9M05

709 FLOATING POINT DIAGNOSTIC

THIS PROGRAM ASSUMES THAT ALL
FIXED POINT AND INDEXING
INSTRUCTIONS ARE CORRECT

A. UNIT TESTED

1. PURPOSE

To examine the results of floating point operations, to provide an accuracy and reliability test for floating point, to provide a trace to insure that each test is undertaken in proper sequence.

2. METHOD

General

In general, a floating point operation is performed, and the results are examined by means of the fixed-point instructions. The program is divided into three parts, each part is divided into two sections. They are as follows:

Part 1

Section 1 - This is the basic execution controls program, with floating point operations which should not trap, non-linear programming begins late in this section to provide more vigorous test.

Section 2 - This is the basic floating point trap program. Its purpose is to insure that floating point trap will occur on spill conditions.

Part 2

Section 1 - This is the floating point trap program which provides a complete examination of floating point trap operation by extended use of non-linear programming.

Section 2 - This is the floating point accuracy and reliability program. Its purpose is to insure reliability of floating point under all worst case conditions likely to be encountered during actual application by a customer. Extensive use is made of subroutines and indexing for program control. As the program proceeds, the tests become more complex and more extensive floating point operations are performed before the answers can be check. If and error occurs in this section and not in the the preceeding sections, then there is most likely a sliver condition developing and causing a beat failure.

Part-3

Section 1 - This section repeats the operations of Part 2, Section 1, with the addition of indirect addressing, except that it begins with a cursory check of the three floating point circuits with indirect addressing. The purpose of this section is to see what effect, if any, indirect addressing will have on floating point trap.

Section 2 - This section repeats the accuracy tests of Part 2, Section 2, with the addition of indirect addressing. Its purpose is to see what effect, if any, indirect addressing will have on floating point accuracy and reliablity.

Monitor

9M05 includes a program monitor to prevent the program from skipping wildly into unused portions of core storage, and to provide some means of detecting random address errors which are difficult to predict. This is accomplished as follows:

When 9M05 is begun at the normal starting addres, 6273, all locations in core storage, regardless of size, which are not used by the normal operation of 9M05 are replaced by TSX Space 4. In addition, the starting address of every test is recorded by monitor. Thus, if the program skips out of control, monitor can recover control and return to the test which has been underway when this error occurred.

Tracing

In addition to monitor, 9M05 includes a tracing routine. 9M05 may be operated in the tracing mode as follows:

When 9M05 is first loaded and tracing is caled for by the special transfer card supplied with the deck, explained under program control, the normal start of 9M05, 6273 is bypassed, 9M05 and 9DEPR are altered, and 9M05 will begin at 30. As each test is completed the address recorded in monitor and the terminating address of the test is printed in octal. Any error indications will also be printed normally by 9DEPR if sense switch 3 is up. When 9M05 has completed one pass in the tracing mode, the trace program is erased, the program is restored to normal, and will proceed once more from 6273 in the normal mode. Tracing will not take place again unless the program is reloaded. Sense switch settings do not suppress tracing. Note that tracing merely follows 9M05 whenever it may go. It does not interfere with its operation, but it does make some changes which are not restored until one pass of the program is completed. If tracing is to be suspended before the end of one pass, manually transfer to 6302. The program will then be restored, the tracing routine erased, and 9M05 will restart in the normal mode.

B. AREA REQUIRED

Units-Card Reader, Printer, Main Frame.
All core locations are written when 9M05 starts at 6273, See-Unit Tested.

C. PROGRAM CONTROL

Deck
1 - For normal operation, ready in card reader.
9M05B 000 through
9M05B 192
This deck includes 9DEPR diagnostic error print subroutine.
Cards 191 and 192 are used only with 4k machine.

Depress Load cards

Card 9M05B 188 is the normal transfer card which transfers to 6???. The start routine sets monitor, erases the trace program and transfers to 30 to being 9M05 in the normal mode.

2 - For Trace Operation
Place 9M05B 189 in
Front of 9M05B 188

Depress Load Cards

Card 9M0B 189 is the trace transfer card which transfers to 6341. The trace program will make suitable alteratuions in 9M05B, and transfer to 30 to being 9M05B in the tracing mode. When one pass has been completed, the tracing program is erased, and 9M05 will restart normally at 6273.
Sense Switches.
Refer to the write-up of 9DEPR for sense switch settings.
If switch 5 is down, perform FDH with halt.

D. NORMAL STOPS

With sense switch 5 down, stop at 0621 with divide check on, on first pass of the program only.

E. ERROR STOPS

With sense switch 3 down and 2 up, normal etrror stops in 9DEPR at 6517 or 6545.

F. PRINT-OUTS

With sense switch 2 and 3 up, normal error prints by 9DEPR,. When operating in tracing mode, trace prints regardless of sense switch settings. it is highly recommended that errors be allowed to print, since the print-out is not likely to be misleading.

G. COMMENTS

9M05 is designed to provide not only a basic test of floating-point, but also to provide a rigorous test under all extreme conditions that can be predicted in normal customer applications. Diagnostic Engineering will be grateful for any suggestions, criticisms or complaints regarding this test.

H. HOW TO USE 9M05

A single pass of the program without errors takes about 5 seconds. Most effective use of the program would be to allow it to repeat for several minutes under sense switch 4 and/or 6 control.

Each part of the test will be considered separately.

Part 1

Section One is the basic execution controls test. Section Two is the basic floating point trap program. There are no legal trap conditions in Section One.

Non-linear programming is introduced in Part One. This means, simply, that subroutines are used to a great extent to check results of each test, and to service each test. The use of subroutines has several advantages.

1. They conserve storage space, since routines which are performed most often are written only once for the entire program rather than once for each test.

2. They provide for a more rigorous test, since each test is free to perform complete checking at a minimum expenditure of storage.

3. They make the main program easier to follow, since all instructions not directly pertaining to the operation but only incidental to it are listed elsewhere. In addition, when an error occurs, the engineer is referred to a place on the listing which not only indicates what error occurred, but also contains the correct arithmetic result directly on the listing.

4. The job of learning the program is simpler, since each error or service subroutine need be studied only once, rather tehn once for each test in the program.

The subroutines are described on later pages.

Part 2

Section One provides an extended test of floating point trap. Not only are all the arithmetic results checked but also all the information written at zero is checked. All possible combinations of the four indicator bits are provided for.

Section Two is the Reliability Tests.

Part 3

Part 3 is essentially the same as Part 2 except that indirect addressing is included. If Part 1 and Part 2 run and Part 3 does not, it may be safe to assume that indirect addressing is interferring with floating point, or visa versa.

What the subroutines do, and what the error indication mean.

6211 Clear - This subroutine checks the sequence of each test which uses it to assure that each test is being performed in proper order and that nothing has been skipped. Every test within 9M05, except the very first test, enters clear, thus, before every test starts, we make sure that this test is in its proper sequence. Three conditions are tested for:

1. With sense switch 1 or 4 down the test should be repeated. See that the starting address of this test is the same as the address recorded in 6120. Or
2. Normal sequence. Sense switch 1 and 4 up. See that this test is the one which follows the test whose starting address is recordded in 6120. Or
3. Manual Transfer - See that the keys contain the instruction TRA X, and that X is the same as teh starting address of the test now being entered.

If these conditions are fulfilled, then the program goes on to-Reset- if not then tranfer is made to -Space-. See below.

6246 Reset - This routine simply resets all registers and indicators in the main-frame, clears location zero, and stores the address of the test which uses it in the decrement of 6120. -Resset- does not check program sequence.

6265 Part 2 - This subroutine simple turns on sense light 4 and goes to Clear+1. Light 4 is used to signal the trap routine that a return address has been placed at Sect 2, 6131.

6270 Part 3 - This subroutine turns on sense light 3 and goes to Part 2. Light 3 is merely a visual signal to indicate that indirect addressing is being used by the test.

5137 ACB - This subroutine checks columns S, Q, P and 35 of the accumlator as follows:
The word following the instruction TSX ACB,4 is loaded into indicator register columns 32, 33, 34 and 35. Then, if ACC 35 is a 1, indicator column 35 is inverted, if P is a 1, indicator 34 is inverted, if Q is 1, indicator 33 is inverted, if S is a 1, indicator 32 is inverted. The ACC and MQ are restored after this operation. If the test is successful, the indicators will be zero, otherwise the indicators will contain an octal number corresponding to the bits S, Q, P and/or 35 of the ACC which were wrong. This bit code is given in a table listed with the subroutine. If the indicators are not zero, the sub-routine executes TIX error-1,4 note that the ERR location complement is already in XRC, and is reduced by one, therefor the error location given is the address of the word which contains the correct bit code, the indicators contain the bit codes for the bits in error.
ACC and MQ are unchanged.
This subroutine also stores the logical accumulator at SALON+5, 5717, and the MQ at Q, 6115 in preparation for the following routines.

5164 ACCF - This subroutine assumes that ACB has stored the ACC at 5717, and checks, then, the accumulator columns 1 through 34 as follows:

The word at 5717 is brought to the accumulator by ADM, and column 35 is dropped by ANA - then the correct answer, which follows the TSX ACCF,4 instruction is subtracted from the accumulator, if the test is successful, the ACC zeros. If the ACC does not zero, the word subtracted is added back, then the correct answer is placed in the MQ, and the subroutine executes TIX error-1,4,1. Thus the error location given is the word which contains the correct answer. Note that the accumulator contains its original result, that is, the incorrect result, and the MQ contains the correct result.

5174 MQF - This subroutine assumes that ACB has stored the original MQ result at 6115, and checks this result as follows: The word following the TSX MQF,4 instruction is teh correct answer, this is loaded into the MQ. Then the word at 6115 is brought into the ACC, and then checking proceeds as described in ACCF. Thus the error location is the address of the correct answer. The ACC contains the original MQ result, that is, the incorrect answer. The MQ contains the correct result.

5177 ZERO - This subroutine checks the address written in location zero as follows: The word following the instruction TSX Zero,4 is the correct address. The address past of location zero is brought to the ACC through XRA, the correct address is loaded into the MQ, checking proceeds as described in ACCF. Thus the error location given is the address of the word which contains the correct address that should have been written in zero, the accumulator contains the address which was written in zero. The MQ contains the correct address. Location zero is unchanged.

5203 BITS - This subroutine checks the decrement part of location zero in the same manner as descibed for _ZERO-, above.

5212 SETIT - This subroutine services test ITS -2575-, two divsions are performed if the first division causes a trap, the error lcoation given will be from -SETIT-,-5212-. If the test is to continue, this subroutine clears the previous MQ and ACC contents, and sets the correct contents and returns to ITS+7, to continue the test.

5217 SETID - This subroutine services test IDIH, 4352, in the same way and for the same reason as given above for SETIT.

5125 UONLY - This subroutine checks the overflow and divide check trigs, ACC overflow trigger should be off, if it is on, the error location will be the address of the instruction TSX UONLY,4. If the divide check trigger is on the error location will be 2 locations following the TSX UONLY,4 instruction.

OONLY - EQUALS-UONLY

5224 SQRT - This subroutine takes the square root of the floating point number which is in the accumulator upon entry to the subrouine. If the ACC is minus, the subroutine returns to the location following the TSX SQRT,4 instruction, which is defined as an error return. If the ACC is not minus, but is zero, the return is two locations following the TSX SQRT,4 instruction, because the square root of zero is zero and no calculation is required.

Otherwise the square root is extracted by the basic Newtonion iteration method, which is:

$$X_1 = 1/2 \left(X_0 + \frac{N}{X_0}\right)$$

Where X_0 is teh first trail root, and N is the radicand.
The iteration continues for 13 cycles, namely until X_{13} has been calculated. This should give the floating point root exact to 9 octal places. When the iterations have been completed, the root is placed in the accumulator and return is made to the second location following the TSX SQRT,4 instruction. The results are checked there in the main program.

****** If you wish to repeat this routine witha given number for scoping, perform the following steps:

1. Store the desired number at 77777

2. Replace 5242 with the instruction CLA 77777

3. Replace 5243 with the instruction TRA 5227

4. Depress reset

5. Set the instruction counter to 5241 by manual tranfer

6. Execute TSX 6246 TAG 4.

7. Put sense switch 2 down

8. Put in automatic and press start

The square root of the chosen number will continually be extracted. If the routine traps of skips into space control will be returned to the routine by monitor. If switch 2 is up, these last two conditions will cause an error indication by 9DEPR.

