06124  J 01026
1660                DCW    @#09.08@,G                                                6  06136
1661      FX        BBE    FY,TAD2,1                                                12  06138  W 06157 01002 1
1662                B      *&2                                                       7  06150  J 06158
1663      FY        H                                                                1  06157  .
1664                BBE    FW,TAD1,1                                                12  06158  W 06089 01001 1
1665        SUB-RTN 09.09
1666      FZ        ZS     @Y@,WORK2         SHOULD TREAT ALPHA Y AS PLUS 8         11  06170  ; 09926 09869
1667                BZN    GC,WORK2,-        SHOULD BRANCH                          12  06181  V 06251 09869 K
1668                BBE    GA,TADO,1                                                12  06193  W 06219 01000 1
1669                B      TYPE                                                      7  06205  J 01026
1670                DCW    @#09.09@,G                                                6  06217
1671      GA        BBE    GB,TAD2,1                                                12  06219  W 06238 01002 1
1672                B      *&2                                                       7  06231  J 06239
1673      GB        H                                                                1  06238  .
1674                BBE    FZ,TAD1,1                                                12  06239  W 06170 01001 1
1675        SUB-RTN 09.10
1676      GC        ZS     -8,WORK2          SET SIGN POSITIVE                      11  06251  ; 09925 09869
1677                ZS     @8@,WORK2         SHOULD TREAT NUMERIC 8 AS PLUS 8       11  06262  ; 09927 09869
1678                BZN    GF,WORK2,-        SHOULD BRANCH                          12  06273  V 06343 09869 K
1679                BBE    GD,TADO,1                                                12  06285  W 06311 01000 1
1680                B      TYPE                                                      7  06297  J 01026
1681                DCW    @#09.10@,G                                                6  06309
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PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
1682      GD         BBE    GE,TAD2,1                                        12  06311  W 06330 01002 1
1683                 B      *&2                                               7  06323  J 06331
1684      GE         H                                                        1  06330  .
1685                 BBE    GC,TAD1,1                                        12  06331  W 06251 01001 1
1686        SUB-RTN 09.11   CK FOR HI-ORDER ZONE ELIMINATION
1687      GF         ZA     &8,WORK3-1                                       11  06343  M 09924 09870
1688                 ZA     WORK3-1,WORK3                                    11  06354  M 09870 09871
1689                 BZN    GI,WORK3-1,        SHOULD BRANCH, ZONE ELIMINATED 12  06365  V 06435 09870 2
1690                 BBE    GG,TADO,1                                        12  06377  W 06403 01000 1
1691                 B      TYPE                                              7  06389  J 01026
1692                 DCW    a#09.11a,G                                        6  06401
1693      GG         BBE    GH,TAD2,1                                        12  06403  W 06422 01002 1
1694                 B      *&2                                               7  06415  J 06423
1695      GH         H                                                        1  06422  .
1696                 BBE    GF,TAD1,1                                        12  06423  W 06343 01001 1
1697        SUB-RTN 09.12   CK FOR HI-ORDER ZERO GENERATION
1698      GI         ZS     &8,WORK3-1                                       11  06435  : 09924 09870
1699                 ZS     WORK3-1,WORK3                                    11  06446  : 09870 09871
1700                 ZS     WORK3-1            SINGLE-FIELD ARITH TEST FOR ZERO  6  06457  : 09870
1701                 BZ     GL                 SHOULD BRANCH                  7  06463  J 06528 V
1702                 BBE    GJ,TADO,1                                        12  06470  W 06496 01000 1
1703                 B      TYPE                                              7  06482  J 01026
1704                 DCW    a#09.12a,G                                        6  06494
1705      GJ         BBE    GK,TAD2,1                                        12  06496  W 06515 01002 1
1706                 B      *&2                                               7  06508  J 06516
1707      GK         H                                                        1  06515  .
1708                 BBE    GI,TAD1,1                                        12  06516  W 06435 01001 1
1709        SUB-RTN 09.13   CK ZERO-ADD & ZERO-SUBTRACT, SINGLE NUMERIC BIT
1710      GL         ZA     &6,WORK2                                         11  06528  M 09928 09869
1711                 ZA     -1,WORK2                                         11  06539  M 09929 09869
1712                 BBE    GM,WORK2,S         SHOULD NOT BRANCH             12  06550  W 06574 09869 S
1713                 BBE    GP,WORK2,1         SHOULD BRANCH                 12  06562  W 06632 09869 1
1714      GM         BBE    GN,TADO,1                                        12  06574  W 06600 01000 1
1715                 B      TYPE                                              7  06586  J 01026
1716                 DCW    a#C9.13a,G                                        6  06598
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PGLIN   LABEL   OPCOD  OPERAND                                       CT  ADDRS  INSTRUCTION

1717    GN      BBE    GO,TAD2,1                                     12  06600  W 06619 01002 1
1718            B      *&2                                            7  06612  J 06620
1719    GO      H                                                     1  06619  .
1720            BBE    GL,TAD1,1                                     12  06620  W 06528 01001 1
1721      SUB-RTN 09.14
1722    GP      ZS     -9,WORK2                                      11  06632  : 09930 09869
1723            ZS     &2,WORK2                                      11  06643  : 09931 09869
                                W                                                            W
1724            BBE    GQ,WORK2,S        SHOULD NOT BRANCH           12  06654  W 06678 09869 S
1725            BBE    GT,WORK2,2        SHOULD BRANCH               12  06666  W 06736 09869 2
1726    GQ      BBE    GR,TADO,1                                     12  06678  W 06704 01000 1
1727            B      TYPE                                           7  06690  J 01026
1728            DCW    @#09.14@,G                                     6  06702
1729    GR      BBE    GS,TAD2,1                                     12  06704  W 06723 01002 1
1730            B      *&2                                            7  06716  J 06724
1731    GS      H                                                     1  06723  .
1732            BBE    GP,TAD1,1                                     12  06724  W 06632 01001 1
1733      SUB-RTN 09.15
                                                                                Q
1734    GT      ZA     &9,WORK2                                      11  06736  M 09932 09869
1735            ZS     &4,WORK2                                      11  06747  : 09933 09869
1736            BBE    GU,WORK2,,        SHOULD NOT BRANCH           12  06758  W 06782 09869 ,
1737            BBE    GX,WORK2,4        SHOULD BRANCH               12  06770  W 06840 09869 4
1738    GU      BBE    GV,TADO,1                                     12  06782  W 06808 01000 1
1739            B      TYPE                                           7  06794  J 01026
1740            DCW    @#09.15@,G                                     6  06806
1741    GV      BBE    GW,TAD2,1                                     12  06808  W 06827 01002 1
1742            B      *&2                                            7  06820  J 06828
1743    GW      H                                                     1  06827  .
1744            BBE    GT,TAD1,1                                     12  06828  W 06736 01001 1
1745      SUB-RTN 09.16
1746    GX      ZS     -6,WORK2                                      11  06840  : 09934 09869
                                                                                Q
1747            ZA     -8,WORK2                                      11  06851  M 09925 09869
1748            BBE    GY,WORK2,X        SHOULD NOT BRANCH           12  06862  W 06886 09869 X
1749            BBE    HB,WORK2,8        SHOULD BRANCH               12  06874  W 06944 09869 8
1750    GY      BBE    GZ,TADO,1                                     12  06886  W 06912 01000 1
1751            B      TYPE                                           7  06898  J 01026
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PGLIN     LABEL     OPCOD  OPERAND                          CT  ADDRS  INSTRUCTION
1752                DCW    @#C9.16@,G                        6  06910
1753      GZ        BBE    HA,TAD2,1                        12  06912  W 06931 01002 1
1754                B      *&2                               7  06924  J 06932
1755      HA        H                                        1  06931  .
1756                BBE    GX,TAD1,1                        12  06932  W 06840 01001 1
```

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PGLIN     LABEL      OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
1758
1759        ROUTINE 10.00   CHECK OPERATIONS ADD AND SUBTRACT
1760
1761        SUB-RTN 10.01   ADD ZERO TO ZERO
1762      HB           ZA     HB,WORK2                                 11  06944  M 06944 09869
1763                   A      HB,WORK2                                 11  06955  A 06944 09869
1764                   BZ     HC                  SHOULD BRANCH         7  06966  J 07031 V
1765                   BBE    *&15,TAD0,1                              12  06973  W 06999 01000 1
1766                   B      TYPE                                      7  06985  J 01026
1767                   DCW    @#10.01@,G                                6  06997
1768                   BBE    *&8,TAD2,1                               12  06999  W 07018 01002 1
1769                   B      *&2                                       7  07011  J 07019
1770                   H                                                1  07018  .
1771                   BBE    HB,TAD1,1                                12  07019  W 06944 01001 1
1772        SUB-RTN 10.02   ADD PLUS 1 TO MINUS 1
1773      HC           ZS     &1,WORK2                                 11  07031  . 09935 09869
1774                   A      &1,WORK2                                 11  07042  A 09935 09869
1775                   BZ     HD                  SHOULD BRANCH         7  07053  J 07118 V
1776                   BBE    *&15,TAD0,1                              12  07060  W 07086 01000 1
1777                   B      TYPE                                      7  07072  J 01026
1778                   DCW    @#10.02@,G                                6  07084
1779                   BBE    *&8,TAD2,1                               12  07086  W 07105 01002 1
1780                   B      *&2                                       7  07098  J 07106
1781                   H                                                1  07105  .
1782                   BBE    HC,TAD1,1                                12  07106  W 07031 01001 1
1783        SUB-RTN 10.03   ADD MINUS 2 TO PLUS 2
1784      HD           ZS     -2,WORK2                                 11  07118  . 09936 09869
1785                   A      -2,WORK2                                 11  07129  A 09936 09869
1786                   BZ     HE                  SHOULD BRANCH         7  07140  J 07205 V
1787                   BBE    *&15,TAD0,1                              12  07147  W 07173 01000 1
1788                   B      TYPE                                      7  07159  J 01026
1789                   DCW    @#10.03@,G                                6  07171
1790                   BBE    *&8,TAD2,1                               12  07173  W 07192 01002 1
1791                   B      *&2                                       7  07185  J 07193
1792                   H                                                1  07192  .
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PGLIN     LABEL      OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
1793                 BBE    HD,TAD1,1                                12  07193  W 07118 01001 1
1794       SUB-RTN 10.04    ADD PLUS 4 TO MINUS 4
1795      HE         ZA     -4,WORK2                                 11  07205  M 09937 09869 Q
1796                 A      &4,WORK2                                 11  07216  A 09933 09869
1797                 BZ     HF                  SHOULD BRANCH         7  07227  J 07292 V
1798                 BBE    *&15,TAD0,1                              12  07234  W 07260 01000 1
1799                 B      TYPE                                      7  07246  J 01026
1800                 DCW    @#10.04@,G                                6  07258
1801                 BBE    *&8,TAD2,1                               12  07260  W 07279 01002 1
1802                 B      *&2                                       7  07272  J 07280
1803                 H                                                1  07279  .
1804                 BBE    HE,TAD1,1                                12  07280  W 07205 01001 1
1805       SUB-RTN 10.05    ADD MINUS 8 TO PLUS 8
1806      HF         ZA     &8,WORK2                                 11  07292  M 09924 09869 Q
1807                 A      -8,WORK2                                 11  07303  A 09925 09869
1808                 BZ     HG                  SHOULD BRANCH         7  07314  J 07379 V
1809                 BBE    *&15,TAD0,1                              12  07321  W 07347 01000 1
1810                 B      TYPE                                      7  07333  J 01026
1811                 DCW    @#10.05@,G                                6  07345
1812                 BBE    *&8,TAD2,1                               12  07347  W 07366 01002 1
1813                 B      *&2                                       7  07359  J 07367
1814                 H                                                1  07366  .
1815                 BBE    HF,TAD1,1                                12  07367  W 07292 01001 1
1816       SUB-RTN 10.06    SUBTRACT PLUS 1 FROM PLUS 1
1817      HG         ZA     &1,WORK2                                 11  07379  M 09935 09869 Q
1818                 S      &1,WORK2                                 11  07390  S 09935 09869
1819                 BZ     HH                  SHOULD BRANCH         7  07401  J 07466 V
1820                 BBE    *&15,TAD0,1                              12  07408  W 07434 01000 1
1821                 B      TYPE                                      7  07420  J 01026
1822                 DCW    @#10.06@,G                                6  07432
1823                 BBE    *&8,TAD2,1                               12  07434  W 07453 01002 1
1824                 B      *&2                                       7  07446  J 07454
1825                 H                                                1  07453  .
1826                 BBE    HG,TAD1,1                                12  07454  W 07379 01001 1
1827       SUB-RTN 10.07    SUBTRACT MINUS 2 FROM MINUS 2
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PGLIN     LABEL       OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
1828      HH          ZS     &2,WORK2                                 11  07466  : 09931 09869
1829                  S      -2,WORK2                                 11  07477  S 09936 09869
1830                  BZ     HI                  SHOULD BRANCH         7  07488  J 07553 V
1831                  BBE    *&15,TAD0,1                              12  07495  W 07521 01000 1
1832                  B      TYPE                                      7  07507  J 01026
1833                  DCW    @#10.07@,G                                6  07519
1834                  BBE    *&8,TAD2,1                               12  07521  W 07540 01002 1
1835                  B      *&2                                       7  07533  J 07541
1836                  H                                                1  07540  .
1837                  BBE    HH,TAD1,1                                12  07541  W 07466 01001 1
1838        SUB-RTN 10.08    SUBTRACT PLUS 4 FROM PLUS 4
1839      HI          ZS     -4,WORK2                                 11  07553  : 09937 09869
1840                  S      &4,WORK2                                 11  07564  S 09933 09869
1841                  BZ     HJ                  SHOULD BRANCH         7  07575  J 07640 V
1842                  BBE    *&15,TAD0,1                              12  07582  W 07608 01000 1
1843                  B      TYPE                                      7  07594  J 01026
1844                  DCW    @#10.08@,G                                6  07606
1845                  BBE    *&8,TAD2,1                               12  07608  W 07627 01002 1
1846                  B      *&2                                       7  07620  J 07628
1847                  H                                                1  07627  .
1848                  BBE    HI,TAD1,1                                12  07628  W 07553 01001 1
1849        SUB-RTN 10.09    SUBTRACT MINUS 8 FROM MINUS 8
1850      HJ          ZA     -8,WORK2                                 11  07640  Q M 09925 09869
1851                  S      -8,WORK2                                 11  07651  S 09925 09869
1852                  BZ     HK                  SHOULD BRANCH         7  07662  J 07727 V
1853                  BBE    *&15,TAD0,1                              12  07669  W 07695 01000 1
1854                  B      TYPE                                      7  07681  J 01026
1855                  DCW    @#10.09@,G                                6  07693
1856                  BBE    *&8,TAD2,1                               12  07695  W 07714 01002 1
1857                  B      *&2                                       7  07707  J 07715
1858                  H                                                1  07714  .
1859                  BBE    HJ,TAD1,1                                12  07715  W 07640 01001 1
1860        SUB-RTN 10.10    CK ARITH OFLOW AND ZERO BALANCE
1861      HK          BAV    *&1                 SHOULD RESET ARITH OFLOW, IF ON   7  07727  J 07734 Z
1862                  ZA     &5,WORK2                                 11  07734  Q M 09938 09869
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PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
1863                 A      WORK2              DOUBLE WORK2 FOR OFLOW & ZERO BAL  6  07745  A 09869
1864                 BZ     *&8                SHOULD BRANCH                   7  07751  J 07765 V
1865                 B      HL                 IF TAKEN, INDICATES NO ZERO BAL 7  07758  J 07793
1866                 BAV    *&8                SHOULD BRANCH & RESET OFLOW     7  07765  J 07779 Z
1867                 B      HL                 IF TAKEN, INDICATES NO OFLOW    7  07772  J 07793
1868                 BAV    *&8                SHOULD NOT BRANCH               7  07779  J 07793 Z
1869                 B      HM                                                 7  07786  J 07851
1870      HL         BBE    *&15,TADO,1                                       12  07793  W 07819 01000 1
1871                 B      TYPE                                               7  07805  J 01026
1872                 DCW    a#10.10a,G                                         6  07817
1873                 BBE    *&8,TAD2,1                                        12  07819  W 07838 01002 1
1874                 B      *&2                                                7  07831  J 07839
1875                 H                                                         1  07838  .
1876                 BBE    HK,TAD1,1                                         12  07839  W 07727 01001 1
1877       SUB-RTN 10.11    CK ARITH OFLOW & NO ZERO BAL & NO DIGIT OFLOW
1878      HM         BAV    *&1                                                7  07851  J 07858 Z
1879                 ZS     *-10,WORK1         SET WORK1 TO PLUS ZERO         11  07858  ' 07858 09868
1880                 ZS     &9,WORK2                                          11  07869  ' 09932 09869
1881                 S      &9,WORK2           SUB POS FROM NEG NO. FOR OFLOW 11  07880  S 09932 09869
1882                 BAV    *&8                SHOULD BRANCH                   7  07891  J 07905 Z
1883                 B      HN                 IF TAKEN, INDICATES NO OFLOW    7  07898  J 07925
1884                 BZ     HN                 SHOULD NOT BRANCH               7  07905  J 07925 V
1885                 ZA     WORK1              WORK1 SHOULD STILL BE ZERO      6  07912  Q
                                                                                          M 09868
1886                 BZ     HO                 SHOULD BRANCH                   7  07918  J 07983 V
1887      HN         BBE    *&15,TADO,1                                       12  07925  W 07951 01000 1
1888                 B      TYPE                                               7  07937  J 01026
1889                 DCW    a#10.11a,G                                         6  07949
1890                 BBE    *&8,TAD2,1                                        12  07951  W 07970 01002 1
1891                 B      *&2                                                7  07963  J 07971
1892                 H                                                         1  07970  .
1893                 BBE    HM,TAD1,1                                         12  07971  W 07851 01001 1
1894       SUB-RTN 10.12    LONG ADD & SUBTRACT USING ALL DIGITS
1895      HO         ZS     &54321,WORK4-5     WORK4 SHOULD BE  5432J..... NOW 11  07983  ' 09943 09876
1896                 ZS     WORK4-5,WORK4      WORK4 SHOULD BE  000005432A NOW 11  07994  ' 09876 09881
1897                 A      &9876,WORK4-5      WORK4 SHOULD BE  098765432A NOW 11  08005  A 09947 09876
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PGLIN     LABEL       OPCOD  OPERAND                                                       CT  ADDRS  INSTRUCTION

1898                  A      &123,WORK4-5        WORK4 SHOULD BE  099995432A NOW            11  08016  A 09950 09876
1899                  A      &45679,WORK4        WORK4 SHOULD BE  100000000& NOW            11  08027  A 09955 09881
1900                  BZ     HP                  SHOULD NOT BRANCH                           7  08038  J 08147 V
1901                  SW     WORK4-8                                                         6  08045  , 09873
1902                  ZS     WORK4               TEST LOWER 9 POS OF WORK4 FOR ZRO           6  08051  : 09881
1903                  CW     WORK4-8                                                         6  08057  ¤ 09873
1904                  BZ     *&8                 SHOULD BRANCH                               7  08063  J 08077 V
1905                  B      HP                                                              7  08070  J 08147
1906                  S      &123,WORK4-5        WORK4 SHOULD BE  098770000- NOW            11  08077  S 09950 09876
1907                  S      -45679,WORK4        WORK4 SHOULD BE  098765432J NOW            11  08088  S 09960 09881
1908                  S      &9876,WORK4-5       WORK4 SHOULD BE  000005432J NOW            11  08099  S 09947 09876
1909                  S      -54321,WORK4        WORK4 SHOULD BE  000000000- NOW            11  08110  S 09965 09881
1910                  BZ     *&8                 SHOULD BRANCH                               7  08121  J 08135 V
1911                  B      HP                                                              7  08128  J 08147
1912                  BZN    HQ,WORK4,-          WILL BRANCH IF ZONED CORRECTLY             12  08135  V 08205 09881 K
1913      HP          BBE    *&15,TAD0,1      ** ANY #10.12 ERROR COMES HERE                12  08147  W 08173 01000 1
1914                  B      TYPE                                                            7  08159  J 01026
1915                  DCW    @#10.12@,G                                                      6  08171
1916                  BBE    *&8,TAD2,1                                                     12  08173  W 08192 01002 1
1917                  B      *&2                                                             7  08185  J 08193
1918                  H                                                                      1  08192  .
1919                  BBE    HO,TAD1,1                                                      12  08193  W 07983 01001 1
1920        SUB-RTN 10.13    CK B-FIELD ZONE RETENTION & SIGN CHANGE
1921      HQ          SW     WORK5               PROTECT HI-ORDER FIELD OF WORK5             6  08205  , 09885
1922                  ZA     -1,WORK5            INSURE ZONED NEGATIVELY                    11  08211  M 09929 09885
1923                  CW     WORK5               REMOVE WM                                   6  08222  ¤ 09885
1924                  S      WORK5               ZERO OUT WORK5 FIELD                        6  08228  S 09885
1925                  BZN    *&8,WORK5,-         . INSURE                                   12  08234  V 08253 09885 K
1926                  B      HR                  . THAT                                      7  08246  J 08420
1927                  BZN    *&8,WORK5-1,‡       . ZONES                                    12  08253  V 08272 09884 S
1928                  B      HR                  . ARE                                       7  08265  J 08420
1929                  BZN    *&8,WORK5-2,        . RETAINED                                 12  08272  V 08291 09883 2
1930                  B      HR                  . FOLLOWING                                 7  08284  J 08420
1931                  BZN    *&8,WORK5-3,&       . SINGLE-FIELD                             12  08291  V 08310 09882 B
1932                  B      HR                  . SUBTRACT                                  7  08303  J 08420
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PGLIN   LABEL      OPCOD  OPERAND                                                 CT  ADDRS  INSTRUCTION

1933               A      @9RIY@,WORK5                                            11  08310  A 09969 09885
1934               BZN    *&8,WORK5,&        . CHECK                              12  08321  V 08340 09885 B
1935               B      HR                 . SIGN                                7  08333  J 08420
1936               BZN    *&8,WORK5-1,‡      . CHANGE                             12  08340  V 08359 09884 S
1937               B      HR                 . AND                                 7  08352  J 08420
1938               BZN    *&8,WORK5-2,       . ZONE                               12  08359  V 08378 09883 2
1939               B      HR                 . RETENTION                           7  08371  J 08420
1940               BZN    *&8,WORK5-3,&      . FOLLOWING                          12  08378  V 08397 09882 B
1941               B      HR                 . ADD                                 7  08390  J 08420
1942               S      FOUR9S,WORK5       SHOULD CHANGE SIGN BACK TO MINUS     11  08397  S 09913 09885
1943               BZN    HS,WORK5,-         SHOULD BRANCH                        12  08408  V 08478 09885 K
1944    HR         BBE    *&15,TAD0,1     ** ANY #10.13 ERROR COMES HERE          12  08420  W 08446 01000 1
1945               B      TYPE                                                     7  08432  J 01026
1946               DCW    @#10.13@,G         . NOTE - THIS SUBROUTINE IS           6  08444
1947               BBE    *&8,TAD2,1         . NOT SELF-RESTORING AND A           12  08446  W 08465 01002 1
1948               B      *&2                . ONE-TIME ERROR WILL PROBABLY        7  08458  J 08466
1949               H                         . RESULT IN REPEATED FAILURES         1  08465  .
1950               BBE    HQ,TAD1,1                                               12  08466  W 08205 01001 1
1951      SUB-RTN 10.14   ARITHMETIC OPERATIONS ON SPECIAL CHARACTERS
1952    HS         ZA     HS,WORK4           ZERO WORK4, INSURE NO HI-ORDER ZN    11  08478  M 08478 09881
1953               A      SPECL1,WORK4-1     ADD SPECIAL CHARS TO ZEROS           11  08489  A 09891 09880
1954               BBE    HT,WORK4-1,H       . SHOULD NOT                         12  08500  W 08662 09880 H
1955               BBE    HT,WORK4-2,I       . TAKE                               12  08512  W 08662 09879 I
1956               BBE    HT,WORK4-3,M       . ANY                                12  08524  W 08662 09878 M
1957               BBE    HT,WORK4-4,.       . OF THESE                           12  08536  W 08662 09877 .
1958               BBE    HT,WORK4-5,¤       . CONDITIONAL                        12  08548  W 08662 09876 ¤
1959               BBE    HT,WORK4-6,E       . BRANCHES                           12  08560  W 08662 09875 E
1960               S      &34567,WORK4-1                                          11  08572  S 09974 09880
1961               BZ     *&8                SHOULD BRANCH                         7  08583  J 08597 V
1962               B      HT                                                       7  08590  J 08662
1963               ZA     SPECL2,WORK4       TRY ZERO-ADD ON SPECIAL CHARS        11  08597  M 09897 09881
1964               A      -34567,WORK4                                            11  08608  A 09979 09881
1965               BZ     *&8                SHOULD BRANCH                         7  08619  J 08633 V
1966               B      HT                                                       7  08626  J 08662
1967               ZS     SPECL3,WORK4                                            11  08633  : 09903 09881
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LABEL     OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION

          S      SPECL4,WORK4                                     11  08644  S 09909 09881
          BZ     HU                 SHOULD BRANCH                  7  08655  J 08720 V
HT        BBE    *&15,TAD0,1                                      12  08662  W 08688 01000 1
          B      TYPE                                              7  08674  J 01026
          DCW    @#10.14@,G                                        6  08686
          BBE    *&8,TAD2,1                                       12  08688  W 08707 01002 1
          B      *&2                                               7  08700  J 08708
          H                                                        1  08707  .
          BBE    HS,TAD1,1                                        12  08708  W 08478 01001 1
   SUB-RTN 10.15 ARITH OPS WHEREIN A-FLD LENGTH EXCEEDS B-FLD
                                                                             Q
HU        ZA     FOUR9S,WORK3       A-FIELD LENGTH EXCEEDS B-FIELD  11  08720  M 09913 09871
          SAR    HOLDA1                                            7  08731  G 01020 A
          SBR    HOLDB1                                            7  08738  G 01025 B
          S      ALFADD,HOLDA1      CHECK PROPER STEPPING OF AAR   11  08745  S 09918 01020
          BZ     *&8                SHOULD BRANCH                  7  08756  J 08770 V
          B      HV                                                7  08763  J 08877
          S      BETADD,HOLDB1      CHECK PROPER STEPPING OF BAR   11  08770  S 09923 01025
          BZ     *&8                SHOULD BRANCH                  7  08781  J 08795 V
          B      HV                                                7  08788  J 08877
          S      FOUR9S,WORK3       A-FIELD LENGTH EXCEEDS B-FIELD  11  08795  S 09913 09871
          SAR    HOLDA1                                            7  08806  G 01020 A
          SBR    HOLDB1                                            7  08813  G 01025 B
          BZ     *&8                SHOULD BRANCH IF ZA & S PROPER  7  08820  J 08834 V
          B      HV                                                7  08827  J 08877
          S      ALFADD,HOLDA1      CHECK PROPER STEPPING OF AAR   11  08834  S 09918 01020
          BZ     *&8                SHOULD BRANCH                  7  08845  J 08859 V
          B      HV                                                7  08852  J 08877
          S      BETADD,HOLDB1      CHECK PROPER STEPPING OF BAR   11  08859  S 09923 01025
          BZ     HVA                SHOULD BRANCH & EXIT ROUTINE HERE  7  08870  J 08903 V
HV        B      TYPCK              ANY #10.15 ERRORS COME HERE    7  08877  J 01071
          DCW    @#10.15@,G                                        6  08889
          BBE    HU,TAD1,1                                        12  08891  W 08720 01001 1
   SUB-RTN 10.16 TEST THAT ONLY ZERO TURNS ON ZERO BALANCE
HVA       BAV    *&1                INSURE ARITH OFLOW OFF AT START  7  08903  J 08910 Z
                                                                             Q
          ZA     &18,WORK3                                        11  08910  M 09981 09871
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PGLIN	LABEL	OPCOD	OPERAND		CT	ADDRS	INSTRUCTION
2003		ZA	&1C,WORK4-8		11	08921	Q M 09983 09873
2004	HV8	A	&9,WORK3	27,36,45,54,63,72,81,90,99,08 OFL	11	08932	A 09932 09871
2005		S	&1,WORK4-8	09,08,07,06,05,04,03,02,01,00 ZRO	11	08943	S 09935 09873
2006		BZ	*&15	SHOULD BRANCH AFTER 10 REDUCTIONS	7	08954	J 08975 V
2007		BAV	*&15	SHOULD NEVER BRANCH HERE	7	08961	J 08982 Z
2008		B	HV8		7	08968	J 08932
2009		BAV	HV1	SHOULD BRANCH & EXIT ROUTINE HERE	7	08975	J 09008 Z
2010		B	TYPCK		7	08982	J 01071
2011		DCW	@#10.16@,G		6	08994	
2012		BBE	HVA,TAD1,1		12	08996	W 08903 01001 1
2013	SUB-RTN	10.17	ADJUST ROUTINE #11.01 FOR INDICATED STORAGE SIZE				
2014	HV1	CW	HW1&1	ASSUME 10K STORAGE CAPACITY	6	09008	¤ 09103
2015		ZA	MEMSIZ,WORK1	TEST FOR 10K STORAGE CAPACITY	11	09014	Q M 01257 09868
2016		BZ	*&7	BRANCH IF CTL CARD INDICATES 10K	7	09025	J 09038 V
2017		SW	HW1&1	SET #11.01 FOR NOT 10K CAPACITY	6	09032	, 09103

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PGLIN  LABEL     OPCOD  OPERAND                                             CT  ADDRS  INSTRUCTION

2019     ROUTINE 11.00  CHECK OPERATION CLEAR STORAGE
2020
2021     SUB-RTN 11.01  CK CS 0000C FOR NO ERR & PROPER SETTINGS AAR, BAR
2022   HW        CS     0                                                    6  09038  / 00000
2023             SAR    WORK4-5            SAVE AAR SETTING                  7  09044  G 09876 A
2024             SBR    HOLDB1                                               7  09051  G 01025 B
                                                                                       Q
2025             ZA     WORK4-5            TEST FOR PRIOR AAR EQUAL TO 00000 6  09058  M 09876
2026             BZ     *&8                SHOULD BRANCH                     7  09064  J 09078 V
2027             B      HX                                                   7  09071  J 09132
                                  G                                                                G
2028             BBE    HW1,MEMSIZ,M       BR IF MEM SIZE CHAR IS NOT BLANK 12  09078  W 09102 01257 M
2029             BW     HY,997             BRANCH IF INPUT WAS FROM TAPE    12  09090  V 09158 00997 1
2030   HW1       NOPWM                                                       1  09102  N
2031             S      FOUR9S-3,HOLDB1-4  DO THIS IF STOR SIZE EXCEEDS 10K 11  09103  S 09910 01021
2032             S      FOUR9S,HOLCB1      DO THIS FOR ANY SIZE STORAGE     11  09114  S 09913 01025
2033             BZ     HY                 SHOULD BRANCH                     7  09125  J 09158 V
2034   HX        B      TYPCK                                                7  09132  J 01071
2035             DCW    @#11.01@,G                                           6  09144
2036             BBE    HW,TAD1,1                                           12  09146  W 09038 01001 1
2037     SUB-RTN 11.02  CHECK PROPER OPERATION CLEAR STORAGE
2038   HY        CW     30C                . INITIALIZE B-FIELD OF           6  09158  ¤ 00300
2039             SAR    HZ&10              . BBE INSTRUCTION WHICH FOLLOWS   7  09164  G 09314 A
2040             SW     201,251                                             11  09171  , 00201 00251
2041             CS     299                TRY TO CLEAR 00299 - 00200        6  09182  / 00299
2042             BW     JA,251             SHOULD NOT BRANCH                12  09188  V 09353 00251 1
2043             BW     JA,201             SHOULD NOT BRANCH                12  09200  V 09353 00201 1
2044             SW     200,301            PLACE TWO WORD MARKS             11  09212  , 00200 00301
                                                                                       Q
2045             ZA     &7,200             PUT B-A-4-2-1 BITS IN LOC 00200  11  09223  M 09984 00200
                                                                                       Q
2046             ZA     &8,301                                              11  09234  M 09924 00301
2047             CW     301,300                                             11  09245  ¤ 00301 00300
                                                                                       Q
2048             ZA     301,300            FILL 00200 - 00299 WITH EIGHTS   11  09256  M 00301 00300
2049             BBE    JA,200,G           G IS PLUS 7.  SHOULD NOT BRANCH  12  09267  W 09353 00200 G
2050             BBE    *&8,200,8          SHOULD BRANCH                    12  09279  W 09298 00200 8
2051             B      JA                                                   7  09291  J 09353
2052             CS     299                TRY TO CLEAR THE EIGHTS           6  09298  / 00299
                                 G                                                                 G
2053   HZ        BBE    JA,299,M           BRANCH IF ANY BITS AT ALL        12  09304  W 09353 00299 M
```

```
PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
2054                 BZ     JB                 EXIT RTN HERE AFTER TST 100 LOCNS  7  09316  J 09379 V
2055                 SW     HZ&9                                               6  09323  , 09313
2056                 S      &1,HZ&10                                          11  09329  S 09935 09314
2057                 CW     HZ&9                                               6  09340  ¤ 09313
2058                 B      HZ                                                 7  09346  J 09304
2059      JA         B      TYPCK                                              7  09353  J 01071
2060                 DCW    @#11.02@,G                                         6  09365
2061                 BBE    HY,TAD1,1                                         12  09367  W 09158 01001 1
2062       SUB-RTN 11.03    CHECK CLEAR STORAGE & BRANCH
2063      JB         SW     100                . PUT SOME DATA                 6  09379  , 00100
2064                 ZA     &7,100             . IN LOC 00100                 11  09385  M 09984 00100   Q
2065                 CS     JD,100             CLEAR LOC 00100, SKIP NEXT INSTR 11  09396  / 09414 00100
2066      JC         B      JE                                                 7  09407  J 09483
2067      JD         SAR    HOLDA1                                             7  09414  G 01020 A
2068                 SBR    HOLDB1                                             7  09421  G 01025 B
2069                 BBE    JE,100,M  G        SHOULD NOT BRANCH              12  09428  W 09483 00100 M  G
2070                 S      &JC,HOLDA1                                        11  09440  S 09989 01020
2071                 BZ     *&8                SHOULD BRANCH                   7  09451  J 09465 V
2072                 B      JE                                                 7  09458  J 09483
2073                 S      &JC,HOLDB1                                        11  09465  S 09994 01025
2074                 BZ     JF                 SHOULD EXIT ROUTINE HERE        7  09476  J 09509 V
2075      JE         B      TYPCK                                              7  09483  J 01071
2076                 DCW    @#11.03@,G                                         6  09495
2077                 BBE    JB,TAD1,1                                         12  09497  W 09379 01001 1
```

```
PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION

2079        ROUTINE 12.00   INITIALIZE PASS COUNT WORK AREA & LOCATION 00001
2080
2081      JF         NOPWM                                                    1  09509  N
2082                 B      JG                                                7  09510  J 09575
2083                 SW     *-12                                              6  09517  , 09510
2084                 ZA     PCC,PCCWK                                        11  09523  M 01010 01015
2085                 CS     99                                                6  09534  / 00099
2086                 SW     1,8                                              11  09540  , 00001 00008
2087                 CW     REPEAT&1          DUMMY INSTRUCTION TO SET ADDR REG  6  09551  ¤ 01982
2088                 SAR    6                 INIT I-ADDR OF BR INSTR AT 00001  7  09557  G 00006 A
2089                 S      &1,1                                             11  09564  S 09935 00001
```

```
PGLIN     LABEL      OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION

2091        ROUTINE 13.00   CHECK ADDRESSING BY INDEXING
2092
2093        SUB-RTN 13.01
2094      JG          SW     X1-4              WM OVER HI-ORDER DIGIT IX REG 1   6  09575  , 00025
2095                  SAR    X1                                                  7  09581  G 00029 A
2096                  S      X1,5&X1           B-ADDR INDEXED BY INDEX REG 1    11  09588  S 00029 000*5
2097                  BZ     JH&X1             SHOULD BRANCH                     7  09599  J 096T2 V
2098                  B      TYPCK                                               7  09606  J 01071
2099                  DCW    @#13.01@,G                                          6  09618
2100                  BBE    JG,TAD1,1                                          12  09620  W 09575 01001 1
2101        SUB-RTN 13.02
2102      JH          SW     X2-4                                                6  09632  , 00030
2103                  SAR    X2                                                  7  09638  G 00034 A
2104                  S      X2,5&X2                                            11  09645  S 00034 000.5
2105                  BZ     JI&X2             SHOULD BRANCH                     7  09656  J 096Q9 V
2106                  B      TYPCK                                               7  09663  J 01071
2107                  DCW    @#13.02@,G                                          6  09675
2108                  BBE    JH,TAD1,1                                          12  09677  W 09632 01001 1
2109        SUB-RTN 13.03
2110      JI          SW     X3-4                                                6  09689  , 00035
2111                  SAR    X3                                                  7  09695  G 00039 A
2112                  S      X3,5&X3                                            11  09702  S 00039 000M5
2113                  BZ     JJ&X3             SHOULD BRANCH                     7  09713  J 097D6 V
2114                  B      TYPCK                                               7  09720  J 01071
2115                  DCW    @#13.03@,G                                          6  09732
2116                  BBE    JI,TAD1,1                                          12  09734  W 09689 01001 1
2117        SUB-RTN 13.04
2118      JJ          SW     X4-4                                                6  09746  , 00040
2119                  SAR    X4                                                  7  09752  G 00044 A
2120                  S      X4,5&X4                                            11  09759  S 00044 00*05
2121                  BZ     JK&X4             SHOULD BRANCH                     7  09770  J 09Y03 V
2122                  B      TYPCK                                               7  09777  J 01071
2123                  DCW    @#13.04@,G                                          6  09789
2124                  BBE    JJ,TAD1,1                                          12  09791  W 09746 01001 1
2125        SUB-RTN 13.05
```

```
LABEL     OPCOD  OPERAND                                                   CT  ADDRS  INSTRUCTION

JK        SW     X5-4                                                       6  09803  , 00045
          SAR    X5                                                         7  09809  G 00049 A
          S      X5,5&X5                                                   11  09816  S 00049 00‡‡5
          BZ     JL&X5          SHOULD BRANCH                               7  09827  J 01SY9 V
          B      TYPCK                                                      7  09834  J 01071
          DCW    @#13.05@,G                                                 6  09846
          BBE    JK,TAD1,1                                                 12  09848  W 09803 01001 1
          B      JL                                                         7  09860  J 01289
          H                                                                 1  09867  .
ENDPH1    EQU    *
   SUB-RTN 13.06
          ORG    LOWLOC         BACK TO LOWEST AVAILABLE LOCATION              01289
JL        SW     X6-4                                                       6  01289  , 00050
          SAR    X6                                                         7  01295  G 00054 A
          S      X6,5&X6                                                   11  01302  S 00054 00‡.5
          BZ     JM&X6          SHOULD BRANCH                               7  01313  J 01TM6 V
          B      TYPCK                                                      7  01320  J 01071
          DCW    @#13.06@,G                                                 6  01332
          BBE    JL,TAD1,1                                                 12  01334  W 01289 01001 1
   SUB-RTN 13.07
JM        SW     X7-4                                                       6  01346  , 00055
          SAR    X7                                                         7  01352  G 00059 A
          S      X7,5&X7                                                   11  01359  S 00059 00‡M5
          BZ     JN&X7          SHOULD BRANCH                               7  01370  J 01UM3 V
          B      TYPCK                                                      7  01377  J 01071
          DCW    @#13.07@,G                                                 6  01389
          BBE    JM,TAD1,1                                                 12  01391  W 01346 01001 1
   SUB-RTN 13.08
JN        SW     X8-4                                                       6  01403  , 00060
          SAR    X8                                                         7  01409  G 00064 A
          S      X8,5&X8                                                   11  01416  S 00064 00.05
          BZ     JP&X8          SHOULD BRANCH                               7  01427  J 01M60 V
          B      TYPCK                                                      7  01434  J 01071
          DCW    @#13.08@,G                                                 6  01446
          BBE    JN,TAD1,1                                                 12  01448  W 01403 01001 1
```

```
PGLIN     LABEL      OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION

2161        SUB-RTN 13.09
2162      JP         SW     X9-4                                      6  01460  , 00065
2163                 SAR    X9                                        7  01466  G 00069 A
2164                 S      X9,5&X9                                  11  01473  S 00069 00.*5
2165                 BZ     JQ&X9              SHOULD BRANCH          7  01484  J 01N/7 V
2166                 B      TYPCK                                     7  01491  J 01071
2167                 DCW    @#13.09@,G                                6  01503
2168                 BBE    JP,TAD1,1                                12  01505  W 01460 01001 1
2169        SUB-RTN 13.10
2170      JQ         SW     X10-4                                     6  01517  , 00070
2171                 SAR    X1C                                       7  01523  G 00074 A
2172                 S      X10,5&X10                                11  01530  S 00074 00..5
2173                 BZ     JR&X10             SHOULD BRANCH          7  01541  J 01NP4 V
2174                 B      TYPCK                                     7  01548  J 01071
2175                 DCW    @#13.10@,G                                6  01560
2176                 BBE    JQ,TAD1,1                                12  01562  W 01517 01001 1
2177        SUB-RTN 13.11
2178      JR         SW     X11-4                                     6  01574  , 00075
2179                 SAR    X11                                       7  01580  G 00079 A
2180                 S      X11,5&X11                                11  01587  S 00079 00.Q5
2181                 BZ     JS&X11             SHOULD BRANCH          7  01598  J 010C1 V
2182                 B      TYPCK                                     7  01605  J 01071
2183                 DCW    @#13.11@,G                                6  01617
2184                 BBE    JR,TAD1,1                                12  01619  W 01574 01001 1
2185        SUB-RTN 13.12
2186      JS         SW     X12-4                                     6  01631  , 00080
2187                 SAR    X12                                       7  01637  G 00084 A
2188                 S      X12,5&X12                                11  01644  S 00084 00MQ5
2189                 BZ     JT&X12             SHOULD BRANCH          7  01655  J 01F88 V
2190                 B      TYPCK                                     7  01662  J 01071
2191                 DCW    @#13.12@,G                                6  01674
2192                 BBE    JS,TAD1,1                                12  01676  W 01631 01001 1
2193        SUB-RTN 13.13
2194      JT         SW     X13-4                                     6  01688  , 00085
2195                 SAR    X13                                       7  01694  G 00089 A
```

```
PGLIN     LABEL       OPCOD   OPERAND                          CT  ADDRS  INSTRUCTION
2196                  S       X13,5&X13                        11  01701  S 00089 00M#5
                                                                          Q
2197                  BZ      JU&X13          SHOULD BRANCH     7  01712  J 01GU5 V
2198                  B       TYPCK             7  01719  J 01071
2199                  DCW     @#13.13@,G        6  01731
2200                  BBE     JT,TAD1,1        12  01733  W 01688 01001 1
2201        SUB-RTN 13.14
2202      JU          SW      X14-4             6  01745  , 00090
2203                  SAR     X14               7  01751  G 00094 A
2204                  S       X14,5&X14        11  01758  S 00094 00M.5
                                                                          Q.
2205                  BZ      JV&X14          SHOULD BRANCH     7  01769  J 01H.2 V
                                                                          .
2206                  B       TYPCK             7  01776  J 01071
2207                  DCW     @#13.14@,G        6  01788
2208                  BBE     JU,TAD1,1        12  01790  W 01745 01001 1
2209        SUB-RTN 13.15
2210      JV          SW      X15-4             6  01802  , 00095
2211                  SAR     X15               7  01808  G 00099 A
2212                  S       X15,5&X15        11  01815  S 00099 00MM5
                                                                          QQ
2213                  BZ      ANYINQ&X15      SHOULD BRANCH     7  01826  J 01HE9 V
2214                  B       TYPCK             7  01833  J 01071
2215                  DCW     @#13.15@,G        6  01845
2216                  BBE     JV,TAD1,1        12  01847  W 01802 01001 1
```

```
PGLIN     LABEL     OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
2218                       COUNT PASSES, PROVIDE FOR PROGRAM MODIFICATION
2219
2220      ANYINQ    BNQ    INQ              ALLOW ONE INQ REQ PER PGM LOOP   7  01859  J 01157 Q
2221      REDUCE    S      &1,PCCWK                                          11  01866  S 09935 01015
2222                BZ     *&8                                               7  01877  J 01891 V
2223                B      START                                             7  01884  J 02000
2224                BBE    JVC2,TAD3,1                                      12  01891  W 01969 01003 1
2225                B      TYPE                                              7  01903  J 01026
2226                DCW    @-PASS-@,G                                        6  01915
2227      JV01      CS     204              . SAVE                           6  01917  / 00204
2228                SW     200              . TADS                           6  01923  , 00200
2229                CW     1004,1003        . FOR                           11  01929  ¤ 01004 01003
2230                CW     10C2,1001        . NEXT                          11  01940  ¤ 01002 01001
2231                A      10C4,204         . PHASE                         11  01951  A 01004 00204
2232                B      LOADER           EXIT C020B-1 HERE                7  01962  J 00400
2233
2234      JV02      BW     JVC1,999         BRANCH IF INPUT WAS FROM TAPE   12  01969  V 01917 00999 1
2235
2236      REPEAT    CW     JF&1                                              6  01981  ¤ 09510
2237                B      START                                             7  01987  J 02000
2238                H                                                        1  01994  .
```

```
PGLIN     LABEL     OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION

2240                       ASSIGN CONSTANTS NEAR END OF MEMORY
2241
2242                 ORG   ENDPH1                                       09868
2243      WORK1      DCW   @ @                                      1  09868
2244      WORK2            @ @                                      1  09869
2245      WORK3            @  @                                     2  09871
2246      WORK4            @           @                           10  09881
2247      WORK5            @& S B-@                                 4  09885
2248      SPECL1           @&.¤BLLGTM@                              6  09891
2249      SPECL2           @B,%SSSWBM@                              6  09897
2250      SPECL3           @ #@.GTTM@                               6  09903
2251      SPECL4           @-$*B,R.L@                               6  09909
2252      FOUR9S           &9999                                    4  09913
2253      ALFADD           FOUR9S-2                                 5  09918  09911
2254      BETADD           WORK3-2                                  5  09923  09869
2255
2256                 LTORG *                    ASSIGN ALL LITERAL CONSTANTS    09924
2256                       &8                                       1  09924
2256                       -8                                       1  09925
2256                       @Y@                                      1  09926
2256                       @8@                                      1  09927
2256                       &6                                       1  09928
2256                       -1                                       1  09929
2256                       -9                                       1  09930
2256                       &2                                       1  09931
2256                       &9                                       1  09932
2256                       &4                                       1  09933
2256                       -6                                       1  09934
2256                       &1                                       1  09935
2256                       -2                                       1  09936
2256                       -4                                       1  09937
2256                       &5                                       1  09938
2256                       &54321                                   5  09943
2256                       &9876                                    4  09947
2256                       &123                                     3  09950
```

PGLIN	LABEL	OPCOD	OPERAND	CT	ADDRS	INSTRUCTION
2256			£45679	5	09955	
2256			-45679	5	09960	
2256			-54321	5	09965	
2256			@9RIY@	4	09969	
2256			£34567	5	09974	
2256			-34567	5	09979	
2256			£18	2	09981	
2256			£1C	2	09983	
2256			£7	1	09984	
2256			JD	5	09989	09414
2256			JC	5	09994	09407

```
PGLIN     LABEL     OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
2258      BLANK     EQU    TABLE
2259      MINUS7    EQU    PEA
2260      MINUS8    EQU    QUEUE
2261      MINUS0    EQU    EXCLAM
2262
2263                ORG    1000                                         01000
2264
2265                DC     @     @,G                                 5  01004
2266
2267                DCW    &00100          PASS COUNT CONSTANT         5  01010
2268                       @      @        PASS COUNT WORK AREA        5  01015
2269
2270                       @      @        . COMMON AREA FOR STORING   5  01020
2271                       @      @        . ADDRESS REGISTERS         5  01025
2272
2273                SBR    *&9             COMMON TYPE ROUTINE         7  01026  G 01041 B
2274                WCP    0                                          10  01033  M %TO 00000 W
2275                SBR    *&20                                        7  01043  G 01069 B
2276                BCB1   *-23                                        7  01050  R 01033 2
                                                                                 G
2277                BA1    *&1                                         7  01057  R 01064 M
2278                B      0                                           7  01064  J 00000
2279
2280                SBR    *&39            TYPE AND TAD CHECK ROUTINE  7  01071  G 01116 B
2281                SBR    *&65                                        7  01078  G 01149 B
2282                A      *-17,*&54                                  11  01085  A 01078 01149
2283                BBE    *&25,TAD0,1                                12  01096  W 01132 01000 1
2284                WCP    0                                          10  01108  M %TO 00000 W
2285                BCB1   *-16                                        7  01118  R 01108 2
                                                                                 G
2286                BA1    *&1                                         7  01125  R 01132 M
2287                BBE    *&8,TAD2,1                                 12  01132  W 01151 01002 1
2288                B      0                                           7  01144  J 00000
2289                H      *-12                                        6  01151  . 01144
```

```
PGLIN   LABEL   OPCOD  OPERAND                                                    CT  ADDRS  INSTRUCTION

2291            RCP    *&26          COMMON ADDRESS ALTER ROUTINE                 10  01157  M %TO 01192 R
                                                                                                     S
2292            BNT1   *&39                                                        7  01167  R 01212 B
                           T                                                                         T
2293            BEX1   *-23,M                                                      7  01174  R 01157 M
                                                                                                     G
2294            BA1    *&1                                                         7  01181  R 01188 M
2295            RCPW   0                                                          10  01188  L %TO 00000 R
                           S                                                                         S
2296            BEX1   *-16,M                                                      7  01198  R 01188 M
                                                                                                     G
2297            BA1    *&1                                                         7  01205  R 01212 M
2298            B      PW                                                          7  01212  J 01854
                        G
2299            DCW    @M@                                                         1  01219
2300
2301            ORG    CTLIND                                                         01230
2302            DC     @           @                                               9  01238
2303            DCW    @1.12.101KCZ@  10K OR 20K, SEQ NO. 012,                    11  01249
2304                                  DUMP TO 09999 ON TAPE
2305            ORG    IDENT                                                          01250
2306            DCW    @C020B@,G                                                   5  01254
2307
2308            ORG    SYSCTL                                                         01256
2309            DC     @                              ‡@                          33  01288
```

```
PGLIN     LABEL     OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
2311                ORG    START              PHASE 2 BEGINS HERE               02000
2312
2313                       TYPE IDENT, INITIALIZE LOC 00001-00008 FOR
2314                       RESTART, INITIAILIZE PASS COUNTER, RESTORE TADS
2315
2316                NOPWM                                                    1  02000  N
2317                B      KA                                                7  02001  J 02099
2318                SW     *-17,WDSEP                                       11  02008  , 02001 09906
2319                CS     7                                                 6  02019  / 00007
2320                SW     1,8                                              11  02025  , 00001 00008
2321                CW     REDO&1             DUMMY INSTRUCTION TO SET ADDR REG  6  02036  ¤ 01949
2322                SAR    6                                                 7  02042  G 00006 A
2323                S      &1,1                                             11  02049  S 09954 00001
2324                CS     1004               .                              6  02060  / 01004
2325                SW     1000               . USE SAME TADS AS PREVIOUS PHASE  6  02066  , 01000
2326                A      204,1004           .                             11  02072  A 00204 01004
2327                B      TYPE                                              7  02083  J 01026
2328                DCW    @ C020B-2@,G                                      8  02097
2329      KA        NOPWM                                                    1  02099  N
2330                B      KB                                                7  02100  J 02124
2331                SW     *-12                                              6  02107  , 02100
2332                ZA     PCC,PCCWK                                        11  02113  M 01010 01015
```

```
PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION

2334        ROUTINE 14.00   BEING A TEST IN WHICH THE PROPER OPERATION OF
2335                        INDEXING IS REQUIRED TO PREVENT SYSTEM CK ERRORS
2336
2337        SUB-RTN 14.01
2338      KB        CW      X1,X1-1          . PREPARE INDEX REGISTER AREA   11  02124  ¤ 00029 00028
2339                CW      X1-2,X1-3        . TO BE USED                    11  02135  ¤ 00027 00026
2340                CW      X1-4             . BY                             6  02146  ¤ 00025
2341                SW      X1-5             . THIS ROUTINE                   6  02152  , 00024
2342                ZA      ONEHTH,X1        100,000 TO INDEX REGISTER 1     11  02158  M 09778 00029
2343                CW      KC&1             ESTABLISH NON-ZERO ADDR REG SET  6  02169  ¤ 02200
2344                SAR     HOLDA2&X15       TEST FOR NO ERROR W/ZONES ON CAR 7  02175  G 01MB0 A
2345                S       HOLDA2,X1        FORM 100000 COMPLEMENT OF ADDRESS 11 02182  S 01020 00029
2346                CS      KC&X1            EFFECTIVE ADDRESS S/B 00000      6  02193  / 021Z9
2347      KC        SAR     HOLDA2&X1        SAVE AAR, TEST NO EFFECT IF INDXD 7 02199  G 010S0 A
2348                ZA      HOLDA2,X1        TEST FOR ZERO                   11  02206  M 01020 00029
2349                BZ      *&8&X1           SHOULD BRANCH                    7  02217  J 022T1 V
2350                B       KD                                                7  02224  J 02273
2351                ZS      &99999,X1        SET INDEX REG 1 TO -99999       11  02231  ! 09959 00029
2352                SW      0&X1             EFFECTIVE ADDRESS S/B 00001      6  02242  , 000#0
2353                SAR     HOLDA2                                            7  02248  G 01020 A
2354                ZS      HOLDA2,X1        TEST FOR ZERO                   11  02255  ! 01020 00029
2355                BZ      KFC1&X1          SHOULD BRANCH & EXIT ROUTINE HERE 7 02266  J 022Z9 V
2356      KD        B       TYPCK                                             7  02273  J 01071
2357                DCW     a#14.01a,G                                        6  02285
2358                BBE     KB,TAD1,1                                        12  02287  W 02124 01001 1
```

```
PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
2360        ROUTINE 15.00   CHECK OPERATION OF BRANCH CHARACTER EQUAL
2361
2362        SUB-RTN 15.01   COMPARE D-MOD 9 WITH B-FLD @ FOR LO COMPARE
2363                        AND NO BRANCH.  CHECK AAR & BAR SETTINGS
2364      KF01        BCE   KF02,ATSIGN,9       SHOULD NOT BRANCH              12  02299  B 02382 09911 9
2365                  SAR   HOLDA2                                              7  02311  G 01020 A
2366                  SBR   HOLDB2                                              7  02318  G 01025 B
2367                  BL    *&8                 SHOULD BRANCH                  7  02325  J 02339 T
2368                  B     KF02                                              7  02332  J 02382
2369                  S     &KF02,HOLDA2                                     11  02339  S 09964 01020
2370                  BZ    *&8                 SHOULD BRANCH                  7  02350  J 02364 V
2371                  B     KF02                                              7  02357  J 02382
2372                  S     &POUND,HOLDB2       ADDR OF POUND IS ADDR OF ATSIGN-1  11  02364  S 09969 01025
2373                  BZ    KF03                SHOULD BRANCH                  7  02375  J 02408 V
2374      KF02        B     TYPCK                                             7  02382  J 01071
2375                  DCW   @#15.01@,G                                        6  02394
2376                  BBE   KF01,TAD1,1                                      12  02396  W 02299 01001 1
2377        SUB-RTN 15.02   COMPARE D-MOD AT SIGN WITH B-FLD NINE
2378                        FOR HI COMPARE AND NO BRANCH.
2379      KF03        BCE   KF04,NINE,@         SHOULD NOT BRANCH              12  02408  B 02441 09953 @
2380                  BH    *&8                 SHOULD BRANCH                  7  02420  J 02434 U
2381                  B     *&8                                               7  02427  J 02441
2382                  BH    KF05                SHOULD STILL BRANCH            7  02434  J 02467 U
2383      KF04        B     TYPCK                                             7  02441  J 01071
2384                  DCW   @#15.02@,G                                        6  02453
2385                  BBE   KF03,TAD1,1                                      12  02455  W 02408 01001 1
```

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PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION

2387        SUB-RTN 15.03   COMPARE D-MOD AMPERSAND W/B-FLD AMPERSAND FOR
2388                        EQ COMPARE AND BRANCH.  CHECK AAR & BAR SETTINGS
2389      KF05       BCE    KF07,AMPSND,&      SHOULD BRANCH                 12  02467  B 02486 09896 &
2390      KF06       B      KF08                                             7  02479  J 02564
2391      KF07       SAR    HOLDA2                                           7  02486  G 01020 A
2392                 SBR    HOLDB2                                           7  02493  G 01025 B
2393                 BU     KF08               SHOULD NOT BRANCH             7  02500  J 02564 /
2394                 BE     *&8                SHOULD BRANCH                 7  02507  J 02521 S
2395                 B      KF08                                             7  02514  J 02564
2396                 S      &KF07,HOLDA2                                    11  02521  S 09974 01020
2397                 BZ     *&8                                              7  02532  J 02546 V
2398                 B      KF08                                             7  02539  J 02564
2399                 S      &KF06,HOLDB2                                    11  02546  S 09979 01025
2400                 BZ     KG                 SHOULD BRANCH & EXIT ROUTINE HERE  7  02557  J 02590 V
2401      KF08       B      TYPCK                                            7  02564  J 01071
2402                 DCW    @#15.03@,G                                       6  02576
2403                 BBE    KF05,TAD1,1                                     12  02578  W 02467 01001 1
```

```
PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
2405        ROUTINE 16.00   CHECK CERTAIN MOVE OPCODES PREPARATORY TO COMPARE
2406
2407        SUB-RTN 16.01   CHECK SCNLS FOR STEPPING AAR, BAR ONE POSITION
2408      KG          CS    103                                               6  02590  / 00103
2409                  SCNLS 102,103                                           12 02596  D 00102 00103
2410                  SAR   HOLDA2                                           7  02608  G 01020 A
2411                  SBR   HOLDB2                                           7  02615  G 01025 B
2412                  S     @00101@,HOLDA2                                    11 02622  S 09984 01020
2413                  BZ    *&8                 SHOULD BRANCH                 7  02633  J 02647 V
2414                  B     KH                                                7  02640  J 02665
2415                  S     @00102@,HOLDB2                                    11 02647  S 09989 01025
2416                  BZ    KI                                                7  02658  J 02691 V
2417      KH          B     TYPCK                                             7  02665  J 01071
2418                  DCW   @#16.01@,G                                        6  02677
2419                  BBE   KG,TAD1,1                                         12 02679  W 02590 01001 1
2420        SUB-RTN 16.02   CHECK MLNS FOR CORRECT OPERATION
2421      KI          CS    101                                               6  02691  / 00101
2422                  SW    10C                                               6  02697  , 00100
2423                  ZA    MINUS7,101          PUT 8-4-2-1 BITS IN LOC 00101 11 02703  Q M 09932 00101
2424                  MLNS  WYE,101                                           12 02714  D 09942 00101 1
2425                  BBE   KJ,101,X            SHOULD NOT BRANCH             12 02726  W 02781 00101 X
2426                  BW    KJ,101              SHOULD NOT BRANCH             12 02738  V 02781 00101 1
2427                  BBE   *&8,101,-           SHOULD BRANCH                 12 02750  W 02769 00101 -
2428                  B     KJ                                                7  02762  J 02781
2429                  BBE   KK,101,8            EXIT ROUTINE HERE             12 02769  W 02807 00101 8
2430      KJ          B     TYPCK                                             7  02781  J 01071
2431                  DCW   @#16.02@,G                                        6  02793
2432                  BBE   KI,TAD1,1                                         12 02795  W 02691 01001 1
2433        SUB-RTN 16.03   CHECK MLZS FOR CORRECT OPERATION
2434      KK          CS    101                                               6  02807  / 00101
2435                  SW    10C                                               6  02813  , 00100
2436                  ZA    MINUS8,101          PUT 8-8 BITS IN LOC 00101     11 02819  Q M 09933 00101
2437                  MLZS  EKS,101                                           12 02830  D 09941 00101 2
2438                  BBE   KL,101,P            SHOULD NOT BRANCH             12 02842  W 02897 00101 P
2439                  BW    KL,101              SHOULD NOT BRANCH             12 02854  V 02897 00101 1
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RGLIN    LABEL     OPCOD  OPERAND                                              CT  ADDRS  INSTRUCTION

2440               BBE    *&8,101,8         SHOULD BRANCH                      12  02866  W 02885 00101 8
2441               B      KL                                                    7  02878  J 02897
                                  S                                                                     S
2442               BBE    KM,101,B                                             12  02885  W 02923 00101 B
2443     KL        B      TYPCK                                                 7  02897  J 01071
2444               DCW    @#16.03@,G                                            6  02909
2445               BBE    KK,TAD1,1                                            12  02911  W 02807 01001 1
2446       SUB-RTN 16.04  CHECK MLCS FOR CORRECT OPERATION
2447     KM        CS     101                                                   6  02923  / 00101
2448               SW     100                                                   6  02929  , 00100
                                                                                          Q
2449               ZA     MINUS0,101        PUT B-8-2 BITS IN LOC 00101        11  02935  M 09925 00101
2450               MLCS   VEE,101                                              12  02946  D 09939 00101 3
2451               BW     KN,101            SHOULD NOT BRANCH                  12  02958  V 03032 00101 1
                                  '                                                                     '
2452               BBE    KN,101,.          SHOULD NOT BRANCH                  12  02970  W 03032 00101 .
2453               BBE    *&8,101,1         SHOULD BRANCH                      12  02982  W 03001 00101 1
2454               B      KN                                                    7  02994  J 03032
2455               BBE    *&8,101,4         SHOULD BRANCH                      12  03001  W 03020 00101 4
2456               B      KN                                                    7  03013  J 03032
                                  S                                                                     S
2457               BBE    KR,101,B          SHOULD EXIT ROUTINE HERE           12  03020  W 03058 00101 B
2458     KN        B      TYPCK                                                 7  03032  J 01071
2459               DCW    @#16.04@,G                                            6  03044
2460               BBE    KM,TAD1,1                                            12  03046  W 02923 01001 1
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PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION

2462        ROUTINE 17.00   CHECK COMPARE OPCOD USING SINGLE CHARACTERS
2463
2464                        BEGIN BY USING SIMPLEST COMPARISONS TO VERIFY
2465                        CORRECT OPERATION OF BRANCH HI, LO, EQ, UNEQUAL
2466
2467        SUB-RTN 17.01   COMPARE A-FLD 9 WITH B-FLD @ FOR LO COMPARE
2468      KR          C     NINE,ATSIGN                                      11  03058  C 09953 09911
2469                  BE    KS                  SHOULD NOT BRANCH             7  03069  J 03104 S
2470                  BU    *&8                 SHOULD BRANCH                 7  03076  J 03090 /
2471                  B     KS                                                7  03083  J 03104
2472                  BH    *&8                 SHOULD NOT BRANCH             7  03090  J 03104 U
2473                  BL    KT                  SHOULD BRANCH                 7  03097  J 03130 T
2474      KS          B     TYPCK                                             7  03104  J 01071
2475                  DCW   @#17.01@,G                                        6  03116
2476                  BBE   KR,TAD1,1                                        12  03118  W 03058 01001 1
2477        SUB-RTN 17.02   COMPARE A-FLD @ WITH B-FLD 9 FOR HI COMPARE
2478      KT          C     ATSIGN,NINE                                      11  03130  C 09911 09953
2479                  BE    KU                  SHOULD NOT BRANCH             7  03141  J 03176 S
2480                  BU    *&8                 SHOULD BRANCH                 7  03148  J 03162 /
2481                  B     KU                                                7  03155  J 03176
2482                  BL    KU                  SHOULD NOT BRANCH             7  03162  J 03176 T
2483                  BH    KV                  SHOULD BRANCH                 7  03169  J 03202 U
2484      KU          B     TYPCK                                             7  03176  J 01071
2485                  DCW   @#17.02@,G                                        6  03188
2486                  BBE   KT,TAD1,1                                        12  03190  W 03130 01001 1
2487        SUB-RTN 17.03   COMPARE AMPERSAND WITH AMPERSAND FOR EQ COMPARE
2488      KV          C     AMPSND,AMPSND                                    11  03202  C 09896 09896
2489                  BU    KW                  SHOULD                        7  03213  J 03241 /
2490                  BH    KW                   NOT                          7  03220  J 03241 U
2491                  BL    KW                    BRANCH                      7  03227  J 03241 T
2492                  BE    KX                  SHOULD BRANCH                 7  03234  J 03267 S
2493      KW          B     TYPCK                                             7  03241  J 01071
2494                  DCW   @#17.03@,G                                        6  03253
2495                  BBE   KV,TAD1,1                                        12  03255  W 03202 01001 1
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PGLIN     LABEL      OPCOD  OPERAND                                                    CT  ADDRS  INSTRUCTION
2497          ROUTINE 18.00  IF THE THREE ROUTINES #17.01 - #17.03 CAUSED NO
2498                         ERRORS, CORRECT OPERATION OF BU, BE, BH AND BL
2499                         IS NOW ASSUMED.  PROPER OPERATION OF THESE FOUR
2500                         CONDITIONAL BRANCHES IS A NECESSARY REQUIREMENT
2501                         FOR THE SUBROUTINE #18.01 WHICH FOLLOWS.
2502
2503                         THIS ROUTINE COMPARES ALL SIXTY-FOUR LEGITIMATE
2504                         CHARACTERS WITH ONE ANOTHER AND INSURES THAT ALL
2505                         IDENTICAL CHARACTERS COMPARE EQUAL, THAT NO
2506                         CHARACTER COMPARES EQUAL TO ANY CHARACTER EXCEPT
2507                         ITSELF, AND THAT THE COLLATING SEQUENCE IS PROPER
2508
2509          SUB-RTN 18.01  COMPARE ALL 64 CHARS VS ALL 64 CHARS.  4096 TOTAL
2510
2511                         BECAUSE THE TIME REQUIRED TO PERFORM THIS ROUTINE
2512                         IS RELATIVELY LONG, IT IS DONE THE FIRST TIME
2513                         THROUGH C020B-2 AND THEREAFTER ONLY WHEN THE
2514                         PASS COUNT CONSTANT WORK AREA IS REDUCED TO ZERO
2515
2516      KX       NOPWM                                                          1  03267  N
2517               B        KY                                                    7  03268  J 04011
2518               ZA       &4096,LIMIT                                          11  03275  M 09993 09816
2519               CW       TYPESW&1                                              6  03286  ¤ 03723
2520               CW       X1,X2                                                11  03292  ¤ 00029 00034
2521               CW       X1-1,X2-1                                            11  03303  ¤ 00028 00033
2522               CW       X1-2,X2-2                                            11  03314  ¤ 00027 00032
2523               CW       X1-3,X2-3                                            11  03325  ¤ 00026 00031
2524               SW       X1-4,X2-4                                            11  03336  , 00025 00030
2525               SW       EQULSW&1,ANYERR&1  FORCE 1ST CMP EQ & INITIALIZATION 11  03347  , 03444 03425
2526               ZA       &64,X2                                               11  03358  M 09995 00034
2527               ZA       &63,HISTRT                                           11  03369  M 09997 09818
2528               ZA       &63,HICNT                                            11  03380  M 09997 09822
2529               ZA       &1,LOSTRT                                            11  03391  M 09954 09820
2530               ZA       &1,LOCNT                                             11  03402  M 09954 09824
2531      RETURN   ZA       &64,X1                                               11  03413  M 09995 00029
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PGLIN     LABEL     OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
2532      ANYERR    NOPWM                                            1  03424  N
2533                B      REINIT            BRANCH IF ANY PREVIOUS CMP ERROR  7  03425  J 03944
2534      COMPAR    C      TABLE-1&X1,TABLE-1&X2                     11  03432  C 098Y9 098Q9
2535      EQULSW    NOPWM                                            1  03443  N
2536                B      SBEQUL            BRANCH IF EQUAL EXPECTED  7  03444  J 03654
2537                BE     CMPERR                                    7  03451  J 03715 S
2538                DCW    @N5@                                      2  03459
2539                BU     *&10                                      7  03460  J 03476 /
2540                B      CMPERR                                    7  03467  J 03715
2541                DCW    @N6@                                      2  03475
2542      HILOSW    NOPWM                                            1  03476  N
2543                B      SBLO              BRANCH IF LO EXPECTED   7  03477  J 03569
2544                BL     CMPERR                                    7  03484  J 03715 T
2545                DCW    @N9@                                      2  03492
2546                BH     *&10                                      7  03493  J 03509 U
2547                B      CMPERR                                    7  03500  J 03715
2548                DCW    @NX@                                      2  03508
2549                S      &1,HICNT                                 11  03509  S 09954 09822
2550                BZ     *&8                                       7  03520  J 03534 V
2551                B      COMMON                                    7  03527  J 03811
2552                SW     HILOSW&1                                  6  03534  , 03477
2553                S      &1,HISTRT                                11  03540  S 09954 09818
2554                ZA     HISTRT,HICNT                             11  03551  AM 09818 09822
2555                B      COMMON                                    7  03562  J 03811
2556      SBLO      BH     CMPERR                                    7  03569  J 03715 U
2557                DCW    @N7@                                      2  03577
2558                BL     *&10                                      7  03578  J 03594 T
2559                B      CMPERR                                    7  03585  J 03715
2560                DCW    @N8@                                      2  03593
2561                S      &1,LOCNT                                 11  03594  S 09954 09824
2562                BZ     *&8                                       7  03605  J 03619 V
2563                B      COMMON                                    7  03612  J 03811
2564                SW     EQULSW&1                                  6  03619  , 03444
2565                A      &1,LOSTRT                                11  03625  AM 09954 09820
2566                ZA     LOSTRT,LOCNT                             11  03636  09820 09824
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PGLIN   LABEL    OPCOD  OPERAND                                                   CT  ADDRS  INSTRUCTION