5246 SQRI - This subroutine is exactly the same as SQRT described above, except that indirect addressing is used.

****** If you wish to repeat the iterations with a given value for scoping, perform the following steps:
1. Store the desired value at 77777

2. Replace 5264 with the instruction CLA 77777

3. Replace 5266 with the instruction TRA 5251

4. Depress reset

5. Set the instruction counter to 5263

6. Execute TSX 6246 TAG 4.

7. Put sense switch 2 down

8. Put in automatic and press start

The square root of the chosen number will continually be extracted. If the routine traps of skips wildly into space, control will be returned to the routine by monitor. If switch 2 is up, these last two conditions will cause an error indication by 9DEPR.

5266 ENK - This subroutine is used to examine the console keys. If the S key is down the value in the keys is entered and examined. If the value is a floating point number whose characteristic is greater then 200, but less then 233, and whose fractional part represents an octal integer, that is, a whole number, then the value is accepted by the program, otherwise it is not accepted. S is not entered. This value is used by -FXFLM-, -3427.

5313 PRINT - This subroutine extracts the primitive root at the value found in the accumulator upon entry. The method used is the method of Gruenburger and proceeds as follows:

1. The prime is checked to make sure it is greater than 2, less than 7777.

2. The value 2 is subtracted and the prime is made a fixed point number.

3. This number is preserved at 5713 and is called the tally count.
The original floating point prime is stored at 5712.

4. The tally count is placed in XRB, and 12 is placed in XRA.

5. The first trial root is selected and stored at 5757.

6. The trial root is squared, and the squared placed at 5760, then divided by the prime.

7. The decimal places are removed from the quotient, and the whole number part, the integral part only, is used. This is multiplied by the original prime.

8. Then the value at 5760, the dividend, is subtracted from the above product. If the result is minus one, and if the tally count is one, then the root has been found. If the result is less than minus one, and,

IF-The tally count is greater than one, then the tally count is stepped down one, the result just calculated is stored at 5757, and used as the the trial root, and the iteration repeats.

OR- The tally count is one. The tally count is reset to its initial value, a new trial root is selected, and the iteration repeat.

In any event, if the result at step 8 is positive, then there is sure proof of a machine failure, since no combination of positive whole numbers can produce a positive remainder in step 8. All the primes and correct answers are listed on page 51 of the program listing.

The error locations from the primitive root routine are as follows:

3706 The root calculated was wrong, the correct root is in the MQ. Refer to page 51 of the listing for the prime used. This error could have occurred almost anywhere. See -Error Analysis- for methods of detecting the trouble.

3721 The power to which the root must be raised is wrong. This values is simply the value at 5712 minus one. The error occurred most likely in CLA and FSB.

3724 RATS - The prime given to the subroutine was found to be out of range; this of course is wrong. The correct root is in the MQ. You may refer to the table on page 51 to find the prime involved. Display XRB, if XRB is 3740 then the error occurred between 5314 and 5332. Otherwise, the error occurred within the iteration. See Error Analysis.

3731 This error indicates that a prime number had divided evenly into some other number, which is impossible. Error was detected at 5431. See Error Analysis.

3734 This indicates that the result went plus at 5351 or 5354. This is not arithmetically possible with any two positive whole numbers as explained before. See Error Analysis.

3742 This indicates that a F.P. trap occurred. The address of the instruction that caused trap is in XRB.

ERROR ANALYSIS - This program takes over a thousand iterations. Its purpose is to provide an extreme case reliability test of floating point. Errors which this test is designed to show up are intermittant beat failures which, as you know, are extremely difficult even to detect, much less pin down. A list of all correct answers for each step of the iteration would be impractical, since this would require a table 80 pages long. The best way to detect teh trouble would be either.

If you suspect a given floating point instruction, transfer to a basic test and scope that
or
scope he primitive root iteration. This may be accomplished in the following way.

5712 When error indication is given, the prime used is still stored at 5712, and the tally count at 5713. You may display these locations to check, and refer to the table on page 51 to find the proper root. Remember, the tally count is 2 less than the fixed

point value of the prime. After you have made sure the desired values are at these locations then, to scope the test

1. Replace 5362 with the instruction TSX 5332 TAG 4

2. Replace 5365 with the instruction TRA 5362

3. Replace 5366 with the instruction TRA 5362

4. Set the instruction counter to 5361

5. Execute TSX 6246 TAG 4

6. Sense switch 2 Down

7. Put in automatic and press start

The primitive root will continually be extracted for the desired number. If the routine traps or skips wildly into space, control will be returned to teh routine by monitor.

5374 PRID - This subroutine is exactly the same as PRIRT, execpt that it uses indirect addressing. All the indirect addresses refer to PRIRT. The prime is stored at 5712 and the tally count at 5713 as in PRIRT. To scope the test

1. Replace 5443 with the instruction TSX 5413 TAG 4

2. Replace 5446 with the instruction TRA 5443

3. Replace 5447 with the instruction TRA 5443

4. Set the instruction counter to 5442

5. Execute TSX 6246 TAG 4

6. Sense switch 2 Down

7. Put in automatic and press start

The primitive root will continually be extracted for the desired number. If the routine traps or skips wildly into space, control will be returned to teh routine by monitor.

6121 SEQ - This is the trap sequence. If sense light 4 is on the XRC is 0, then the instruction at SECT2 is executed. If light 4 is off, a transfer is made to -WHAT-, 6132, where the nature of the trap error is determined.

6156 If light 4 is on, it remains on, and XRC is examined. If XRC is not zero, transfer is made to XRCE, 6156. The value in XRC is moved to XRB and an error indication is given.

The error location is at or near the address at zero. Please remember that this is a floating point trap address. After the error, XRCE returns to SEQ, which preserves the trap address and then executes the instruction at SECT2, 6131. ACC and MQ are unchanged.

6132 WHAT - This routine is entered as explained in SEQ. The address of zero is examined, if this address is zero, or if it is the same as the last trap address written as recorded at 6137 decrement, then transfer is made to OUTER, 6171. If these conditions do not exist, then transfer is made to FADED, 6152. ACC and MQ are unchanged.

6152 FADED - This error indication means that the program arrived at 10 when no trap should have occurred. The error location is one less than the address at zero. This routine returns to the main program at the address specified at zero. ACC and MQ are unchanged.

6171 OUTER - This routine merely sets XRC and transfers to SPACE, 6174.

6174 SPACE - This routine is entered whenever the program skips to an unused portion of core storage or skips from one test to another out of sequence. The address to which the skip was made is in the decrement of the indicator register. The address to which the routine returns control is in the address of the indicators, and is considered to be the location of the test which skipped out of control. ACC and MQ are unchanged.

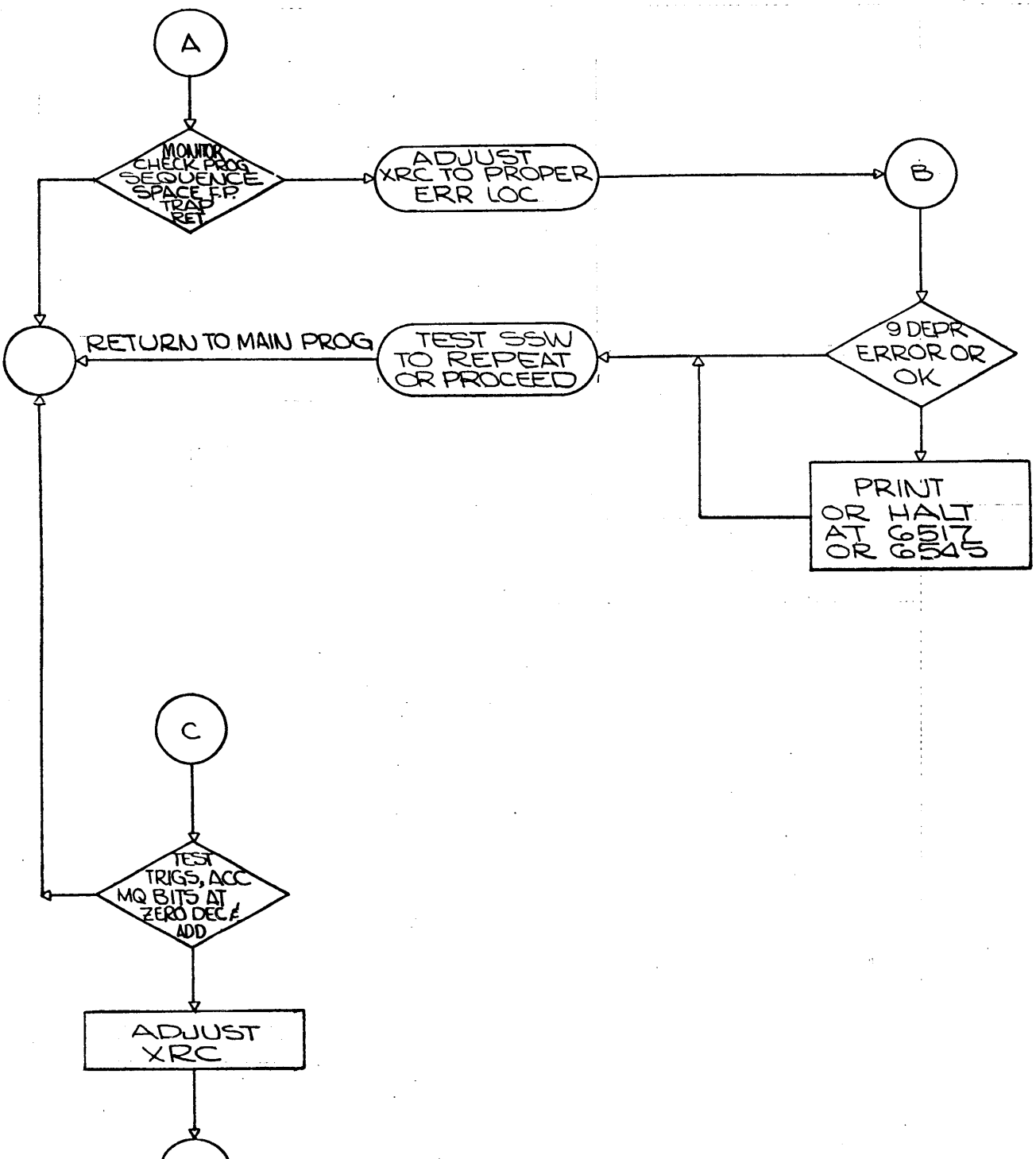
9M05B - 4K STORAGE

To run 9M05B with 4K Storage, insert cards 191 and 192 in front of card 188 and remove cards 186 and 187 from the program deck.

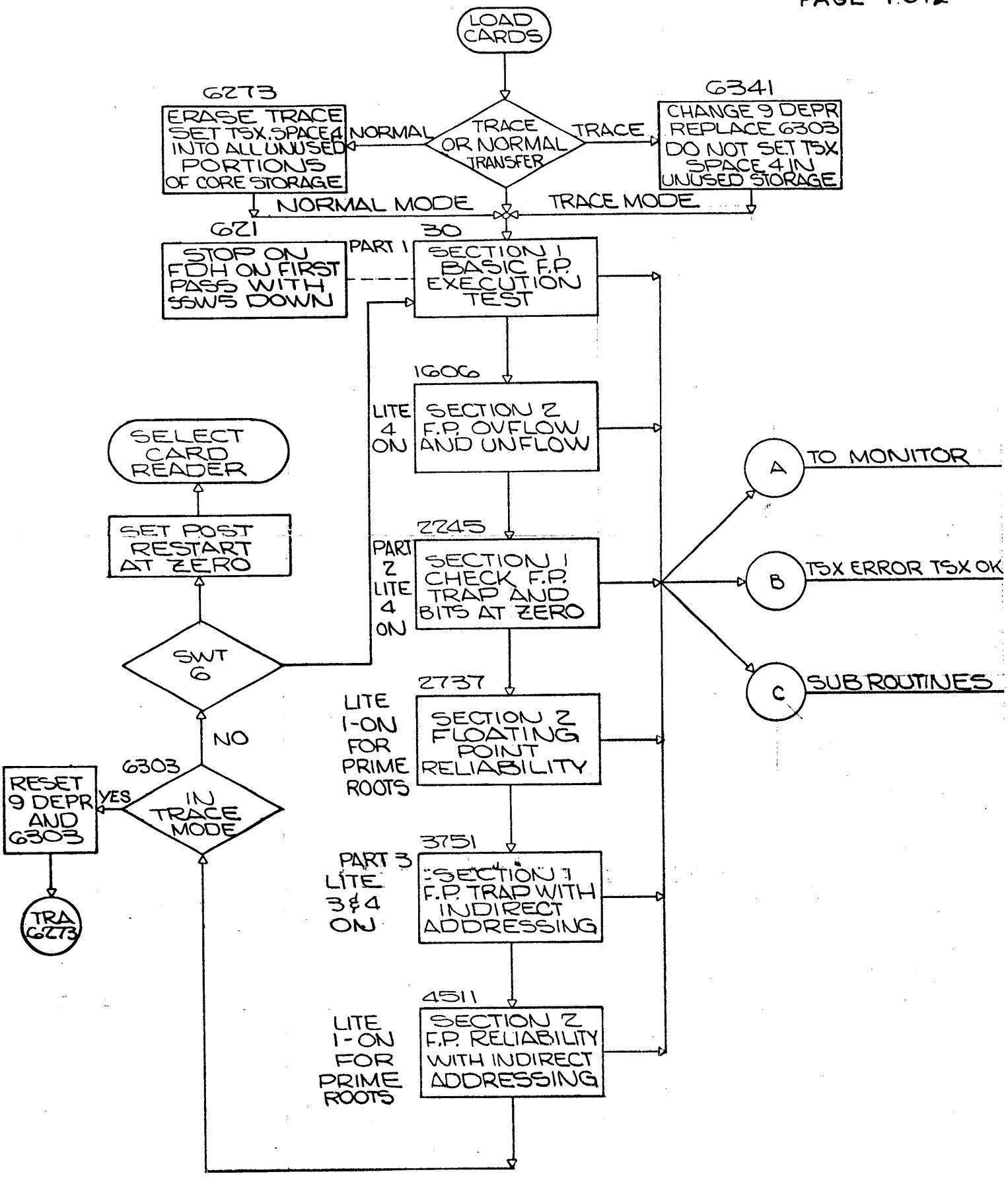
This change will eliminate the following two typeouts - NOW PERFORMING DIAGNOSTIC 9M05, and 10 PROGRAM PASSES COMPLETE.

File Attachments: Source Cards Deck
File Attachments: Source Cards Deck

9M05 GENERAL FLOW



9M05 GENERAL FLOW



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* 9M05,    709 FLOATING POINT.

*9M05,  FLOATING POINT FUNCTION INTERROGATION
*PROGRAMME FOR THE IBM TYPE 709 COMPUTING ENGINE.



                 00001         ORG 1
00001  0074 00 4 06174         TSX SPACE,4
00002  0074 00 4 06174         TSX SPACE,4
00003  0074 00 4 06174         TSX SPACE,4
00004  0074 00 4 06174         TSX SPACE,4
00005  0074 00 4 06174         TSX SPACE,4
00006  0074 00 4 06174         TSX SPACE,4
00007  0074 00 4 06174         TSX SPACE,4
00010  0021 00 0 06121         TTR SEQ       FOR F.P. TRAP
00011  0074 00 4 06174         TSX SPACE,4
00012  0074 00 4 06174         TSX SPACE,4
00013  0074 00 4 06174         TSX SPACE,4
00014  0074 00 4 06174         TSX SPACE,4
00015  0074 00 4 06174         TSX SPACE,4
00016  0074 00 4 06174         TSX SPACE,4
00017  0074 00 4 06174         TSX SPACE,4
00020  0074 00 4 06174         TSX SPACE,4
00021  0074 00 4 06174         TSX SPACE,4
00022  0074 00 4 06174         TSX SPACE,4
00023  0074 00 4 06174         TSX SPACE,4
00024  0074 00 4 06174         TSX SPACE,4
00025  0074 00 4 06174         TSX SPACE,4
00026  0020 00 0 00030         TRA L31
                 00027         ORG 23



*BEGIN PART 1 OF 9M05.
*SECTION 1, NO FLOATING POINT TRAP.
                                           TEST UFA FOR NOT CLEAR-
                                           ING CHAR ON FR EQUAL 0
00027  642621606060            BCD 1UFA
00030  0074 00 4 06246   L31   TSX RESET,4
00031  0500 00 0 05547         CLA K34       CH 233 FR-707070707
00032 -0300 00 0 05550         UFA K34+1     CH 233 HR +707070707
00033  0100 00 0 00037         TZE *+4       NG
00034  0763 00 0 00043         LLS 35
00035  0400 00 0 05551         ADD K34+2     L +2000000000
00036  0100 00 0 00040         TZE *+2       OK
00037  0074 00 4 06504         TSX ERROR,4
00040  0074 00 4 06511         TSX OK,4
00041  0020 00 0 00030         TRA L31

                                           ACC, MQ SIGNS UNLIKE IN
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```
                                                    ANS, NO NORMALIZING NEEDED
00042  262124606060            BCD 1FAD
00043  0074 00 4 06211   L33   TSX CLEAR,4
00044  0500 00 0 05552         CLA K35       CH 234 FR-60000000000
00045  0300 00 0 05554         FAD K36       CH 233 FR +4000000000
00046  0400 00 0 05553         ADD K35+1     CH 234 FR +400000000
00047  0100 00 0 00051         TZE *+2
00050  0074 00 4 06504         TSX ERROR,4
00051  0074 00 4 06511         TSX OK,4
00052  0020 00 0 00043         TRA L33


*             TEST - FLOATING SUBTRACT

00053  266222606060            BCD 1FSB
00054  0074 00 4 06211   L32   TSX CLEAR,4
00055  0500 00 0 05550         CLA K34+1     CH 233 FR +707070707
00056  0302 00 0 05550         FSB K34+1     CHECK CLEARING ON 0 FR
00057  0100 00 0 00061         TZE *+2
00060  0074 00 4 06504         TSX ERROR,4
00061  0074 00 4 06511         TSX OK,4
00062  0020 00 0 00054         TRA L32

                                            TEST FSB SIGN EXCHANGE
00063  266222606060            BCD 1FSB
00064  0074 00 4 06211   L34   TSX CLEAR,4
00065  0500 00 0 05555         CLA K37       CH 204 FR +600000000
00066  0302 00 0 05556         FSB K37+1     CH 201 FR +40000000
00067 -0120 00 0 00072         TMI *+3       NG
00070  0402 00 0 05557         SUB K37+2     L +204540000000
00071  0100 00 0 00073         TZE *+2       OK
00072  0074 00 4 06504         TSX ERROR,4
00073  0074 00 4 06511         TSX OK,4
00074  0020 00 0 00064         TRA L34

                                            TEST UFS FOR NOT
                                            CLEARING ON 0 FR
00075  642662606060            BCD 1UFS
00076  0074 00 4 06211   L35A  TSX CLEAR,4
00077  0500 00 0 05550         CLA K34+1     CH 233 FR + 707070707
00100 -0302 00 0 05550         UFS K34+1
00101  0402 00 0 05603         SUB K46       L +  233000000000
00102  0100 00 0 00104         TZE *+2       OK
00103  0074 00 4 06504         TSX ERROR,4
00104  0074 00 4 06511         TSX OK,4
00105  0020 00 0 00076         TRA L35A


*             TEST - FLOATING MULTIPLY

                                            TEST UFM FOR CHAR. ADJUST.
                                            WITCH CH MORE THEN 128
00106  642644606060            BCD 1UFM
00107  0074 00 4 06211   L35   TSX CLEAR,4
00110  0560 00 0 05560         LDQ K40       CH 211 FR +000000001
00111 -0260 00 0 05561         UFM K40+1     CH 222 FR +00000001
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00112  0402 00 0 05562          SUB K40+2      L +233000000000
00113 -0100 00 0 00117          TNZ *+4        NG
00114  0763 00 0 00010          LLS 8          MQ CH TO ACC
00115  0402 00 0 05563          SUB K41        L +0200
00116  0100 00 0 00120          TZE *+2        OK
00117  0074 00 4 06504          TSX ERROR,4
00120  0074 00 4 06511          TSX OK,4
00121  0020 00 0 00107          TRA L35

                                               TEST UFM FOR CHAR. ADJUST.
                                               WITH CH LESS THEN 128
00122  642644606060             BCD 1UFM
00123  0074 00 4 06211   L36    TSX CLEAR,4
00124  0560 00 0 05564          LDQ K42        CH 174 FR +000000001
00125 -0260 00 0 05565          UFM K42+1      CH 170 FR +000000001
00126  0402 00 0 05566          SUB K42+2      L +164000000000
00127 -0100 00 0 00133          TNZ *+4        NG
00130  0763 00 0 00010          LLS 8          MQ CH TO ACC
00131  0402 00 0 05567          SUB K42+3      L + 131
00132  0100 00 0 00134          TZE *+2        OK
00133  0074 00 4 06504          TSX ERROR,4
00134  0074 00 4 06511          TSX OK,4
00135  0020 00 0 00123          TRA L36

                                               TEST UFM FOR SIGN ADJUST
                                               BOTH SIGNS +
00136  642644606060             BCD 1UFM
00137  0074 00 4 06211   L37    TSX CLEAR,4
00140  0560 00 0 05550          LDQ K34+1      L + 233707070707
00141 -0760 00 0 00003          SSM            ACC SIGN -
00142 -0260 00 0 05550          UFM K34+1      MULT. BY NO.
00143 -0120 00 0 00146          TMI *+3        ACC 5 NG
00144  0763 00 0 00000          LLS            MG S TO ACC S
00145  0120 00 0 00147          TPL *+2        OK
00146  0074 00 4 06504          TSX ERROR,4
00147  0074 00 4 06511          TSX OK,4
00150  0020 00 0 00137          TRA L37

                                               TEST UFM FOR SIGN ADJUST
                                               BOTH SIGNS -
00151  642644606060             BCD 1UFM
00152  0074 00 4 06211   L40    TSX CLEAR,4
00153  0560 00 0 05547          LDQ K34        L -233707070707
00154 -0760 00 0 00003          SSM            ACC SIGN -
00155 -0260 00 0 05547          UFM K34        MULT. BY - NO.
00156 -0120 00 0 00161          TMI *+3        ACC S NG
00157  0763 00 0 00000          LLS            MQ S TO ACC S
00160  0120 00 0 00162          TPL *+2        OK
00161  0074 00 4 06504          TSX ERROR,4
00162  0074 00 4 06511          TSX OK,4
00163  0020 00 0 00152          TRA L40

                                               TEST UFM FOR SIGN ADJUST
                                               MQ -, STG +
00164  642644606060             BCD 1UFM
00165  0074 00 4 06211   L41    TSX CLEAR,4
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```
00166  0560 00 0 05547         LDQ K34        L -233707070707
00167  0500 00 0 05506         CLA K0         L + 0
00170 -0260 00 0 05550         UFM K34+1      MULT. BY + SAME NO.
00171  0120 00 0 00174         TPL *+3        ACC SIGN NG
00172  0763 00 0 00000         LLS            MQ S TO ACC S
00173 -0120 00 0 00175         TMI *+2        OK
00174  0074 00 4 06504         TSX ERROR,4
00175  0074 00 4 06511         TSX OK,4
00176  0020 00 0 00165         TRA L41

                                              TEST UFM FOR SIGN ADJUST
                                              MQ +, STG -
00177  642644606060            BCD 1UFM
00200  0074 00 4 06211   L42   TSX CLEAR,4
00201  0560 00 0 05550         LDQ K34+1      L + 2337070707
00202  0500 00 0 05506         CLA K0         L + 0
00203 -0260 00 0 05547         UFM K34        MULT BY - SAME NO.
00204  0120 00 0 00207         TPL *+3        ACC S NG
00205  0763 00 0 00000         LLS            MQ S TO ACC S
00206 -0120 00 0 00210         TMI *+2        OK
00207  0074 00 4 06504         TSX ERROR,4
00210  0074 00 4 06511         TSX OK,4
00211  0020 00 0 00200         TRA L42

                                              TEST UFM FOR FR. VALUE
00212  642644606060            BCD 1UFM
00213  0074 00 4 06211   L43   TSX CLEAR,4
00214  0560 00 0 05571         LDQ K43        CH 200 FR + 0007777777
00215 -0260 00 0 05571         UFM K43
00216  0402 00 0 05572         SUB K43+1      L + 200000000777
00217 -0100 00 0 00223         TNZ *+4        ACC NG
00220  0763 00 0 00043         LLS 35         PEPARE TO CHECK MQ
00221  0402 00 0 05573         SUB K43+2      L + 145776000001
00222  0100 00 0 00224         TZE *+2        OK
00223  0074 00 4 06504         TSX ERROR,4
00224  0074 00 4 06511         TSX OK,4
00225  0020 00 0 00213         TRA L43