2567             B      COMMON                                                     7  03647  J 03811
2568    SBEQUL   BU     CMPERR                                                     7  03654  J 03715 /
2569             DCW    @N1@                                                       2  03662
2570             BH     CMPERR                                                     7  03663  J 03715 U
2571             DCW    @N2@                                                       2  03671
2572             BL     CMPERR                                                     7  03672  J 03715 T
2573             DCW    @N3@                                                       2  03680
2574             BE     *&10                                                       7  03681  J 03697 S
2575             B      CMPERR                                                     7  03688  J 03715
2576             DCW    @N4@                                                       2  03696
2577             CW     EQULSW&1,HILOSW&1                                         11  03697  ¤ 03444 03477
2578             B      COMMON                                                     7  03708  J 03811
2579
2580    CMPERR   SBR    X3                  SAVE RETURN ADDR & ERR IND IN X3       7  03715  G 00039 B
2581    TYPESW   NOPWM                      .                                      1  03722  N
2582             B      AROUND              . BRANCH TAKEN AFTER FIRST ERROR       7  03723  J 03750
2583             SW     *-12                                                       6  03730  , 03723
2584             B      TYPCK                                                      7  03736  J 01071
2585             DCW    @#18.01@,G                                                 6  03748
2586    AROUND   BBE    COMPAR,TAD1,1                                             12  03750  W 03432 01001 1
2587             BBE    OUT,TAD0,1          BRANCH IF NOT TYPE                    12  03762  W 03804 01000 1
                                                                                                  Q
2588             MLCS   1&X3,3&X4           WHERE X4 IS INITIALLY MESAG&9         12  03774  D 000M1 00*03 3
2589             SBR    X4                  UPDATE X4                              7  03786  G 00044 B
2590             SW     COMMON&1,ANYERR&1   IND ERR OCC, TYP & RE-INIT REQD       11  03793  , 03812 03425
                                                                                                  Q
2591    OUT      B      2&X3                RETURN                                 7  03804  J 000M2
2592
2593    COMMON   NOPWM                                                             1  03811  N
2594             B      *&8                 BRANCH IF ANY COMPARE ERROR            7  03812  J 03826
2595             B      DIMIN                                                      7  03819  J 03883
2596             CW     COMMON&1            RESTORE SWITCH TO NOP                  6  03826  ¤ 03812
2597             MLCS   TABLE-1&X1,MESAG&1 . MOVE CHARACTERS BEING COMPARED       12  03832  D 098Y9 03864 3
2598             MLCS   TABLE-1&X2,MESAG&6 . TO ERROR MESSAGE                     12  03844  D 098Q9 03869 3
2599             B      TYPE                                                       7  03856  J 01026
2600    MESAG    DCW    @ * VS * ERR * * * *@,G  * - FILLED IN BY ER ROUTINE      19  03863
2601
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PGLIN    LABEL      OPCOD  OPERAND                                                  CT  ADDRS  INSTRUCTION

2602     CIMIN      S      &1,LIMIT                                                 11  03883  S 09954 09816
2603                BZ     KX01               FINISHED. CLOSE UP THIS ROUTINE        7  03894  J 04005 V
2604                S      &1,X1                                                    11  03901  S 09954 00029
2605                BZ     *&8                                                       7  03912  J 03926 V
2606                B      ANYERR                                                    7  03919  J 03424
2607                S      &1,X2                                                    11  03926  S 09954 00034
2608                B      RETURN                                                    7  03937  J 03413
2609
2610     REINIT     CW     ANYERR&1,MESAG&10  RESTORE SW, SET UP B-ADDR REG         11  03944  ¤ 03425 03873
2611                SBR    X4                 INITIALIZE X4 TO MESAG&9               7  03955  G 00044 B
2612                MLCS   BLANK,MESAG&14     . BLANK OUT POSITIONS                 12  03962  D 09890 03877 3
2613                MLCS   BLANK,MESAG&16     . WHICH MAY CONTAIN                   12  03974  D 09890 03879 3
2614                MLCS   BLANK,MESAG&18     . ERROR NUMBERS                       12  03986  D 09890 03881 3
2615                B      COMPAR             BACK TO COMPARE NEXT TWO CHARS         7  03998  J 03432
2616     KX01       SW     KX&1                                                      6  04005  , 03268
2617       SUB-RTN 18.02   COMPARE TWO FIELDS, A LONGER THAN B.
2618                       CHECK RESULTS OF COMPARE AND ADDRESS REG SETTINGS
2619     KY         C      FIELD1,FIELD2                                            11  04011  C 09802 09805
2620                SAR    HOLDA2                                                    7  04022  G 01020 A
2621                SBR    HOLDB2                                                    7  04029  G 01025 B
2622                BE     KZ                 SHOULD NOT BRANCH EQUAL                7  04036  J 04107 S
2623                BH     KZ                 SHOULD NOT BRANCH HIGH                 7  04043  J 04107 U
2624                BL     *&8                SHOULD BRANCH LOW                      7  04050  J 04064 T
2625                B      KZ                                                        7  04057  J 04107
2626                S      AADDR1,HOLDA2                                            11  04064  S 09783 01020
2627                BZ     *&8                SHOULD BRANCH                          7  04075  J 04089 V
2628                B      KZ                                                        7  04082  J 04107
2629                S      BADDR1,HOLDB2                                            11  04089  S 09788 01025
2630                BZ     LB                 SHOULD BRANCH & EXIT ROUTINE HERE      7  04100  J 04133 V
2631     KZ         B      TYPCK                                                     7  04107  J 01071
2632                DCW    @#18.02@,G                                                6  04119
2633                BBE    KY,TAD1,1                                                12  04121  W 04011 01001 1
2634       SUB-RTN 18.03   COMPARE TWO FIELDS, B LONGER THAN A.
2635                       CHECK RESULTS OF COMPARE AND ADDRESS REG SETTINGS
2636     LB         C      FIELD3,FIELD4                                            11  04133  C 09808 09812
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PGLIN     LABEL     OPCOD  OPERAND                                                          CT  ADDRS  INSTRUCTION

2637                SAR    HOLDA2                                                            7  04144  G 01020 A
2638                SBR    HOLDB2                                                            7  04151  G 01025 B
2639                BE     LC                 SHOULD NOT BRANCH EQUAL                        7  04158  J 04229 S
2640                BL     LC                 SHOULD NOT BRANCH LCW                          7  04165  J 04229 T
2641                BH     *&8                SHOULD BRANCH HIGH                             7  04172  J 04186 U
2642                B      LC                                                                7  04179  J 04229
2643                S      AACDR2,HOLCA2                                                    11  04186  S 09793 01020
2644                BZ     *&8                                                               7  04197  J 04211 V
2645                B      LC                                                                7  04204  J 04229
2646                S      BACDR2,HOLCB2                                                    11  04211  S 09798 01025
2647                BZ     LK                 SHOULD BRANCH & EXIT ROUTINE HERE              7  04222  J 04255 V
2648      LC        B      TYPCK                                                             7  04229  J 01071
2649                DCW    @#18.03@,G                                                        6  04241
2650                BBE    LB,TAD1,1                                                        12  04243  W 04133 01001 1
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PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
2652        ROUTINE 19.00   CHECK OPERATION OF DATA MOVE INSTRUCTION
2653
2654        SUB-RTN 19.01   CHECK SCNLS FOR MOVE NO DATA
2655      LK          MLCS  NWM63,WORK6                                      12  04255  D 09888 09825 3
2656                  SW    WORK6                                           6  04267  , 09825
2657                  SCNLS NWM00,WORK6                                     12  04273  D 09826 09825
2658                  C     ALLBIT,WORK6                                    11  04285  C 09895 09825
2659                  BE    LL                                               7  04296  J 04329 S
2660                  B     TYPCK                                            7  04303  J 01071
2661                  DCW   @#19.01@,G                                       6  04315
2662                  BBE   LK,TAD1,1                                       12  04317  W 04255 01001 1
2663        SUB-RTN 19.02   CHECK MLNS FOR MOVE NUMERIC, NO ZONES, NO WM
2664      LL          MLCS  NWM62,WORK6                                      12  04329  D 09887 09825 3
2665                  SW    WORK6                                           6  04341  , 09825
2666                  MLNS  NWM01,WORK6                                     12  04347  D 09827 09825 1
2667                  C     AYE,WORK6                                       11  04359  C 09916 09825
2668                  BE    LM                                               7  04370  J 04403 S
2669                  B     TYPCK                                            7  04377  J 01071
2670                  DCW   @#19.02@,G                                       6  04389
2671                  BBE   LL,TAD1,1                                       12  04391  W 04329 01001 1
2672        SUB-RTN 19.03   CHECK MLZS FOR MOVE ZONES, NO NUMERIC, NO WM
2673      LM          MLCS  NWM31,WORK6                                      12  04403  D 09856 09825 3
2674                  SW    WORK6                                           6  04415  , 09825
2675                  MLZS  NWM32,WORK6                                     12  04421  D 09857 09825 2
2676                  C     DELTA,WORK6                                     11  04433  C 09901 09825
2677                  BE    LN                                               7  04444  J 04477 S
2678                  B     TYPCK                                            7  04451  J 01071
2679                  DCW   @#19.03@,G                                       6  04463
2680                  BBE   LM,TAD1,1                                       12  04465  W 04403 01001 1
2681        SUB-RTN 19.04   CHECK MLCS FOR MOVE NUMERIC, ZONE, NO WM
2682      LN          MLNS  NWM25,WORK6                                      12  04477  D 09851 09825 1
2683                  MLZS  NWM25,WORK6                                      12  04489  D 09851 09825 2
2684                  SW    WORK6                                            6  04501  , 09825
2685                  MLCS  NWM38,WORK6                                      12  04507  D 09863 09825 3
2686                  C     OH,WORK6                                        11  04519  C 09931 09825
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PGLIN     LABEL      OPCOD  OPERAND                                                  CT  ADDRS  INSTRUCTION
2687                 BE     LP                                                        7  04530  J 04563 S
2688                 B      TYPCK                                                     7  04537  J 01071
2689                 DCW    @#19.04@,G                                                6  04549
2690                 BBE    LN,TAD1,1                                                12  04551  W 04477 01001 1
2691       SUB-RTN 19.05    CHECK MLWS FOR MOVE WM, NO ZONE, NO NUMERIC
2692     LP          MLCS   NWM63,WORK6                                              12  04563  D 09888 09825 3
2693                 CW     WORK6                                                     6  04575  ¤ 09825
2694                 MLWS   BLANK,WORK6                                             12  04581  D 09890 09825 4
2695                 C      ALLBIT,WORK6                                             11  04593  C 09895 09825
2696                 BE     LQ                                                        7  04604  J 04637 S
2697                 B      TYPCK                                                     7  04611  J 01071
2698                 DCW    @#19.05@,G                                                6  04623
2699                 BBE    LP,TAD1,1                                                12  04625  W 04563 01001 1
2700       SUB-RTN 19.06    CHECK MLNWS FOR MOVE NUMERIC, WM, NO ZONE
2701     LQ          MLCS   NWM54,WORK6                                              12  04637  D 09879 09825 3
2702                 CW     WORK6                                                     6  04649  ¤ 09825
2703                 MLNWS  NINE,WORK6                                              12  04655  D 09953 09825 5
2704                 C      EYE,WORK6                                                11  04667  C 09924 09825
2705                 BE     LR                                                        7  04678  J 04711 S
2706                 B      TYPCK                                                     7  04685  J 01071
2707                 DCW    @#19.06@,G                                                6  04697
2708                 BBE    LQ,TAD1,1                                                12  04699  W 04637 01001 1
2709       SUB-RTN 19.07    CHECK MLZWS FOR MOVE ZONE, WM, NO NUMERIC
2710     LR          MLCS   NWM31,WORK6                                              12  04711  D 09856 09825 3
2711                 CW     WORK6                                                     6  04723  ¤ 09825
2712                 MLZWS  DASH,WORK6                                              12  04729  D 09902 09825 6
2713                 C      DELTA,WORK6                                              11  04741  C 09901 09825
2714                 BE     LS                                                        7  04752  J 04785 S
2715                 B      TYPCK                                                     7  04759  J 01071
2716                 DCW    @#19.07@,G                                                6  04771
2717                 BBE    LR,TAD1,1                                                12  04773  W 04711 01001 1
2718       SUB-RTN 19.08    CHECK MLCWS FOR MOVE CHARACTER AND WORD MARK
2719     LS          MLCS   NWM00,WORK6                                              12  04785  D 09826 09825 3
2720                 CW     WORK6                                                     6  04797  ¤ 09825
2721                 MLCWS  ALLBIT,WORK6                                            12  04803  D 09895 09825 7
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PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
2722                 C      ALLBIT,WORK6                                     11  04815  C 09895 09825
2723                 BE     LT                                                7  04826  J 04859 S
2724                 B      TYPCK                                             7  04833  J 01071
2725                 DCW    @#19.08@,G                                        6  04845
2726                 BBE    LS,TAD1,1                                        12  04847  W 04785 01001 1
2727       SUB-RTN 19.09  CHECK SCNR FOR MOVE NO DATA, PROPER ADDR REG STEP
2728     LT          MLCWS  NWM63,100                                        12  04859  D 09888 00100 7
2729                 MLCWS  BLANK,101                                        12  04871  D 09890 00101 7
2730                 SCNR   100,101                                          12  04883  D 00100 00101 8
2731                 SAR    HOLDA2                                            7  04895  G 01020 A
2732                 SBR    HOLDB2                                            7  04902  G 01025 B
2733                 C      HOLDA2,@00101@     CK AAR FOR PROPER STEPPING    11  04909  C 01020 09984
2734                 BU     LU                 SHOULD NOT BRANCH              7  04920  J 05025 /
2735                 C      HOLDB2,@00102@     CK BAR FOR PROPER STEPPING     11  04927  C 01025 09989
2736                 BU     LU                 SHOULD NOT BRANCH              7  04938  J 05025 /
2737                 C      BLANK,101          TEST LOC 00101 FOR WM-BLANK    11  04945  C 09890 00101
2738                 BU     LU                 SHOULD NOT BRANCH              7  04956  J 05025 /
2739                 SCNR   101,100                                          12  04963  D 00101 00100 8
2740                 SAR    HOLDA2                                            7  04975  G 01020 A
2741                 SBR    HOLDB2                                            7  04982  G 01025 B
2742                 C      HOLDA2,@00102@     CK AAR FOR PROPER STEPPING    11  04989  C 01020 09989
2743                 BU     LU                 SHOULD NOT BRANCH              7  05000  J 05025 /
2744                 C      HOLDB2,@00101@     CK BAR FOR PROPER STEPPING     11  05007  C 01025 09984
2745                 BE     LV                 SHOULD BRANCH & EXIT ROUTINE HERE  7  05018  J 05051 S
2746     LU          B      TYPCK           ** ALL #19.09 ERRORS COME HERE     7  05025  J 01071
2747                 DCW    @#19.09@,G                                        6  05037
2748                 BBE    LT,TAD1,1                                        12  05039  W 04859 01001 1
2749       SUB-RTN 19.10  CHECK MRN SIMILAR TO MLNS
2750     LV          MLCWS  NWM50,WORK6                                      12  05051  D 09875 09825 7
2751                 MRN    COLON,WORK6                                      12  05063  D 09912 09825 9
2752                 BW     *&13,WORK6         SHOULD NOT BRANCH             12  05075  V 05099 09825 1
2753                 BCE    LW,WORK6,B         SHOULD BRANCH                 12  05087  B 05125 09825 B
2754                 B      TYPCK                                             7  05099  J 01071
2755                 DCW    @#19.10@,G                                        6  05111
2756                 BBE    LV,TAD1,1                                        12  05113  W 05051 01001 1
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LABEL      OPCOD  OPERAND                                 CT  ADDRS  INSTRUCTION

   SUB-RTN 19.11  CHECK MRZ
LW         MLCWS  NWM47,WORK6                             12  05125  D 09872 09825 7
           MRZ    SUBLNK,WORK6                            12  05137  D 09909 09825 0
           BW     *&13,WORK6       SHOULD NOT BRANCH      12  05149  V 05173 09825 1
                            S                                                      S
           BCE    LX,WORK6,M       SHOULD BRANCH          12  05161  B 05199 09825 M
           B      TYPCK                                    7  05173  J 01071
           DCW    @#19.11@,G                               6  05185
           BBE    LW,TAD1,1                               12  05187  W 05125 01001 1
   SUB-RTN 19.12  CHECK MRC
LX         MLCWS  NWM12,WORK6                             12  05199  D 09838 09825 7
           MRC    SEE,WORK6                               12  05211  D 09918 09825 #
           BW     *&13,WORK6       SHOULD NOT BRANCH      12  05223  V 05247 09825 1
           BCE    LY,WORK6,C       SHOULD BRANCH          12  05235  B 05273 09825 C
           B      TYPCK                                    7  05247  J 01071
           DCW    @#19.12@,G                               6  05259
           BBE    LX,TAD1,1                               12  05261  W 05199 01001 1
   SUB-RTN 19.13  CHECK MRW
LY         MLCWS  ALLBIT,WORK6                            12  05273  D 09895 09825 7
           MRW    NWM00,WORK6                             12  05285  D 09826 09825 @
           BW     *&13,WORK6       SHOULD NOT BRANCH      12  05297  V 05321 09825 1
                            G                                                      G
           BCE    LZ,WORK6,M       SHOULD BRANCH          12  05309  B 05347 09825 M
           B      TYPCK                                    7  05321  J 01071
           DCW    @#19.13@,G                               6  05333
           BBE    LY,TAD1,1                               12  05335  W 05273 01001 1
   SUB-RTN 19.14  CHECK MRNW
LZ         MLCWS  QUESTN,WORK6                            12  05347  D 09915 09825 7
           MRNW   NWM05,WORK6                             12  05359  D 09831 09825 :
           BW     *&13,WORK6       SHOULD NOT BRANCH      12  05371  V 05395 09825 1
           BCE    MA,WORK6,E       SHOULD BRANCH          12  05383  B 05421 09825 E
           B      TYPCK                                    7  05395  J 01071
           DCW    @#19.14@,G                               6  05407
           BBE    LZ,TAD1,1                               12  05409  W 05347 01001 1
   SUB-RTN 19.15  CHECK MRZW
MA         MLCWS  TPMARK,WORK6                            12  05421  D 09914 09825 7
                                                                                   G
           MRZW   NWM48,WORK6                             12  05433  D 09873 09825 T
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PGLIN   LABEL    OPCOD  OPERAND                                                  CT  ADDRS  INSTRUCTION

2792             BW     *&13,WORK6            SHOULD NOT BRANCH                  12  05445  V 05469 09825 1
                                 G                                                                        G
2793             BCE    MB,WORK6,M            SHOULD BRANCH                      12  05457  B 05495 09825 M
2794             B      TYPCK                                                     7  05469  J 01071
2795             DCW    @#19.15@,G                                                6  05481
2796             BBE    MA,TAD1,1                                                12  05483  W 05421 01001 1
2797     SUB-RTN 19.16  CHECK MRCW
2798    MB       MLCWS  EMM,WORK6                                                12  05495  D 09929 09825 7
                                                                                                          T
2799             MRCW   NWM27,WORK6                                              12  05507  D 09852 09825 M
2800             BW     *&13,WORK6            SHOULD NOT BRANCH                  12  05519  V 05543 09825 1
2801             BCE    MC,WORK6,,            SHOULD BRANCH                      12  05531  B 05569 09825 ,
2802             B      TYPCK                                                     7  05543  J 01071
2803             DCW    @#19.16@,G                                                6  05555
2804             BBE    MB,TAD1,1                                                12  05557  W 05495 01001 1
2805     SUB-RTN 19.17  CHECK SCNLA FOR MOVE NO DATA, PROPER ADDR REG STP
2806    MC       MLCWS  LBRAKT,102                                               12  05569  D 09893 00102 7
2807             MLCWS  NWM02,103                                                12  05581  D 09828 00103 7
2808             MLCWS  LBRAKT,104                                               12  05593  D 09893 00104 7
                                                                                                          S
2809             SCNLA  103,104                                                  12  05605  D 00103 00104 B
2810             SAR    HOLDA2                                                    7  05617  G 01020 A
2811             SBR    HOLDB2                                                    7  05624  G 01025 B
2812             C      HOLDA2,@00101@        CHECK AAR FOR PROPER STEPPING      11  05631  C 01020 09984
2813             BU     MD                    SHOULD NOT BRANCH                   7  05642  J 05685 /
2814             C      HOLDB2,@00102@        CHECK BAR FOR PROPER STEPPING      11  05649  C 01025 09989
2815             BU     MD                    SHOULD NOT BRANCH                   7  05660  J 05685 /
2816             C      NWM61,104             TEST THAT NO DATA WERE MOVED       11  05667  C 09886 00104
2817             BE     ME                    SHOULD BRANCH & EXIT ROUTINE HERE   7  05678  J 05711 S
2818    MD       B      TYPCK              ** ALL #19.17 ERRORS COME HERE         7  05685  J 01071
2819             DCW    @#19.17@,G                                                6  05697
2820             BBE    MC,TAD1,1                                                12  05699  W 05569 01001 1
2821     SUB-RTN 19.18  CHECK MLNA
2822    ME       MLCWS  DELTA,102                                                12  05711  D 09901 00102 7
2823             MLCWS  NWM16,103                                                12  05723  D 09842 00103 7
2824             MLCWS  DELTA,104                                                12  05735  D 09901 00104 7
2825             MLNA   103,104                                                  12  05747  D 00103 00104 /
2826             C      NWM32,104                                                11  05759  C 09857 00104
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PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
2827                 BE     MF                SHOULD BRANCH & EXIT ROUTINE HERE   7  05770  J 05803 S
2828                 B      TYPCK                                              7  05777  J 01071
2829                 DCW    @#19.18@,G                                         6  05789
2830                 BBE    ME,TAD1,1                                         12  05791  W 05711 01001 1
2831       SUB-RTN 19.19    CHECK MLZA
2832     MF          MLCWS  PERCNT,102                                        12  05803  D 09905 00102 7
2833                 MLCWS  NWM35,103                                         12  05815  D 09860 00103 7
2834                 MLCWS  PERCNT,104                                        12  05827  D 09905 00104 7
2835                 MLZA   103,104                                           12  05839  D 00103 00104 S
2836                 C      NWM44,104                                         11  05851  C 09869 00104
2837                 BE     MG                SHOULD BRANCH & EXIT ROUTINE HERE   7  05862  J 05895 S
2838                 B      TYPCK                                              7  05869  J 01071
2839                 DCW    @#19.19@,G                                         6  05881
2840                 BBE    MF,TAD1,1                                         12  05883  W 05803 01001 1
2841       SUB-RTN 19.20    CHECK MLCA
2842     MG          MLCWS  NWM63,WORK6                                       12  05895  D 09888 09825 7
2843                 MLCA   BLANK,WORK6                                       12  05907  D 09890 09825 T
2844                 BW     *&13,WORK6        SHOULD NOT BRANCH               12  05919  V 05943 09825 1
2845                 BCE    MH,WORK6,         SHOULD BRANCH                   12  05931  B 05969 09825
2846                 B      TYPCK                                              7  05943  J 01071
2847                 DCW    @#19.20@,G                                         6  05955
2848                 BBE    MG,TAD1,1                                         12  05957  W 05895 01001 1
2849       SUB-RTN 19.21    CHECK MLWA
2850     MH          MLCWS  NWM53,WORK6                                       12  05969  D 09878 09825 7
2851                 MLWA   NAUGHT,WORK6                                      12  05981  D 09944 09825 U
2852                 C      NWM53,WORK6                                       11  05993  C 09878 09825
2853                 BE     MI                SHOULD BRANCH                   7  06004  J 06037 S
2854                 B      TYPCK                                              7  06011  J 01071
2855                 DCW    @#19.21@,G                                         6  06023
2856                 BBE    MH,TAD1,1                                         12  06025  W 05969 01001 1
2857       SUB-RTN 19.22    CHECK MLNWA
2858     MI          MLCWS  NWM47,WORK6                                       12  06037  D 09872 09825 7
2859                 MLNWA  SUBLNK,WORK6                                      12  06049  D 09909 09825 V
2860                 C      NWM32,WORK6                                       11  06061  C 09857 09825
2861                 BE     MJ                SHOULD BRANCH                   7  06072  J 06105 S
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PGLIN     LABEL      OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
2862                 B      TYPCK                                     7  06079  J 01071
2863                 DCW    a#19.22a,G                                6  06091
2864                 BBE    MI,TAD1,1                                12  06093  W 06037 01001 1
2865       SUB-RTN 19.23    CHECK MLZWA
2866      MJ         MLCWS  NWM03,WORK6                              12  06105  D 09829 09825 7
2867                 MLZWA  LOZNGE,WORK6                             12  06117  D 09892 09825 W
2868                 C      NWM51,WORK6                              11  06129  C 09876 09825
2869                 BE     MK                SHOULD BRANCH          7  06140  J 06173 S
2870                 B      TYPCK                                     7  06147  J 01071
2871                 DCW    a#19.23a,G                                6  06159
2872                 BBE    MJ,TAD1,1                                12  06161  W 06105 01001 1
2873       SUB-RTN 19.24    CHECK MLCWA
2874      MK         MLCWS  ALLBIT,102                               12  06173  D 09895 00102 7
2875                 MLCWS  NWM00,103                                12  06185  D 09826 00103 7
2876                 MLCWS  ALLBIT,104                               12  06197  D 09895 00104 7
2877                 MLCWA  103,104                                  12  06209  D 00103 00104 X
2878                 BW     *&13,104          SHOULD NOT BRANCH      12  06221  V 06245 00104 1
2879                 BCE    ML,104,           SHOULD BRANCH          12  06233  B 06270 00104
2880                 B      TYPCK                                     7  06245  J 01071
2881                 DCW    a#19.24a                                  6  06257
2882                 BBE    MK,TAD1,1                                12  06258  W 06173 01001 1
2883       SUB-RTN 19.25    CHECK SCNRR FOR MOVE NO DATA, PROPER ADDR REG STP
2884      ML         MLCWA  NWM26,101                                12  06270  D 09889 00101 X
2885                 MLCWS  GREATR,37                                12  06282  D 09913 00037 7
2886                 MLCWS  NWM49,36                                 12  06294  D 09874 00036 7
2887                 SCNRR  37,36                                    12  06306  D 00037 00036 Y
2888                 SAR    HOLDA2                                    7  06318  G 01020 A
2889                 SBR    HOLDB2                                    7  06325  G 01025 B
2890                 C      HOLDA2,a00102a    CHECK AAR FOR PROPER STEPPING  11  06332  C 01020 09989
2891                 BU     MM                SHOULD NOT BRANCH      7  06343  J 06392 /
2892                 C      HOLDB2,a00101a    CHECK BAR FOR PROPER STEPPING  11  06350  C 01025 09984
2893                 BU     MM                SHOULD NOT BRANCH      7  06361  J 06392 /
2894                 SW     38                                        6  06368  , 00038
2895                 C      NWM26,101         TEST THAT NO DATA WERE MOVED  11  06374  C 09889 00101
2896                 BE     MN                SHOULD BRANCH & EXIT ROUTINE HERE  7  06385  J 06418 S
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PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
2897      MM         B      TYPCK                                             7  06392  J 01071
2898                 DCW    @#19.25@,G                                        6  06404
2899                 BBE    ML,TAD1,1                                        12  06406  W 06270 01001 1
2900        SUB-RTN 19.26   CHECK MRNR
2901      MN         CW     100                                               6  06418  ¤ 00100
2902                 MRCW   K01,100                                          12  06424  D 09745 00100 T M
2903                 MRNR   K02,100                                          12  06436  D 09747 00100 Z
2904                 BW     MP,100          SHOULD NOT BRANCH                12  06448  V 06510 00100 1
2905                 BW     *&8,101         SHOULD BRANCH                    12  06460  V 06479 00101 1
2906                 B      MP                                                7  06472  J 06510
2907                 BCE    *&8,100,        SHOULD BRANCH                    12  06479  B 06498 00100
2908                 B      MP                                                7  06491  J 06510
2909                 BCE    MQ,101,:                                         12  06498  B 06536 00101 :
2910      MP         B      TYPCK                                             7  06510  J 01071
2911                 DCW    @#19.26@,G                                        6  06522
2912                 BBE    MN,TAD1,1                                        12  06524  W 06418 01001 1
2913        SUB-RTN 19.27   CHECK MRZR
2914      MQ         CW     100                                               6  06536  ¤ 00100
2915                 MRCW   K03,100                                          12  06542  D 09749 00100 T M
2916                 MRZR   K04,100                                          12  06554  D 09751 00100 ≠
2917                 BW     MR,100          SHOULD NOT BRANCH                12  06566  V 06628 00100 1
2918                 BW     *&8,101         SHOULD BRANCH                    12  06578  V 06597 00101 1
2919                 B      MR                                                7  06590  J 06628
2920                 BCE    *&8,100,-       SHOULD BRANCH                    12  06597  B 06616 00100 -
2921                 B      MR                                                7  06609  J 06628
2922                 BCE    MS,101,V        SHOULD BRANCH & EXIT ROUTINE HERE 12  06616  B 06654 00101 V
2923      MR         B      TYPCK                                             7  06628  J 01071
2924                 DCW    @#19.27@,G                                        6  06640
2925                 BBE    MQ,TAD1,1                                        12  06642  W 06536 01001 1
2926        SUB-RTN 19.28   CHECK MRCR
2927      MS         MLCWA  K05,101                                          12  06654  D 09754 00101 X
2928                 MRCR   K06,100                                          12  06666  D 09755 00100 ,
2929                 BW     *&8,100         SHOULD BRANCH                    12  06678  V 06697 00100 1
2930                 B      MT                                                7  06690  J 06715
2931                 C      101,K14&1                                        11  06697  C 00101 09772
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LABEL      OPCOD  OPERAND                                               CT  ADDRS  INSTRUCTION

           BE     MU             SHOULD BRANCH & EXIT ROUTINE HERE      7  06708  J 06741 S
MT         B      TYPCK                                                 7  06715  J 01071
           DCW    @#19.28@,G                                            6  06727
           BBE    MS,TAD1,1                                            12  06729  W 06654 01001 1
  SUB-RTN 19.29   CHECK MRWR
MU         MLCWA  K07,101                                              12  06741  D 09758 00101 X
           MRWR   K08,100                                              12  06753  D 09759 00100 %
           BW     MV,100         SHOULD NOT BRANCH                     12  06765  V 06827 00100 1
           BW     *&8,101        SHOULD BRANCH                         12  06777  V 06796 00101 1
           B      MV                                                    7  06789  J 06827
           BCE    *&8,100,I      SHOULD BRANCH                         12  06796  B 06815 00100 I
           B      MV                                                    7  06808  J 06827
           BCE    MW,101,N       SHOULD BRANCH & EXIT ROUTINE HERE     12  06815  B 06853 00101 N
MV         B      TYPCK                                                 7  06827  J 01071
           DCW    @#19.29@,G                                            6  06839
           BBE    MU,TAD1,1                                            12  06841  W 06741 01001 1
  SUB-RTN 19.30   CHECK MRNWR
MW         MLCWA  K09,101                                              12  06853  D 09762 00101 X
                                                                                              W
           MRNWR  K10,100                                              12  06865  D 09763 00100 S
           BW     MX,100         SHOULD NOT BRANCH                     12  06877  V 06939 00100 1
           BW     *&8,101        SHOULD BRANCH                         12  06889  V 06908 00101 1
           B      MX                                                    7  06901  J 06939
                          S                                                                   S
           BCE    *&8,100,B      SHOULD BRANCH                         12  06908  B 06927 00100 B
           B      MX                                                    7  06920  J 06939
           BCE    MY,101,:       SHOULD BRANCH & EXIT ROUTINE HERE     12  06927  B 06965 00101 :
MX         B      TYPCK                                                 7  06939  J 01071
           DCW    @#19.30@,G                                            6  06951
           BBE    MW,TAD1,1                                            12  06953  W 06853 01001 1
  SUB-RTN 19.31   CHECK MRZWR
MY         MLCWA  K11,101                                              12  06965  D 09766 00101 X
                                                                                              B
           MRZWR  K12,100                                              12  06977  D 09767 00100 S
           BW     MZ,100         SHOULD NOT BRANCH                     12  06989  V 07051 00100 1
           BW     *&8,101        SHOULD BRANCH                         12  07001  V 07020 00101 1
           B      MZ                                                    7  07013  J 07051
           BCE    *&8,100,X      SHOULD BRANCH                         12  07020  B 07039 00100 X
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PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
2967                 B      MZ                                                7  07032  J 07051
2968                 BCE    NA,101,V          SHOULD BRANCH & EXIT ROUTINE HERE 12  07039  B 07077 00101 V
2969      MZ         B      TYPCK                                             7  07051  J 01071
2970                 DCW    @#19.31@,G                                        6  07063
2971                 BBE    MY,TAD1,1                                        12  07065  W 06965 01001 1
2972        SUB-RTN 19.32   CHECK MRCWR
2973      NA         CW     10C                                               6  07077  ¤ 00100
2974                 MRCW   K13,100                                          12  07083  D 09769 00100 T
2975                 MRCWR  K14,100                                          12  07095  D 09771 00100 M
2976                 BW     *&8,100           SHOULD BRANCH                   12  07107  V 07126 00100 1
2977                 B      NB                                                7  07119  J 07144
2978                 C      101,K14&1                                        11  07126  C 00101 09772
2979                 BE     NC                SHOULD BRANCH & EXIT ROUTINE HERE 7  07137  J 07170 S
2980      NB         B      TYPCK                                             7  07144  J 01071
2981                 DCW    @#19.32@,G                                        6  07156
2982                 BBE    NA,TAD1,1                                        12  07158  W 07077 01001 1
2983        SUB-RTN 19.33   CHECK SCNL8 FOR MOVE NO DATA, PROPER ADDR REG STP
2984      NC         MLCWS  TPMARK,102                                       12  07170  D 09914 00102 7
2985                 MLCWS  NWM48,103                                        12  07182  D 09873 00103 7
2986                 MLCWS  AMPSND,104                                       12  07194  D 09896 00104 7
2987                 SCNLB  104,103                                          12  07206  D 00104 00103 -
2988                 SAR    HOLDA2                                            7  07218  G 01020 A
2989                 SBR    HOLDB2                                            7  07225  G 01025 B
2990                 C      HOLDA2,@00102@                                   11  07232  C 01020 09989
2991                 BU     ND                SHOULD NOT BRANCH               7  07243  J 07286 /
2992                 C      HOLDB2,@00101@                                   11  07250  C 01025 09984
2993                 BU     ND                SHOULD NOT BRANCH               7  07261  J 07286 /
2994                 C      NWM15,102         TEST THAT NO DATA WERE MOVED    11  07268  C 09841 00102
2995                 BE     NE                SHOULD BRANCH & EXIT ROUTINE HERE 7  07279  J 07312 S
2996      ND         B      TYPCK                                             7  07286  J 01071
2997                 DCW    @#19.33@,G                                        6  07298
2998                 BBE    NC,TAD1,1                                        12  07300  W 07170 01001 1
2999        SUB-RTN 19.34   CHECK MLNB
3000      NE         MLCWS  BKSLSH,WORK6                                     12  07312  D 09907 09825 7
3001                 MLNB   NWM33,WORK6                                      12  07324  D 09858 09825 J
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PGLIN     LABEL      OPCOD  OPERAND                          CT  ADDRS  INSTRUCTION
3002                 C      NWM17,WORK6                      11  07336  C 09843 09825
3003                 BE     NF               SHOULD BRANCH    7  07347  J 07380 S
3004                 B      TYPCK                             7  07354  J 01071
3005                 DCW    @#19.34@,G                        6  07366
3006                 BBE    NE,TAD1,1                        12  07368  W 07312 01001 1
3007       SUB-RTN 19.35    CHECK MLZB
3008     NF          SW     100                               6  07380  , 00100
3009                 MLCWS  NWM63,101                        12  07386  D 09888 00101 7
3010                 MLZB   BLANK,101                        12  07398  D 09890 00101 K
3011                 BW     *&13,101          SHOULD NOT BRANCH 12  07410  V 07434 00101 1
3012                 BCE    NG,101,M          SHOULD BRANCH    12  07422  B 07460 00101 M
3013                 B      TYPCK                             7  07434  J 01071
3014                 DCW    @#19.35@,G                        6  07446
3015                 BBE    NF,TAD1,1                        12  07448  W 07380 01001 1
3016       SUB-RTN 19.36    CHECK MLCB
3017     NG          SW     100                               6  07460  , 00100
3018                 MLCWS  NWM52,101                        12  07466  D 09877 00101 7
3019                 MLCB   POUND,101                        12  07478  D 09910 00101 L
3020                 BW     *&13,101          SHOULD NOT BRANCH 12  07490  V 07514 00101 1
3021                 BCE    NH,101,#          SHOULD BRANCH    12  07502  B 07540 00101 #
3022                 B      TYPCK                             7  07514  J 01071
3023                 DCW    @#19.36@,G                        6  07526
3024                 BBE    NG,TAD1,1                        12  07528  W 07460 01001 1
3025       SUB-RTN 19.37    CHECK MLWB
3026     NH          SW     100                               6  07540  , 00100
3027                 MLCWS  NWM15,101                        12  07546  D 09841 00101 7
3028                 MLWB   AMPSND,101                       12  07558  D 09896 00101 M
3029                 C      NWM15,101                        11  07570  C 09841 00101
3030                 BE     NI               SHOULD BRANCH    7  07581  J 07614 S
3031                 B      TYPCK                             7  07588  J 01071
3032                 DCW    @#19.37@,G                        6  07600
3033                 BBE    NH,TAD1,1                        12  07602  W 07540 01001 1
3034       SUB-RTN   19.38   CHECK MLNWB
3035     NI          SW     100                               6  07614  , 00100
3036                 MLCWS  NWM06,101                        12  07620  D 09832 00101 7
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PGLIN    LABEL      OPCOD  OPERAND                                                 CT  ADDRS  INSTRUCTION

3037                MLNWB  EYE,101                                                 12  07632  D 09924 00101 N
3038                C      NWM09,101                                               11  07644  C 09835 00101
3039                BE     NJ                   SHOULD BRANCH                       7  07655  J 07688 S
3040                B      TYPCK                                                    7  07662  J 01071
3041                DCW    @#19.38@,G                                               6  07674
3042                BBE    NI,TAD1,1                                               12  07676  W 07614 01001 1
3043       SUB-RTN 19.39   CHECK MLZWB
3044     NJ         MLCWS  ALLBIT,WORK6                                            12  07688  D 09895 09825 7
3045                MLZWB  NWM00,WORK6                                             12  07700  D 09826 09825 0
3046                BW     *&13,WORK6           SHOULD NOT BRANCH                  12  07712  V 07736 09825 1
                                  T                                                                          T
3047                BCE    NK,WORK6,M           SHOULD BRANCH                      12  07724  B 07762 09825 M
3048                B      TYPCK                                                    7  07736  J 01071
3049                DCW    @#19.39@,G                                               6  07748
3050                BBE    NJ,TAD1,1                                               12  07750  W 07688 01001 1
3051       SUB-RTN 19.40   CHECK MLCWB
3052     NK         MLCWS  LOZNGE,WORK6                                            12  07762  D 09892 09825 7
3053                MLCWB  NWM03,WORK6                                             12  07774  D 09829 09825 P
3054                BW     *&13,WORK6           SHOULD NOT BRANCH                  12  07786  V 07810 09825 1
3055                BCE    NL,WORK6,3           SHOULD BRANCH                      12  07798  B 07836 09825 3
3056                B      TYPCK                                                    7  07810  J 01071
3057                DCW    @#19.40@,G                                               6  07822
3058                BBE    NK,TAD1,1                                               12  07824  W 07762 01001 1
3059       SUB-RTN 19.41   CHECK SCNRG FOR MOVE NO DATA, PROPER ADDR REG STP
3060     NL         CS     164                  INSURE 00100-00164 BLANK            6  07836  / 00164
3061                MLCWS  ALLBIT,101           PUT TERMINAL CHARACTER IN 00101    12  07842  D 09895 00101 7
3062                MLWA   164,100              INSURE NO WMS 00038-00100          12  07854  D 00164 00100 U
3063                MLCWB  NINE,100             MOVE 64 CHARACTERS TO 00037-00100  12  07866  D 09953 00100 P
3064                CW     42                   REMOVE WM FROM GROUP MARK           6  07878  ¤ 00042
3065                SCNRG  37,36                TRY THE SCAN                       12  07884  D 00037 00036 Q
3066                SAR    HOLDA2                                                   7  07896  G 01020 A
3067                SBR    HOLDB2                                                   7  07903  G 01025 B
3068                C      HOLDA2,@00102@       CHECK AAR FOR PROPER SETTING       11  07910  C 01020 09989
3069                BU     NM                   SHOULD NOT BRANCH                   7  07921  J 08000 /
3070                C      HOLDB2,@00101@       CHECK BAR FOR PROPER SETTING       11  07928  C 01025 09984
3071                BU     NM                   SHOULD NOT BRANCH                   7  07939  J 08000 /
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PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
3072                 BW     NM,42            SHOULD NOT BRANCH               12  07946  V 08000 00042 1
3073                 MLWA   164,100          REMOVE ALL WMS FROM 00038-00100 12  07958  D 00164 00100 U
3074                 MLCB   NINE,164         MOVE 64 CHARACTERS TO 00101-00164 12 07970  D 09953 00164 L
3075                 C      100,164          CHECK THAT SCAN MOVED NO DATA   11  07982  C 00100 00164
3076                 BE     NN               SHOULD BRANCH & EXIT ROUTINE HERE 7 07993  J 08026 S
3077      NM         B      TYPCK                                            7   08000  J 01071
3078                 DCW    a#19.41a,G                                       6   08012
3079                 BBE    NL,TAD1,1                                        12  08014  W 07836 01001 1
3080        SUB-RTN 19.42   CHECK MRNG
3081      NN         MLCWS  NWM19,101                                        12  08026  D 09845 00101 7
3082                 MLCWS  SPLAT,102                                        12  08038  D 09898 00102 7
3083                 MLCWS  ALLBIT,103                                       12  08050  D 09895 00103 7
3084                 MRNG   102,101                                          12  08062  D 00102 00101 R
3085                 BW     *&13,101          SHOULD NOT BRANCH              12  08074  V 08098 00101 1
3086                 BCE    NP,101,%          SHOULD BRANCH                  12  08086  B 08124 00101 %
3087                 B      TYPCK                                            7   08098  J 01071
3088                 DCW    a#19.42a,G                                       6   08110
3089                 BBE    NN,TAD1,1                                        12  08112  W 08026 01001 1
3090        SUB-RTN 19.43   CHECK MRZG
3091      NP         MLCWS  ALLBIT,101                                       12  08124  D 09895 00101 7
3092                 MLCWS  NWM00,102                                        12  08136  D 09826 00102 7
3093                 MLCWS  ALLBIT,103                                       12  08148  D 09895 00103 7
3094                 MRZG   102,101                                          12  08160  D 00102 00101 !
3095                 C      NWM15,101                                        11  08172  C 09841 00101
3096                 BE     NQ               SHOULD BRANCH                  7   08183  J 08216 S
3097                 B      TYPCK                                            7   08190  J 01071
3098                 DCW    a#19.43a,G                                       6   08202
3099                 BBE    NP,TAD1,1                                        12  08204  W 08124 01001 1
3100        SUB-RTN 19.44   CHECK MRCG
3101      NQ         MLCWS  AITCH,101                                        12  08216  D 09923 00101 7
3102                 MLCWS  NWM07,102                                        12  08228  D 09833 00102 7
3103                 MLCWS  ALLBIT,103                                       12  08240  D 09895 00103 7
3104                 MRCG   102,101                                          12  08252  D 00102 00101 $
3105                 C      NWM07,101                                        11  08264  C 09833 00101
3106                 BE     NR               SHOULD BRANCH                  7   08275  J 08308 S
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PGLIN    LABEL     OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION

3107               B      TYPCK                                     7  08282  J 01071
3108               DCW    @#19.44@,G                                6  08294
3109               BBE    NQ,TAD1,1                                12  08296  W 08216 01001 1
3110       SUB-RTN 19.45  CHECK MRWG
3111     NR        MLCWS  DELTA,101                                12  08308  D 09901 00101 7
3112               MLCWS  NWM16,102                                12  08320  D 09842 00102 7
3113               MLCWS  ALLBIT,103                               12  08332  D 09895 00103 7
3114               MRWG   102,101                                  12  08344  D 00102 00101 *
3115               BW     *&13,101          SHOULD NOT BRANCH      12  08356  V 08380 00101 1
                                  D                                                         D
3116               BCE    NS,101,L          SHOULD BRANCH          12  08368  B 08406 00101 L
3117               B      TYPCK                                     7  08380  J 01071
3118               DCW    @#19.45@,G                                6  08392
3119               BBE    NR,TAD1,1                                12  08394  W 08308 01001 1
3120       SUB-RTN 19.46  CHECK MRNWG
3121     NS        MLCWS  EXCLAM,101                               12  08406  D 09925 00101 7
3122               MLCWS  NWM21,102                                12  08418  D 09847 00102 7
3123               MLCWS  ALLBIT,103                               12  08430  D 09895 00103 7
                                                                                            R
3124               MRNWG  102,101                                  12  08442  D 00102 00101 B
3125               BW     *&13,101          SHOULD NOT BRANCH      12  08454  V 08478 00101 1
3126               BCE    NT,101,N                                 12  08466  B 08504 00101 N
3127               B      TYPCK                                     7  08478  J 01071
3128               DCW    @#19.46@,G                                6  08490
3129               BBE    NS,TAD1,1                                12  08492  W 08406 01001 1
3130       SUB-RTN 19.47  CHECK MRZWG
3131     NT        MLCWS  NWM63,101                                12  08504  D 09888 00101 7
3132               MLCWS  BLANK,102                                12  08516  D 09890 00102 7
3133               MLCWS  ALLBIT,103                               12  08528  D 09895 00103 7
                                                                                            .
3134               MRZWG  102,101                                  12  08540  D 00102 00101 ;
3135               C      NWM15,101                                11  08552  C 09841 00101
3136               BE     NU                SHOULD BRANCH           7  08563  J 08596 S
3137               B      TYPCK                                     7  08570  J 01071
3138               DCW    @#19.47@,G                                6  08582
3139               BBE    NT,TAD1,1                                12  08584  W 08504 01001 1
3140       SUB-RTN 19.48  CHECK MRCWG
3141     NU        MLCWS  NWM48,101                                12  08596  D 09873 00101 7
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PGLIN    LABEL     OPCOD  OPERAND                                                     CT  ADDRS  INSTRUCTION

3142               MLCWS  TPMARK,102                                                  12  08608  D 09914 00102 7
3143               MLCWS  ALLBIT,103                                                  12  08620  D 09895 00103 7
                                                                                                               D
3144               MRCWG  102,101                                                     12  08632  D 00102 00101 L
3145               C      NWM15,101                                                   11  08644  C 09841 00101
3146               BE     NV                  SHOULD BRANCH                            7  08655  J 08688 S
3147               B      TYPCK                                                        7  08662  J 01071
3148               DCW    @#19.48@,G                                                   6  08674
3149               BBE    NU,TAD1,1                                                   12  08676  W 08596 01001 1
3150      SUB-RTN 19.49   CHECK SCNL FOR MOVE NO DATA, PROPER ADDR REG STEP
3151     NV        MLCWS  JAY,102                                                     12  08688  D 09926 00102 7
3152               MLCWS  NWM30,103                                                   12  08700  D 09855 00103 7
3153               SCNL   102,103             TEST STOP ON A-FIELD WM                 12  08712  D 00102 00103 &
3154               SAR    HOLDA2                                                       7  08724  G 01020 A
3155               SBR    HOLDB2                                                       7  08731  G 01025 B
3156               C      HOLDA2,@00101@      CHECK AAR FOR PROPER STEPPING           11  08738  C 01020 09984
3157               BU     NW                  SHOULD NOT BRANCH                        7  08749  J 08867 /
3158               C      HOLDB2,@00102@      CHECK BAR FOR PROPER STEPPING           11  08756  C 01025 09989
3159               BU     NW                  SHOULD NOT BRANCH                        7  08767  J 08867 /
3160               BW     NW,103              SHOULD NOT BRANCH WORD MARK             12  08774  V 08867 00103 1
                                   B                                                                           B
3161               BCE    *&8,103,S           SHOULD BRANCH                           12  08786  B 08805 00103 S
3162               B      NW                                                           7  08798  J 08867
3163               SCNL   103,102             TEST STOP ON B-FIELD WM                 12  08805  D 00103 00102 &
3164               SAR    HOLDA2                                                       7  08817  G 01020 A
3165               SBR    HOLDB2                                                       7  08824  G 01025 B
3166               C      HOLDA2,@00102@                                              11  08831  C 01020 09989
3167               BU     NW                  SHOULD NOT BRANCH                        7  08842  J 08867 /
3168               C      HOLDB2,@00101@                                              11  08849  C 01025 09984
3169               BE     NX                  SHOULD BRANCH & EXIT ROUTINE HERE        7  08860  J 08893 S
3170     NW        B      TYPCK                                                        7  08867  J 01071
3171               DCW    @#19.49@,G                                                   6  08879
3172               BBE    NV,TAD1,1                                                   12  08881  W 08688 01001 1
3173      SUB-RTN 19.50   CHECK MLN
3174     NX        MLCWS  NWM63,WORK6                                                 12  08893  D 09888 09825 7
3175               MLN    BLANK,WORK6                                                 12  08905  D 09890 09825 A
3176               BW     *&13,WORK6          SHOULD NOT BRANCH                       12  08917  V 08941 09825 1
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PGLIN     LABEL      OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
3177                 BCE    NY,WORK6,&        SHOULD BRANCH          12  08929  B 08967 09825 &
3178                 B      TYPCK                                     7  08941  J 01071
3179                 DCW    a#19.50a,G                                6  08953
3180                 BBE    NX,TAD1,1                                12  08955  W 08893 01001 1
3181       SUB-RTN 19.51    CHECK MLZ
3182      NY         MLCWS  NWM51,WORK6                              12  08967  D 09876 09825 7
3183                 MLZ    ATSIGN,WORK6                             12  08979  D 09911 09825 B
3184                 BW     *&13,WORK6        SHOULD NOT BRANCH      12  08991  V 09015 09825 1
3185                 BCE    NZ,WORK6,3        SHOULD BRANCH          12  09003  B 09041 09825 3
3186                 B      TYPCK                                     7  09015  J 01071
3187                 DCW    a#19.51a,G                                6  09027
3188                 BBE    NY,TAD1,1                                12  09029  W 08967 01001 1
3189       SUB-RTN 19.52    CHECK MLC
3190      NZ         MLCWS  NWM31,WORK6                              12  09041  D 09856 09825 7
3191                 MLC    DASH,WORK6                               12  09053  D 09902 09825 C
3192                 BW     *&13,WORK6        SHOULD NOT BRANCH      12  09065  V 09089 09825 1
3193                 BCE    PA,WORK6,-        SHOULD BRANCH          12  09077  B 09115 09825 -
3194                 B      TYPCK                                     7  09089  J 01071
3195                 DCW    a#19.52a,G                                6  09101
3196                 BBE    NZ,TAD1,1                                12  09103  W 09041 01001 1
3197       SUB-RTN 19.53    CHECK MLW
3198      PA         MLCWS  NWM09,WORK6                              12  09115  D 09835 09825 7
3199                 MLW    EFF,WORK6                                12  09127  D 09921 09825 D
3200                 C      NWM09,WORK6                              11  09139  C 09835 09825
3201                 BE     PB                SHOULD BRANCH          7  09150  J 09183 S
3202                 B      TYPCK                                     7  09157  J 01071
3203                 DCW    a#19.53a,G                                6  09169
3204                 BBE    PA,TAD1,1                                12  09171  W 09115 01001 1
3205       SUB-RTN 19.54    CHECK MLNW
3206      PB         MLCWS  ALLBIT,WORK6                             12  09183  D 09895 09825 7
3207                 MLNW   NWM00,WORK6                             12  09195  D 09826 09825 E
3208                 BW     *&13,WORK6        SHOULD NOT BRANCH      12  09207  V 09231 09825 1
3209                 BCE    PC,WORK6,&        SHOULD BRANCH          12  09219  B 09257 09825 &
3210                 B      TYPCK                                     7  09231  J 01071
3211                 DCW    a#19.54a,G                                6  09243
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PGLIN     LABEL      OPCOD  OPERAND                                                CT  ADDRS  INSTRUCTION
3212                 BBE    PB,TAD1,1                                              12  09245  W 09183 01001 1
3213       SUB-RTN 19.55    CHECK MLZW
3214      PC         MLCWS  PERIOD,WORK6                                           12  09257  D 09891 09825 7
3215                 MLZW   NWM04,WORK6                                            12  09269  D 09830 09825 F
3216                 BW     *&13,WORK6          SHOULD NOT BRANCH                  12  09281  V 09305 09825 1
3217                 BCE    PD,WORK6,#          SHOULD BRANCH                      12  09293  B 09331 09825 #
3218                 B      TYPCK                                                   7  09305  J 01071
3219                 DCW    @#19.55@,G                                              6  09317
3220                 BBE    PC,TAD1,1                                              12  09319  W 09257 01001 1
3221       SUB-RTN 19.56    CHECK MLCW
3222      PD         MLCWS  DELTA,WORK6                                            12  09331  D 09901 09825 7
3223                 MLCW   NWM16,WORK6                                           12  09343  D 09842 09825 G
3224                 BW     *&13,WORK6          SHOULD NOT BRANCH                  12  09355  V 09379 09825 1
3225                 BCE    PE,WORK6,B          SHOULD BRANCH                      12  09367  B 09405 09825 B
3226                 B      TYPCK                                                   7  09379  J 01071
3227                 DCW    @#19.56@,G                                              6  09391
3228                 BBE    PD,TAD1,1                                              12  09393  W 09331 01001 1
3229       SUB-RTN 19.57    CHECK SCNRM FOR MOVE NO DATA, PROPER ADDR REG STP
3230      PE         CS     165                 .                 .                6  09405  / 00165
3231                 SW     102                 . SET UP FIELD .                   6  09411  , 00102
3232                 MLCB   NWM26,165           .     FOR       .                12  09417  D 09889 00165 L
3233                 MLCWA  165,101             .    SCNRM      .                12  09429  D 00165 00101 X
3234                 MLWB   SEVEN,99            .               .                12  09441  D 09951 00099 M
3235                 SCNRM  38,37               TEST THE SCAN FOR STOP ON RM       12  09453  D 00038 00037 H
3236                 SAR    HOLDA2                                                  7  09465  G 01020 A
3237                 SBR    HOLDB2                                                  7  09472  G 01025 B
3238                 C      HOLDA2,@00102@      CHECK FOR PROPER AAR STEPPING      11  09479  C 01020 09989
3239                 BU     PF                  SHOULD NOT BRANCH                   7  09490  J 09619 /
3240                 C      HOLDB2,@00101@      CHECK FOR PROPER BAR STEPPING      11  09497  C 01025 09984
3241                 BU     PF                  SHOULD NOT BRANCH                   7  09508  J 09619 /
3242                 MLWA   163,99              ERASE THE EXTRANEOUS WMS           12  09515  D 00163 00099 U
3243                 C      101,165             TEST THAT SCNRM MOVED NO DATA      11  09527  C 00101 00165
3244                 BU     PF                  SHOULD NOT BRANCH                   7  09538  J 09619 /
3245                 MLCWS  ALLBIT,101                                             12  09545  D 09895 00101 7
3246                 SCNRM  38,37               TRY SCAN W/RM REPLACED BY GMWM     12  09557  D 00038 00037 H
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PGLIN  LABEL     OPCOD  OPERAND                                                   CT  ADDRS  INSTRUCTION

3247             SAR    HOLDA2                                                     7  09569  G 01020 A
3248             SBR    HOLDB2                                                     7  09576  G 01025 B
3249             C      HOLDA2,@00102@                                            11  09583  C 01020 09989
3250             BU     PF              SHOULD NOT BRANCH                          7  09594  J 09619 /
3251             C      HOLDB2,@00101@                                            11  09601  C 01025 09984
3252             BE     PG              SHOULD BRANCH & EXIT ROUTINE HERE          7  09612  J 09645 S
3253   PF        B      TYPCK        ** ALL #19.57 ERRORS COME HERE                7  09619  J 01071
3254             DCW    @#19.57@,G                                                 6  09631
3255             BBE    PE,TAD1,1                                                 12  09633  W 09405 01001 1
3256     SUB-RTN 19.58  CHECK MRNM
3257   PG        MLCWS  ALLBIT,100                                                12  09645  D 09895 00100 7
3258             MLCWS  NWM00,101                                                 12  09657  D 09826 00101 7
3259             MLCWS  RCDMRK,102                                                12  09669  D 09935 00102 7
3260             MRNM   101,100                                                   12  09681  D 00101 00100 1
3261             C      NWM48,100                                                 11  09693  C 09873 00100
3262             BE     PH              SHOULD BRANCH                              7  09704  J 01289 S
3263             B      TYPCK                                                      7  09711  J 01071
3264             DCW    @#19.58@,G                                                 6  09723
3265             BBE    PG,TAD1,1                                                 12  09725  W 09645 01001 1
3266             B      PH                                                         7  09737  J 01289
3267             H                                                                 1  09744  .
3268   ENDPH2    EQU    *
3269     SUB-RTN 19.59  CHECK MRZM
3270             ORG    LOWLOC          BACK TO LOWEST AVAILABLE LOCATION             01289
3271   PH        MLCWS  GEE,100                                                   12  01289  D 09922 00100 7
3272             MLCWS  NWM08,101                                                 12  01301  D 09834 00101 7
3273             MLCWS  ALLBIT,102                                                12  01313  D 09895 00102 7
                                                                                                           Q
3274             MRZM   101,100                                                   12  01325  D 00101 00100 M
3275             C      NWM07,100                                                 11  01337  C 09833 00100
3276             BE     PI              SHOULD BRANCH                              7  01348  J 01381 S
3277             B      TYPCK                                                      7  01355  J 01071
3278             DCW    @#19.59@,G                                                 6  01367
3279             BBE    PH,TAD1,1                                                 12  01369  W 01289 01001 1
3280     SUB-RTN 19.60  CHECK MRCM
3281   PI        MLCWS  TPMARK,100                                                12  01381  D 09914 00100 7
```

```
PGLIN     LABEL       OPCOD  OPERAND                          CT  ADDRS  INSTRUCTION
3282                  MLCWS  NWM48,101                       12  01393  D 09873 00101 7
3283                  MLCWS  RCDMRK,102                      12  01405  D 09935 00102 7
3284                  MRCM   101,100                         12  01417  D 00101 00100 .
3285                  C      NWM48,100                       11  01429  C 09873 00100
3286                  BE     PJ              SHOULD BRANCH    7  01440  J 01473 S
3287                  B      TYPCK                            7  01447  J 01071
3288                  DCW    @#19.60@,G                       6  01459
3289                  BBE    PI,TAD1,1                       12  01461  W 01381 01001 1
3290        SUB-RTN 19.61    CHECK MRWM
3291      PJ          MLCWS  RBRAKT,100                      12  01473  D 09899 00100 7
3292                  MLCWS  NWM18,101                       12  01485  D 09844 00101 7
3293                  MLCWS  ALLBIT,102                      12  01497  D 09895 00102 7
3294                  MRWM   101,100                         12  01509  D 00101 00100 ¤
3295                  BW     *&13,100        SHOULD NOT BRANCH 12  01521  V 01545 00100 1R
3296                  BCE    PK,100,B        SHOULD BRANCH    12  01533  B 01571 00100 B
3297                  B      TYPCK                            7  01545  J 01071
3298                  DCW    @#19.61@,G                       6  01557
3299                  BBE    PJ,TAD1,1                       12  01559  W 01473 01001 1
3300        SUB-RTN 19.62    CHECK MRNWM
3301      PK          MLCWS  NWM63,100                       12  01571  D 09888 00100 7
3302                  MLCWS  BLANK,101                       12  01583  D 09890 00101 7
3303                  MLCWS  RCDMRK,102                      12  01595  D 09935 00102 7
3304                  MRNWM  101,100                         12  01607  D 00101 00100 LB
3305                  C      NWM48,100                       11  01619  C 09873 00100
3306                  BE     PL              SHOULD BRANCH    7  01630  J 01663 S
3307                  B      TYPCK                            7  01637  J 01071
3308                  DCW    @#19.62@,G                       6  01649
3309                  BBE    PK,TAD1,1                       12  01651  W 01571 01001 1
3310        SUB-RTN 19.63    CHECK MRZWM
3311      PL          MLCWS  NWM62,100                       12  01663  D 09887 00100 7
3312                  MLCWS  ONE,101                         12  01675  D 09945 00101 7
3313                  MLCWS  ALLBIT,102                      12  01687  D 09895 00102 7
3314                  MRZWM  101,100                         12  01699  D 00101 00100 LT
3315                  C      NWM14,100                       11  01711  C 09840 00100
3316                  BE     PM              SHOULD BRANCH    7  01722  J 01755 S
```

```
PGLIN     LABEL       OPCOD  OPERAND                          CT  ADDRS  INSTRUCTION
3317                  B      TYPCK                             7  01729  J 01071
3318                  DCW    @#19.63@,G                        6  01741
3319                  BBE    PL,TAD1,1                        12  01743  W 01663 01001 1
3320        SUB-RTN 19.64     CHECK MRCWM
3321      PM          MLCWS  NWM15,100                        12  01755  D 09841 00100 7
3322                  MLCWS  AMPSND,101                       12  01767  D 09896 00101 7
3323                  MLCWS  RCDMRK,102                       12  01779  D 09935 00102 7
3324                  MRCWM  101,100                          12  01791  D 00101 00100 G M
3325                  C      NWM48,100                        11  01803  C 09873 00100
3326                  BE     PV                 SHOULD BRANCH  7  01814  J 01847 S
3327                  B      TYPCK                             7  01821  J 01071
3328                  DCW    @#19.64@,G                        6  01833
3329                  BBE    PM,TAD1,1                        12  01835  W 01755 01001 1
```

```
PGLIN     LABEL     OPCOD  OPERAND                                           CT  ADDRS  INSTRUCTION

3331                       COUNT PASSES, ALLOW FOR PROGRAM MODIFICATION
3332
3333      PV        BNQ    INC                ALLOW ONE INQY PER PROGRAM LOOP    7  01847  J 01157 Q
3334      PW        S      &1,PCCWK                                          11  01854  S 09954 01015
3335                BZ     *&8                                                7  01865  J 01879 V
3336                B      START                                              7  01872  J 02000
3337                BBE    PW02,TAD3,1                                       12  01879  W 01936 01003 1
3338                B      TYPE                                               7  01891  J 01026
3339                DCW    @-PASS-@,G                                         6  01903
3340      PW01      CS     204                .                               6  01905  / 00204
3341                SW     200                . SAVE TADS FOR NEXT PHASE      6  01911  , 00200
3342                MLCWB  1004,204           .                              12  01917  D 01004 00204 P
3343                B      LOADER             EXIT C020B-2 HERE               7  01929  J 00400
3344      PW02      BW     PW01,999           BRANCH IF INPUT WAS FROM TAPE  12  01936  V 01905 00999 1
3345
3346      REDO      CW     KA&1,KX&1                                         11  01948  ¤ 02100 03268
3347                B      START                                              7  01959  J 02000
3348                H                                                         1  01966  .
```

PGLIN	LABEL	OPCOD	OPERAND	CT	ADDRS	INSTRUCTION
3350			CONSTANTS AND WORK AREAS			
3351		ORG	ENCPH2		09745	
3352	K01	DC	a^{T}Ma	1	09745	
3353		DCW	aNa	1	09746	
3354	K02		a&+a	2	09747	
3355	K03	DC	a^{S}Ba	1	09749	
3356		DCW	aNa	1	09750	
3357	K04		a^{D}L+a	2	09751	
3358	K05		a^{G}MNa	2	09754	
3359	K06	DC	a a	1	09755	
3360		DCW	a+a	1	09756	
3361	K07		aINa	2	09758	
3362	K08	DC	a6a	1	09759	
3363		DCW	a+a	1	09760	
3364	K09		a^{S}MNa	2	09762	
3365	K10	DC	a-a	1	09763	
3366		DCW	a+a	1	09764	
3367	K11		aPNa	2	09766	
3368	K12	DC	aYa	1	09767	
3369		DCW	a+a	1	09768	
3370	K13	DC	a^{G}Ma	1	09769	
3371		DCW	aNa	1	09770	
3372	K14		a +a	2	09771	
3373						
3374	CNEHTH	DCW	&1C0000	6	09778	
3375	AADDR1		FIELD1-3	5	09783	09799
3376	BADDR1		FIELD2-3	5	09788	09802
3377	AADDR2		FIELD3-3	5	09793	09805
3378	BADDR2		FIELD4-3	5	09798	09809
3379	FIELD1		a9^{G}8Ga	4	09802	
3380	FIELD2		a¤9Ga	3	09805	
3381	FIELD3		a,IGa	3	09808	
3382	FIELD4		a /.Ga	4	09812	
3383	LIMIT		a a	4	09816	
3384	HISTRT		a a	2	09818	

PGLIN	LABEL	OPCOD	OPERAND	CT	ADDRS	INSTRUCTION
3385	LOSTRT		a a	2	09820	
3386	HICNT		a a	2	09822	
3387	LOCNT		a a	2	09824	
3388	WORK6		a a	1	09825	
3389						
3390	NWM00	DC	a a	1	09826	
3391	NWM01		a1a	1	09827	
3392	NWM02		a2a	1	09828	
3393	NWM03		a3a	1	09829	
3394	NWM04		a4a	1	09830	
3395	NWM05		a5a	1	09831	
3396	NWM06		a6a	1	09832	
3397	NWM07		a7a	1	09833	
3398	NWM08		a8a	1	09834	
3399	NWM09		a9a	1	09835	
3400	NWM10		a0a	1	09836	
3401	NWM11		a#a	1	09837	
3402	NWM12		aaa	1	09838	
3403	NWM13		a.a	1	09839	
3404	NWM14		aGa T	1	09840	
3405	NWM15		aMa S	1	09841	
3406	NWM16		aBa	1	09842	
3407	NWM17		a/a	1	09843	
3408	NWM18		aSa	1	09844	
3409	NWM19		aTa	1	09845	
3410	NWM20		aUa	1	09846	
3411	NWM21		aVa	1	09847	
3412	NWM22		aWa	1	09848	
3413	NWM23		aXa	1	09849	
3414	NWM24		aYa	1	09850	
3415	NWM25		aZa	1	09851	
3416	NWM27		a,a	1	09852	
3417	NWM28		a%a	1	09853	
3418	NWM29		aSa W	1	09854	
3419	NWM30		aSa B	1	09855	

PGLIN	LABEL	OPCOD	OPERAND	CT	ADDRS	INSTRUCTION
3420	NWM31		a(S)Ma	1	09856	
3421	NWM32		a-a	1	09857	
3422	NWM33		aJa	1	09858	
3423	NWM34		aKa	1	09859	
3424	NWM35		aLa	1	09860	
3425	NWM36		aMa	1	09861	
3426	NWM37		aNa	1	09862	
3427	NWM38		aOa	1	09863	
3428	NWM39		aPa	1	09864	
3429	NWM40		aQa	1	09865	
3430	NWM41		aRa	1	09866	
3431	NWM42		a.a	1	09867	
3432	NWM43		a$a	1	09868	
3433	NWM44		a*a	1	09869	
3434	NWM45		a(R)Ba	1	09870	
3435	NWM46		a,a	1	09871	
3436	NWM47		a(D)La	1	09872	
3437	NWM48		a¢a	1	09873	
3438	NWM49		aAa	1	09874	
3439	NWM50		aBa	1	09875	
3440	NWM51		aCa	1	09876	
3441	NWM52		aDa	1	09877	
3442	NWM53		aEa	1	09878	
3443	NWM54		aFa	1	09879	
3444	NWM55		aGa	1	09880	
3445	NWM56		aHa	1	09881	
3446	NWM57		aIa	1	09882	
3447	NWM58		a(Q)Ma	1	09883	
3448	NWM59		a.a	1	09884	
3449	NWM60		a¤a	1	09885	
3450	NWM61		a(L)Ba	1	09886	
3451	NWM62		a(L)Ta	1	09887	
3452	NWM63		a(G)Ma	1	09888	
3453	NWM26		a+a	1	09889	
3454						

PGLIN	LABEL	OPCOD	OPERAND	CT	ADDRS	INSTRUCTION
3455	TABLE	DCW	@ @	1	09890	
3456	PERICD		@.@	1	09891	
3457	LOZNGE		@□@	1	09892	
3458	LBRAKT		@(@	1	09893	
3459	LESS		@<@	1	09894	
3460	ALLBIT		@M@	1	09895	
3461	AMPSND		@&@	1	09896	
3462			@$@	1	09897	
3463	SPLAT		@*@	1	09898	
3464	RBRAKT		@)@	1	09899	
3465			@;@	1	09900	
3466	DELTA		@Δ@	1	09901	
3467	DASH		@-@	1	09902	
3468			@/@	1	09903	
3469	COMMA		@,@	1	09904	
3470	PERCNT		@%@	1	09905	
3471	WDSEP	DC	@W@	1	09906	
3472	BKSLSH	DCW	@B@	1	09907	
3473	SEGMRK		@S@	1	09908	
3474	SUBLNK		@M@	1	09909	
3475	POUND		@S@	1	09910	
3476	ATSIGN		@#@	1	09911	
3477	COLON		@@@	1	09912	
3478	GREATR		@:@	1	09913	
3479	TPMARK		@G@	1	09914	
3480	QUESTN		@T@	1	09915	
3481	AYE		@M@	1	09916	
3482	BEE		@A@	1	09917	
3483	SEE		@B@	1	09918	
3484	DEE		@C@	1	09919	
3485	EEE		@D@	1	09920	
3486	EFF		@E@	1	09921	
3487	GEE		@F@	1	09922	
3488	AITCH		@G@	1	09923	
3489	EYE		@H@	1	09924	

PGLIN	LABEL	OPCOD	OPERAND	CT	ADDRS	INSTRUCTION
3490	EXCLAM		a!a	1	09925	
3491	JAY		aJa	1	09926	
3492			aKa	1	09927	
3493	ELL		aLa	1	09928	
3494	EMM		aMa	1	09929	
3495			aNa	1	09930	
3496	OH		aOa	1	09931	
3497	PEA		aPa	1	09932	
3498	QUEUE		aQa	1	09933	
3499	ARE		aRa	1	09934	
3500	RCDMRK		a*a	1	09935	
3501	ESS		aSa	1	09936	
3502	TEA		aTa	1	09937	
3503			aUa	1	09938	
3504	VEE		aVa	1	09939	
3505	DBLYOU		aWa	1	09940	
3506	EKS		aXa	1	09941	
3507	WYE		aYa	1	09942	
3508	ZEE		aZa	1	09943	
3509	NAUGHT		a0a	1	09944	
3510	ONE		a1a	1	09945	
3511	TWO		a2a	1	09946	
3512	THREE		a3a	1	09947	
3513	FOUR		a4a	1	09948	
3514	FIVE		a5a	1	09949	
3515	SIX		a6a	1	09950	
3516	SEVEN		a7a	1	09951	
3517	EIGHT		a8a	1	09952	
3518	NINE		a9a	1	09953	
3519						
3520		LTORG	*		09954	
3520			&1	1	09954	
3520			&99999	5	09959	
3520			KFC2	5	09964	02382
3520			POUND	5	09969	09910

PGLIN	LABEL	OPCOD	OPERAND	CT	ADDRS	INSTRUCTION
3520			KFC7	5	09974	02486
3520			KFC6	5	09979	02479
3520			@001018	5	09984	
3520			@001028	5	09989	
3520			&4096	4	09993	
3520			&64	2	09995	
3520			&63	2	09997	

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PGLIN     LABEL     OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
3522      DIVSCR    EQU    WORK7
3523      DIVDND    EQU    WORK8
3524      QUOREM    EQU    P1
3525      QUOTNT    EQU    WORK10
3526
3527                ORG    1000                                                 01000
3528
3529                DC     a      a,G                                        5  01004
3530
3531                DCW    &00100          PASS COUNT CONSTANT                5  01010
3532                       a      a        PASS COUNT WORK AREA               5  01015
3533
3534                       a      a        . COMMON AREA FOR STORING          5  01020
3535                       a      a        . ADDRESS REGISTERS                5  01025
3536
3537                SBR    *&9             COMMON TYPE ROUTINE                7  01026  G 01041 B
3538                WCP    0                                                 10  01033  M %TO 00000 W
3539                SBR    *&20                                               7  01043  G 01069 B
3540                BCB1   *-23                                               7  01050  R 01033 2
                                                                                        G
3541                BA1    *&1                                                7  01057  R 01064 M
3542                B      0                                                  7  01064  J 00000
3543
3544                SBR    *&39            TYPE AND TAD CHECK ROUTINE         7  01071  G 01116 B
3545                SBR    *&65                                               7  01078  G 01149 B
3546                A      *-17,*&54                                         11  01085  A 01078 01149
3547                BBE    *&25,TAD0,1                                       12  01096  W 01132 01000 1
3548                WCP    0                                                 10  01108  M %TO 00000 W
3549                BCB1   *-16                                               7  01118  R 01108 2
                                                                                        G
3550                BA1    *&1                                                7  01125  R 01132 M
3551                BBE    *&8,TAD2,1                                        12  01132  W 01151 01002 1
3552                B      0                                                  7  01144  J 00000
3553                H      *-12                                               6  01151  . 01144
```