                                              TEST UFM FOR NOT CLEARING
                                              CH ON MULT. BY 0
00226  642644606060            BCD 1UFM
00227  0074 00 4 06211   L44   TSX CLEAR,4
00230  0560 00 0 05574         LDQ K43+3      CH 200 FR + 777777777
00231 -0260 00 0 05562         UFM K40+2      CH 233 FR + 0
00232  0402 00 0 05562         SUB K40+2
00233 -0100 00 0 00237         TNZ *+4        ACC NG
00234  0763 00 0 00043         LLS 35         PREPARE TO CHECK MQ
00235  0402 00 0 05551         SUB K34+2      L + 2000000000
00236  0100 00 0 00240         TZE *+2        OK
00237  0074 00 4 06504         TSX ERROR,4
00240  0074 00 4 06511         TSX OK,4
00241  0020 00 0 00227         TRA L44

                                              TEST FMP, NORMALIZEING NOT
                                              NEEDED
00242  264447606060            BCD 1FMP
```

```
00243  0074 00 4 06211   L45   TSX CLEAR,4
00244  0560 00 0 05575         LDQ K44        CH 200 FR + 777770000
00245  0260 00 0 05575         FMP K44
00246  0402 00 0 05576         SUB K44+1      L + 200777760000
00247 -0100 00 0 00253         TNZ *+4        ACC NG
00250  0763 00 0 00043         LLS 35         PREPARE TO CHECK MQ
00251  0402 00 0 05577         SUB K44+2      L + 145100000000
00252  0100 00 0 00254         TZE *+2
00253  0074 00 4 06504         TSX ERROR,4
00254  0074 00 4 06511         TSX OK,4
00255  0020 00 0 00243         TRA L45

                                              TEST FMP FOR NORMALIZING
                                              WITH 0 IN ACC 9
00256  264447606060            BCD 1FMP
00257  0074 00 4 06211   L46   TSX CLEAR,4
00260  0560 00 0 05575         LDQ K44        CH 200 FR + 777770000
00261  0260 00 0 05600         FMP K44+3      CH 200 FR + 333330000
00262  0402 00 0 05601         SUB K45        L + 177666651111
00263 -0100 00 0 00267         TNZ *+4        ACC NG
00264  0763 00 0 00043         LLS 35         PREPARE TO CHECK MQ
00265  0402 00 0 05602         SUB K45+1      L + 144200000000
00266  0100 00 0 00270         TZE *+2        OK
00267  0074 00 4 06504         TSX ERROR,4
00270  0074 00 4 06511         TSX OK,4
00271  0020 00 0 00257         TRA L46

                                              TEST FMP FOR CLEARING
                                              CH ON MULT. BY 0
00272  264447606060            BCD 1FMP
00273  0074 00 4 06211   L47   TSX CLEAR,4
00274  0560 00 0 05574         LDQ K43+3      CH 200 FR + 7777777777
00275  0260 00 0 05562         FMP K40+2      CH 233 FR TO
00276 -0100 00 0 00301         TNZ *+3        ACC TO 0
00277  0763 00 0 00043         LLS 35         PREPARE TO CHECK MQ
00300  0100 00 0 00302         TZE *+2        OK
00301  0074 00 4 06504         TSX ERROR,4
00302  0074 00 4 06511         TSX OK,4
00303  0020 00 0 00273         TRA L47


*             TEST - FLOATING DIVIDE

                                              TEST FDP FOR DIV. OF FP.
                                              STG. EQUALS ACC CH
                                              QUOT. WOULD BE LESS THAN 1
00304  262447606060            BCD 1FDP
00305  0074 00 4 06211   L50   TSX CLEAR,4
00306  0560 00 0 05506         LDQ K0         L + 0
00307  0500 00 0 05604         CLA K47        CH 200 FR +070707070
00310  0241 00 0 05605         FDP K47+1      CH 200 FR + 7070707
00311 -0320 00 0 05707         ANA KK         BLANK ACC CH
00312  0402 00 0 05606         SUB K47+2      L + 7070707
00313 -0100 00 0 00320         TNZ *+5        ACC FR NG
00314  0763 00 0 00043         LLS 35         QUOT. TO ACC
00315 -0320 00 0 05707         ANA KK         BLANK MQ CH
```

```
00316  0402 00 0 05607         SUB K47+3     L + 77777777
00317  0100 00 0 00321         TZE *+2       OK
00320  0074 00 4 06504         TSX ERROR,4
00321  0074 00 4 06511         TSX OK,4
00322  0020 00 0 00305         TRA L50

                                             TEST FDP FOR CLEARING MQ
00323  262447606060            BCD 1FDP
00324  0074 00 4 06211   L51   TSX CLEAR,4
00325  0560 00 0 05604         LDQ K47
00326  0500 00 0 05604         CLA K47       CH 200 FR + 070707070
00327  0241 00 0 05605         FDP K47+1     CH 200 FR + 707070707
00330 -0320 00 0 05707         ANA KK        BLANK ACC CH
00331  0402 00 0 05606         SUB K47+2     L + 7070707
00332  0100 00 0 00334         TZE *+2       OK
00333  0074 00 4 06504         TSX ERROR,4
00334  0074 00 4 06511         TSX OK,4
00335  0020 00 0 00324         TRA L51       PROBABLY NOT CLEARED

                                             TEST FDP FOR DIV. OF FR
                                             QUOT. IS BETWEEN 1 AND 2
00336  262447606060            BCD 1FDP
00337  0074 00 4 06211   L52   TSX CLEAR,4
00340  0500 00 0 05610         CLA K50       CH 200 FR + 760000000
00341  0241 00 0 05611         FDP K50+1     CH 200 FR +70000000
00342 -0320 00 0 05707         ANA KK        BLANK ACC CH
00343  0402 00 0 05612         SUB K50+2     L + 300000000
00344 -0100 00 0 00351         TNZ *+5       ACC FR NG
00345  0763 00 0 00043         LLS 35        QUOT TO ACC
00346 -0320 00 0 05707         ANA KK        BLANK MQ CH
00347  0402 00 0 05613         SUB K50+3     L + 433333333
00350  0100 00 0 00352         TZE *+2
00351  0074 00 4 06504         TSX ERROR,4
00352  0074 00 4 06511         TSX OK,4
00353  0020 00 0 00337         TRA L52

                                             TEST FDP FOR CHAR. ADJUST
                                             QUOT. FR LESS THAN 1
00354  262447606060            BCD 1FDP
00355  0074 00 4 06211   L53   TSX CLEAR,4
00356  0500 00 0 05614         CLA K51       CH 377 FR + 070000000
00357  0241 00 0 05615         FDP K51+1     CH 344 FR + 700000000
00360 -0320 00 0 05710         ANA KK1       BLANK ACC FR
00361  0402 00 0 05616         SUB K51+2     CH 344 FR + 0
00362 -0100 00 0 00367         TNZ *+5       ACC CH
00363  0763 00 0 00043         LLS 35        QUOT TO ACC
00364 -0320 00 0 05710         ANA KK1       BLANK MQ FR
00365  0402 00 0 05617         SUB K51+3     CH 233 FR + 0
00366  0100 00 0 00370         TZE *+2       OK
00367  0074 00 4 06504         TSX ERROR,4
00370  0074 00 4 06511         TSX OK,4
00371  0020 00 0 00355         TRA L53

                                             TEST FDP FOR CHAR ADJUST
                                             QUOT FR BETWEEN 1 AND 2
00372  262447606060            BCD 1FDP
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```
00373  0074 00 4 06211   L54   TSX CLEAR,4
00374  0500 00 0 05620         CLA K52       CH 376 FR +760000000
00375  0241 00 0 05615         FDP K51+1     CH 344 FR + 70000000
00376 -0320 00 0 05710         ANA KK1       BLANK ACC FR
00377  0402 00 0 05616         SUB K51+2     CH 344
00400 -0100 00 0 00405         TNZ *+5       ACC CH NG
00401  0763 00 0 00043         LLS 35        QUOT TO ACC
00402 -0320 00 0 05710         ANA KK1       BLANK MQ FR
00403  0402 00 0 05617         SUB K51+3     CH 233 FR TO
00404  0100 00 0 00406         TZE *+2       OK
00405  0074 00 4 06504         TSX ERROR,4
00406  0074 00 4 06511         TSX OK,4
00407  0020 00 0 00373         TRA L54

                                             TEST FDP FOR CHAR ADJUST
                                             CH ACC LESS THAN CH STG
00410  262447606060            BCD 1FDP
00411  0074 00 4 06211   L55   TSX CLEAR,4
00412  0500 00 0 05621         CLA K52+1     CH 344 FR + 0700000000
00413  0241 00 0 05622         FDP K52+2     CH 377 FR + 7000000000
00414 -0320 00 0 05710         ANA KK1       BLANK ACC FR
00415  0402 00 0 05623         SUB K52+3     CH 311 FR + 0
00416 -0100 00 0 00423         TNZ *+5       ACC CH NG
00417  0763 00 0 00043         LLS 35        QUOT TO ACC
00420 -0320 00 0 05710         ANA KK1       BLANK MQ FR
00421  0402 00 0 05624         SUB K52+4     CH 145 FR + 0
00422  0100 00 0 00424         TZE *+2
00423  0074 00 4 06504         TSX ERROR,4
00424  0074 00 4 06511         TSX OK,4
00425  0020 00 0 00411         TRA L55

                                             TEST FDP FOR SIGN ADJUST
                                             ACC. +, STG +
00426  262447606060            BCD 1FDP
00427  0074 00 4 06211   L56   TSX CLEAR,4
00430  0500 00 0 05630         CLA K54+1     CH 233 FR + 0700000000
00431  0241 00 0 05630         FDP K54+1     CH 230 FR + 7000000000
00432 -0120 00 0 00434         TMI *+2       ACC SIGN NG
00433  0162 00 0 00435         TQP *+2       MQ SIGN OK
00434  0074 00 4 06504         TSX ERROR,4
00435  0074 00 4 06511         TSX OK,4
00436  0020 00 0 00427         TRA L56

                                             TEST FDP FOR SIGN ADJUST
                                             ACC. +, STG -
00437  262447606060            BCD 1FDP
00440  0074 00 4 06211   L57   TSX CLEAR,4
00441  0500 00 0 05630         CLA K54+1     CH 233 FR + 070000000
00442  0241 00 0 05547         FDP K34       CH 230 FR -707070707
00443 -0120 00 0 00446         TMI *+3 ACC SIGN NG
00444  0162 00 0 00446         TQP *+2       MQ SIGN NQ
00445  0020 00 0 00447         TRA *+2       OK
00446  0074 00 4 06504         TSX ERROR,4
00447  0074 00 4 06511         TSX OK,4
00450  0020 00 0 00440         TRA L57
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                                                TEST FDP FOR SIGN ADJUST
                                                ACC -, STG +
00451  262447606060             BCD 1FDP
00452  0074 00 4 06211   L60    TSX CLEAR,4
00453  0500 00 0 05627          CLA K54         CH 233 FR - 007777777
00454  0241 00 0 05630          FDP K54+1       CH 233 FR + 070000000
00455  0120 00 0 00460          TPL *+3         ACC SIGN NG
00456  0162 00 0 00460          TQP *+2         MQ SIGN NG
00457  0020 00 0 00461          TRA *+2         OK
00460  0074 00 4 06504          TSX ERROR,4
00461  0074 00 4 06511          TSX OK,4
00462  0020 00 0 00452          TRA L60

                                                TEST FDP FOR SIGN ADJUST
                                                ACC -, STG -
00463  262447606060             BCD 1FDP
00464  0074 00 4 06211   L61    TSX CLEAR,4
00465  0500 00 0 05627          CLA K54         CH 233 FR - 0077777777
00466  0241 00 0 05547          FDP K34         CH 233 FR -707070707
00467  0120 00 0 00471          TPL *+2         ACC SIGN NG
00470  0162 00 0 00472          TQP *+2         OK
00471  0074 00 4 06504          TSX ERROR,4
00472  0074 00 4 06511          TSX OK,4
00473  0020 00 0 00464          TRA L61

                                                TEST FDP FOR XFER OF BITS
                                                MQ 9 TO ACC 35
00474  262447606060             BCD 1FDP
00475  0074 00 4 06211   L62A   TSX CLEAR,4
00476  0500 00 0 05677          CLA K67         CH 173 FR + 516274051
00477  0241 00 0 05700          FDP K67+1       CH 176 FR + 44444445
00500  0402 00 0 05705          SUB K67+6       L 141202471361
00501 -0100 00 0 00505          TNZ *+4         NG
00502  0763 00 0 00043          LLS 35          PREPARE TO CHECK MQ
00503  0402 00 0 05701          SUB K67+2       L + 176444444443
00504  0100 00 0 00506          TZE *+2
00505  0074 00 4 06504          TSX ERROR,4
00506  0074 00 4 06511          TSX OK,4
00507  0020 00 0 00475          TRA L62A