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LABEL     OPCOD  OPERAND                                                     CT  ADDRS  INSTRUCTION

          RCP    *&26               COMMON ADDRESS ALTER ROUTINE             10  01157  M %TO 01192 R
                                                                                                 S
          BNT1   *&39                                                         7  01167  R 01212 B
                       T                                                                         T
          BEX1   *-23,M                                                       7  01174  R 01157 M
                                                                                                 G
          BA1    *&1                                                          7  01181  R 01188 M
          RCPW   0                                                           10  01188  L %TO 00000 R
                       S                                                                         S
          BEX1   *-16,M                                                       7  01198  R 01188 M
                                                                                                 G
          BA1    *&1                                                          7  01205  R 01212 M
          B      TQ2                                                          7  01212  J 01818
                  G
          DCW    @M@                                                          1  01219

          ORG    CTLIND                                                          01230
          DC     @          @                                                 9  01238
                   '  '
          DCW    @1.12.101LCZ@      1CK OR 20K, SEQ NO. 013,                 11  01249
                                    DUMP TO 09999 ON TAPE
          ORG    IDENT                                                           01250
          DCW    @C0208@,G                                                    5  01254

          ORG    SYSCTL                                                          01256
          DC     @                                      ‡@                   33  01288
```

```
PGLIN     LABEL     OPCOD   OPERAND                                          CT  ADDRS  INSTRUCTION
3575                ORG     START              PHASE 3 BEGINS HERE               02000
3576
3577                        TYPE IDENT, INITIALIZE LOCATIONS 00001-00008 FOR
3578                        RESTART, INITIAILIZE PASS COUNTER, RESTORE TADS
3579
3580                NOPWM                                                    1  02000  N
3581                B       QA                                               7  02001  J 02066
3582                SW      *-12                                             6  02008  , 02001
3583                B       TYPE                                             7  02014  J 01026
3584                DCW     @ C020B-3@,G                                     8  02028
3585                CS      1004               .                             6  02030  / 01004
3586                SW      1000               . USE SAME TADS AS PREVIOUS PHASE  6  02036  , 01000
3587                MLCWB   204,1004           .                            12  02042  D 00204 01004 P
                                                                                       S
3588                MRCWR   K15,1                                           12  02054  D 09419 00001 M
3589      CA        NOPWM                                                    1  02066  N
3590                B       QB                                               7  02067  J 02091
3591                SW      *-12                                             6  02074  , 02067
                                                                                       Q
3592                ZA      PCC,PCCWK                                       11  02080  M 01010 01015
```

PGLIN	LABEL	OPCOD	OPERAND		CT	ADDRS	INSTRUCTION
3594	ROUTINE 21.00		ADDITIONAL COMPARE TEST				
3595							
3596	SUB-RTN 21.01		PERFORM COMPLICATED COMPARE				
3597	QB	C	CCON1,CCON2	REQUIRE HI & LO TO ALT W/EACH CYC	11	02091	C 09244 09245
3598		BH	*&8	SHOULD BRANCH	7	02102	J 02116 U
3599		B	QC		7	02109	J 02134
3600		C	CCON2,CCON1		11	02116	C 09245 09244
3601		BL	QG	SHOULD BRANCH	7	02127	J 02160 T
3602	QC	B	TYPCK		7	02134	J 01071
3603		DCW	a#21.01a,G		6	02146	
3604		BBE	QB,TAD1,1		12	02148	W 02091 01001 1

```
PGLIN    LABEL     OPCOD  OPERANC                                    CT  ADDRS  INSTRUCTION

3606      ROUTINE 22.00  TEST TABLE LOOK-UP INSTRUCTION
3607
3608      SUB-RTN 22.01  TEST LOOK UP TO END OF TABLE
3609     QG        LND    ENDITM,ENDTBL                              12  02160  T 08975 09042
3610               SAR    HOLDA3                                      7  02172  G 01020 A
3611               SBR    HOLDB3                                      7  02179  G 01025 B
3612               BE     QH              SHOULD NOT BRANCH           7  02186  J 02250 S
3613               BL     QH              SHOULD NOT BRANCH           7  02193  J 02250 T
3614               BH     *&8             SHOULD BRANCH.  LOOK UP TO  7  02200  J 02214 U
3615                                      END OF TABLE SETS HI COMPARE
3616               B      QH                                          7  02207  J 02250
3617               C      HOLDA3,ENDA                                11  02214  C 01020 08973
3618               BU     QH                                          7  02225  J 02250 /
3619               C      HOLDB3,&ENDITM                             11  02232  C 01025 09707
3620               BE     QI                                          7  02243  J 02276 S
3621     QH        B      TYPCK                                       7  02250  J 01071
3622               DCW    @#22.01@,G                                  6  02262
3623               BBE    QG,TAD1,1                                  12  02264  W 02160 01001 1
3624      SUB-RTN 22.02  TEST LOOK UP LOW
3625     QI        LL     T01,LTBL                                   12  02276  T 09049 09059 1
3626               SAR    HOLDA3                                      7  02288  G 01020 A
3627               SBR    HOLDB3                                      7  02295  G 01025 B
3628               BL     *&8             SHOULD BRANCH               7  02302  J 02316 T
3629               B      QI1                                         7  02309  J 02359
3630               C      HOLDA3,LLCON                               11  02316  C 01020 09047
3631               BE     *&8                                         7  02327  J 02341 S
3632               B      QI1                                         7  02334  J 02359
3633               C      HOLDB3,&LSTP                               11  02341  C 01025 09712
3634               BE     QJ              SHOULD BRANCH               7  02352  J 02385 S
3635     QI1       B      TYPCK                                       7  02359  J 01071
3636               DCW    @#22.02@,G                                  6  02371
3637               BBE    QI,TAD1,1                                  12  02373  W 02276 01001 1
3638      SUB-RTN 22.03  TEST LOOK UP EQUAL
3639     QJ        LE     T02,ETBL                                   12  02385  T 09061 09071 2
3640               SBR    HOLDB3                                      7  02397  G 01025 B
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PGLIN     LABEL      OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
3641                 BU     *&19                SHOULD NOT BRANCH     7  02404  J 02429 /
3642                 C      HOLDB3,&ESTP                             11  02411  C 01025 09717
3643                 BE     QK                  SHOULD BRANCH         7  02422  J 02455 S
3644                 B      TYPCK                                     7  02429  J 01071
3645                 DCW    @#22.03@,G                                6  02441
3646                 BBE    QJ,TAD1,1                                12  02443  W 02385 01001 1
3647       SUB-RTN 22.04    TEST LOOK UP LOW OR EQUAL, STOP ON LOW
3648      QK         LLE    T03,LETBL1                               12  02455  T 09073 09080 3
3649                 SBR    HOLDB3                                    7  02467  G 01025 B
3650                 BL     *&8                 SHOULD BRANCH         7  02474  J 02488 T
3651                 B      *&19                                      7  02481  J 02506
3652                 C      HOLDB3,&LESTP1                           11  02488  C 01025 09722
3653                 BE     QL                                        7  02499  J 02532 S
3654                 B      TYPCK                                     7  02506  J 01071
3655                 DCW    @#22.04@,G                                6  02518
3656                 BBE    QK,TAD1,1                                12  02520  W 02455 01001 1
3657       SUB-RTN 22.05    TEST LOOK UP LOW OR EQUAL, STOP ON EQUAL
3658      QL         LLE    T03,LETBL2                               12  02532  T 09073 09087 3
3659                 SBR    HOLDB3                                    7  02544  G 01025 B
3660                 BU     *&19                SHOULD NOT BRANCH     7  02551  J 02576 /
3661                 C      HOLDB3,&LESTP2                           11  02558  C 01025 09727
3662                 BE     QM                  SHOULD BRANCH         7  02569  J 02602 S
3663                 B      TYPCK                                     7  02576  J 01071
3664                 DCW    @#22.05@,G                                6  02588
3665                 BBE    QL,TAD1,1                                12  02590  W 02532 01001 1
3666       SUB-RTN 22.06    TEST LOOK UP HIGH
3667      QM         LH     T04,HTBL                                 12  02602  T 09089 09099 4
3668                 SBR    HOLDB3                                    7  02614  G 01025 B
3669                 BH     *&8                 SHOULD BRANCH         7  02621  J 02635 U
3670                 B      *&19                                      7  02628  J 02653
3671                 C      HOLDB3,&HSTP                             11  02635  C 01025 09732
3672                 BE     QN                  SHOULD BRANCH         7  02646  J 02679 S
3673                 B      TYPCK                                     7  02653  J 01071
3674                 DCW    @#22.06@,G                                6  02665
3675                 BBE    QM,TAD1,1                                12  02667  W 02602 01001 1
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PGLIN     LABEL      OPCOD  OPERAND                                    CT  ADDRS  INSTRUCTION
3676        SUB-RTN 22.07   TEST LOOK UP LOW OR HIGH, STOP ON LOW
3677      QN           LLH  TO5,LHTBL1                                 12  02679  T 09101 09108 5
3678                   SBR  HOLDB3                                      7  02691  G 01025 B
3679                   BL   *&8                 SHOULD BRANCH           7  02698  J 02712 T
3680                   B    *&19                                        7  02705  J 02730
3681                   C    HOLDB3,&LHSTP1                             11  02712  C 01025 09737
3682                   BE   QP                  SHOULD BRANCH           7  02723  J 02756 S
3683                   B    TYPCK                                       7  02730  J 01071
3684                   DCW  @#22.07@,G                                  6  02742
3685                   BBE  QN,TAD1,1                                  12  02744  W 02679 01001 1
3686        SUB-RTN 22.08   TEST LOOK UP LOW OR HIGH, STOP ON HIGH
3687      QP           LLH  TO5,LHTBL2                                 12  02756  T 09101 09115 5
3688                   SBR  HOLDB3                                      7  02768  G 01025 B
3689                   BH   *&8                 SHOULD BRANCH           7  02775  J 02789 U
3690                   B    *&19                                        7  02782  J 02807
3691                   C    HOLDB3,&LHSTP2                             11  02789  C 01025 09742
3692                   BE   QQ                  SHOULD BRANCH           7  02800  J 02833 S
3693                   B    TYPCK                                       7  02807  J 01071
3694                   DCW  @#22.08@,G                                  6  02819
3695                   BBE  QP,TAD1,1                                  12  02821  W 02756 01001 1
3696        SUB-RTN 22.09   TEST LOOK UP EQUAL OR HIGH, STOP ON EQUAL
3697      QQ           LEH  TO6,EHTBL1                                 12  02833  T 09117 09124 6
3698                   SBR  HOLDB3                                      7  02845  G 01025 B
3699                   BU   *&19                SHOULD NOT BRANCH       7  02852  J 02877 /
3700                   C    HOLDB3,&EHSTP1                             11  02859  C 01025 09747
3701                   BE   QR                  SHOULD BRANCH           7  02870  J 02903 S
3702                   B    TYPCK                                       7  02877  J 01071
3703                   DCW  @#22.09@,G                                  6  02889
3704                   BBE  QQ,TAD1,1                                  12  02891  W 02833 01001 1
3705        SUB-RTN 22.10   TEST LOOK UP EQUAL OR HIGH, STOP ON HIGH
3706      QR           LEH  TO6,EHTBL2                                 12  02903  T 09117 09131 6
3707                   SBR  HOLDB3                                      7  02915  G 01025 B
3708                   BH   *&8                 SHOULD BRANCH           7  02922  J 02936 U
3709                   B    *&19                                        7  02929  J 02954
3710                   C    HOLDB3,&EHSTP2                             11  02936  C 01025 09752
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PGLIN     LABEL      OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
3711                 BE     QS                  SHOULD BRANCH         7  02947  J 02980 S
3712                 B      TYPCK                                     7  02954  J 01071
3713                 DCW    @#22.10@,G                                6  02966
3714                 BBE    QR,TAD1,1                                12  02968  W 02903 01001 1
3715       SUB-RTN 22.11    TEST LOOK UP ANY, STOP ON LOW
3716     QS          LA     TO7,ANY1&2                               12  02980  T 09133 09137 7
3717                 SBR    HOLDB3                                    7  02992  G 01025 B
3718                 BL     *&8                 SHOULD BRANCH         7  02999  J 03013 T
3719                 B      *&19                                      7  03006  J 03031
3720                 C      HOLDB3,&ANY1                             11  03013  C 01025 09757
3721                 BE     QT                  SHOULD BRANCH         7  03024  J 03057 S
3722                 B      TYPCK                                     7  03031  J 01071
3723                 DCW    @#22.11@,G                                6  03043
3724                 BBE    QS,TAD1,1                                12  03045  W 02980 01001 1
3725       SUB-RTN 22.12    TEST LOOK UP ANY, STOP ON EQUAL
3726     QT          LA     TO7,ANY2&2                               12  03057  T 09133 09141 7
3727                 SBR    HOLDB3                                    7  03069  G 01025 B
3728                 BU     *&19                SHOULD NOT BRANCH     7  03076  J 03101 /
3729                 C      HOLDB3,&ANY2                             11  03083  C 01025 09762
3730                 BE     QU                  SHOULD BRANCH         7  03094  J 03127 S
3731                 B      TYPCK                                     7  03101  J 01071
3732                 DCW    @#22.12@,G                                6  03113
3733                 BBE    QT,TAD1,1                                12  03115  W 03057 01001 1
3734       SUB-RTN 22.13    TEST LOOK UP ANY, STOP ON HIGH
3735     QU          LA     TO7,ANY3&2                               12  03127  T 09133 09145 7
3736                 SBR    HOLDB3                                    7  03139  G 01025 B
3737                 BH     *&8                 SHOULD BRANCH         7  03146  J 03160 U
3738                 B      *&19                                      7  03153  J 03178
3739                 C      HOLDB3,&ANY3                             11  03160  C 01025 09767
3740                 BE     QV                  SHOULD BRANCH         7  03171  J 03204 S
3741                 B      TYPCK                                     7  03178  J 01071
3742                 DCW    @#22.13@,G                                6  03190
3743                 BE     QU,TAD1,1                                12  03192  W 03127 01001 1
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PGLIN     LABEL      OPCOD  OPERAND                                                  CT  ADDRS  INSTRUCTION
3745          ROUTINE 23.00  TEST MULTIPLY OPERATION
3746
3747          SUB-RTN 23.01  MULTIPLY ALL 64 CHARACTERS BY EACH OTHER.
3748                         CHECK RESULTS FOR PROPER SIGN, ZERO BALANCE,
3749                         AND THAT PRODUCT OF M X N EQUALS N X M.
3750
3751                         BECAUSE THE TIME REQUIRED TO PERFORM THIS ROUTINE
3752                         IS RELATIVELY LONG, IT IS DONE ONLY THE FIRST
3753                         TIME THROUGH AND THEREAFTER ONLY WHEN THE PASS
3754                         COUNT WORK AREA IS REDUCED TO ZERO.
3755
3756      CV         NOPWM                                                     1  03204  N
3757                 B       QW                                                7  03205  J 04296
3758                 CW      QVERSW&1                                          6  03212  ¤ 04256
3759                 MLCWA   &04096,X14        INDEX REG 14 USED ONLY AS COUNTER  12  03218  D 09772 00094 X
3760                 MLCWA   &00064,X12                                        12  03230  D 09777 00084 X
3761      CVA        MLCWA   &00064,X13                                        12  03242  D 09777 00089 X
3762                 MLCS    MPYTBL&X12,WORK7                                  12  03254  D 09C44 09672 3
3763      CVB        MLCS    MPYTBL&X13,WORK8                                  12  03266  D 09CU4 09673 3
3764                 ZA      WORK7,WORK9       TEST ONE FACTOR FOR ZERO NUMERIC  11  03278  M 09672 09674
3765                 BZ      QVI                                               7  03289  J 03510 V
3766                 ZA      WORK8,WORK9       TEST OTHER FACTOR FOR ZERO NUM    11  03296  M 09673 09674
3767                 BZ      QVI                                               7  03307  J 03510 V
3768                 CW      QVE&1             SET UP FOR NON-ZERO PRODUCT       6  03314  ¤ 03386
3769      CVC        BZN     QVJ,WORK7,-       TEST ONE FACTOR FOR NEGATIVE SIGN  12  03320  V 03534 09672 K
3770                 BZN     QVK,WORK8,-       TEST OTHER FACTOR FOR NEG SIGN    12  03332  V 03546 09673 K
3771      CVD        CW      QVF&1             SET UP FOR POSITIVE PRODUCT       6  03344  ¤ 03401
3772      CVD1       MLCWS   WORK7,P1-2                                         12  03350  D 09672 09697 7
3773      CVD2       MLCWS   WORK8,P2-2                                         12  03362  D 09673 09700 7
3774
3775                 M       WORK7,P2          MULTIPLY FACTOR1 BY FACTOR2       11  03374  @ 09672 09702
3776      CVE        NOPWM                                                     1  03385  N
3777                 B       QVL               BRANCH IF ZERO PROD ANTICIPATED   7  03386  J 03559
3778                 BZ      QVM               SHOULD NOT BRANCH                 7  03393  J 03690 V
3779      CVF        NOPWM                                                     1  03400  N
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PGLIN   LABEL    OPCOD  OPERAND                                               CT  ADDRS  INSTRUCTION

3780             B      QVN               BRANCH IF NEGATIVE PROD EXPECTED     7  03401  J 03812
3781             BZN    QVP,P2,-          SHOULD NOT BRANCH                   12  03408  V 03947 09702 K
3782    CVG      M      WORK8,P1          MULTIPLY FACTOR2 BY FACTOR1         11  03420  @ 09673 09699
3783             C      P1,P2             TEST FOR EQUALITY OF PRODUCTS       11  03431  C 09699 09702
3784             BU     QVC               SHOULD NOT BRANCH                    7  03442  J 04070 /
3785    CVH      S      &1,X14            REDUCE IX REG 14 BY 1               11  03449  S 09778 00094
3786             BZ     QVR               IF ZERO, ON TO NEXT ROUTINE          7  03460  J 04290 V
3787             S      &1,X13                                                11  03467  S 09778 00089
3788             BZ     *&8                                                    7  03478  J 03492 V
3789             B      QVB                                                    7  03485  J 03266
3790             S      &1,X12                                                11  03492  S 09778 00084
3791             B      QVA                                                    7  03503  J 03242
3792
3793    QVI      SW     QVE&1             SET SWITCH FOR ZERO PRODUCT          6  03510  , 03386
3794             ZA     &1,WORK9          DUMMY OP TO TURN OFF ZERO BAL       11  03516  M 09778 09674
3795             B      QVC                                                    7  03527  J 03320
3796
3797    CVJ      BZN    QVC,WORK8,-                                           12  03534  V 03344 09673 K
3798    CVK      SW     QVF&1             SET SWITCH FOR NEGATIVE PRODUCT      6  03546  , 03401
3799             B      QVD1                                                   7  03552  J 03350
3800
3801    CVL      BZ     QVF               SHOULD BRANCH                        7  03559  J 03400 V
3802             B      QVERR                                                  7  03566  J 04236
3803             BBE    ERSKP1,TADC,1                                         12  03573  W 03651 01000 1
3804             MLCS   WORK7,ZROMSG&1                                        12  03585  D 09672 03629 3
3805             MLCS   WORK8,ZROMSG&2                                        12  03597  D 09673 03630 3
3806             MLCB   P2,ZROMSG&11                                          12  03609  D 09702 03639 L
3807             B      TYPE                                                   7  03621  J 01026
3808     ZROMSG  DCW    @ ** PROD @       ASTERISKS FILLED IN                  9  03628
3809                    @***; S/B ZERO@,G    BY ERROR ROUTINE                 13  03649
3810    ERSKP1   BBE    *&8,TAD2,1                                            12  03651  W 03670 01002 1
3811             B      *&2                                                    7  03663  J 03671
3812             H                                                             1  03670  .
3813             BBE    QVC2,TAD1,1                                           12  03671  W 03362 01001 1
3814             B      QVF                                                    7  03683  J 03400
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PGLIN     LABEL      OPCOD  OPERAND                          CT  ADDRS  INSTRUCTION
3815
3816      QVM        B      QVERR                             7  03690  J 04236
3817                 BBE    ERSKP2,TADC,1                    12  03697  W 03773 01000 1
3818                 MLCS   WORK7,NZMSG&1                    12  03709  D 09672 03753 3
3819                 MLCS   WORK8,NZMSG&2                    12  03721  D 09673 03754 3
3820                 MLCB   P2,NZMSG&11                      12  03733  D 09702 03763 L
3821                 B      TYPE                              7  03745  J 01026
3822      NZMSG      DCW    @ ** PROD @       ASTERISKS FILLED IN  9  03752
3823                        @***; S/B NZ@,G      BY ERROR ROUTINE 11  03771
3824      ERSKP2     BBE    *&8,TAD2,1                       12  03773  W 03792 01002 1
3825                 B      *&2                               7  03785  J 03793
3826                 H                                        1  03792  .
3827                 BBE    QVC2,TAD1,1                      12  03793  W 03362 01001 1
3828                 B      QVF                               7  03805  J 03400
3829
3830      QVN        BZN    QVG,P2,-          SHOULD BRANCH   12  03812  V 03420 09702 K
3831                 B      QVERR                             7  03824  J 04236
3832                 BBE    ERSKP3,TADC,1                    12  03831  W 03908 01000 1
3833                 MLCS   WORK7,NEGMSG&1                    12  03843  D 09672 03887 3
3834                 MLCS   WORK8,NEGMSG&2                    12  03855  D 09673 03888 3
3835                 MLCB   P2,NEGMSG&11                      12  03867  D 09702 03897 L
3836                 B      TYPE                              7  03879  J 01026
3837      NEGMSG     DCW    @ ** PROD @       ASTERISKS FILLED IN  9  03886
3838                        @***; S/B NEG@,G     BY ERROR ROUTINE 12  03906
3839      ERSKP3     BBE    *&8,TAD2,1                       12  03908  W 03927 01002 1
3840                 B      *&2                               7  03920  J 03928
3841                 H                                        1  03927  .
3842                 BBE    QVC2,TAD1,1                      12  03928  W 03362 01001 1
3843                 B      QVG                               7  03940  J 03420
3844
3845      QVP        B      QVERR                             7  03947  J 04236
3846                 BBE    ERSKP4,TADC,1                    12  03954  W 04031 01000 1
3847                 MLCS   WORK7,POSMSG&1                    12  03966  D 09672 04010 3
3848                 MLCS   WORK8,POSMSG&2                    12  03978  D 09673 04011 3
3849                 MLCB   P2,POSMSG&11                      12  03990  D 09702 04020 L
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PGLIN     LABEL     OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
3850                B      TYPE                                      7  04002  J 01026
3851       POSMSG   DCW    @ ** PROD @        ASTERISKS FILLED IN    9  04009
3852                       @***; S/B POS@,G      BY ERROR ROUTINE   12  04029
3853      ERSKP4    BBE    *&8,TAD2,1                               12  04031  W 04050 01002 1
3854                B      *&2                                       7  04043  J 04051
3855                H                                                1  04050  .
3856                BBE    QVD2,TAD1,1                              12  04051  W 03362 01001 1
3857                B      QVG                                       7  04063  J 03420
3858
3859      CVC       B      QVERR                                     7  04070  J 04236
3860                BBE    ERSKP5,TAD0,1                            12  04077  W 04197 01000 1
3861                MLCS   WORK7,NEQMSG&1                           12  04089  D 09672 04169 3
3862                MLCS   WORK8,NEQMSG&2                           12  04101  D 09673 04170 3
3863                MLCB   P2,NEQMSG&11                            12  04113  D 09702 04179 L
3864                MLCS   WORK8,NEQMSG&17                          12  04125  D 09673 04185 3
3865                MLCS   WORK7,NEQMSG&18                          12  04137  D 09672 04186 3
3866                MLCB   P1,NEQMSG&27                            12  04149  D 09699 04195 L
3867                B      TYPE                                      7  04161  J 01026
3868       NEQMSG   DCW    @ ** PROD @        ASTERISKS              9  04168
3869                       @***; NE ** PROD @   FILLED IN BY        16  04192
3870                       @***@,G                ERROR ROUTINE      3  04195
3871      ERSKP5    BBE    *&8,TAD2,1                               12  04197  W 04216 01002 1
3872                B      *&2                                       7  04209  J 04217
3873                H                                                1  04216  .
3874                BBE    QVD1,TAD1,1                              12  04217  W 03350 01001 1
3875                B      QVH                                       7  04229  J 03449
3876
3877      CVERR     SBR    QVEXIT&5                                  7  04236  G 04288 B
3878                BBE    QVEXIT,TAD0,1                            12  04243  W 04283 01000 1
3879      CVERSW    NOPWM                                            1  04255  N
3880                B      QVEXIT                                    7  04256  J 04283
3881                SW     *-12                                      6  04263  , 04256
3882                B      TYPE                                      7  04269  J 01026
3883                DCW    @#23.01@,G                                6  04281
3884      CVEXIT    B      0                                         7  04283  J 00000
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PGLIN     LABEL      OPCOD  OPERAND                                                  CT  ADDRS  INSTRUCTION
3885      CVR        SW     QV&1                                                      6  04290  , 03205
3886        SUB-RTN  23.02  MAMMOTH MULTIPLY.  MAXIMUM CYCLES AND CARRYS
3887      QW         MLCA   FIVE4S,BIGANS-17                                         12  04296  D 09261 09326 T
3888                 M      MANY9S,BIGANS                                            11  04308  @ 09277 09343
3889                 C      BIGANS,PRODCT                                            11  04319  C 09343 09310
3890                 BE     QX                                                        7  04330  J 04363 S
3891                 B      TYPCK                                                     7  04337  J 01071
3892                 DCW    @#23.02@,G                                                6  04349
3893                 BBE    QW,TAD1,1                                                12  04351  W 04296 01001 1
3894        SUB-RTN  23.03  CHECK ADDRESS REGISTERS FOLLOWING MULTIPLY
3895      QX         ZA     FIVE4S-13,BIGANS-30                                      11  04363  QM 09248 09313
3896                 M      MANY9S-15,BIGANS-28  A-FLD LENGTH 1, B-FLD LENGTH 5       11  04374  @ 09262 09315
3897                 SAR    HOLDA3                                                    7  04385  G 01020 A
3898                 SBR    HOLDB3                                                    7  04392  G 01025 B
3899                 C      HOLDA3,K16                                               11  04399  C 01020 09431
3900                 BU     *&19                 SHOULD NOT BRANCH                    7  04410  J 04435 /
3901                 C      HOLDB3,K17                                               11  04417  C 01025 09436
3902                 BE     QY                   SHOULD BRANCH                        7  04428  J 04461 S
3903                 B      TYPCK                                                     7  04435  J 01071
3904                 DCW    @#23.03@,G                                                6  04447
3905                 BBE    QX,TAD1,1                                                12  04449  W 04363 01001 1
3906        SUB-RTN  23.04  SIMILAR TO #23.03 WITH FIELD LENGTHS REVERSED
3907      QY         ZA     MANY9S-15,BIGANS-32                                      11  04461  QM 09262 09311
3908                 M      FIVE4S-13,BIGANS-28  A-FLD LENGTH 3, B-FLD LENGTH 5       11  04472  @ 09248 09315
3909                 SAR    HOLDA3                                                    7  04483  G 01020 A
3910                 SBR    HOLDB3                                                    7  04490  G 01025 B
3911                 C      HOLDA3,K18                                               11  04497  C 01020 09441
3912                 BU     *&19                 SHOULD NOT BRANCH                    7  04508  J 04533 /
3913                 C      HOLDB3,K17                                               11  04515  C 01025 09436
3914                 BE     RA                   SHOULD BRANCH & EXIT ROUTINE HERE    7  04526  J 04559 S
3915                 B      TYPCK                                                     7  04533  J 01071
3916                 DCW    @#23.04@,G                                                6  04545
3917                 BBE    QY,TAD1,1                                                12  04547  W 04461 01001 1
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PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
3919        RCUTINE 24.00   TEST DIVIDE OPERATION
3920
3921        SUB-RTN 24.01   INSURE DIVIDE OVERFLOW OFF
3922      RA           BCV    *&1                  TURN OFF DIV OFLOW          7  04559  J 04566 W
3923                   BCV    *&8                  SHOULD NOT BRANCH           7  04566  J 04580 W
3924                   B      RB                                               7  04573  J 04606
3925                   B      TYPCK                                            7  04580  J 01071
3926                   DCW    @#24.01@,G                                       6  04592
3927                   BBE    RA,TAD1,1                                       12  04594  W 04559 01001 1
3928        SUB-RTN 24.02   DIVIDE NUMBERS 0 THRU 9 BY NUMBERS 1 THRU 9
3929      RB           CW     RBERSW&1             RESET ERROR SWITCH          6  04606  ¤ 04845
3930                   MLCWA  -0C009,X9            INITIALIZE INDEX REGS 9 & 10 12  04612  D 09783 00069 X
3931      RBA          MLCWA  -0C010,X10                                       12  04624  D 09788 00074 X
3932      RBA1         ZA     DTABLE&1&X9,DIVSOR   GET DIVISOR FROM TABLE      11  04636  M 09M79 09672
3933      RBB          ZA     DTABLE&1&X10,DIVDND  GET DIVIDEND FROM TABLE     11  04647  M 09MJ9 09673
3934      RBC          ZA     DIVDND,QUOREM        PUT DIVIDEND IN QUOT-REMNDR FIELD 11 04658 M 09673 09699
3935                   D      DIVSOR,QUOREM        PERFORM 1-CHARACTER DIVISION 11  04669  % 09672 09699
3936                   BCV    RBC                  SHOULD NEVER BRANCH         7  04680  J 04799 W
3937                   ZA     QUOREM-2,QUOTNT      SAVE THE QUOTIENT          11  04687  M 09697 09675
3938                   ZA     QUOREM,WORK9         SAVE THE REMAINDER         11  04698  M 09699 09674
3939                   M      DIVSOR,QUOREM        MULTIPLY DIVISOR AND QUOTIENT 11 04709  @ 09672 09699
3940                   A      WORK9,QUOREM         ADD REMAINDER TO PRODUCT    11  04720  A 09674 09699
3941                   C      QUOREM,DIVCND        TEST FOR EQUALITY           11  04731  C 09699 09673
3942                   BU     RBE                  SHOULD NOT BRANCH           7  04742  J 04819 /
3943                   A      &1,X10                                           11  04749  A 09778 00074
3944                   BZ     *&8                                              7  04760  J 04774 V
3945                   B      RBB                                              7  04767  J 04647
3946                   A      &1,X9                                           11  04774  A 09778 00069
3947                   BZ     RBC                                              7  04785  J 05132 V
3948                   B      RBA                                              7  04792  J 04624
3949
3950      RBC          SBR    X8                                               7  04799  G 00064 B
3951                   SW     RBCFLO&1             SET SW TO IND DIV OFLOW OCCURRED 6 04806 , 04873
3952                   B      RBERR                                            7  04812  J 04832
3953
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PGLIN     LABEL     OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
3954      RBE       SBR    X8                                                7  04819  G 00064 B
3955                CW     RBOFLO&1          SET SW TO IND COMP UNEQUAL OCC  6  04826  ¤ 04873
3956
3957      RBERR     BBE    RBOFLO,TADC,1                                    12  04832  W 04872 01000 1
3958      RBERSW    NOPWM                                                    1  04844  N
3959                B      RBOFLO                                           7  04845  J 04872
3960                SW     *-12                                             6  04852  , 04845
3961                B      TYPE                                             7  04858  J 01026
3962                DCW    @#24.02@,G                                       6  04870
3963      RBOFLO    NOPWM                                                    1  04872  N
3964                B      RBF               BRANCH IF ERROR WAS DIV OFLOW  7  04873  J 05058
3965                BBE    ERSKP6,TADC,1                                   12  04880  W 05019 01000 1
3966                MLCS   DIVDND,DVMSG1&1                                 12  04892  D 09673 04984 3
3967                MLCS   DIVSOR,DVMSG1&3                                 12  04904  D 09672 04986 3
3968                MLCS   QUOTNT,DVMSG1&8                                 12  04916  D 09675 04991 3
3969                MLCS   WORK9,DVMSG1&15                                 12  04928  D 09674 04998 3
3970                MLCS   DIVSOR,DVMSG1&23                                12  04940  D 09672 05006 3
3971                MLCS   QUOTNT,DVMSG1&26                                12  04952  D 09675 05009 3
3972                MLCS   WORK9,DVMSG1&34                                 12  04964  D 09674 05017 3
3973                B      TYPE                                             7  04976  J 01026
3974      DVMSG1    DCW    @ */* EQ *, REM *; NEQ B*BB*B PLUS *@,G         35  04983
3975      ERSKP6    BBE    *&8,TAD2,1                                      12  05019  W 05038 01002 1
3976                B      *&2                                              7  05031  J 05039
3977                H                                                       1  05038  .
3978                BBE    RBC,TAD1,1                                      12  05039  W 04658 01001 1
3979                B      0&X8                                             7  05051  J 00.00
3980
3981      RBF       BBE    ERSKP6,TADC,1                                   12  05058  W 05019 01000 1
3982                MLCS   DIVDND,DVMSG2&3                                 12  05070  D 09673 05104 3
3983                MLCS   DIVSOR,DVMSG2&5                                 12  05082  D 09672 05106 3
3984                B      TYPE                                             7  05094  J 01026
3985      DVMSG2    DCW    @ CO*/* CAUSED DIV OFLOW@,G                     23  05101
3986                B      ERSKP6                                           7  05125  J 05019
3987
3988      RBG       ZS     RBA1  . THESE THREE OPERATIONS CHANGE THE OP CODES 6  05132  . 04636
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PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
3989                 ZS     *&1    . AT RBA1 & RBB SO THAT IN FOUR PASSES ALL  6  05138  ' . 05144
3990                 ZS     RBB    . PLUS & MINUS NO.S ARE DIVIDED BY EACH OTHER  6  05144  ' . 04647
3991       SUB-RTN 24.03    CHECK DIVICE OVERFLOW
3992     RC          BCV    *&1                                              7  05150  J 05157 W
3993                 ZA     *-10,QUOREM          ZERO OUT DIVIDEND-QUOTIENT FIELD  11  05157  M 05157 09699
3994                 ZA     *-10,DIVSOR          PUT ZERO IN DIVISOR         11  05168  M 05168 09672
3995                 D      DIVSOR,QUOREM        DIVIDE ZERO BY ZERO         11  05179  % 09672 09699
3996                 BCV    *&8                  SHOULD BRANCH & TURN OFF DIV OFLO  7  05190  J 05204 W
3997                 B      *&15                                             7  05197  J 05218
3998                 BCV    *&8                  SHOULD NOT BRANCH NOW       7  05204  J 05218 W
3999                 B      RD                   EXIT ROUTINE HERE           7  05211  J 05244
4000                 B      TYPCK                                            7  05218  J 01071
4001                 DCW    @#24.03@,G                                       6  05230
4002                 BBE    RC,TAD1,1                                        12  05232  W 05150 01001 1
4003       SUB-RTN 24.04    TEST B-BIT RECOGNITION CKTS
4004     RD          MLCWA  @‡‡YI@,WORK11        NUMERIC 0089, ZONES A A A BA  12  05244  D 09792 09679 X
4005                 D      -8,WORK11-1          DIVIDE ‡‡YI BY MINUS 8      11  05256  % 09793 09678
4006                 C      WORK11,@/J‡A@                                    11  05267  C 09679 09797
4007                 BE     RE                   SHOULD BRANCH EQUAL         7  05278  J 05311 S
4008                 B      TYPCK                                            7  05285  J 01071
4009                 DCW    @#24.04@,G                                       6  05297
4010                 BBE    RD,TAD1,1                                        12  05299  W 05244 01001 1
4011       SUB-RTN 24.05    INSURE NO INTERFERENCE BY WDMKS IN B-FIELD
4012     RE          ZS     -8,WORK11                                        11  05311  ' . 09793 09679
4013                 SW     WORK11,WORK11-1                                  11  05322  , 09679 09678
4014                 D      -8,WORK11                                        11  05333  % 09793 09679
4015                 BW     *&8,WORK11           TEST UNITS POS FOR WM       12  05344  V 05363 09679 1
4016                 B      RF                   SHOULD NOT TAKE THIS ONE    7  05356  J 05411
4017                 BW     *&8,WORK11-1         TEST TENS POS FOR WM        12  05363  V 05382 09678 1
4018                 B      RF                   SHOULD NOT TAKE THIS ONE, EITHER  7  05375  J 05411
4019                 CW     WORK11,WORK11-1                                  11  05382  ¤ 09679 09678
4020                 C      WORK11,@0JCM@                                    11  05393  C 09679 09801
4021                 BE     RG                   EXIT ROUTINE HERE           7  05404  J 05448 S
4022     RF          B      TYPCK                                            7  05411  J 01071
4023                 DCW    @#24.05@,G                                       6  05423
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PGLIN     LABEL      OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
4024                 CW     WORK11,WORK11-1                          11  05425  ¤ 09679 09678
4025                 BBE    RE,TAD1,1                                12  05436  W 05311 01001 1
4026       SUB-RTN 24.06    PERFORM DIABOLIC DIVIDE
4027      RG         ZA     K19,BIGANS-2                             11  05448  Q M 09461 09341
4028                 D      K20,BIGANS-21                            11  05459  % 09471 09322
4029                 C      BIGANS-2,K21                             11  05470  C 09341 09502
4030                 BE     RH                                        7  05481  J 05514 S
4031                 B      TYPCK                                     7  05488  J 01071
4032                 DCW    @#24.06@,G                                6  05500
4033                 BBE    RG,TAD1,1                                12  05502  W 05448 01001 1
4034       SUB-RTN 24.07    CHECK ADDRESS REGISTERS FOLLOWING DIVIDE
4035      RH         ZA     DTABLE,WORK11                            11  05514  Q M 09418 09679
4036                 D      K20-8,WORK11                             11  05525  % 09463 09679
4037                 SAR    HOLDA3                                    7  05536  G 01020 A
4038                 SBR    HOLDB3                                    7  05543  G 01025 B
4039                 C      HOLDA3,K23                               11  05550  C 01020 09512
4040                 BU     *&19                                      7  05561  J 05586 /
4041                 C      HOLDB3,K22                               11  05568  C 01025 09507
4042                 BE     RI                                        7  05579  J 05612 S
4043                 B      TYPCK                                     7  05586  J 01071
4044                 DCW    @#24.07@,G                                6  05598
4045                 BBE    RH,TAD1,1                                12  05600  W 05514 01001 1
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PGLIN     LABEL      OPCOD   OPERAND                                          CT  ADDRS  INSTRUCTION
4047        ROUTINE 25.00   CHECK OPERATION MOVE CHARACTERS & SUPPRESS ZEROS
4048
4049        SUB-RTN 25.01   TEST FOR ZONE BIT REMOVAL, UNITS POSN, B-FIELD
4050      RI        ZS      -8,P1                PUT DATA IN AREA P1         11  05612  : 09793 09699
4051                MCS     -8,P1                                            11  05623  Z 09793 09699
4052                BZN     RJ,P1,               SHOULD BRANCH               12  05634  V 05672 09699 2
4053                B       TYPCK                                             7  05646  J 01071
4054                DCW     @#25.01@,G                                        6  05658
4055                BBE     RI,TAD1,1                                        12  05660  W 05612 01001 1
4056        SUB-RTN 25.02   TEST THAT B-FIELD WORD MARKS ARE REMOVED BY MCS
4057      RJ        SW      P1,P1-1              PLACE TWO WORD MARKS        11  05672  , 09699 09698
4058                MCS     @SSBB@,P1                                        11  05683  Z 09803 09699
4059                BW      *&20,P1              SHOULD NOT BRANCH           12  05694  V 05725 09699 1
4060                BW      *&8,P1-1             SHOULD NOT BRANCH           12  05706  V 05725 09698 1
4061                B       RK                                                7  05718  J 05762
4062                B       TYPCK                                             7  05725  J 01071
4063                DCW     @#25.02@,G                                        6  05737
4064                CW      P1,P1-1              INSURE WORD MARKS REMOVED   11  05739  ¤ 09699 09698
4065                BBE     RJ,TAD1,1                                        12  05750  W 05672 01001 1
4066        SUB-RTN 25.03   CHECK PROPER OPERATION OF EDIT SKID CYCLE
4067      RK        MLCWA   @XX @-1,P1           PUT WM DATA IN P1 AREA      12  05762  D 09805 09699 X
4068                MCS     @SSBB@-1,P1                                      11  05774  Z 09802 09699
4069                C       @XX @,P1                                         11  05785  C 09806 09699
4070                CW      P1-1                 REMOVE WM FROM P1 AREA       6  05796  ¤ 09698
4071                BE      RL                   SHOULD BRANCH                7  05802  J 05835 S
4072                B       TYPCK                                             7  05809  J 01071
4073                DCW     @#25.03@,G                                        6  05821
4074                BBE     RK,TAD1,1                                        12  05823  W 05762 01001 1
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PGLIN     LABEL      OPCOD  OPERAND                                                  CT  ADDRS  INSTRUCTION
4076        SUB-RTN 25.04   TEST ZERO SUPPRESS LATCH ON AT START OF SECOND
4077                        SCAN AND NOT RESET BY DECIMAL PT OR MINUS SIGN
4078      RL          MCS   K24,WORK12                                              11  05835  Z 09519 09687
4079                  C     WORK12,K28                                             11  05846  C 09687 09543
4080                  BE    RM                                                      7  05857  J 05890 S
4081                  B     TYPCK                                                   7  05864  J 01071
4082                  DCW   @#25.04@,G                                              6  05876
4083                  BBE   RL,TAD1,1                                              12  05878  W 05835 01001 1
4084        SUB-RTN 25.05   TEST ZERO SUPPRESS LATCH ON AT START OF SECOND
4085                        SCAN AND NOT RESET BY ZERO, BLANK OR COMMA
4086      RM          MCS   K25,WORK12                                             11  05890  Z 09525 09687
4087                  C     WORK12,K29                                             11  05901  C 09687 09549
4088                  BE    RN                                                      7  05912  J 05945 S
4089                  B     TYPCK                                                   7  05919  J 01071
4090                  DCW   @#25.05@,G                                              6  05931
4091                  BBE   RM,TAD1,1                                              12  05933  W 05890 01001 1
4092        SUB-RTN 25.06   TEST THAT FIRST SIGNIFICANT DIGIT TURNS OFF ZERO
4093                        SUPPRESS LATCH AND IT REMAINS OFF THROUGHOUT
4094      RN          MCS   K26,WORK12                                             11  05945  Z 09531 09687
4095                  C     WORK12,K30                                             11  05956  C 09687 09555
4096                  BE    RP                                                      7  05967  J 06000 S
4097                  B     TYPCK                                                   7  05974  J 01071
4098                  DCW   @#25.06@,G                                              6  05986
4099                  BBE   RN,TAD1,1                                              12  05988  W 05945 01001 1
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PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION

4101        SUB-RTN 25.07   TEST THAT FIRST NON-SIGNIFICANT DIGIT TURNS ON
4102                        ZERO SUPPRESS LATCH
4103      RP           MCS  K27,WORK12                                       11  06000  Z 09536 09687
4104                   C    WORK12,K31                                       11  06011  C 09687 09560
4105                   BE   RR                                               7  06022  J 06055 S
4106                   B    TYPCK                                            7  06029  J 01071
4107                   DCW  @#25.07@,G                                       6  06041
4108                   BBE  RP,TAD1,1                                       12  06043  W 06000 01001 1
4109        SUB-RTN 25.08   CHECK ADDRESS REGISTERS FOLLOWING MCS INSTRUCTION
4110      RR           MCS  WORK11,WORK12                                    11  06055  Z 09679 09687
4111                   SAR  HOLDA3                                           7  06066  G 01020 A
4112                   SBR  HOLDB3                                           7  06073  G 01025 B
4113                   C    HOLDA3,K22                                       11  06080  C 01020 09507
4114                   BU   *&19              SHOULD NOT BRANCH              7  06091  J 06116 /
4115                   C    HOLDB3,K32                                       11  06098  C 01025 09565
4116                   BE   SA                                               7  06109  J 06142 S
4117                   B    TYPCK                                            7  06116  J 01071
4118                   DCW  @#25.08@,G                                       6  06128
4119                   BBE  RR,TAD1,1                                       12  06130  W 06055 01001 1
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PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
4121        ROUTINE 26.00   CHECK EDIT INSTRUCTION
4122                        ALL #26.XX ROUTINES END OPERATION AFTER 1ST SCAN
4123        SUB-RTN 26.01   CHECK MCE FOR PROPER STEPPING OF AAR AND BAR
4124      SA          MLCWA  &50,WORK13          PUT DATA IN WORK13          12  06142  D 09808 09689 X
4125                  SW     WORK13             MAKE CONTROL FIELD LENGTH 1 CHAR  6  06154  , 09689
4126                  MCE    WORK13-1,WCRK13                                11  06160  E 09688 09689
4127                  SAR    HOLDA3                                          7  06171  G 01020 A
4128                  SBR    HOLDB3                                          7  06178  G 01025 B
4129                  C      HOLDA3,K33         CHECK AAR                   11  06185  C 01020 09570
4130                  BU     *&19                                           7  06196  J 06221 /
4131                  C      HOLDB3,K34         CHECK BAR                   11  06203  C 01025 09575
4132                  BE     SB                 SHOULD BRANCH                7  06214  J 06247 S
4133                  B      TYPCK                                           7  06221  J 01071
4134                  DCW    @#26.01@,G         IND EDIT POSS NOT STOP IN 1 SCAN  6  06233
4135                  BBE    SA,TAD1,1                                      12  06235  W 06142 01001 1
4136        SUB-RTN 26.02   CHECK WM ELIMINATION IN B-FLD AND MOVE NO DATA
4137      SB          MLCWA  &50,WORK13                                     12  06247  D 09808 09689 X
4138                  SW     WORK13                                          6  06259  , 09689
4139                  MCE    WORK13-1,WORK13                                11  06265  E 09688 09689
4140                  C      WORK13,&50                                     11  06276  C 09689 09808
4141                  BU     *&19                                            7  06287  J 06312 /
4142                  C      &50,WORK13                                     11  06294  C 09808 09689
4143                  BE     SC                 SHOULD BRANCH                7  06305  J 06338 S
4144                  B      TYPCK                                           7  06312  J 01071
4145                  DCW    @#26.02@,G                                      6  06324
4146                  BBE    SB,TAD1,1                                      12  06326  W 06247 01001 1
4147        SUB-RTN 26.03   CHECK REPLACEMENT OF AMPERSAND BY BLANK
4148      SC          MLCWA  @M&@,WORK13         CTL FLD AMPERSAND, DATA FLD GM  12  06338  D 09810 09689 X
                              G
4149                  SW     WORK13                                          6  06350  , 09689
4150                  MCE    WORK13-1,WCRK13                                11  06356  E 09688 09689
4151                  SBR    HOLDB3                                          7  06367  G 01025 B
4152                  C      HOLDB3,K34                                     11  06374  C 01025 09575
4153                  BU     *&13               SHOULD NOT BRANCH            7  06385  J 06404 /
4154                  BCE    SD,WORK13,         SHOULD BRANCH               12  06392  B 06430 09689
4155                  B      TYPCK                                           7  06404  J 01071
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PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
4156                 DCW    @#26.03@,G                                        6  06416
4157                 BBE    SC,TAD1,1                                        12  06418  W 06338 01001 1
4158       SUB-RTN 26.04    CONTROL FIELD BLANK, DATA FIELD NEGATIVE
4159      SD         MLCWA  @J @,WORK13                                      12  06430  D 09812 09689 X
4160                 SW     WORK13                                            6  06442  , 09689
4161                 MCE    WORK13-1,WCRK13                                  11  06448  E 09688 09689
4162                 SBR    HOLDB3                                            7  06459  G 01025 B
4163                 C      HOLDB3,K34                                       11  06466  C 01025 09575
4164                 BU     *&13                SHOULD NOT BRANCH             7  06477  J 06496 /
4165                 BCE    SE,WORK13,1         SHOULD BRANCH                12  06484  B 06522 09689 1
4166                 B      TYPCK                                             7  06496  J 01071
4167                 DCW    @#26.04@,G                                        6  06508
4168                 BBE    SD,TAD1,1                                        12  06510  W 06430 01001 1
4169       SUB-RTN 26.05    CONTROL FIELD MINUS SIGN, DATA FIELD NEGATIVE
4170      SE         MLCWA  @J-@,WORK13                                      12  06522  D 09814 09689 X
4171                 SW     WORK13                                            6  06534  , 09689
4172                 MCE    WORK13-1,WORK13                                  11  06540  E 09688 09689
4173                 SBR    HOLDB3                                            7  06551  G 01025 B
4174                 C      HOLDB3,K34                                       11  06558  C 01025 09575
4175                 BU     *&13                SHOULD NOT BRANCH             7  06569  J 06588 /
4176                 BCE    SF,WORK13,-                                      12  06576  B 06614 09689 -
4177                 B      TYPCK                                             7  06588  J 01071
4178                 DCW    @#26.05@,G                                        6  06600
4179                 BBE    SE,TAD1,1                                        12  06602  W 06522 01001 1
4180       SUB-RTN 26.06    CONTROL FIELD LETTERS ZR, DATA FIELD POSITIVE
4181      SF         MLCWA  @AZR@,WORK14                                     12  06614  D 09817 09692 X
4182                 SW     WORK14-1                                          6  06626  , 09691
4183                 MCE    WORK14-2,WCRK14                                  11  06632  E 09690 09692
4184                 SBR    HOLDB3                                            7  06643  G 01025 B
4185                 C      HOLDB3,K35                                       11  06650  C 01025 09580
4186                 BU     *&19                SHOULD NOT BRANCH             7  06661  J 06686 /
4187                 C      WORK14,@AZ @                                     11  06668  C 09692 09820
4188                 BE     SG                                                7  06679  J 06712 S
4189                 B      TYPCK                                             7  06686  J 01071
4190                 DCW    @#26.06@,G                                        6  06698
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PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
4191                 BBE    SF,TAD1,1                                        12  06700  W 06614 01001 1
4192       SUB-RTN 26.07    TURN ON EXTENSION LATCH AND NOT BODY LATCH
4193      SG         MLCWA  @M, @,WORK14       CTL FLD COMMA BLANK, DATA FLD GM  12  06712  D 09823 09692 X
4194                 SW     WORK14-1                                          6  06724  , 09691
4195                 MCE    WORK14-2,WCRK14                                  11  06730  E 09690 09692
4196                 SBR    HOLDB3                                            7  06741  G 01025 B
4197                 C      HOLDB3,K35                                       11  06748  C 01025 09580
4198                 BU     *&19               SHOULD NOT BRANCH              7  06759  J 06784 /
4199                 C      WORK14,@M Ma                                     11  06766  C 09692 09826
4200                 BE     SH                                                7  06777  J 06810 S
4201                 B      TYPCK                                             7  06784  J 01071
4202                 DCW    @#26.07@,G                                        6  06796
4203                 BBE    SG,TAD1,1                                        12  06798  W 06712 01001 1
4204       SUB-RTN 26.08    TURN ON BODY LATCH AND NOT EXTENSION LATCH
4205      SH         MLCWA  @.BC @,WORK15                                    12  06810  D 09830 09696 X
4206                 SW     WORK15-1                                          6  06822  , 09695
4207                 MCE    WORK15-2,WCRK15                                  11  06828  E 09694 09696
4208                 SBR    HOLDB3                                            7  06839  G 01025 B
4209                 C      HOLDB3,K36                                       11  06846  C 01025 09585
4210                 BU     *&19               SHOULD NOT BRANCH              7  06857  J 06882 /
4211                 C      WORK15,@.BC @                                    11  06864  C 09696 09830
4212                 BE     SI                                                7  06875  J 06908 S
4213                 B      TYPCK                                             7  06882  J 01071
4214                 DCW    @#26.08@,G                                        6  06894
4215                 BBE    SF,TAD1,1                                        12  06896  W 06614 01001 1
4216       SUB-RTN 26.09    TURN ON BODY AND EXTENSION LATCHES
4217      SI         MLCWA  @□□.* @,WORK14     FILL BOTH WORK14 AND WORK13     12  06908  D 09835 09692 X
4218                 SW     WORK14-2                                          6  06920  , 09690
4219                 MCE    WORK13,WCRK14                                    11  06926  E 09689 09692
4220                 SBR    HOLDB3                                            7  06937  G 01025 B
4221                 C      HOLDB3,K37                                       11  06944  C 01025 09590
4222                 BU     *&19               SHOULD NOT BRANCH              7  06955  J 06980 /
4223                 C      WORK14,@.□@@                                     11  06962  C 09692 09838
4224                 BE     SJ                                                7  06973  J 07006 S
4225                 B      TYPCK                                             7  06980  J 01071
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PGLIN     LABEL      OPCOD  OPERAND                                    CT  ADDRS  INSTRUCTION
4226                 DCW    @#26.09@,G                                  6  06992
4227                 BBE    SI,TAD1,1                                  12  06994  W 06908 01001 1
4228       SUB-RTN 26.10    CHECK REMAINDER OF 1ST SCAN CIRCUITRY
4229                        WITHOUT PROCEEDING TO 2ND SCAN
4230       SJ        MLCWA  @%-$& @,WORK14     FILL BOTH WORK14 AND WORK13  12  07006  D 09843 09692 X
4231                 MCE    @ZR@,WORK14                                11  07018  E 09845 09692
4232                 SBR    HOLDB3                                      7  07029  G 01025 B
4233                 C      HOLDB3,K33                                 11  07036  C 01025 09570
4234                 BU     *&19               SHOULD NOT BRANCH        7  07047  J 07072 /
4235                 C      WORK14,@%-Z 9@                             11  07054  C 09692 09850
4236                 BE     SK                                          7  07065  J 07098 S
4237                 B      TYPCK                                       7  07072  J 01071
4238                 DCW    @#26.10@,G                                  6  07084
4239                 BBE    SJ,TAD1,1                                  12  07086  W 07006 01001 1
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PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
4241        ROUTINE 27.00    CHECK EDIT INSTRUCTION, CONTINUED
4242                         ALL #27.XX ROUTINES END OPERATION AFTER 2ND SCAN
4243        SUB-RTN 27.01    TURN ON ZERO SUPPRESS LATCH, STORE NON-ZERO CHAR
4244      SK           MLCWA  @E0@,WORK13                                      12  07098  D 09852 09689 X
4245                   SW     WORK13                                           6  07110  , 09689
4246                   MCE    WORK13-1,WCRK13                                 11  07116  E 09688 09689
4247                   SBR    HOLDB3                                           7  07127  G 01025 B
4248                   C      HOLDB3,K38                                      11  07134  C 01025 09595
4249                   BU     *&19                SHOULD NOT BRANCH            7  07145  J 07170 /
4250                   C      WORK13,@E5@                                     11  07152  C 09689 09854
4251                   BE     SL                  SHOULD BRANCH                7  07163  J 07196 S
4252                   B      TYPCK                                            7  07170  J 01071
4253                   DCW    @#27.01@,G                                       6  07182
4254                   BBE    SK,TAD1,1                                       12  07184  W 07098 01001 1
4255        SUB-RTN 27.02    ZERO IN B-FLD WITH ZERO SUPPRESS ALREADY ON AND
4256                         CHECK REGEN EXT & 2ND SCAN LATCH IN SECOND SCAN
4257      SL           MLCWA  @&MOO@,WORK15                                    12  07196  D 09858 09696 X
4258                   SW     WORK15-1                                         6  07208  , 09695
4259                   MCE    WORK15-2,WCRK15                                 11  07214  E 09694 09696
4260                   SBR    HOLDB3                                           7  07225  G 01025 B
4261                   C      HOLDB3,K39                                      11  07232  C 01025 09600
4262                   BU     *&19                SHOULD NOT BRANCH            7  07243  J 07268 /
4263                   C      WORK15,@&M&M@                                   11  07250  C 09696 09862
4264                   BE     SM                  SHOULD BRANCH                7  07261  J 07294 S
4265                   B      TYPCK                                            7  07268  J 01071
4266                   DCW    @#27.02@,G                                       6  07280
4267                   BBE    SL,TAD1,1                                       12  07282  W 07196 01001 1
4268        SUB-RTN 27.03    CHECK ASTERISK FILL, DOLLAR SIGN TO LEFT IGNORED
4269      SM           MLCWA  @$*&O@,WORK15                                    12  07294  D 09866 09696 X
4270                   MCE    @7,0/@,WCRK15                                   11  07306  E 09870 09696
4271                   SBR    HOLDB3                                           7  07317  G 01025 B
4272                   C      HOLDB3,K39                                      11  07324  C 01025 09600
4273                   BU     *&19                SHOULD NOT BRANCH            7  07335  J 07360 /
4274                   C      WORK15,@***1@                                   11  07342  C 09696 09874
4275                   BE     SN                  SHOULD BRANCH                7  07353  J 07386 S
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PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
4276                 B      TYPCK                                             7  07360  J 01071
4277                 DCW    a#27.03a,G                                        6  07372
4278                 BBE    SM,TAD1,1                                        12  07374  W 07294 01001 1
4279       SUB-RTN 27.04    CHECK ASTERISK FILL AND DECIMAL CONTROL
4280     SN          MLCWA  a .*0a,WORK15                                     12  07386  D 09878 09696 X
4281                 MCE    &070,WORK15                                      11  07398  E 09881 09696
4282                 SBR    HOLDB3                                            7  07409  G 01025 B
4283                 C      HOLDB3,K39                                       11  07416  C 01025 09600
4284                 BU     *&19                SHOULD NOT BRANCH             7  07427  J 07452 /
4285                 C      WORK15,a*.70a                                    11  07434  C 09696 09885
4286                 BE     SP                  SHOULD BRANCH                 7  07445  J 07478 S
4287                 B      TYPCK                                             7  07452  J 01071
4288                 DCW    a#27.04a,G                                        6  07464
4289                 BBE    SN,TAD1,1                                        12  07466  W 07386 01001 1
4290       SUB-RTN 27.05    PROVE THAT NON-SIGNIFICANT DIGIT SETS ZERO SUPPR
4291     SP          MLCWA  a    0a,WORK15     LINK WORK15 TO WORK14          12  07478  D 09890 09696 X
4292                 MCE    a10X02a,WORK15                                   11  07490  E 09895 09696
4293                 SBR    HOLDB3                                            7  07501  G 01025 B
4294                 C      HOLDB3,K39                                       11  07508  C 01025 09600
4295                 BU     *&19                SHOULD NOT BRANCH             7  07519  J 07544 /
4296                 C      WORK15,a10X 2a                                   11  07526  C 09696 09900
4297                 BE     SQ                  SHOULD BRANCH                 7  07537  J 07570 S
4298                 B      TYPCK                                             7  07544  J 01071
4299                 DCW    a#27.05a,G                                        6  07556
4300                 BBE    SP,TAD1,1                                        12  07558  W 07478 01001 1
4301       SUB-RTN 27.06    PROVE THAT PERIOD AND ZERO SUPPRESS OFF
4302                        DOES NOT SET DECIMAL CONTROL ON
4303     SQ          MLCWA  a0.*,0a,WORK15      LINK WORK15 TO WORK14          12  07570  D 09905 09696 X
4304                 MCE    a5a,a,WORK15        DATA FLD IS FIVE, AT SIGN, COMMA 11  07582  E 09908 09696
4305                 SBR    HOLDB3                                            7  07593  G 01025 B
4306                 C      HOLDB3,K39                                       11  07600  C 01025 09600
4307                 BU     *&19                SHOULD NOT BRANCH             7  07611  J 07636 /
4308                 C      WORK15,a5.a*#a      FIVE, POINT, AT, SPLAT, POUND 11  07618  C 09696 09913
4309                 BE     SR                  SHOULD BRANCH                 7  07629  J 07662 S
4310                 B      TYPCK                                             7  07636  J 01071
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PGLIN     LABEL       OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
4311                  DCW    @#27.06@,G                                        6  07648
4312                  BBE    SQ,TAD1,1                                        12  07650  W 07570 01001 1
4313        SUB-RTN 27.07    PROVE DEC CTL ON, PROPER TREATMENT OF MINUS SIGN
4314      SR          MLCWA  K41,WORK15          K41 IS @ - X.Y 0@            12  07662  D 09613 09696 X
4315                  MCE    -7007,WORK15                                     11  07674  E 09917 09696
4316                  SBR    HOLDB3                                            7  07685  G 01025 B
4317                  C      HOLDB3,K39                                       11  07692  C 01025 09600
4318                  BU     *&19               SHOULD NOT BRANCH              7  07703  J 07728 /
4319                  C      WORK15,K42         K42 IS @7-0X.Y07@             11  07710  C 09696 09621
4320                  BE     SS                 SHOULD BRANCH                  7  07721  J 07754 S
4321                  B      TYPCK                                             7  07728  J 01071
4322                  DCW    @#27.07@,G                                        6  07740
4323                  BBE    SR,TAD1,1                                        12  07742  W 07662 01001 1
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LABEL       OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION

  ROUTINE 28.00    CHECK EDIT INSTRUCTION, CONCLUDED
                   ALL #28.XX ROUTINES REQUIRE THREE SCANS
  SUB-RTN 28.01    CHECK FLOATING DOLLAR SIGN AND SKID CYCLE, SCAN 3
SS          MLCWA  a$0Va,WORK14                                     12  07754  D 09920 09692 X
            MCE    &00,WORK14-1                                     11  07766  E 09922 09691
            SBR    HOLDB3                                            7  07777  G 01025 B
            C      HOLDB3,K35                                       11  07784  C 01025 09580
            BU     *&19                SHOULD NOT BRANCH             7  07795  J 07820 /
            C      WORK14,a $Va                                     11  07802  C 09692 09925
            BE     ST                  SHOULD BRANCH                 7  07813  J 07846 S
            B      TYPCK                                             7  07820  J 01071
            DCW    a#28.01a,G                                        6  07832
            BBE    SS,TAD1,1                                        12  07834  W 07754 01001 1
  SUB-RTN 28.02    GO TO 3RD SCAN BECAUSE DEC CTRL AND ZERO SUPPR ON
                   PROVE NON-SIGNIFICANT DEC & ZERO REPL WITH BLANKS
ST          MLCWA  a.0a,WORK14                                      12  07846  D 09927 09692 X
            MCE    &0,WORK14                                        11  07858  E 09928 09692
            SBR    HOLDB3                                            7  07869  G 01025 B
            C      HOLDB3,K35                                       11  07876  C 01025 09580
            BU     *&19                SHOULD NOT BRANCH             7  07887  J 07912 /
            C      WORK14,a  a                                      11  07894  C 09692 09930
            BE     SU                  SHOULD BRANCH                 7  07905  J 07938 S
            B      TYPCK                                             7  07912  J 01071
            DCW    a#28.02a,G                                        6  07924
            BBE    ST,TAD1,1                                        12  07926  W 07846 01001 1
  SUB-RTN 28.03    PROVE ASTERISKS REPLACE ZERO, DECIMAL IN 3RD SCAN
SU          MLCWA  a.*0a,WORK14                                     12  07938  D 09933 09692 X
            MCE    &00,WORK14                                       11  07950  E 09922 09692
            SBR    HOLDB3                                            7  07961  G 01025 B
            C      HOLDB3,K37                                       11  07968  C 01025 09590
            BU     *&19                SHOULD NOT BRANCH             7  07979  J 08004 /
            C      WORK14,a***1a-1     NOTE THAT DIGIT 1 IS NOT INCLUDED  11  07986  C 09692 09873
            BE     SV                  SHOULD BRANCH                 7  07997  J 08030 S
            B      TYPCK                                             7  08004  J 01071
            DCW    a#28.03a,G                                        6  08016
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PGLIN   LABEL       OPCOD  OPERAND                                        CT  ADDRS  INSTRUCTION