                                                TEST FDP FOR CLEARING MQ
                                                AND ACC IF DIVIDEND FR IS 0
00510  262447606060             BCD 1FDP
00511  0074 00 4 06211   L62    TSX CLEAR,4
00512  0500 00 0 05632          CLA K55         CH 377 FR + 0
00513  0241 00 0 05604          FDP K47         CH 200 FR + 070707070
00514 -0100 00 0 00517          TNZ *+3         NG - ACC NOT CLEARED
00515  0763 00 0 00043          LLS 35          QUOT TO ACC
00516  0100 00 0 00520          TZE *+2         OK
00517  0074 00 4 06504          TSX ERROR,4
00520  0074 00 4 06511          TSX OK,4
00521  0020 00 0 00511          TRA L62

                                                TEST FDP FOR DIVIDE
                                                CHECK ON DIVISION BY 0
                                                CHECK ACC UNCHANGED.
```

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00522  262447606060            BCD 1FDP
00523  0074 00 4 06211   L63   TSX CLEAR,4   CLEAR PANEL
00524  0500 00 0 05615         CLA K51+1     344.7
00525  0241 00 0 05616         FDP K51+2     344.0
00526  0760 00 0 00012         DCT           SHOULD NOT SKIP
00527  0020 00 0 00532         TRA *+3       OK
00530  0074 00 4 06503         TSX ERROR-1,4 DIVIDE CHECK TRIG
00531  0020 00 0 00523         TRA L63       SHOULD HAVE BEEN ON

                                             CHECK ACC UNCHANGED
00532  0402 00 0 05615         SUB K51+1     -344.700000000
00533  0100 00 0 00537         TZE L63E      OK IF ZERO.
00534  0400 00 0 05615         ADD K51+1     REPLACE ACC
00535  0560 00 0 05615         LDQ K51+1     CORRECT ANS IN MQ
00536  0074 00 4 06504         TSX ERROR,4   ACC ERR,SHOULD NOT
                                             HAVE BEEN CHANGED
                                             BY DIVIDE BY ZERO
                                             CORRECT ANS IN MQ,
                                             ORIG ANS IN ACC.
00537  0074 00 4 06511   L63E  TSX OK,4      PROCEED OR
00540  0020 00 0 00523         TRA L63       REPEAT

                                             TEST FDP FOR
                                             DIVIDE CHECK WITH
                                             DIVISOR TO SMALL,
                                             AND CHECK THAT ACC
                                             IS NOT CHANGED.

00541  262447606060            BCD 1FDP
00542  0074 00 4 06211   L64   TSX CLEAR,4   CLEAR PANEL
00543  0500 00 0 05615         CLA K51+1     344.7
00544  0241 00 0 05604         FDP K47       BY 200.070707070.
00545  0760 00 0 00012         DCT           SHOULD NOT SKIP
00546  0020 00 0 00551         TRA *+3       OK
00547  0074 00 4 06503         TSX ERROR-1,4 DIVIDE CHECK TRIG
00550  0020 00 0 00542         TRA L64       SHOULD BE BEEN ON
00551  0402 00 0 05615         SUB K51+1     -344.7000000
00552  0100 00 0 00556         TZE L64E      OF IF ZERO HERE
00553  0400 00 0 05615         ADD K51+1     RESTORE ACC
00554  0560 00 0 05615         LDQ K51+1     CORRECT ANS TO MQ
00555  0074 00 4 06504         TSX ERROR,4   ACC CHANGED ON
                                             DIVIDE CHECK,CORRECT
                                             ANS IN MQ
00556  0074 00 4 06511   L64E  TSX OK,4      PROCEED OR
00557  0020 00 0 00542         TRA L64       REPEAT

                                             CRAZY

                                 TEST FOR FALSE DIV CHECK
00560  262447606060            BCD 1FDP
00561  0074 00 4 06211   L65   TSX CLEAR,4
00562  0500 00 0 05610         CLA K50       CH 200 FR + 760000000
00563  0241 00 0 05611         FDP K50+1     CH 200 FR + 700000000
00564  0760 00 0 00012         DCT           TEST INDICATOR
00565  0020 00 0 00567         TRA *+2       NG-DIVIDE CHECK
00566  0020 00 0 00570         TRA *+2       OK
```

```
00567  0074 00 4 06504         TSX ERROR,4
00570  0074 00 4 06511         TSX OK,4
00571  0020 00 0 00561         TRA L65

                                            TEST FDH FOR NO HALT ON
                                            NO DIVIDE CHECK
00572  262430606060             BCD 1FDH
00573  0074 00 4 06211   L66   TSX CLEAR,4
00574  0500 00 0 05610         CLA K50       CH 200 FR + 760000000
00575  0240 00 0 05611         FDH K50+1     CH 200 FR + 700000000
00576  0761 00 0 00000         NOP           ERROR COULD CAUSE HALT
00577  0402 00 0 05703         SUB K67+4     CH 146 FR 30000000
00600 -0100 00 0 00604         TNZ *+4       NG - WRONG REM
00601  0763 00 0 00043         LLS 35        QUOT TO ACC
00602  0402 00 0 05704         SUB K67+5     CH 201 FR 43333333
00603  0100 00 0 00605         TZE *+2       OK
00604  0074 00 4 06504         TSX ERROR,4
00605  0074 00 4 06511         TSX OK,4
00606  0020 00 0 00573         TRA L66

                                            TEST FDH FOR HALT
                                            IF SWITCH 5 IS DOWN
00607  262430606060             BCD 1FDH
00610  0074 00 4 06211   L67   TSX CLEAR,4   CLEAR
00611  0760 00 0 00165         SWT 5         TEST SWITCH 5
00612  0020 00 0 00631         TRA L67E      IF 5 IS UP,DO NOT
                                            PERFORM FDH WITH HALT

00613  0500 00 0 00612         CLA *-1       IF 5 IS DOWN,PERFORM
00614  0601 00 0 00611         STO L67+1     FDH WITH HALT. BUT
                                            DO NOT REPEAT UNLESS
                                            SWITCH 1 IS DOWN
                                            AND 4 IS UP. DO NOT
                                            DO THIS TEST AGAIN
                                            UPON REPITITION OF
                                            PROGRAM BY SWITCH
                                            6 CONTROL

00615  0760 00 0 00012   L67A  DCT           MAKE SURE DIVIDE
                                            CHECK TRIG IS
                                            OFF.
00616  0761 00 0 00000         NOP
00617  0500 00 0 05615         CLA K51+1     L 344.7
00620  0240 00 0 05604         FDH K47       BY 200.07070707070
                                            NO 9 CARRY ON FIRST
                                            STEP AT ER5 TIME.
                                            T1 REMAINS ON. SHOULD
                                            HALT ON DIVIDE CHECK.
00621  0760 00 0 00012         DCT           HALT OK,PRESS START
00622  0020 00 0 00625         TRA *+3       DCT OK,EXIT
00623  0074 00 4 06503         TSX ERROR-1,4 SKIP ON DCT,THE
                                            DIVIDE CHECK TRIG
                                            SHOULD HAVE BEEN ON

00624  0761 00 0 00610         NOP L67       TEST SWITCHES BEFORE
                                            ALLOWING REPEAT
```

```
00625  0760 00 0 00164         SWT 4          IF 4 IS DOWN
00626  0760 00 0 00161         SWT 1          OR 1 IS UP
00627  0020 00 0 00631         TRA *+2        DO NO REPEAT
00630  0020 00 0 00615         TRA L67A       4 UP,1 DOWN,REPEAT
00631  0074 00 4 06511   L67E  TSX OK,4       STEP DOWN REPEAT
00632  0020 00 0 00610         TRA L67        COUNTER IF 4 IS
                                              DOWN,BUT DO NOT
                                              REPEAT TEST


*              TEST - UNNORMALIZED ADD MAGNITUDE

                                              SIGN ++, CHAR EQUAL

00633  642144606060            BCD 1UAM
00634  0074 00 4 06211   F1    TSX CLEAR,4
00635  0500 00 0 05507         CLA K0+1       L 33.101010101
00636 -0304 00 0 05510         UAM K0+2       L 33.404040404
00637  0402 00 0 05511         SUB K0+3       L+033505050505
00640  0100 00 0 00642         TZE *+2        OK
00641  0074 00 4 06504         TSX ERROR,4
00642  0074 00 4 06511         TSX OK,4
00643  0020 00 0 00634         TRA F1


                                              SIGNS-+, CHAR EQUAL
00644  642144606060            BCD 1UAM
00645  0074 00 4 06211   F1A   TSX CLEAR,4
00646  0500 00 0 05512         CLA K0+4       L-33.505050505
00647 -0304 00 0 05507         UAM K0+1       CH 033 FR 101010101
00650  0400 00 0 05510         ADD K0+2       L 033404040404
00651  0100 00 0 00653         TZE *+2        OK
00652  0074 00 4 06504         TSX ERROR,4
00653  0074 00 4 06511         TSX OK,4
00654  0020 00 0 00645         TRA F1A


                                              SIGNS +-, CHAR EQUAL
00655  642144606060            BCD 1UAM
00656  0074 00 4 06211   F2    TSX CLEAR,4
00657  0500 00 0 05507         CLA K0+1       L 33.101010101
00660 -0304 00 0 05512         UAM K0+4       L-33.505050505
00661  0402 00 0 05513         SUB K0+5       L 033606060606
00662  0100 00 0 00664         TZE *+2        OK
00663  0074 00 4 06504         TSX ERROR,4
00664  0074 00 4 06511         TSX OK,4
00665  0020 00 0 00656         TRA F2

                                              CHECK NOT NORMALIZING
00666  642144606060            BCD 1UAM
00667  0074 00 4 06211   F2A   TSX CLEAR,4
00670  0500 00 0 05512         CLA K0+4       L-33.505050505
00671 -0304 00 0 05512         UAM K0+4       SAME
00672  0400 00 0 05514         ADD K0+6       L033000000000
00673  0100 00 0 00675         TZE *+2        OK
```

```
00674  0074 00 4 06504         TSX ERROR,4
00675  0074 00 4 06511         TSX OK,4
00676  0020 00 0 00667         TRA F2A

                                                CHECK NOT NORMALIZING
00677  642144606060            BCD 1UAM
00700  0074 00 4 06211   F3    TSX CLEAR,4
00701  0500 00 0 05515         CLA K0+7        L-33.303030303
00702 -0304 00 0 05510         UAM K0+2        L 33.404040404
00703  0402 00 0 05507         SUB K0+1        L 033101010101
00704  0100 00 0 00706         TZE *+2         OK
00705  0074 00 4 06504         TSX ERROR,4
00706  0074 00 4 06511         TSX OK,4
00707  0020 00 0 00700         TRA F3


*             TEST - FLOATING ADD MAGNITUDE

                                                SIGNS ++, CHAR EQUAL
00710  262144606060            BCD 1FAM
00711  0074 00 4 06211   F4    TSX CLEAR,4
00712  0500 00 0 05516         CLA K1          L 344.01010101010
00713  0304 00 0 05517         FAM K1+1        L 344.440404040
00714  0402 00 0 05520         SUB K1+2        L3445050505050
00715  0100 00 0 00717         TZE *+2         OK
00716  0074 00 4 06504         TSX ERROR,4
00717  0074 00 4 06511         TSX OK,4
00720  0020 00 0 00711         TRA F4

                                                SIGNS-+, CHAR EQUAL
00721  262144606060            BCD 1FAM