4360                BBE    SU,TAD1,1                                      12  08018  W 07938 01001 1
4361     SUB-RTN 28.04     RETAIN CHARACTER & REPLACE BLANK WITH ASTERISK
4362    SV          MLCWA  @*.M0@,WORK14                                  12  08030  D 09937 09692 X
4363                MCE    @Z @,WORK14                                    11  08042  E 09939 09692
4364                SBR    HOLDB3                                          7  08053  G 01025 B
4365                C      HOLDB3,K37                                     11  08060  C 01025 09590
4366                BU     *&19                 SHOULD NOT BRANCH          7  08071  J 08096 /
4367                C      WORK14,@Z*M*@                                  11  08078  C 09692 09943
4368                BE     SW                   SHOULD BRANCH              7  08089  J 08122 S
4369                B      TYPCK                                           7  08096  J 01071
4370                DCW    @#28.04@,G                                      6  08108
4371                BBE    SV,TAD1,1                                      12  08110  W 08030 01001 1
4372     SUB-RTN 28.05     CHECK THAT BLANK IN UNITS POSN RETAINED IN SCAN 3
4373    SW          MLCWA  @0.0@,WORK14                                   12  08122  D 09946 09692 X
4374                MCE    @, @,WORK14                                    11  08134  E 09948 09692
4375                SBR    HOLDB3                                          7  08145  G 01025 B
4376                C      HOLDB3,K35                                     11  08152  C 01025 09580
4377                BU     *&19                 SHOULD NOT BRANCH          7  08163  J 08188 /
4378                C      WORK14,@    0@-2     B-FLD IS BLANK, BLANK, BLANK  11  08170  C 09692 09888
4379                BE     SX                   SHOULD BRANCH              7  08181  J 08214 S
4380                B      TYPCK                                           7  08188  J 01071
4381                DCW    @#28.05@,G                                      6  08200
4382                BBE    SW,TAD1,1                                      12  08202  W 08122 01001 1
4383     SUB-RTN 28.06     ZERO SUPPRESS & DECIMAL CONTROL BOTH OFF, SCAN 3
4384                       INSURE THAT * TO LEFT OF $ IGNORED IN SCAN 2
4385    SX          MLCWA  @ *$0@,WORK15                                  12  08214  D 09952 09696 X
4386                MCE    @6.0@,WORK15                                   11  08226  E 09955 09696
4387                SBR    HOLDB3                                          7  08237  G 01025 B
4388                C      HOLDB3,K40                                     11  08244  C 01025 09605
4389                BU     *&19                 SHOULD NOT BRANCH          7  08255  J 08280 /
4390                C      WORK15,@$6.0@                                  11  08262  C 09696 09959
4391                BE     SY                   SHOULD BRANCH              7  08273  J 08306 S
4392                B      TYPCK                                           7  08280  J 01071
4393                DCW    @#28.06@,G                                      6  08292
4394                BBE    SX,TAD1,1                                      12  08294  W 08214 01001 1
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PGLIN     LABEL      OPCOD  OPERAND                                                    CT  ADDRS  INSTRUCTION

4395        SUB-RTN 28.07   ZERO SUPPRESS OFF, DECIMAL CONTROL ON, SCAN 3
4396      SY         MLCWA  a00$0a,WORK14                                              12  08306  D 09963 09692 X
4397                 MCE    a.30a,WORK14                                               11  08318  E 09966 09692
4398                 SBR    HOLDB3                                                      7  08329  G 01025 B
4399                 C      HOLDB3,K37                                                 11  08336  C 01025 09590
4400                 BU     *&19              SHOULD NOT BRANCH                         7  08347  J 08372 /
4401                 C      WORK14,a .30a     NOTE ABSENCE OF FLOATING DOLLAR          11  08354  C 09692 09970
4402                 BE     SZ                SHOULD BRANCH                             7  08365  J 08398 S
4403                 B      TYPCK                                                       7  08372  J 01071
4404                 DCW    a#28.07a,G                                                  6  08384
4405                 BBE    SY,TAD1,1                                                  12  08386  W 08306 01001 1
4406        SUB-RTN 28.08   PERFORM ELABORATE EDIT
4407      SZ         MLCWA  K43,BIGANS                                                 12  08398  D 09641 09343 X
4408                 MCE    K44,BIGANS                                                 11  08410  E 09651 09343
4409                 C      BIGANS,K45                                                 11  08421  C 09343 09671
4410                 BE     TA                SHOULD BRANCH                             7  08432  J 08465 S
4411                 B      TYPCK                                                       7  08439  J 01071
4412                 DCW    a#28.08a,G                                                  6  08451
4413                 BBE    SZ,TAD1,1                                                  12  08453  W 08398 01001 1
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PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION

4415        ROUTINE 29.00   CHECK CHAINED OPERATIONS
4416
4417        SUB-RTN 29.01   CHAINED BRANCH-ON-WORD-MARK INSTRUCTIONS
4418      TA          CS     202                 INSURE TEST AREA BLANK          6  08465  / 00202
4419                  SW     200                                                 6  08471  , 00200
4420                  BW     *&8,202             SHOULD NOT BRANCH              12  08477  V 08496 00202 1
4421                  BW                         I-ADDR SAME, B-ADDR 00201, NO BR  1  08489  V
4422                  BW     TB                  NEW I-ADDR, B-ADDR 00200, BRANCH  6  08490  V 08522
4423                  B      TYPCK                                               7  08496  J 01071
4424                  DCW    a#29.01a,G                                          6  08508
4425                  BBE    TA,TAD1,1                                          12  08510  W 08465 01001 1
4426        SUB-RTN 29.02   CHAINED SET WORD MARK INSTRUCTIONS
4427      TB          CS     206                 INSURE TEST AREA BLANK          6  08522  / 00206
4428                  SW     206,202             ESTABLISH A & B ADDRESSES      11  08528  , 00206 00202
4429                  SW                         SHOULD SET WMS AT 00205, 00201  1  08539  ,
4430                  SW     204                 SHOULD CHANGE BOTH AAR & BAR    6  08540  , 00204
4431                  SW                         SHOULD SET WM ONLY AT 00203     1  08546  ,
4432                  BW     *&8,205             SHOULD BRANCH                  12  08547  V 08566 00205 1
4433                  B      TC                                                  7  08559  J 08623
4434                  BW     *&8,203             SHOULD BRANCH                  12  08566  V 08585 00203 1
4435                  B      TC                                                  7  08578  J 08623
4436                  BW     *&8,201             SHOULD BRANCH                  12  08585  V 08604 00201 1
4437                  B      TC                                                  7  08597  J 08623
4438                  BW     *&8,200             SHOULD NOT BRANCH              12  08604  V 08623 00200 1
4439                  B      TD                                                  7  08616  J 08649
4440      TC          B      TYPCK                                               7  08623  J 01071
4441                  DCW    a#29.02a,G                                          6  08635
4442                  BBE    TB,TAD1,1                                          12  08637  W 08522 01001 1
4443        SUB-RTN 29.03   CHAINED CLEAR WORD MARK INSTRUCTIONS
4444      TD          SW     205,202             SET WMS OVER 00200-00205       11  08649  , 00205 00202
4445                  SW                                                         1  08660  ,
4446                  SW                                                         1  08661  ,
4447                  CW     206,202             ESTABLISH A & B ADDRESSES      11  08662  ¤ 00206 00202
4448                  CW                         SHOULD CLEAR WMS AT 00205, 00201  1  08673  ¤
4449                  CW     204                 SHOULD CHANGE BOTH AAR & BAR    6  08674  ¤ 00204
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PGLIN    LABEL     OPCOD  OPERAND                                               CT  ADDRS  INSTRUCTION

4450               CW                          SHOULD CLEAR WM ONLY AT 00203     1  08680  ¤
4451               BW     TE,205               SHOULD NOT BRANCH                12  08681  V 08703 00205 1
4452               BW                          DITTO                             1  08693  V
4453               BW                          DITTO                             1  08694  V
4454               BW                          DITTO                             1  08695  V
4455               BW                          DITTO                             1  08696  V
4456               BW     TF                   EXAMINE LOC 00200.  SHOULD BRANCH 6  08697  V 08729
4457     TE        B      TYPCK                                                  7  08703  J 01071
4458               DCW    a#29.03a,G                                             6  08715
4459               BBE    TD,TAD1,1                                             12  08717  W 08649 01001 1
4460       SUB-RTN 29.04  CHAINED BRANCH UNCONDITIONAL
4461     TF        BCE    TG,TF,               SETS UP I-ADDR, D-MOD.  NO BRANCH 12 08729  B 08768 08729
4462               DCW    aJa                  HOME MADE 1-CHAR BRANCH OP CODE   1  08741
4463               B      TYPCK                                                  7  08742  J 01071
4464               DCW    a#29.04a,G                                             6  08754
4465               BBE    TF,TAD1,1                                             12  08756  W 08729 01001 1
4466       SUB-RTN 29.05  CHAINED CONDITIONAL BRANCH.  SIMILAR TO #29.04
4467     TG        BCE    *&9,TG,S             SETS I-ADDR, D-MOD, UNEQ COMP    12  08768  B 08788 08768 S
4468               DCW    aJa                  PREV D-MOD SIMULATES BR EQL HERE  1  08780
4469               B      TH                   SHOULD TAKE THIS ONE              7  08781  J 08814
4470               B      TYPCK                                                  7  08788  J 01071
4471               DCW    a#29.05a,G                                             6  08800
4472               BBE    TG,TAD1,1                                             12  08802  W 08768 01001 1
4473       SUB-RTN 29.06  CHAINED CLEAR STORAGE INSTRUCTION
                            G
4474     TH        MLCWA  aXMa,200             MOVE DATA TO LOC 00199, 00200    12  08814  D 09972 00200 X
4475               SW     20C                                                    6  08826  , 00200
4476               CS     300                  CLEAR LOCATION 00300, STOP        6  08832  / 00300
4477               CS                          SHOULD CLEAR 00200-00299          1  08838  /
4478               C      a X a,200            TEST LOCATIONS 00199, 00200      11  08839  C 09975 00200
4479               BE     TI                   SHOULD BRANCH                     7  08850  J 08883 S
4480               B      TYPCK                                                  7  08857  J 01071
4481               DCW    a#29.06a,G                                             6  08869
4482               BBE    TH,TAD1,1                                             12  08871  W 08814 01001 1
4483       SUB-RTN 29.07  CHAINED CLEAR STORAGE & BRANCH INSTRUCTION
                                                                                                      S
4484     TI        MRCWR  *&8,200              RELOCATE FOLLOWING SHORT ROUTINE 12  08883  D 08902 00200 M
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PGLIN     LABEL      OPCOD  OPERAND                                                    CT  ADDRS  INSTRUCTION
4485                 B      200                  BRANCH TO IT                           7  08895  J 00200
4486                 CS     212,300  * RELOC TO 00200, CLEARS & BR TO LOC 00212       11  08902  / 00212 00300
4487                 H               * RELOC TO 00211, NEVER EXECUTED                1  08913  .
4488                 CS              * RELOC TO 00212, SHOULD CLEAR 00211-00200      1  08914  /
4489                 B      TJ       * RELOC TO 00213, RETURN TO MAIN PROGRAM        7  08915  J 08923
4490                 DCW    @#@      * RELOC TO 00220, TERMINAL CHAR FOR MRCWR       1  08922
4491      TJ         BCE    TK,200,            EXAMINE LOC 00200.  SHOULD BRANCH   12  08923  B 01289 00200
4492                 B      TYPCK                                                    7  08935  J 01071
4493                 DCW    @#29.07@,G                                               6  08947
4494                 BBE    TI,TAD1,1                                               12  08949  W 08883 01001 1
4495                 B      TK                                                       7  08961  J 01289
4496                 H                                                               1  08968  .
4497      ENDPH3     EQU    *
4498        SUB-RTN  29.08  CHAINED DATA MOVE INSTRUCTIONS
4499                 ORG    LOWLOC               BACK TO LOWEST AVAILABLE LOCATION      01289
4500      TK         CS     214                                                      6  01289  / 00214
4501                 MLCWA  @5.@*#@,214          MOVE DATA TO 00210-00214        12  01295  D 09913 00214 X
4502                 MLCWA  214                  ALTER A-ADDR, CHAIN B-ADDR       6  01307  D 00214
4503                 MLCWA                       CHAIN BOTH A & B ADDRESS         1  01313  D
4504                 C      204,@5.@*#@          TEST ORIGINAL DATA NOW AT 00204  11  01314  C 00204 09913
4505                 BE     TL                   SHOULD BRANCH                    7  01325  J 01358 S
4506                 B      TYPCK                                                    7  01332  J 01071
4507                 DCW    @#29.08@,G                                               6  01344
4508                 BBE    TK,TAD1,1                                               12  01346  W 01289 01001 1
4509        SUB-RTN  29.09  CHAINED ZERO-ADD INSTRUCTION
4510      TL         CS     209                                                      6  01358  / 00209
4511                 SW     200,205                                                 11  01364  , 00200 00205
4512                 ZA     DTABLE,209           PUT 0000I INTO 00205-00209      11  01375  M 09418 00209
4513                 ZA                          SHOULD PUT 0000H INTO 00200-00204  1  01386  M
4514                 C      204,&00008                                              11  01387  C 00204 09980
4515                 BE     TM                   SHOULD BRANCH                    7  01398  J 01431 S
4516                 B      TYPCK                                                    7  01405  J 01071
4517                 DCW    @#29.09@,G                                               6  01417
4518                 BBE    TL,TAD1,1                                               12  01419  W 01358 01001 1
4519        SUB-RTN  29.10  CHAINED ZERO-SUBTRACT.  SIMILAR TO #29.09
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PGLIN     LABEL      OPCOD  OPERAND                                        CT  ADDRS  INSTRUCTION

4520      TM         CS     202                                             6  01431  / 00202
4521                 SW     200,202                                        11  01437  , 00200 00202
4522                 ZS     @Z*M*@,202     B-FLD LENGTH LESS THAN A-FLD    11  01448  : 09943 00202
4523                 ZS                                                     1  01459  :
4524                 C      201,&44                                        11  01460  C 00201 09982
4525                 BE     TN             SHOULD BRANCH                    7  01471  J 01504 S
4526                 B      TYPCK                                           7  01478  J 01071
4527                 DCW    @#29.10@,G                                      6  01490
4528                 BBE    TM,TAD1,1                                      12  01492  W 01431 01001 1
4529        SUB-RTN 29.11   CHAINED ADD INSTRUCTION
4530      TN         CS     203                                             6  01504  / 00203
4531                 SW     200,202                                        11  01510  , 00200 00202
4532                 A      DTABLE,202     SET UP ADDRESS REGISTERS        11  01521  A 09418 00202
4533                 A                     SHOULD ADD PLUS 8 TO TWO BLANKS  1  01532  A
4534                 C      201,@08@                                       11  01533  C 00201 09984
4535                 BE     TP             SHOULD BRANCH                    7  01544  J 01577 S
4536                 B      TYPCK                                           7  01551  J 01071
4537                 DCW    @#29.11@,G                                      6  01563
4538                 BBE    TN,TAD1,1                                      12  01565  W 01504 01001 1
4539        SUB-RTN 29.12   CHAINED SUBTRACT INSTRUCTION
4540      TP         MLCWA  -00009,204                                     12  01577  D 09783 00204 X
4541                 SW     201,204                                        11  01589  , 00201 00204
4542                 S      204,203        A-FLD LENGTH 1, B-FLD LENGTH 3  11  01600  S 00204 00203
4543                 S                     SHOULD SUBTRACT 00203 FROM 00200 1  01611  S
4544                 BCE    TQ,200,R       SHOULD BRANCH.  R IS MINUS 9    12  01612  B 01650 00200 R
4545                 B      TYPCK                                           7  01624  J 01071
4546                 DCW    @#29.12@,G                                      6  01636
4547                 BBE    TP,TAD1,1                                      12  01638  W 01577 01001 1
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PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
4549        SUB-RTN 29.13   CHAINED MULTIPLY INSTRUCTIONS
4550      TQ         CS     211                 .              .              6  01650  / 00211
4551                 SW     211                 . SET          .              6  01656  , 00211
4552                 SW                         .  UP          .              1  01662  ,
4553                 SW     209,206             .   WORK       .             11  01663  , 00209 00206
4554                 SW     203,200             .    FIELD     .             11  01674  , 00203 00200
4555                 ZA     DTABLE,211          .     WITH     .             11  01685  QM 09418 00211
4556                 ZS                         .      CONSTANTS .            1  01696  ,
4557                 ZA                         .       FROM    .             1  01697  .QM
4558                 ZS     DTABLE-3,206        .        DIVIDE .             11  01698  , 09415 00206
4559                 ZS     DTABLE-4,203        .         TABLE .             11  01709  . 09414 00203
4560                 ZS     DTABLE-5,200        .                .             11  01720  , 09413 00200
4561                 M      209,208             ESTABLISH A & B ADDR REG SETTINGS  11  01731  . 00209 00208
4562                 M      211                 ALTER A-FLD ADDR, CHAIN B-ADDR     6  01742  @ 00211
4563                 M                          CHAIN BOTH A & B ADDRESSES         1  01748  @
4564                 C      205,-045            TEST EFFECT OF 1ST CHAINED MPY    11  01749  C 00205 09987
4565                 BU     *&19                SHOULD NOT BRANCH                  7  01760  J 01785 /
4566                 C      202,&032            TEST EFFECT OF 2ND CHAINED MPY    11  01767  C 00202 09990
4567                 BE     TQ1                 SHOULD BRANCH                      7  01778  J 01811 S
4568                 B      TYPCK                                                  7  01785  J 01071
4569                 DCW    @#29.13@,G                                             6  01797
4570                 BBE    TQ,TAD1,1                                             12  01799  W 01650 01001 1
```

```
PGLIN   LABEL    OPCOD   OPERAND                                          CT  ADDRS  INSTRUCTION
4572                     COUNT PASSES, ALLOW FOR PROGRAM MODIFICATION
4573
4574     TQ1     BNQ     INC                                               7  01811  J 01157 Q
4575     TQ2     S       &1,PCCWK                                         11  01818  S 09778 01015
4576             BZ      *&8                                               7  01829  J 01843 V
4577             B       START                                             7  01836  J 02000
4578             BBE     TQ2B,TAD3,1                                      12  01843  W 01900 01003 1
4579             B       TYPE                                              7  01855  J 01026
4580             DCW     @-PASS-@,G                                        6  01867
4581     TQ2A    CS      204                .                              6  01869  / 00204
4582             SW      200                . SAVE TADS FOR NEXT PHASE     6  01875  , 00200
4583             MLCWB   1004,204           .                             12  01881  D 01004 00204 P
4584             B       LOADER             EXIT C020B-3 HERE              7  01893  J 00400
4585     TQ2B    BW      TQ2A,999           BRANCH IF INPUT WAS FROM TAPE  12  01900  V 01869 00999 1
4586
4587     AGAIN   CW      QA&1,QV&1                                        11  01912  ¤ 02067 03205
4588             B       START                                             7  01923  J 02000
4589             H                                                         1  01930  .
```

PGLIN	LABEL	OPCOD	OPERAND	CT	ADDRS	INSTRUCTION
4591			CONSTANTS AND WORK AREAS			
4592						
4593			TABLES OF DATA USED IN TABLE LOOK UP TEST			
4594						
4595		ORG	ENDPH3		08969	
4596	ENDA	DCW	ENDITM-1	5	08973	08974
4597	ENDITM		@B&@	2	08975	
4598			@ @	1	08976	
4599			@.¤BTM&$*BM@	10	08986	
4600			@,L-/,%SSMB#@.TMMAB&@	19	09005	
4601	ENDTBL		@CDEFGHI.JKLMNOPQR*STUVWXYZ0123456789$@	37	09042	
4602						
4603	LLCON		TO1-2	5	09047	09047
4604	TO1		@B/@	2	09049	
4605			@ @	1	09050	
4606	LSTP		@ *,@	3	09051	
4607			@ B/@	3	09056	
4608	LTBL		@ ;-@	3	09059	
4609						
4610	TO2		@S#@	2	09061	
4611			@ @	1	09062	
4612	ESTP		@ S#@	3	09063	
4613			@ S#@	3	09068	
4614	ETBL		@ M#@	3	09071	
4615						
4616	TO3		@MB@	2	09073	
4617			@ @	1	09074	
4618	LESTP1		@ TC@	3	09075	
4619	LETBL1		@ MA@	3	09080	
4620						
4621			@ @	1	09081	
4622	LESTP2		@ MB@	3	09082	
4623	LETBL2		@ MB@	3	09087	
4624						
4625	TO4		@E I@	2	09089	

```
PGLIN     LABEL     OPCOD  OPERAND                                    CT  ADDRS  INSTRUCTION
4626                       @ @                                        1  09090
4627       HSTP            @ FH@                                      3  09091
4628                       @ EI@                                      3  09096
4629      HTBL             @ D'@                                      3  09099
4630
4631      TO5              @LO@                                       2  09101
4632                       @ @                                        1  09102
4633       LHSTP1          @ KO@                                      3  09103
4634      LHTBL1           @ LO@                                      3  09108
4635
4636                       @ @                                        1  09109
4637       LHSTP2          @ MO@                                      3  09110
4638      LHTBL2           @ LO@                                      3  09115
4639
4640      TO6              @≠U@                                       2  09117
4641                       @ @                                        1  09118
4642       EHSTP1          @ ≠U@                                      3  09119
4643      EHTBL1           @ RV@                                      3  09124
4644
4645                       @ @                                        1  09125
4646       EHSTP2          @ ST@                                      3  09126
4647      EHTBL2           @ RU@                                      3  09131
4648
4649      TO7              @X1@                                       2  09133
4650                       @ @                                        1  09134
4651       ANY1            @ W2@                                      3  09135
4652
4653                       @ @                                        1  09138
4654       ANY2            @ X1@                                      3  09139
4655
4656                       @ @                                        1  09142
4657       ANY3            @ Y0@                                      3  09143
```

```
PGLIN    LABEL     OPCOD  OPERAND                                                  CT  ADDRS  INSTRUCTION

4659                      OTHER CONSTANTS AND WORK AREAS
4660
4661               DCW    a 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9a      50  09195
4662     CCON2     DC     a 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9a      50  09245
4663     CCON1     EQU    CCCN2-1
                                   . W R L
4664     FIVE4S    DCW    a54EDNMVU.aS%B*B¤a                                       16  09261
4665     MANY9S           a999999999999999Ia                                       16  09277
4666     PRODCT           a0545454545454545345454545454545 4Fa                     33  09310
4667     BIGANS           a                               a                        33  09343
                            GLL   Q           D.R   '
4668      MPYTBL          a MTB¤.MIHGFEDCBA&L,B*$.RQPONMLKJ-a                      33  09344
                           SBW                STG.
4669                      aMSS%,‡ZYXbVUTS/BMT.a#0987654321 a                       32  09408
4670                      &0        NUMBER                                          1  09409
4671                      &1                                                        1  09410
4672                      &2        TABLE                                           1  09411
4673                      &3                                                        1  09412
4674                      &4        USED                                            1  09413
4675                      &5                                                        1  09414
4676                      &6        BY SUBROUTINE                                   1  09415
4677                      &7                                                        1  09416
4678                      &8        #24.02 AND OTHERS                               1  09417
4679     DTABLE           &9                                                        1  09418
4680     K15       B      AGAIN                                                     7  09419  J 01912
4681               DCW    a‡a                                                       1  09426
4682     K16              MANY9S-16                                                 5  09431  09261
4683     K17              BIGANS-33                                                 5  09436  09310
4684     K18              FIVE4S-16                                                 5  09441  09245
4685     K19              a1234567889888888899a                                    20  09461
                                    C
4686     K20              a123456789Ma                                             10  09471
4687     K21              a0000000000999999999I001234567 8Ia                       31  09502
4688     K22              WORK11-4                                                  5  09507  09675
4689     K23              K20-10                                                    5  09512  09461
                                 Q
4690     K24              a,-,.0.Ma                                                 7  09519
4691     K25              a0,,  0a                                                  6  09525
                                '
4692     K26              a9 .,-.a                                                  6  09531
4693     K27              a 9,$‡a                                                   5  09536
```

```
PGLIN     LABEL     OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
4694      K28              @ - . . @                                 7  09543
4695      K29              @      @                                  6  09549
4696      K30              @9 .,-0@                                  6  09555
4697      K31              @ 9,$ @                                   5  09560
4698      K32              WORK12&1                                  5  09565  09688
4699      K33              WORK13-2                                  5  09570  09687
4700      K34              WORK13-1                                  5  09575  09688
4701      K35              WORK14-2                                  5  09580  09690
4702      K36              WORK15-2                                  5  09585  09694
4703      K37              WORK14-3                                  5  09590  09689
4704      K38              WORK13&1                                  5  09595  09690
4705      K39              WORK15&1                                  5  09600  09697
4706      K40              WORK15-4                                  5  09605  09692
4707      K41              @ - X.Y 0@                                8  09613
4708      K42              @7-0X.Y07@                                8  09621
4709      K43              @           ,$90$*C.-0@                  20  09641
4710      K44              @,N@F  , 0N@                             10  09651
4711      K45              @******N@F***9, 0C.-5@                   20  09671
4712      WORK7            @ @                                       1  09672
4713      WORK8            @ @                                       1  09673
4714      WORK9            @ @                                       1  09674
4715      WORK10           @ @                                       1  09675
4716      WORK11           @    @                                    4  09679
4717      WORK12           @        @                                8  09687
4718      WORK13           @  @                                      2  09689
4719      WORK14           @   @                                     3  09692
4720      WORK15           @    @                                    4  09696
4721      P1               @   @                                     3  09699
4722      P2               @   @                                     3  09702
```

PGLIN	LABEL	OPCOD	OPERAND	CT	ADDRS	INSTRUCTION
4724		LTORG	*		09703	
4724			ENDITM	5	09707	08975
4724			LSTP	5	09712	09051
4724			ESTP	5	09717	09063
4724			LESTP1	5	09722	09075
4724			LESTP2	5	09727	09082
4724			HSTP	5	09732	09091
4724			LHSTP1	5	09737	09103
4724			LHSTP2	5	09742	09110
4724			EHSTP1	5	09747	09119
4724			EHSTP2	5	09752	09126
4724			ANY1	5	09757	09135
4724			ANY2	5	09762	09139
4724			ANY3	5	09767	09143
4724			£04096	5	09772	
4724			£00064	5	09777	
4724			£1	1	09778	
4724			-00009	5	09783	
4724			-00010	5	09788	
4724			a##YIa	4	09792	
4724			-8	1	09793	
4724			a/J#Aa	4	09797	
4724			aOJOMa	4	09801	
4724			aBBa	2	09803	
4724			aXX a	3	09806	
4724			£5C	2	09808	
4724			aM£a	2	09810	
4724			aJ a	2	09812	
4724			aJ-a	2	09814	
4724			aAZRa	3	09817	
4724			aAZ a	3	09820	
4724			aM, a	3	09823	
4724			aM Ma	3	09826	
4724			a.BC a	4	09830	
4724			a□□.* a	5	09835	

PGLIN	LABEL	OPCOD	OPERAND	CT	ADDRS	INSTRUCTION
4724			a'.¤aa	3	09838	
4724			a%-$& a	5	09843	
4724			aZRa	2	09845	
4724			a%-Z 9a	5	09850	
4724			aE0a	2	09852	
4724			aE5a	2	09854	
4724			a&M00a	4	09858	
4724			a&M&Ma	4	09862	
4724			a$*&0a	4	09866	
4724			a7,0/a	4	09870	
4724			a***1a	4	09874	
4724			a .*0a	4	09878	
4724			&070	3	09881	
4724			a*.70a	4	09885	
4724			a 0a	5	09890	
4724			a10X02a	5	09895	
4724			a10X 2a	5	09900	
4724			a0.*,0a	5	09905	
4724			a5a,a	3	09908	
4724			a5.a*#a	5	09913	
4724			-7007	4	09917	
4724			a$Cva	3	09920	
4724			&00	2	09922	
4724			a $va	3	09925	
4724			a.Ca	2	09927	
4724			&0	1	09928	
4724			a a	2	09930	
4724			a.*0a	3	09933	
4724			a*.M0a	4	09937	
4724			aZ a	2	09939	
4724			aZ*M*a	4	09943	
4724			a0.0a	3	09946	
4724			a, a	2	09948	
4724			a *$0a	4	09952	
4724			a6.0a	3	09955	

PGLIN	LABEL	OPCOD	OPERAND	CT	ADDRS	INSTRUCTION
4724			@$6.0@	4	09959	
4724			@0C$0@	4	09963	
4724			@.30@	3	09966	
4724			@ .30@	4	09970	
4724			@XG@	2	09972	
4724			@ X @	3	09975	
4724			&0CC08	5	09980	
4724			&44	2	09982	
4724			@08@	2	09984	
4724			-045	3	09987	
4724			&032	3	09990	

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PGLIN     LABEL     OPCOD  OPERAND                                    CT  ADDRS  INSTRUCTION
4726      XR0       EQU    24
4727      INTAPE    EQU    10,CU
4728      BSPTPO    EQU    982
4729
4730                ORG    1000                                           01000
4731
4732                DC     @     @,G                                  5  01004
4733
4734                DCW    &00100          PASS COUNT CONSTANT          5  01010
4735                       @     @         PASS COUNT WORK AREA         5  01015
4736
4737                       @     @         . COMMON AREA FOR STORING    5  01020
4738                       @     @         . ADDRESS REGISTERS          5  01025
4739
4740                SBR    *&9             COMMON TYPE ROUTINE          7  01026  G 01041 B
4741                WCP    0                                           10  01033  M %TO 00000 W
4742                SBR    *&20                                         7  01043  G 01069 B
4743                BCB1   *-23                                         7  01050  R 01033 2
4744                BA1    *&1                                          7  01057  R 01064 M
4745                B      0                                            7  01064  J 00000
4746
4747                SBR    *&39            TYPE AND TAD CHECK ROUTINE   7  01071  G 01116 B
4748                SBR    *&65                                         7  01078  G 01149 B
4749                A      *-17,*&54                                   11  01085  A 01078 01149
4750                BBE    *&25,TAD0,1                                 12  01096  W 01132 01000 1
4751                WCP    0                                           10  01108  M %TO 00000 W
4752                BCB1   *-16                                         7  01118  R 01108 2
4753                BA1    *&1                                          7  01125  R 01132 M
4754                BBE    *&8,TAD2,1                                  12  01132  W 01151 01002 1
4755                B      0                                            7  01144  J 00000
4756                H      *-12                                         6  01151  . 01144
```

```
PGLIN    LABEL      OPCOD  OPERAND                                       CT  ADDRS  INSTRUCTION

4758                RCP    *&26           COMMON ADDRESS ALTER ROUTINE   10  01157  M %TO 01192 R
                                                                                              S
4759                BNT1   *&39                                           7  01167  R 01212 B
                                T                                                           T
4760                BEX1   *-23,M                                         7  01174  R 01157 M
                                                                                            G
4761                BA1    *&1                                            7  01181  R 01188 M
4762                RCPW   0                                             10  01188  L %TO 00000 R
                                S                                                           S
4763                BEX1   *-16,M                                         7  01198  R 01188 M
                                                                                            G
4764                BA1    *&1                                            7  01205  R 01212 M
4765                B      WB                                             7  01212  J 03684
                            G
4766                DCW    aMa                                            1  01219
4767
4768                ORG    CTLIND                                            01230
4769                DC     a         a                                    9  01238
4770                DCW    a1.12.101MCZa  1CK OR 20K, SEQ NO. 014,       11  01249
4771                                      DUMP TO 09999 ON TAPE
4772                ORG    IDENT                                             01250
4773                DCW    aC020Ba,G                                      5  01254
4774
4775                ORG    SYSCTL                                            01256
4776                DC     a                             ‡a              33  01288
```

```
PGLIN     LABEL     OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
4778                ORG    START              PHASE 4 BEGINS HERE               02000
4779
4780                B      LOWLOC             BACK TO LOWEST AVAILABLE ADDRESS  7  02000  J 01289
4781
4782                ORG    LOWLOC                                               01289
4783
4784                       TYPE IDENT, INITIALIZE LOC 00001-00008 FOR
4785                       RESTART, INITIAILIZE PASS COUNTER, RESTORE TADS
4786
4787                NOPWM                                                    1  01289  N
4788                B      TQ4                                               7  01290  J 01355
4789                SW     *-12                                              6  01297  , 01290
4790                B      TYPE                                              7  01303  J 01026
4791                DCW    @ C020B-4@,G                                      8  01317
4792                CS     10C4               .                              6  01319  / 01004
4793                SW     10C0               . USE SAME TADS AS PREVIOUS PHASE  6  01325  , 01000
4794                MLCWB  204,1004           .                             12  01331  D 00204 01004 PS
4795                MRCWR  K49,1                                             12  01343  D 04292 00001 M
4796      TQ4       NOPWM                                                    1  01355  N
4797                B      TR                                                7  01356  J 01380
4798                SW     *-12                                              6  01363  , 01356
4799                ZA     PCC,PCCWK                                        11  01369  QM 01010 01015
```

```
PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
4801        SUB-RTN 29.14   CHAINED DIVIDE INSTRUCTION. B-ADDR ONLY
4802      TR         MLCWA  @001 @,203                                       12  01380  D 04476 00203 X
4803                 CW     203              DUMMY OP TO ESTABLISH A & B ADDR  6  01392  ¤ 00203
4804                 D      &5               NEW A-ADDR, B-ADDR LOCATION 00202 6  01398  % 04477
4805                 C      202,@A0D@        PLUS 1, REMAINDER PLUS 4          11  01404  C 00202 04480
4806                 BE     TS                                                 7  01415  J 01448 S
4807                 B      TYPCK                                              7  01422  J 01071
4808                 DCW    @#29.14@,G                                         6  01434
4809                 BBE    TR,TAD1,1                                         12  01436  W 01380 01001 1
4810        SUB-RTN 29.15   CHAINED DIVIDE INSTRUCTION, A & B ADDRESSES
4811      TS         MLCWA  @NC0E@,203                                        12  01448  D 04484 00203 X
4812                 SW     201,204          DEFINE FLD LENGTHS, SET A & B ADR 11  01460  , 00201 00204
4813                 D                       SHOULD DIV LOC 00200 INTO 00203   1  01471  %
4814                 C      203,@JOM@Q@      @                                 11  01472  C 00203 04487
4815                 BE     TT                                                 7  01483  J 01516 S
4816                 B      TYPCK                                              7  01490  J 01071
4817                 DCW    @#29.15@,G                                         6  01502
4818                 BBE    TS,TAD1,1                                         12  01504  W 01448 01001 1
4819        SUB-RTN 29.16   CHAINED BRANCH ON BIT EQUAL
4820      TT         BBE    TU,*&1,R         SET BAR, D-MOD. SHOULD NOT BRANCH 12  01516  W 01554 01528 R
4821                 BBE    *&8              SHOULD BRANCH                     6  01528  W 01541
4822                 B      TU                                                 7  01534  J 01554
4823                 MLWS   TV&1,*&1         DUMMY OP TO SET AAR, BAR, D-MOD  12  01541  D 01581 01553 4
4824                 BBE                     SHOULD BRANCH                     1  01553  W
4825      TU         B      TYPCK                                              7  01554  J 01071
4826                 DCW    @#29.16@,G                                         6  01566
4827                 BBE    TT,TAD1,1                                         12  01568  W 01516 01001 1
4828        SUB-RTN 29.17   CHAINED BRANCH ON CHARACTER EQUAL
4829      TV         NOP                     THIS OP ESSENTIAL TO PRIOR TEST   1  01580  N
4830                 BCE    TW,*&1,Z         SET BAR, D-MOD. SHOULD NOT BRANCH 12  01581  B 01619 01593 Z
4831                 BCE    *&8              SHOULD BRANCH                     6  01593  B 01606
4832                 B      TW                                                 7  01599  J 01619
4833                 MLWS   TX&1,*&1         DUMMY OP TO SET AAR, BAR, D-MOD  12  01606  D 01646 01618 4
4834                 BCE                     SHOULD BRANCH                     1  01618  B
4835      TW         B      TYPCK                                              7  01619  J 01071
```

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PGLIN     LABEL       OPCOD  OPERAND                                                  CT  ADDRS  INSTRUCTION

4836                  DCW    @#29.17@,G                                                6  01631
4837                  BBE    TV&1,TAD1,1                                              12  01633  W 01581 01001 1
4838        SUB-RTN 29.18    CHAINED COMPARE INSTRUCTIONS
4839      TX          NOP                        THIS OP ESSENTIAL TO PRIOR TEST       1  01645  N
4840                  C      K46,K47             9 VS 8 MUST SET B LESS THAN A        11  01646  C 04289 04290
4841                  C      K46                 COMPARE TWO IDENTICAL NUMBER 9S       6  01657  C 04289
4842                  BE     *&8                 SHOULD BRANCH                         7  01663  J 01677 S
4843                  B      *&9                                                       7  01670  J 01685
4844                  C                          COMP A-FLD LTR C WITH B-FLD LTR J     1  01677  C
4845                  BH     TY                  SHOULD BRANCH                         7  01678  J 01711 U
4846                  B      TYPCK                                                     7  01685  J 01071
4847                  DCW    @#29.18@,G                                                6  01697
4848                  BBE    TX&1,TAD1,1                                              12  01699  W 01646 01001 1
4849        SUB-RTN 29.19    CHAINED TABLE LOOK-UP INSTRUCTIONS
4850      TY          LL     NTABLE-3,NTABLE     SET AAR, BAR, D-MOD REGISTERS        12  01711  T 04059 04062 1
4851                  LL     NTABLE-6                                                  6  01723  T 04056
4852                  SBR    *&11                                                      7  01729  G 01746 B
4853                  BCE    *&8,0,A             SHOULD BRANCH                        12  01736  B 01755 00000 A
4854                  B      TZ                                                        7  01748  J 01787
4855                  MLZS   NTABLE-6,NTABLE     SET AAR, BAR, D-MOD REGISTERS        12  01755  D 04056 04062 2
4856                  LE                                                               1  01767  T
4857                  SBR    *&11                                                      7  01768  G 01785 B
4858                  BCE    UA,0,A              SHOULD BRANCH                        12  01775  B 01813 00000 A
4859      TZ          B      TYPCK                                                     7  01787  J 01071
4860                  DCW    @#29.19@,G                                                6  01799
4861                  BBE    TY,TAD1,1                                                12  01801  W 01711 01001 1
4862        SUB-RTN 29.20    CHAINED MOVE AND ZERO SUPPRESS INSTRUCTIONS
4863      UA          MCS    K51,WORK16-1        ESTABLISH A & B ADDR REG SETTINGS    11  01813  Z 04311 04051
4864                  MCS    K51                 ALTER AAR, CHAIN BAR                  6  01824  Z 04311
4865                  C      WORK16,K54                                               11  01830  C 04052 04328
4866                  BU     UB                  SHOULD NOT BRANCH                     7  01841  J 01878 /
4867                  MCS    K51,WORK16-1        ESTABLISH A & B ADDR REG SETTINGS    11  01848  Z 04311 04051
4868                  MCS                        CHAIN BOTH AAR & BAR                  1  01859  Z
4869                  C      WORK16,K53                                               11  01860  C 04052 04322
4870                  BE     UC                  SHOULD BRANCH                         7  01871  J 01904 S
```

```
PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
4871      UB         B      TYPCK                                             7  01878  J 01071
4872                 DCW    @#29.20@,G                                        6  01890
4873                 BBE    UA,TAD1,1                                        12  01892  W 01813 01001 1
4874        SUB-RTN 29.21   CHAINED MOVE CHARACTERS AND EDIT INSTRUCTION, #1
4875      UC         MLCWA  @XC 00@,204          SET UP CONTROL FIELDS       12  01904  D 04492 00204 X
4876                 SW     202                  . SET UP                     6  01916  , 00202
4877                 SW                          . FIELD LENGTHS              1  01922  ,
4878                 MCE    &50,203              ESTABLISH A & B REG SETTINGS 11  01923  E 04494 00203
4879                 MCE    &50                  ALTER AAR, CHAIN BAR         6  01934  E 04494
4880                 C      204,@X 550@          TEST WORK AREA              11  01940  C 00204 04499
4881                 BE     UD                   SHOULD BRANCH                7  01951  J 02007 S
4882                 B      TYPCK                                             7  01958  J 01071
4883                 DCW    @#29.21@,G                                        6  01970
4884                 BBE    UC,TAD1,1                                        12  01972  W 01904 01001 1
4885                 B      UD                   SKIP INSTRUCTION AT LOC 02000 7  01984  J 02007
4886                 H                           DEFINE PRECEDING INSTR LENGTH 1  01991  .
4887        SUB-RTN 29.22   CHAINED MOVE CHARACTERS AND EDIT INSTRUCTION, #2
4888                 ORG    START&7              ADJACENT TO BR INSTR AT LOC 02000    02007
4889      UD         MLCWA  @ .0@,202            SET UP CONTROL FIELDS       12  02007  D 04502 00202 X
4890                 SW     201                                               6  02019  , 00201
4891                 MCE    K48,202              ESTABLISH A & B REG SETTINGS 11  02025  E 04291 00202
4892                 MCE                         CHAIN BOTH AAR & BAR         1  02036  E
4893                 C      202,@8  @                                        11  02037  C 00202 04505
4894                 BE     UE                   SHOULD BRANCH                7  02048  J 02081 S
4895                 B      TYPCK                                             7  02055  J 01071
4896                 DCW    @#29.22@,G                                        6  02067
4897                 BBE    UD,TAD1,1                                        12  02069  W 02007 01001 1
4898        SUB-RTN 29.23   TEST FOR NO RESET OF D-MODIFIER REGISTER
4899      UE         BCE    *&8,*&1,J            SET D-MODIFIER, SHOULD NOT BRANCH 12  02081  B 02100 02093 J
4900                 CW     UF&1                 ESTABLISH A & B ADDR REG SETTINGS 6  02093  ¤ 02127
4901                 BCE                         SHOULD BRANCH                1  02099  B
4902                 B      TYPCK                                             7  02100  J 01071
4903                 DCW    @#29.23@,G                                        6  02112
4904                 BBE    UE,TAD1,1                                        12  02114  W 02081 01001 1
4905        SUB-RTN 29.24   TEST FOR RESET OF D-MODIFIER REGISTER
```

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PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
4906      UF         BAV    *&1              DUMMY OP SETS D-MOD RESGITER TO Z   7  02126  J 02133 Z
4907                 CW     UG1&1,UG         DUMMY OP SETS AAR, BAR, RESET D    11  02133  ¤ 02175 02173
4908                 BCE                     SHOULD BRANCH TO NEXT ROUTINE       1  02144  B
4909                 B      TYPCK                                               7  02145  J 01071
4910                 DCW    @#29.24@,G                                          6  02157
4911                 BBE    UF,TAD1,1                                          12  02159  W 02126 01001 1
4912      UG         DCW    @N Z@                                               3  02173
4913        SUB-RTN 29.25   TEST THAT NOP HAS NO EFFECT ON CHAINED OPERATION
4914      UG1        MLWS   UG2&1,*&1        SETS AAR, BAR, OP MOD REGISTERS    12  02174  D 02226 02186 4
4915                 DCW    @N%B9876543210@                                    12  02197
4916                 BCE                     SHOULD BRANCH TO NEXT ROUTINE       1  02198  B
4917                 B      TYPCK                                               7  02199  J 01071
4918                 DCW    @#29.25@,G                                          6  02211
4919                 BBE    UG1,TAD1,1                                         12  02213  W 02174 01001 1
4920        SUB-RTN 29.26   TEST THAT SBR INST DOES NOT EFFECT AAR OR BAR
4921                        BUT DOES ALTER THE OP MOD REGISTER
4922      UG2        NOP                     THIS OP ESSENTIAL TO PRIOR TEST     1  02225  N
4923                 MLWS   UH,*&9           SET A & B ADDRESS REGISTERS        12  02226  D 02273 02246 4
4924                 SBR    HOLDB4           DUMMY OP TO CHANGE OP MOD REG       7  02238  G 01025 B
4925                 BCE                     SHOULD BRANCH TO NEXT ROUTINE       1  02245  B
4926                 B      TYPCK                                               7  02246  J 01071
4927                 DCW    @#29.26@,G                                          6  02258
4928                 BBE    UG2&1,TAD1,1                                       12  02260  W 02226 01001 1
```

```
PGLIN     LABEL      OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
4930        ROUTINE 30.00   TEST PROGRAM AND COMPUTER RESETS, ONLY ONE TIME
4931
4932                        IT IS RECOMMENDED THAT ONCE, DURING THE EXECUTION
4933                        OF C020B-4, TAD4 AT LOCATION 01004 BE ALTERED TO
4934                        A 1 SO THAT CERTAIN FUNCTIONS OF THE RESET KEYS
4935                        MAY BE TESTED
4936
4937        SUB-RTN 30.01   TEST PROGRAM RESET, OPTIONAL
4938                NOP                          THIS OP ESSENTIAL TO PRIOR TEST    1  02272  N
4939      UH        BBE     *&8,TAD4,1           ONLY DO ROUTINE IF TAD4 IS 1      12  02273  W 02292 01004 1
4940                B       US                   OTHERWISE, SKIP WHOLE THING        7  02285  J 02691
4941                ZA      &500,WORK16-5                                          11  02292  M 04508 04047
4942                A       WORK16-5             TURN ON ZERO BAL, ARITH OVERFLOW   6  02303  A 04047
4943                D       NTABLE-9,WORK16-5    TURN ON DIVIDE OVERFLOW           11  02309  % 04053 04047
4944                C       *,*                  TURN ON B EQUAL A                 11  02320  C 02330 02330
4945                MLCA    &UJ,6                ALTER LOC 00002-00006             12  02331  D 04513 00006 T
4946      UI        B       TYPE                                                    7  02343  J 01026
4947                DCW     @PRESS PROGRAM RESET & START@,G                        27  02376
4948                H       UI                                                      6  02378  . 02343
4949      UJ        MLCA    &WC1,6               RESTORE LOC 00002-00006           12  02384  D 04518 00006 T
4950                BE      *&12                 SHOULD BRANCH                      7  02396  J 02414 S
4951                CW      UK&1,UL&1                                              11  02403  ¤ 02469 02503
4952                BAV     *&12                 SHOULD BRANCH                      7  02414  J 02432 Z
4953                CW      UK&1,UM&1                                              11  02421  ¤ 02469 02535
4954                BCV     *&12                 SHOULD BRANCH                      7  02432  J 02450 W
4955                CW      UK&1,UN&1                                              11  02439  ¤ 02469 02569
4956                BZ      *&12                 SHOULD BRANCH                      7  02450  J 02468 V
4957                CW      UK&1,UP&1                                              11  02457  ¤ 02469 02601
4958      UK        NOP                                                             1  02468  N
4959                B       US                   EXIT HERE IF NO ERRORS             7  02469  J 02691
4960                B       TYPCK                                                   7  02476  J 01071
4961                DCW     @#30.01@,G                                              6  02488
4962                BBE     UQ,TAD0,1                                              12  02490  W 02631 01000 1
4963      UL        NOP                                                             1  02502  N
4964                B       UM                                                      7  02503  J 02534
```

```
PGLIN     LABEL     OPCOD   OPERAND                          CT  ADDRS  INSTRUCTION
4965                B       TYPE                              7  02510  J 01026
4966                DCW     @ B EQUAL A RESET@,G             16  02532
4967      UM        NOP                                       1  02534  N
4968                B       UN                                7  02535  J 02568
4969                B       TYPE                              7  02542  J 01026
4970                DCW     @ ARITH OFLOW RESET@,G           18  02566
4971      UN        NOP                                       1  02568  N
4972                B       UP                                7  02569  J 02600
4973                B       TYPE                              7  02576  J 01026
4974                DCW     @ DIV OFLOW RESET@,G             16  02598
4975      UP        NOP                                       1  02600  N
4976                B       UQ                                7  02601  J 02631
4977                B       TYPE                              7  02608  J 01026
4978                DCW     @ ZERO BAL RESET@,G              15  02629
4979      UQ        BBE     *&8,TAD2,1                       12  02631  W 02650 01002 1
4980                B       *&2                               7  02643  J 02651
4981                H                                         1  02650  .
4982                SW      UK&1,UL&1                        11  02651  , 02469 02503
4983                SW      UM&1,UN&1                        11  02662  , 02535 02569
4984                SW      UP&1                              6  02673  , 02601
4985                BBE     UH,TAD1,1                        12  02679  W 02273 01001 1
```

```
PGLIN     LABEL      OPCOD  OPERAND                                  CT  ADDRS  INSTRUCTION
4987        SUB-RTN 30.02   TEST COMPUTER RESET, OPTIONAL.  SIMILAR TO #30.01
4988      US           BBE  *&8,TAD4,1          ONLY DO ROUTINE IF TAD4 IS 1  12  02691  W 02710 01004 1
4989                   B    VB1                 OTHERWISE, FORGET IT           7  02703  J 03157
4990                   ZA   &5C0,WORK16-5       .                             11  02710  M 04508 04047
4991                   A    WORK16-5            . JUST LIKE #30.01             6  02721  A 04047
4992                   D    NTABLE-9,WORK16-5   .                             11  02727  % 04053 04047
4993                   C    *,*                 .                             11  02738  C 02748 02748
4994                   MLCA &UU,6               ALTER LOC 00002-00006         12  02749  D 04523 00006 T
4995      UT           B    TYPE                                               7  02761  J 01026
4996                   DCW  @PRESS COMPUTER RESET & START@,G                   28  02795
4997                   H    UT                                                 6  02797  . 02761
4998      UU           MLCA &WC1,6              RESTORE LOC 00002-00006       12  02803  D 04518 00006 T
4999                   BL   *&12                SHOULD BRANCH                  7  02815  J 02833 T
5000                   CW   UV&1,UW&1                                         11  02822  ¤ 02909 02943
5001                   BAV  *&8                 SHOULD NOT BRANCH              7  02833  J 02847 Z
5002                   B    *&12                                               7  02840  J 02858
5003                   CW   UV&1,UX&1                                         11  02847  ¤ 02909 02977
5004                   BCV  *&8                 SHOULD NOT BRANCH              7  02858  J 02872 W
5005                   B    *&12                                               7  02865  J 02883
5006                   CW   UV&1,UY&1                                         11  02872  ¤ 02909 03015
5007                   BZ   *&8                 SHOULD NOT BRANCH              7  02883  J 02897 V
5008                   B    *&12                                               7  02890  J 02908
5009                   CW   UV&1,UZ&1                                         11  02897  ¤ 02909 03051
5010      UV           NOP                                                     1  02908  N
5011                   B    VB                  EXIT HERE IF NO ERRORS         7  02909  J 03145
5012                   B    TYPCK                                              7  02916  J 01071
5013                   DCW  @#30.02@,G                                         6  02928
5014                   BBE  VA,TAD0,1                                         12  02930  W 03085 01000 1
5015      UW           NOP                                                     1  02942  N
5016                   B    UX                                                 7  02943  J 02976
5017                   B    TYPE                                               7  02950  J 01026
5018                   DCW  @ FAIL TO SET B L T A@,G                           18  02974
5019      UX           NOP                                                     1  02976  N
5020                   B    UY                                                 7  02977  J 03014
5021                   B    TYPE                                               7  02984  J 01026
```

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PGLIN    LABEL   OPCOD  OPERAND                                                  CT  ADDRS  INSTRUCTION

5022             DCW    @ ARITH OFLOW NOT RESET@,G                               22  03012
5023     UY      NOP                                                              1  03014  N
5024             B      UZ                                                        7  03015  J 03050
5025             B      TYPE                                                      7  03022  J 01026
5026             DCW    @ CIV OFLOW NOT RESET@,G                                 20  03048
5027     UZ      NOP                                                              1  03050  N
5028             B      VA                                                        7  03051  J 03085
5029             B      TYPE                                                      7  03058  J 01026
5030             DCW    @ ZERO BAL NOT RESET@,G                                  19  03083
5031     VA      BBE    *&8,TAD2,1                                               12  03085  W 03104 01002 1
5032             B      *&2                                                       7  03097  J 03105
5033             H                                                                1  03104  .
5034             SW     UV&1,UW&1                                                11  03105  , 02909 02943
5035             SW     UX&1,UY&1                                                11  03116  , 02977 03015
5036             SW     UZ&1                                                      6  03127  , 03051
5037             BBE    US,TAD1,1                                                12  03133  W 02691 01001 1
5038     VB      MLCS   @ @,TAD4          PREVENT REPEAT OF #30.01 & #30.02      12  03145  D 04524 01004 3
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LABEL      OPCOD  OPERAND                                                    CT  ADDRS  INSTRUCTION

  ROUTINE 31.00   MISCELLANECUS LONG ROUTINES

                  BECAUSE THE TIME REQUIRED TO PERFORM THIS ROUTINE
                  ANC THE NEXT IS RELATIVELY LONG, THEY ARE DONE
                  ONLY THE FIRST TIME THROUGH AND THEREAFTER ONLY
                  WHEN THE PASS COUNT WORK AREA IS REDUCED TC ZERO.

  SUB-RTN 31.01   FILL UPPER HALF OF AVAILABLE STORAGE WITH
                  WORD-MARK D.  THEN EXECUTE THESE DS AS AT LEAST
                  FIVE-THOUSAND CHAINED DATA MOVE INSTRUCTIONS.
                  CHECK ADDRESS REGISTERS AT CONCLUSION.
VB1        NOPWM                                                              1  03157  N
           B      VE2                                                         7  03158  J 03397
VC         SW     MEMSIZ            PREPARE FOR TABLE LOOK-UP                 6  03165  , 01257
           LEH    MEMSIZ,SIZTBL     IF MEMSIZ IS NON-NUMERIC, ASSUME         12  03171  T 01257 04288 6
           SBR    *&6               MINIMUM MACHINE CAPACITY                  7  03183  G 03195 B
           MLCWA  0,X2              FILLS BOTH INDEX REGS 2 AND 1            12  03190  D 00000 00034 X
           CW     MEMSIZ                                                      6  03202  ¤ 01257
           SW     4900&X2,X2-4      . CLEAR STORAGE                          11  03208  , 049.0 00030
           CS     9999&X1           . FROM                                    6  03219  / 099Z9
           SBR    *&6               . HIGHEST AVAILABLE LOCATION              7  03225  G 03237 B
           CS     0                 . TO ADDRESS AT                           6  03232  / 00000
           SBR    *-7               . HALF OF MAXIMUM                         7  03238  G 03237 B
           BW     *-24,4900&X2      . STORAGE SIZE                           12  03245  V 03232 049.0 1S
           MRCWR  K56,9977&X1       PUT SHORT ROUTINE AT END OF STOR         12  03257  D 04341 099X7 M
           SW     4978&X2           .                                         6  03269  , 049P8
           MLCWS  *-11,9976&X1      . FILL HALF OF STORAGE WITH WM-D         12  03275  D 03275 099X6 7
           MLCWB  9976&X1,9975&X1   .                                        12  03287  D 099X6 099X5 P
           MLCWA  K55&11,4977&X2    PUT INITIAL INSTRUCTION AT MID-PT        12  03299  D 04340 049P7 X
           B      4966&X2           BRANCH TO IT                              7  03311  J 04906
VD         C      HOLDA4,@00C00@    RETURN TO THIS POINT                     11  03318  C 01020 04529
           BU     VE                SHOULD NOT BRANCH                         7  03329  J 03365 /
           A      &4999,X2                                                   11  03336  A 04533 00034
           C      HOLDB4,X2                                                  11  03347  C 01025 00034
           BE     VE1                                                         7  03358  J 03391 S
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PGLIN     LABEL      OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
5075      VE         B      TYPCK                                             7  03365  J 01071
5076                 DCW    a#31.01a,G                                        6  03377
5077                 BBE    VC,TAD1,1                                        12  03379  W 03165 01001 1
5078      VE1        SW     VB1&1                                             6  03391  , 03158
5079
5080        SUB-RTN 31.02   FILL STORAGE - EXCEPT FOR APPROX THE LOWER 5100
5081                        POSITIONS - WITH A SERIES OF INDEXED BRANCH
5082                        INSTRUCTIONS ALTERNATED WITH STORE B REGISTER
5083                        INSTRUCTIONS.  THIS ROUTINE, WHICH PROVIDES NO
5084                        ERROR TYPEOUT, IS EXPECTED TO PROVE THE
5085                        RELIABILITY OF INDEXING AND SBR INSTRUCTION.
5086                        INDEX REGISTER #1 IS USED BY THE ROUTINE ITSELF,
5087                        AND INDEX REGISTERS 2 THROUGH 15 ARE TESTED.
5088
5089      VE2        NOPWM                                                     1  03397  N
5090                 B      WA                                                7  03398  J 03677
5091      VF         MLCWA  TRASH,X15          FILL ENTIRE IX REG AREA W/JUNK 12  03405  D 04472 00099 X
5092                 SW     X15                                               6  03417  , 00099
5093                 MLWB   X15,X15-1          SET WMS OVER EVERY POSITION   12  03423  D 00099 00098 M
5094                 SW     MEMSIZ             .                              6  03435  , 01257
5095                 LEH    MEMSIZ,KTABLE      .                             12  03441  T 01257 04178 6
5096                 SBR    *&6                . JUST LIKE #31.01             7  03453  G 03465 B
5097                 MLCA   0,X1               .                             12  03460  D 00000 00029 T
5098                 CW     MEMSIZ             .                              6  03472  ¤ 01257
5099                 MLCWA  &00014,XR0                                       12  03478  D 04538 00024 X
5100                 MLCA   &LTABLE,*&6                                      12  03490  D 04543 03507 T
5101      COMBAK     MLCA   0,K57&12                                         12  03502  D 00000 04375 T
5102                 SAR    *&6                                               7  03514  G 03526 A
5103                 MLCA   0,K57&4                                          12  03521  D 00000 04367 T
5104                 SAR    COMBAK&5                                          7  03533  G 03507 A
5105                 MLCA   K57&12,K58&5                                     12  03540  D 04375 04396 T
5106                 SW     5000               .                              6  03552  , 05000
5107                 CS     9999&X1            .                              6  03558  / 0999
5108                 SBR    *&6                . JUST LIKE #31.01             7  03564  G 03576 B
5109                 CS     0                  .                              6  03571  / 00000
```

```
PGLIN    LABEL     OPCOD  OPERAND                                               CT  ADDRS  INSTRUCTION

5110               SBR    *-7                .                                   7  03577  G 03576 B
5111               BW     *-24,5000          .                                  12  03584  V 03571 05000 1
5112               SW     5091                                                   6  03596  , 05091
                                                                                                           D
5113               MRCWG  K57,9977&X1                                           12  03602  D 04363 099X7 L
5114               MLCWB  9990&X1,9976&X1    FILL STOR WITH BR AND SBR INSTRS   12  03614  D 09920 099X6 P
5115               MLCWA  K58&6,5090                                            12  03626  D 04397 05090 X
5116               MLCWA                                                         1  03638  D
5117               B      5078                                                   7  03639  J 05078
5118     TOHERE    S      &1,XR0                                                11  03646  S 04544 00024
5119               BZ     *&8                EXIT ROUTINE HERE AFTER 14 LOOPS    7  03657  J 03671 V
5120               B      COMBAK                                                 7  03664  J 03502
5121               SW     VE2&1                                                  6  03671  , 03398
```

PGLIN	LABEL	OPCOD	OPERAND		CT	ADDRS	INSTRUCTION
5123			COUNT PASSES, ALLOW FOR PROGRAM MODIFICATION				
5124							
5125	WA	BNQ	INC		7	03677	J 01157 Q
5126	WB	S	&1,PCCWK		11	03684	S 04544 01015
5127		BZ	*&8		7	03695	J 03709 V
5128		B	START		7	03702	J 02000
5129		BBE	WC,TAD3,1		12	03709	W 03742 01003 1
5130		B	TYPE		7	03721	J 01026
5131		DCW	@-PASS-@,G		6	03733	
5132		B	LOADER	EXIT C020B-4 HERE	7	03735	J 00400
5133							
5134	WC	BW	WE,999	BRANCH IF INPUT WAS FROM TAPE	12	03742	V 03778 00999 1
5135	WC1	CW	TQ4&1		6	03754	¤ 01356
5136		CW	VB1&1,VE2&1		11	03760	¤ 03158 03398
5137		B	START		7	03771	J 02000

```
PGLIN     LABEL     OPCOD  OPERAND                                          CT  ADDRS  INSTRUCTION
5139                       THE FOLLOWING SERIES OF INSTRUCTIONS IS EXECUTED
5140                       ONLY IF PROGRAM INPUT WAS FROM TAPE AND THE
5141                       OPERATOR HAS ELECTED TO REPEAT THE TEST.  UNDER
5142                       THESE CONDITIONS EACH PHASE OF C020B IS RUN IN
5143                       SEQUENCE AND AFTER PERFORMING C020B-4, THE INPUT
5144                       TAPE UNIT IS BACKSPACED FOUR TIMES AND THE CYCLE
5145                       REPEATED.  THE STANDARD TADS ARE NOT RESET FROM
5146                       PHASE 4 TO PHASE 1.
5147
5148      WE        MLCS   998,READTP&1      . SET UP TAPE CHANNEL          12  03778  D 00998 03905 3
5149                MLCS   999,READTP&10     . TO AGREE WITH THAT           12  03790  D 00999 03914 3
5150                MLCS   999,READTP&17     . USED BY                      12  03802  D 00999 03921 3
5151                MLCS   999,READTP&24     . TC50                         12  03814  D 00999 03928 3
5152
5153                B      BSPTPO            . BACKSPACE                     7  03826  J 00982
5154                B      BSPTPO            . INPUT TAPE                    7  03833  J 00982
5155                B      BSPTPO            . FOUR                          7  03840  J 00982
5156                B      BSPTPO            . TIMES                         7  03847  J 00982
5157                MLCB   1003,SAVTAC                                      12  03854  D 01003 03888 L
                                                                                                    D
5158                MRCWG  SAVTAD-3,1C0                                     12  03866  D 03885 00100 L
5159                B      108                                              7  03878  J 00108
```

```
PGLIN     LABEL      OPCOD  OPERAND                                                CT  ADDRS  INSTRUCTION

5161                        DATA AND INSTRUCTIONS FROM THIS POINT TO THE END
5162                        OF THE MESSAGE  @PERSISTENT RD ERR.  START@,G
5163                        ARE MOVED TO LOCATIONS 00100 - 00259.
5164                        ADDRESSES AFTER RELOCATION ARE GIVEN IMMEDIATELY
5165                        TO THE LEFT OF THE MNEMONIC OPERATION CODE.
5166
5167      SAVTAD 103 DCW    @    @                                                  4  03888
5168             105        @  @                                                    2  03890
5169             107        &10                                                     2  03892  Q
5170             108 ZA     107,105                                                11  03893  M 00107 00105
5171      READTP 119 RTBGW  INTAPE,100C       READ C020B-1 FROM TAPE               10  03904  L %B0 01000 $
5172             129 BEX1   119,3             WAIT IF BUSY OR NOT READY             7  03914  R 00119 3
                                                                                                          G
5173             136 BA1    143                                                     7  03921  R 00143 M
5174             143 BEX1   178,@             BRANCH IF ERROR OR END OF FILE        7  03928  R 00178 @
5175             150 MLCS   103,1003          . SAVE TADS                          12  03935  D 00103 01003 3
5176             162 MLCS                     . FROM                                1  03947  D
5177             163 MLCS                     . PART 4 TO                           1  03948  D
5178             164 MLCS                     . PART 1                              1  03949  D
5179             165 SW     AH&1              PREVENT TWO STOPS IN PHASE 1          6  03950  , 02230
5180             171 B      START                                                   7  03956  J 02000
5181             178 B      BSPTPO            BACKSPACE INPUT TAPE FOR RE-READ      7  03963  J 00982
5182             185 S      233,105                                                11  03970  S 00233 00105
5183             196 BZ     21C               BRANCH IF 10 SUCCESSIVE RD ERRORS     7  03981  J 00210 V
5184             203 B      119                                                     7  03988  J 00119
5185             210 WCP    234               NOTIFY OPERATOR                      10  03995  M %T0 00234 W
                                                                                                         G
5186             220 BA1    21C                                                     7  04005  R 00210 M
5187             227 H      108               START TO TRY TEN MORE TIMES           6  04012  . 00108
5188             233 DCW    &1                                                      1  04018
5189         234-259        @PERSISTENT RD ERR.  START@,G                          25  04043
```

PGLIN	LABEL	OPCOD	OPERAND	CT	ADDRS	INSTRUCTION
5191			CONSTANTS AND WORK AREAS			
5192						
5193	WORK16	DCW	@ @	8	04052	
5194			&0	1	04053	
5195			&1	1	04054	
5196			&2	1	04055	
5197			&3	1	04056	
5198			&4	1	04057	
5199			&5	1	04058	
5200			&6	1	04059	
5201			&7	1	04060	
5202			&8	1	04061	
5203	NTABLE		&9	1	04062	
5204			@QC@M@	2	04064	
5205			99	2	04066	
5206			@Q'.@	2	04068	
5207			94	2	04070	
5208			@Q‡@	2	04072	
5209			89	2	04074	
5210			@QC@	2	04076	
5211			84	2	04078	
5212			@'C.@	2	04080	
5213			79	2	04082	
5214			@''.@	2	04084	
5215			74	2	04086	
5216			@'.‡@	2	04088	
5217			69	2	04090	
5218			@'.C@	2	04092	
5219			64	2	04094	
5220			@‡C@	2	04096	
5221			59	2	04098	
5222			@‡'.@	2	04100	
5223			54	2	04102	
5224			@‡‡@	2	04104	
5225			49	2	04106	

PGLIN	LABEL	OPCOD	OPERAND	CT	ADDRS	INSTRUCTION
5226			a‡0a	2	04108	
5227			44	2	04110	
5228			a0Ma	2	04112	
5229			39	2	04114	
5230			a0.a	2	04116	
5231	LTABLE		34	2	04118	
5232			a8996490	6	04124	
5233			a7996880	6	04130	
5234			a6997270	6	04136	
5235			a5997660	6	04142	
5236			a4998050	6	04148	
5237			a3998440	6	04154	
5238			a2998830	6	04160	
5239			a1999220	6	04166	
5240			a0999610	6	04172	
5241	KTABLE		a0000000	6	04178	
5242			a900004500C9a	11	04189	
5243			a800004000C8a	11	04200	
5244			a700003500C7a	11	04211	
5245			a600003C00C6a	11	04222	
5246			a500002500C5a	11	04233	
5247			a400002000C4a	11	04244	
5248			a300001500C3a	11	04255	
5249			a2C0001000C2a	11	04266	
5250			a100000500C1a	11	04277	
5251	SIZTBL		a0C00000000C0a	11	04288	
5252	K46		9	1	04289	
5253	K47		8	1	04290	
5254	K48		0	1	04291	
5255	K49	B	WC1	7	04292	J 03754
5256		DCW	a‡a	1	04299	
5257	K50		a0,, 0a	6	04305	
5258	K51		a9 .,-.a	6	04311	
5259	K52		a 9,$‡a	5	04316	
5260	K53		a a	6	04322	

```
PGLIN     LABEL     OPCOD   OPERAND                                  CT  ADDRS  INSTRUCTION
5261      K54               @9 .,-0@                                  6  04328
5262      K55       SCNLS   50C0&X2,9999&X1                          12  04329  D 050.0 099Z9
5263      K56       SAR     HOLDA4                                    7  04341  G 01020 A
5264                SBR     HOLDB4                                    7  04348  G 01025 B
5265                B       VD                                        7  04355  J 03318
5266                DCW     @+@                                       1  04362
5267      K57       B       0                                         7  04363  J 00000
5268                SBR     0                                         7  04370  G 00000 B
5269                B       TOHERE                                    7  04377  J 03646
5270                DCW     @M@                                       1  04384
5271                CW      5099                                      6  04385  ¤ 05099
5272      K58       SAR     0                                         7  04391  G 00000 A
5273                DCW     @-+0&&+0&-+0&-+0&-+0&-+0&+@              25  04422
5274                DC      @+0&-00&-+&&-+0+-+0&0+0&-&@              25  04447
5275      TRASH             @0&-++&-+0C-+0&&+0&-+0&-+0@              25  04472
5276
5277                LTORG   *                                            04473
5277                        @00I @                                    4  04476
5277                        &5                                        1  04477
5277                        @AC0@                                     3  04480
5277                        @N00E@                                    4  04484
5277                        @J0M@                                     3  04487
5277                        @X0 00@                                   5  04492
5277                        &5C                                       2  04494
5277                        @X 550@                                   5  04499
5277                        @ .0@                                     3  04502
5277                        @8  @                                     3  04505
5277                        &500                                      3  04508
5277                        UJ                                        5  04513  02384
5277                        WC1                                       5  04518  03754
5277                        UU                                        5  04523  02803
5277                        @ @                                       1  04524
5277                        @00000@                                   5  04529
5277                        &4999                                     4  04533
5277                        &00014                                    5  04538
```

PGLIN	LABEL	OPCOD	OPERAND	CT	ADDRS	INSTRUCTION
5277			LTABLE	5	04543	04118
5277			&1	1	04544	
5278						
5279		END	START 12/31/63 KRB			J02000

END OF ASSEMBLY

SUMMARY

I. There are four System Control Cards in C020B; they are the first data cards in each of the four phases and one numbered 001, 184, 366 and 549. Cards 001 and 549 provide information to program phases 1 and 4 regarding CPU storage capacity. Data on cards 184 and 366 are not required by this program.

II. C020B must be loaded by means of the Card Load Program L1A or Tape Control Program TC50 ( ). Proper operation of C020B depends upon data that are placed in memory by these programs.

III. TAD 4 at location 01004 is the only special TAD used by this program. If set to "1", subroutine Nos. 30.01 and 30.02 will be included in the test during C020B-4. Subroutines 30.01 and 30.02 require manual intervention and contain programmed Halt instructions. TAD 4 may be set to "1" by the CE during any of the four phases; it will be reset to a blank by the program after performing subroutine No. 30.02.