00722  0074 00 4 06211   F5    TSX CLEAR,4
00723  0500 00 0 05521         CLA K1+3        L-344.010101010
00724  0304 00 0 05520         FAM K1+2        L 344.450505050
00725  0402 00 0 05517         SUB K1+1        L 344440404040
00726  0100 00 0 00730         TZE *+2         OK
00727  0074 00 4 06504         TSX ERROR,4
00730  0074 00 4 06511         TSX OK,4
00731  0020 00 0 00722         TRA F5

                                                SIGN +-, CHAR EQUAL
00732  262144606060            BCD 1FAM
00733  0074 00 4 06211   F6    TSX CLEAR,4
00734  0500 00 0 05517         CLA K1+1        L 344.440404040
00735  0304 00 0 05521         FAM K1+3        L-344.010101010
00736  0402 00 0 05520         SUB K1+2        L 34450505050
00737  0100 00 0 00741         TZE *+2         OK
00740  0074 00 4 06504         TSX ERROR,4
00741  0074 00 4 06511         TSX OK,4
00742  0020 00 0 00733         TRA F6

                                                CHECK FOR NORMALIZING
00743  262144606060            BCD 1FAM
00744  0074 00 4 06211   F7    TSX CLEAR,4
00745  0500 00 0 05522         CLA K1+4        L-344.347474747
00746  0304 00 0 05520         FAM K1+2        L 344.450505050
```

```
00747  0402 00 0 05523          SUB K1+5       L342404040404
00750  0100 00 0 00752          TZE *+2        OK
00751  0074 00 4 06504          TSX ERROR,4
00752  0074 00 4 06511          TSX OK,4
00753  0020 00 0 00744          TRA F7

                                                CHECK FOR NORMALIZING
00754  262144606060             BCD 1FAM
00755  0074 00 4 06211   F10    TSX CLEAR,4
00756  0500 00 0 05521          CLA K1+3       L-344.010101010
00757  0304 00 0 05516          FAM K1         L 344.010101010
00760  0100 00 0 00762          TZE *+2        OK
00761  0074 00 4 06504          TSX ERROR,4
00762  0074 00 4 06511          TSX OK,4
00763  0020 00 0 00755          TRA F10


*              TEST - FLOATING SUBTRACT MAG

                                                SIGNS ++, CHAR EQUAL
00764  266244606060             BCD 1FSM
00765  0074 00 4 06211   F11    TSX CLEAR,4
00766  0500 00 0 05520          CLA K1+2       L 344.450505050
00767  0306 00 0 05516          FSM K1         L 344.010101010
00770  0402 00 0 05517          SUB K1+1       L 344440404040
00771  0100 00 0 00773          TZE *+2        OK
00772  0074 00 4 06504          TSX ERROR,4
00773  0074 00 4 06511          TSX OK,4
00774  0020 00 0 00765          TRA F11

                                                SIGN +-, CHAR EQUAL
00775  266244606060             BCD 1FSM
00776  0074 00 4 06211   F12    TSX CLEAR,4
00777  0500 00 0 05520          CLA K1+2       L 344.450505050
01000  0306 00 0 05521          FSM K1+3       L-344.010101010
01001  0402 00 0 05517          SUB K1+1       L 344440404040
01002  0100 00 0 01004          TZE *+2        OK
01003  0074 00 4 06504          TSX ERROR,4
01004  0074 00 4 06511          TSX OK,4
01005  0020 00 0 00776          TRA F12

                                                SIGNS -+, CHAR EQUAL
01006  266244606060             BCD 1FSM
01007  0074 00 4 06211   F13    TSX CLEAR,4
01010  0500 00 0 05521          CLA K1+3       L-344.010101010
01011  0306 00 0 05517          FSM K1+1       L 344.440404040
01012  0400 00 0 05520          ADD K1+2       L 344450505050
01013  0100 00 0 01015          TZE *+2        OK
01014  0074 00 4 06504          TSX ERROR,4
01015  0074 00 4 06511          TSX OK,4
01016  0020 00 0 01007          TRA F13

                                                CHECK FOR NORMALIZING
01017  266244606060             BCD 1FSM
01020  0074 00 4 06211   F14    TSX CLEAR,4
01021  0500 00 0 05520          CLA K1+2       L 344.450505050
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```
01022  0306 00 0 05522         FSM K1+4      L-344.347474747
01023  0402 00 0 05523         SUB K1+5      L 342404040404
01024  0100 00 0 01026         TZE *+2       OK
01025  0074 00 4 06504         TSX ERROR,4
01026  0074 00 4 06511         TSX OK,4
01027  0020 00 0 01020         TRA F14

                                             CHECK FOR NORMALIZING
01030  266244606060            BCD 1FSM
01031  0074 00 4 06211   F15   TSX CLEAR,4
01032  0500 00 0 05520         CLA K1+2      L 344.450505050
01033  0306 00 0 05520         FSM K1+2
01034  0100 00 0 01036         TZE *+2       OK
01035  0074 00 4 06504         TSX ERROR,4
01036  0074 00 4 06511         TSX OK,4
01037  0020 00 0 01031         TRA F15


*             TEST - UNNORMALIZED SUB MAG

                                             SIGNS ++, CHAR EQUAL
01040  646244606060            BCD 1USM
01041  0074 00 4 06211   F16   TSX CLEAR,4
01042  0500 00 0 05511         CLA K0+3      L 033.50505050
01043 -0306 00 0 05507         USM K0+1      L 033.10101010
01044  0402 00 0 05510         SUB K0+2      L 03340040404
01045  0100 00 0 01047         TZE *+2       OK
01046  0074 00 4 06504         TSX ERROR,4
01047  0074 00 4 06511         TSX OK,4
01050  0020 00 0 01041         TRA F16

                                             SIGNS -+, CHAR EQUAL
01051  646244606060            BCD 1USM
01052  0074 00 4 06211   F17   TSX CLEAR,4
01053  0502 00 0 05507         CLS K0+1      L 033.101010101
01054 -0306 00 0 05510         USM K0+2      L 033.404040404
01055  0400 00 0 05511         ADD K0+3      L 033505050505
01056  0100 00 0 01060         TZE *+2       OK
01057  0074 00 4 06504         TSX ERROR,4
01060  0074 00 4 06511         TSX OK,4
01061  0020 00 0 01052         TRA F17

                                             SIGNS +-, CHAR EQUAL
01062  646244606060            BCD 1USM
01063  0074 00 4 06211   F20   TSX CLEAR,4
01064  0500 00 0 05507         CLA K0+1      L 033.101010101
01065 -0306 00 0 05512         USM K0+4      L-035.505050505
01066  0400 00 0 05510         ADD K0+2      L 033404040404
01067  0100 00 0 01071         TZE *+2       OK


01070  0074 00 4 06504         TSX ERROR,4
01071  0074 00 4 06511         TSX OK,4
01072  0020 00 0 01063         TRA F20

                                             CHECK NOT NORMALIZING
```

```
01073  646244606060            BCD 1USM
01074  0074 00 4 06211   F21   TSX CLEAR,4
01075  0500 00 0 05511         CLA K0+3      L 033.505050505
01076 -0306 00 0 05511         USM K0+3
01077  0402 00 0 05514         SUB K0+6      L 033000000000
01100  0100 00 0 01102         TZE *+2       OK
01101  0074 00 4 06504         TSX ERROR,4
01102  0074 00 4 06511         TSX OK,4
01103  0020 00 0 01074         TRA F21

                                             CHECK NOT NORMALIZING
01104  646244606060            BCD 1USM
01105  0074 00 4 06211   F22   TSX CLEAR,4
01106  0500 00 0 05510         CLA K0+2      L 033.404040404
01107 -0306 00 0 05515         USM K0+7      L-033.303030303
01110  0402 00 0 05507         SUB K0+1      L 033101010101
01111  0100 00 0 01113         TZE *+2       OK
01112  0074 00 4 06504         TSX ERROR,4
01113  0074 00 4 06511         TSX OK,4
01114  0020 00 0 01105         TRA F22


*THE WIESS-LAYDEN SPECIAL... OR,EARLY TO RISE

*                    BIT IN MQ 35, 5TH STEP
01115  262124606060            BCD 1FAD
01116  0074 00 4 06211   FIF   TSX CLEAR,4
01117  0500 00 0 05455         CLA BOOZE     233.00000001
01120  0300 00 0 05456         FAD BOOZE+1   266.0
                                             NORMALIZE FROM
                                             MQ 35

                                             TONIC OR GINGER...

01121 -0600 00 0 06115         STQ Q         SAVE MQ
01122  0340 00 0 06016         CAS COEF      SHOULD BE 201.4
01123  1 00000 0 01125         TXI *+2       ERROR
01124  0020 00 0 01130         TRA *+4       OK
01125  0560 00 0 06016         LDQ COEF      CORRECT TO MQ
01126  0074 00 4 06503         TSX ERROR-1,4 ACC ERR. CORRECT
01127  0020 00 0 01116         TRA FIF       ANS. IN MQ.


01130  0500 00 0 06115         CLA Q         CHECK MQ FACTOR
01131  0340 00 0 05457         CAS BOOZE+2   146.0
01132  1 00000 0 01134         TXI *+2       ERR
01133  0020 00 0 01137         TRA *+4
01134  0560 00 0 05457         LDQ BOOZE+2
01135  0074 00 4 06503         TSX ERROR-1,4 MQ ERROR,CORRECT
01136  0020 00 0 01116         TRA FIF       ANS IN MQ.

01137  0074 00 4 06511         TSX OK,4      PROCEED OR
01140  0020 00 0 01116         TRA FIF       REPEAT
```

```
                                                    BIT IN ACC 9
01141  262124606060             BCD 1FAD
01142  0074 00 4 06211   TEEN   TSX CLEAR,4
01143  0300 00 0 06016          FAD COEF        +201.4
01144  0402 00 0 06016          SUB COEF        -201.4{0
01145  0100 00 0 01147          TZE *+2         OK IF ZERO
01146  0074 00 4 06504          TSX ERROR,4     NO GOOD
01147  0074 00 4 06511          TSX OK,4        YUMMY
01150  0020 00 0 01142          TRA TEEN



*BIT IN MQ 35 AND ACC 9. EXCHANGE

01151  262124606060             BCD 1FAD
01152  0074 00 4 06211   MEN    TSX CLEAR,4
01153  0500 00 0 05460          CLA BOOZE+3     266.4
01154  0300 00 0 05455          FAD BOOZE       233.000000001

                                                    MIXING DRINKS AGAIN...

01155 -0600 00 0 06115          STQ Q
01156  0340 00 0 05460          CAS BOOZE+3     266.4
01157  1 00000 0 01161          TXI *+2         NO GOOD
01160  0020 00 0 01164          TRA *+4
01161  0560 00 0 05460          LDQ BOOZE+3     CORRECT TO MQ
01162  0074 00 4 06503          TSX ERROR-1,4 ACC ERR,CORRECT
01163  0020 00 0 01152          TRA MEN         ANS IN MQ.

01164  0500 00 0 06115          CLA Q           CHECK MQ
01165  0340 00 0 05455          CAS BOOZE       233.00000001
01166  1 00000 0 01170          TXI *+2
01167  0020 00 0 01172          TRA *+3
01170  0560 00 0 05455          LDQ BOOZE       CORRECT TO MQ
01171  0074 00 4 06504          TSX ERROR,4     MQ ERR,CORRECT
01172  0074 00 4 06511          TSX OK,4        ANS IN MQ
01173  0020 00 0 01152          TRA MEN


*BIT IN ACC 10 AND MQ 34,5TH STEP

01174  262124606060             BCD 1FAD
01175  0074 00 4 06211   ONA    TSX CLEAR,4
01176  0500 00 0 05455          CLA BOOZE       233.000000001
01177  0300 00 0 05461          FAD BOOZE+4     265.377777777

                                                    HIC

01200 -0600 00 0 06115          STQ Q           SAVE MQ
01201  0340 00 0 05462          CAS BOOZE+5     264.777777776
01202  1 00000 0 01204          TXI *+2         WRONG
01203  0020 00 0 01207          TRA *+4
01204  0560 00 0 05462          LDQ BOOZE+5     CORRECT TO MQ
01205  0074 00 4 06503          TSX ERROR-1,4 ACC ERR,CORRECT
01206  0020 00 0 01175          TRA ONA         ANS IN MQ
```

```
01207  0500 00 0 06115         CLA Q          CHECK MQ
01210  0340 00 0 05463         CAS BOOZE+6    231.000000004
01211  1 00000 0 01213         TXI *+2
01212  0020 00 0 01215         TRA *+3        OK

01213  0560 00 0 05463         LDQ BOOZE+6    CORRECT TO MQ
01214  0074 00 4 06504         TSX ERROR,4    MQ ERR,CORRECT
01215  0074 00 4 06511         TSX OK,4       ANS IN MQ
01216  0020 00 0 01175         TRA ONA



*BIT IN ACC 9 AND 10
01217  266222606060            BCD 1FSB
01220  0074 00 4 06211   DEAD  TSX CLEAR,4
01221  0502 00 0 05464         CLS BOOZE+7    -202.4
01222  0302 00 0 06016         FSB COEF       -201.4{-202.6


01223 -0600 00 0 06115         STQ Q
01224  0340 00 0 05465         CAS BOOZE+8    -202.6
01225  1 00000 0 01227         TXI *+2
01226  0020 00 0 01232         TRA *+4        OK
01227  0560 00 0 05465         LDQ BOOZE+8    CORRECT TO MQ
01230  0074 00 4 06503         TSX ERROR-1,4  ACC ERR,CORRECT
01231  0020 00 0 01220         TRA DEAD       ANS IN MQ


01232  0500 00 0 06115         CLA Q
01233  0340 00 0 05466         CAS BOOZE+9    -147.0
01234  1 00000 0 01236         TXI *+2
01235  0020 00 0 01240         TRA *+3        OK
01236  0560 00 0 05466         LDQ BOOZE+9    CORRECT TO MQ
01237  0074 00 4 06504         TSX ERROR,4    MQ ERR,CORRECT
01240  0074 00 4 06511         TSX OK,4       ANS IN MQ
01241  0020 00 0 01220         TRA DEAD


                                              THE HONEY DIPPER

*BIT IN ACC 16,5TH STEP
01242  262124606060            BCD 1FAD
01243  0074 00 4 06211   MANS  TSX CLEAR,4
01244  0500 00 0 05467         CLA BOOZE+10   233.0017777777
01245  0300 00 0 05455         FAD BOOZE      233.0000000001


01246 -0600 00 0 06115         STQ Q
01247  0340 00 0 05470         CAS BOOZE+11   224.4
01250  1 00000 0 01252         TXI *+2
01251  0020 00 0 01255         TRA *+4        OK
01252  0560 00 0 05470         LDQ BOOZE+11   CORRECT TO MQ
01253  0074 00 4 06503         TSX ERROR-1,4  ACC ERR,CORRECT
01254  0020 00 0 01243         TRA MANS       ANS. IN MQ

01255  0500 00 0 06115         CLA Q          CHECK MQ FACTOR
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```
01256  0340 00 0 05471         CAS BOOZE+12  171.0
01257  1 00000 0 01261         TXI *+2
01260  0020 00 0 01263         TRA *+3       OK
01261  0560 00 0 05471         LDQ BOOZE+12  MQ ERR,CORRECT
01262  0074 00 4 06504         TSX ERROR,4   ANS. IN MQ
01263  0074 00 4 06511         TSX OK,4
01264  0020 00 0 01243         TRA MANS



*BIT IN ACC 17,5TH STEP
01265  266222606060            BCD 1FSB
01266  0074 00 4 06211   CHEST TSX CLEAR,4
01267  0302 00 0 05467         FSB BOOZE+10  -233.001777777

01270 -0600 00 0 06115         STQ Q
01271  0340 00 0 05472         CAS BOOZE+13  -223.777777740
01272  1 00000 0 01274         TXI *+2
01273  0020 00 0 01277         TRA *+4

01274  0560 00 0 05472         LDQ BOOZE+13  CORRECT TO MQ
01275  0074 00 4 06503         TSX ERROR-1,4 ACC ERR,CORRECT
01276  0020 00 0 01266         TRA CHEST     ANS IN MQ

01277  0500 00 0 06115         CLA Q         CHECK MQ FACTOR
01300  0340 00 0 05473         CAS BOOZE+14  -170.0
01301  1 00000 0 01303         TXI *+2
01302  0020 00 0 01305         TRA *+3       OK
01303  0560 00 0 05473         LDQ BOOZE+14  CORRECT TO MQ
01304  0074 00 4 06504         TSX ERROR,4   MQ ERR,CORRECT
01305  0074 00 4 06511         TSX OK,4      ANS IN MQ
01306  0020 00 0 01266         TRA CHEST



*BITS IN ACC 9 AND 11,5TH STEP,SIGNS PLUS
01307  262124606060            BCD 1FAD
01310  0074 00 4 06211   YOHO  TSX CLEAR,4
01311  0500 00 0 05474         CLA BOOZE+15  201.52525252525
01312  0300 00 0 05475         FAD BOOZE+16  234.52525252525


01313 -0600 00 0 06115         STQ Q
01314  0340 00 0 05475         CAS BOOZE+16  CHECK ACC
01315  1 00000 0 01317         TXI *+2
01316  0020 00 0 01322         TRA *+4       OK
01317  0560 00 0 05475         LDQ BOOZE+16  CORRECT TO MQ
01320  0074 00 4 06503         TSX ERROR-1,4 ACC ERR,CORRECT
01321  0020 00 0 01310         TRA YOHO      ANS IN MQ

01322  0500 00 0 06115         CLA Q
01323  0340 00 0 05474         CAS BOOZE+15  201.52525252525
01324  1 00000 0 01326         TXI *+2
01325  0020 00 0 01330         TRA *+3       OK
01326  0560 00 0 05474         LDQ BOOZE+15  CORRECT TO MQ
01327  0074 00 4 06504         TSX ERROR,4   MQ ERR,CORRECT
```

```
01330  0074 00 4 06511         TSX OK,4      ANS IN MQ
01331  0020 00 0 01310         TRA YOHO



*BITS IN ACC 9 AND 11,5TH STEP,SIGNS MINUS
01332  266222606060            BCD 1FSB
01333  0074 00 4 06211   HO    TSX CLEAR,4
01334  0502 00 0 05474         CLS BOOZE+15  -201.52525252525
01335  0302 00 0 05475         FSB BOOZE+16  -234.52525252525


01336 -0600 00 0 06115         STQ Q
01337  0340 00 0 05476         CAS BOOZE+17  -234.52525252525
01340  1 00000 0 01342         TXI *+2
01341  0020 00 0 01345         TRA *+4       OK
01342  0560 00 0 05476         LDQ BOOZE+17  CORRECT TO MQ
01343  0074 00 4 06503         TSX ERROR-1,4 ACC ERR,CORRECT
01344  0020 00 0 01333         TRA HO        ANS. IN MQ


01345  0500 00 0 06115         CLA Q         CHECK MQ
01346  0340 00 0 05477         CAS BOOZE+18  -201.52525252525
01347  1 00000 0 01351         TXI *+2
01350  0020 00 0 01353         TRA *+3       OK
01351  0560 00 0 05477         LDQ BOOZE+18  CORRECT TO MQ
01352  0074 00 4 06504         TSX ERROR,4   MQ ERR,CORRECT
01353  0074 00 4 06511         TSX OK,4      ANS IN MQ
01354  0020 00 0 01333         TRA HO


*ACC AND MQ ZERO,5TH STEP.
01355  262124606060            BCD 1FAD
01356  0074 00 4 06211   ANDA  TSX CLEAR,4
01357  0500 00 0 05475         CLA BOOZE+16  234.525252525
01360  0300 00 0 05476         FAD BOOZE+17  -234.525252525
01361  0600 00 0 06116         STZ Q+1
01362 -0600 00 0 06115         STQ Q
01363  0560 00 0 06116         LDQ Q+1       CORRECT TO MQ
01364  0601 00 0 06116         STO Q+1
01365 -0500 00 0 06116         CAL Q+1       SIGN TO P.
01366  0100 00 0 01371         TZE *+3       ACC SHOULD{+0
01367  0074 00 4 06503         TSX ERROR-1,4 ACC ERR,SHOULD
01370  0020 00 0 01356         TRA ANDA      HAVE BEEN+ZERO.


01371 -0500 00 0 06115         CAL Q         SHOULD B ZERO
01372  0100 00 0 01374         TZE *+2
01373  0074 00 4 06504         TSX ERROR,4   MQ ERR. MQ SHOULD
01374  0074 00 4 06511         TSX OK,4      HAVE BEEN+ZERO
01375  0020 00 0 01356         TRA ANDA
```

```
*SHIFT ACC AND MQ TO ZERO.
01376  262124606060            BCD 1FAD
01377  0074 00 4 06211   BOTLE TSX CLEAR,4
01400  0500 00 0 05500         CLA BOOZE+19  -201.4
01401  0300 00 0 05501         FAD BOOZE+20  267.0,WATCH THAT
01402 -0600 00 0 06115         STQ Q         FIRST STEP,ITS
                                             A LULU
01403 -0100 00 0 01405         TNZ *+2       ACC SHOULD
01404 -0120 00 0 01407         TMI *+3       BE{-0
01405  0074 00 4 06503         TSX ERROR-1,4 ACC ERR,ACC SHOULD
01406  0020 00 0 01377         TRA BOTLE     BE {-0

01407  0500 00 0 06115         CLA Q         CHECK MQ
01410 -0100 00 0 01412         TNZ *+2
01411 -0120 00 0 01413         TMI *+2
01412  0074 00 4 06504         TSX ERROR,4   MQ ERR. SHOULD
01413  0074 00 4 06511         TSX OK,4      HAVE BEEN{-0
01414  0020 00 0 01377         TRA BOTLE



*CHECK F.P. ROUND.

*NO BIT IN MQ COL 9.

01415  265145606060            BCD 1FRN
01416  0074 00 4 06211   RND   TSX CLEAR,4   CLEAR.
01417  0500 00 0 05517         CLA K1+1      +344.44040404040
01420  0560 00 0 05516         LDQ K1        +344.010101010
01421  0760 00 0 00011         FRN           SHOULD NOT ROUND
01422  0402 00 0 05517         SUB K1+1      CHECK ACC UNCHANGED
01423 -0600 00 0 06115         STQ Q         SAVE MQ.
01424  0100 00 0 01431         TZE *+5       IF NOT ZERO,ACC ERR.
01425  0400 00 0 05517         ADD K1+1      RESTOR ACC.
01426  0560 00 0 05517         LDQ K1+1      CORRECT VALUE TO MQ
01427  0074 00 4 06503         TSX ERROR-1,4 ACC ERR. ON FRN WITH
01430  0020 00 0 01416         TRA RND       NO BIT IN MQ COL9.
                                             CORRECT ANS IN MQ,
                                             ORIG. ANS. IN ACC.

01431  0500 00 0 06115         CLA Q         CHECK MQ UNCHANGED
01432  0402 00 0 05516         SUB K1
01433  0100 00 0 01437         TZE *+4       OK IF ZERO
01434  0400 00 0 05516         ADD K1        ERR. RESTORE ANS.
01435  0560 00 0 05516         LDQ K1        CORRECT VALUE TO MQ.
01436  0074 00 4 06504         TSX ERROR,4   ERR IN MQ FACTOR ON
                                             FRN WITH NO BIT IN
                                             MQ COL 9. CORRECT ANS.
                                             IS IN MQ,ORIG. ANS.
                                             IN ACC.
01437  0074 00 4 06511         TSX OK,4      PROCEED OR
01440  0020 00 0 01416         TRA RND       REPEAT
```

```
*FRN WITH A BIT IN MQ COL 9.

01441  265145606060            BCD 1FRN
01442  0074 00 4 06211   FRNA  TSX CLEAR,4   CLEAR.
01443  0560 00 0 05517         LDQ K1+1      344.440404040 TO MQ.
01444  0500 00 0 05563         CLA K41       +000.00000200 TO ACC
01445  0760 00 0 00011         FRN           SHOULD RND.
01446 -0600 00 0 06115         STQ Q         SAVE MQ.
01447  0402 00 0 05651         SUB K61       -201
01450  0100 00 0 01455         TZE *+5       OK IF ZERO.
01451  0560 00 0 05651         LDQ K61       CORRECT VALUE TO MQ.
01452  0400 00 0 05651         ADD K61       RESTORE ACC.
01453  0074 00 4 06503         TSX ERROR-1,4 ERR IN ACC ON FRN WITH
01454  0020 00 0 01442         TRA FRNA      A BIT IN MQ COL 9.
                                             CORRECT ANS. IN MQ,
                                             ORIG. ANS. IN ACC.

01455  0500 00 0 06115         CLA Q         CHECK MQ UNCHANGED
01456  0402 00 0 05517         SUB K1+1
01457  0100 00 0 01463         TZE *+4       OK IF ZERO.
01460  0400 00 0 05517         ADD K1+1      RESTORE ORIG. ANS.
01461  0560 00 0 05517         LDQ K1+1      CORRECT VALUE TO MQ.
01462  0074 00 4 06504         TSX ERROR,4   ERR IN MQ ON FRN WITH
                                             A BIT IN MQ COL 9.
                                             CORRECT ANS. IN MQ,
                                             ORIG. ANS. IN ACC.
01463  0074 00 4 06511         TSX OK,4      PROCEED OR
01464  0020 00 0 01442         TRA FRNA      REPEAT.


*NON-LINEAR PROGRAMMING FOLLOWS, SUB ROUTINES USED TO
*CHECK RESULTS, SUBROUTINES START AT...UONLY..SYMBOLIC.

*RIPPLE OUT OF P INTO Q,SHOULD NOT TRAP.

01465  265145606060            BCD 1FRN
01466  0074 00 4 06211   FRP   TSX CLEAR,4   CLEAR.
01467  0760 00 0 00006         COM           ALL ONES IN ACC.
01470  0771 00 0 00001         ARS 1         VACATE Q.
01471  0560 00 0 01502         LDQ FRP+12    001.4,NO BIT IN ONE
01472  0760 00 0 00011         FRN           CARRY TO Q,SHOULD
                                             NOT TRAP.

*CHECK ACC COLS S,Q,P, AND 35.
01473  0074 00 4 05137         TSX ACB,4
01474  0000 00 0 00004         HTR 4         ERR. ACC S,Q,P, AND 35.
                                             SHOULD
01475  0020 00 0 01466         TRA FRP       HAVE Q. ITS IN ERR. IN
                                             IND. REG. AS OCTAL NOS.
                                             10{S,4{Q,2{P,1{35.

*CHECK ACC COLS 1 TO 34.
01476  0074 00 4 05164         TSX ACCF,4
01477 +000400000000            OCT 000400000000    ERR. ACC 1 TO 34.
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                                                CORRECT
01500  0020 00 0 01466          TRA FRP         ANS. IN MQ,ORIG ANS. IN AC

*CHECK MQ COLS S TO 35.
01501  0074 00 4 05174          TSX MQF,4
01502 +001400000000             OCT 001400000000 MQ ERR. CORRECT ANS.
                                                IN
01503  0020 00 0 01466          TRA FRP         MQ,ORIG ANS. IN ACC.

01504  0074 00 4 06511          TSX OK,4        PROCEED OR
01505  0020 00 0 01466          TRA FRP         REPEAT.



*FRN,WORST CASE RIPPLE CARRY,SHOULD NOT TRAP.
*RIPPLE OUT OF Q,SHOULD NOT TRAP.

01506  265145606060             BCD 1FRN
01507  0074 00 4 06211   FRQ    TSX CLEAR,4     CLEAR
01510  0760 00 0 00006          COM             ALL ONES IN ACC.
01511  0560 00 0 06016          LDQ COEF        201.4
01512  0760 00 0 00011          FRN             CARRY OUT OF Q,
                                                SHOULD NOT TRAP.
*CHECK ACC COLS S,Q,P, AND 35.
01513  0074 00 4 05137          TSX ACB,4
01514  0000 00 0 00000          HTR             ERR. ACC S,Q,P, AND 35
                                                SHOULD
01515  0020 00 0 01507          TRA FRQ         BE ZERO. BITS IN ERR. IN
                                                IND. REG. AS OCTAL NOS.
                                                10{S,4{Q,2{P,1{35.

*CHECK ACC COLS 1 TO 34.
01516  0074 00 4 05164          TSX ACCF,4
01517 +000400000000             OCT 000400000000    ERR. ACC 1 TO 34.
                                                CORRECT
01520  0020 00 0 01507          TRA FRQ         ANS. IN MQ,ORIG. ANS.
                                                IN ACC

*CHECK MQ COLS S TO 35.
01521  0074 00 4 05174          TSX MQF,4
01522 +201400000000             OCT 201400000000    MQ ERR. CORRECT ANS.
01523  0020 00 0 01507          TRA FRQ         IN MQ,ORIG. ANS. IN ACC.

01524  0074 00 4 06511          TSX OK,4        PROCEED OR
01525  0020 00 0 01507          TRA FRQ         REPEAT.



*FRN WITH BITS IN ACC 1 TO 34. NO BIT IN MQ 1.

01526  265145606060             BCD 1FRN
01527  0074 00 4 06265   DON    TSX PART2,4     LITE 4 ON,CLEAR
01530  0774 00 1 01547          AXT WIESS,1     SET RETURN IN
01531  0634 00 1 06131          SXA SECT2,1     CASE OF TRAP

01532 -0500 00 0 01541          CAL *+7         FILL ACC 1 TO 34
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01533  0560 00 0 01502         LDQ FRP+12    001.4
01534  0760 00 0 00011         FRN           SHOULD NOT TRAP

*CHECK ACC COLS S,Q,P,AND 35

01535  0074 00 4 05137         TSX ACB,4
01536  0000 00 0 00001         HTR 1         ERR IN ACC S,Q,P,AND 35
01537  0020 00 0 01527         TRA DON       SHOULD HAVE 35
                                             BITS IN ERR IN IND.
                                             REG AS OCTAL NOS.
                                             10{S,4{Q,2{P,1{35

*CHECK ACC COLS 1 TO 34

01540  0074 00 4 05164         TSX ACCF,4
01541 +377777777776            OCT 377777777776 ERR IN ACC 1 TO 34
01542  0020 00 0 01527         TRA DON       CORRECT ANS IN MQ.


*CHECK MQ COLS S TO 35

01543  0074 00 4 05174         TSX MQF,4
01544 +001400000000            OCT 001400000000 ERR IN MQ RESULT
01545  0020 00 0 01527         TRA DON       CORRECT ANS IN MQ
                                             ORIG ANS IN ACC

01546  0020 00 0 01552         TRA *+4
01547  0534 00 1 00000   WIESS LXA 0,1        TRAP ADDRESS TO XRA
01550  1 77777 1 01551         TXI *+1,1,-1  *RA-1
01551  0074 00 4 06504         TSX ERROR,4   TRAP ERR. ADDRESS OF
                                             INSTR. THAT CAUSED TRAP
                                             IS IN XRA

01552  0074 00 4 06511         TSX OK,4      PROCEED OR
01553  0020 00 0 01527         TRA DON       REPEAT



*PLACE BIT IN Q,FRN TO P,SHOULD NOT TRAP

01554  265145606060            BCD 1FRN
01555  0074 00 4 06265   JOE   TSX PART2,4   LITE 4 ON,CLEAR
01556  0774 00 1 01600         AXT BROWN,1   SET RETURN IN
01557  0634 00 1 06131         SXA SECT2,1   CASE OF TRAP.
01560 -0760 00 0 00003         SSM           GET BITS IN
01561  0601 00 0 05757         STO FREE       ACC Q,AND 1 TO 35
01562 -0500 00 0 05757         CAL FREE        BUT NO BIT
01563  0760 00 0 00006         COM              IN COL. P
01564  0560 00 0 01502         LDQ FRP+12    001.4
01565  0760 00 0 00011         FRN           SHOULD NOT TRAP



*CHECK ACC COLS S,Q,P,AND 35
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01566  0074 00 4 05137         TSX ACB,4     ERR IN ACC S,Q,P,AND 35
01567  0000 00 0 00006         HTR 4+2       SHOULD HAVE Q AND P,BITS
01570  0020 00 0 01555         TRA JOE       IN ERR IN IND.REG. AS
                                             OCTAL NOS.
                                             10{S,4{Q,2{P,1{35

*CHECK ACC COLS 1 TO 34

01571  0074 00 4 05164         TSX ACCF,4    ERR IN ACC 1 TO 34
01572 +000400000000            OCT 000400000000 CORRECT ANS IN MQ
01573  0020 00 0 01555         TRA JOE


*CHECK MQ COLS S TO 35

01574  0074 00 4 05174         TSX MQF,4     ERR IN MQ RESULT
01575 +001400000000            OCT 001400000000 CORRECT ANS IN MQ.
01576  0020 00 0 01555         TRA JOE       ORIG ANS IN ACC
01577  0020 00 0 01603         TRA BROWN+3

01600  0534 00 1 00000   BROWN LXA 0,1       TRAP ADDRESS IN XRA
01601  1 77777 1 01602         TXI *+1,1,-1  XRA-1
01602  0074 00 4 06504         TSX ERROR,4   TRAP ERR. ADD. OF INSTR
01603  0074 00 4 06511         TSX OK,4      THAT CAUSED TRAP
01604  0020 00 0 01555         TRA JOE       IS IN XRA



*BEGIN SECTION 2 OF FIRST PART 9M05
*FLOATING POINT WITH OVERFLOW AND UNDERFLOW



*WILL F.P. TRAP WORK ON FIRST TRAP CONDITION.

01605  264763514740            BCD 1FPTRP-
01606  0074 00 4 06265   TR    TSX PART2,4   CLEAR
01607  0774 00 1 01622         AXT TRT,1
01610  0634 00 1 06131         SXA SECT2,1   SET RETURN
01611  0500 00 0 06112         CLA RTC+3     376.4
01612  0300 00 0 06112         FAD RTC+3     ACC NOW 377.4
01613  0300 00 0 06113         FAD RTC+4     SHOULD TRAP HERE
01614  0300 00 0 06113         FAD RTC+4     AND GET THIS ADDRESS
01615  0300 00 0 06113         FAD RTC+4
01616  0300 00 0 06113         FAD RTC+4
01617  0074 00 4 06503         TSX ERROR-1,4 FAILED TO TRAP
01620  0020 00 0 01606         TRA TR
01621  0020 00 0 01625         TRA TRT+3
*CHECK TRAP ADDRESS IF TRAP OCCURS
01622  0074 00 4 05177   TRT   TSX ZERO,4    ERR IN TRAP ADDRESS
01623  0000 00 0 01614         HTR TR+6      CORRECT ADDRESS IN MQ
01624  0020 00 0 01606         TRA TR        ADDRESS WRITTEN IN ACC

01625  0074 00 4 06511         TSX OK,4      PROCEED OR
01626  0020 00 0 01606         TRA TR        REPEAT.
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*DOES TRAP MODE EFFECT F.P. TRAP.

01627  264763514740            BCD 1FPTRP-
01630  0074 00 4 06265   TR1   TSX PART2,4
01631  0774 00 1 01647         AXT TR1T,1
01632  0634 00 1 06131         SXA SECT2,1
01633  0500 00 0 06114         CLA RTC+5     L. TTR TR1E
01634  0601 00 0 00001         STO 1
01635  0760 00 0 00007         ETM
01636  0500 00 0 06113         CLA RTC+4     +377.4
01637  0300 00 0 06113         FAD RTC+4     FORCE OVERFLOW
01640 -0760 00 0 00007         LTM
01641  0074 00 4 06503         TSX ERROR-1,4 FAILED TO TRAP
01642  0020 00 0 01630         TRA TR1
01643  0020 00 0 01647         TRA TR1T      CHECK ZERO ANYWAY
01644 -0760 00 0 00007   TR1E  LTM
01645  0074 00 4 06503         TSX ERROR-1,4 TRAP TO 1 INSTEAD
01646  0020 00 0 01630         TRA TR1       OF TO 10


*CHECK TRAP ADDRESS AT ZERO
01647  0074 00 4 05177   TR1T  TSX ZERO,4    ERR IN TRAP ADDRESS
01650  0000 00 0 01640         HTR TR1+8     CORRECT ADDRESS IN MQ
01651  0020 00 0 01630         TRA TR1       ADDRESS WRITTEN IN AC

01652  0500 00 0 06117         CLA TMODE+6   CONTINUE TO
01653  0601 00 0 00001         STO 1         MONITOR 1

01654  0074 00 4 06511         TSX OK,4      PROCEED OR
01655  0020 00 0 01630         TRA TR1       REPEAT

*MAKE SURE THAT F.P. TRAP DOES NOT CAUSE 709 TO
*ENTER TRAPPING MODE.


01656  264763514740            BCD 1FPTRP-
01657  0074 00 4 06265   T     TSX PART2,4   LITE 4 ON,CLEAR
01660  0560 00 0 01673         LDQ LTTR      PUT TTR INST. AT LOC.1
01661 -0600 00 0 00001         STQ 1         INCASE WE ENTER
                                             TRAPPING MODE.
01662  0774 00 1 01672         AXT TFP,1     SET RETURN ADDRESS
01663  0634 00 1 06131         SXA SECT2,1   FOR F.P. TRAP.
01664  0760 00 0 00006         COM
01665  0602 00 0 05757         SLW FREE      AL ONES.
01666  0502 00 0 05757         CLS FREE      MAKE SIGN PLUS.
01667  0304 00 0 05757         FAM FREE      SHOULD OVERFLOW
01670  0074 00 4 06503         TSX ERROR-1,4 FAILED TO F.P. TRAP.
01671  0020 00 0 01657         TRA T
01672  0020 00 0 01677   TFP   TRA LTTR+4    OK,DID NOT ETM

01673  0021 00 0 01674   LTTR  TTR LTTR+1    INST. AT LOC 1.
01674 -0760 00 0 00007         LTM
01675  0074 00 4 06503         TSX ERROR-1,4 ENTERED TRAPPING MODE
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01676  0020 00 0 01657         TRA T          ON F.P. TRAP.

01677  0500 00 0 06117         CLA TMODE+6    MONITOR 1
01700  0601 00 0 00001         STO 1
01701  0074 00 4 06511         TSX OK,4       PROCEED OR
01702  0020 00 0 01657         TRA T          REPEAT.



*CHECK THAT TRAP WRITES ONLY DEC AND ADD.
*CHECK WITH ONES AT ZERO.

01703  264746654060            BCD 1FPOV-
01704  0074 00 4 06265   TW    TSX PART2,4    CLEAR,LIGHT 4 ON.
01705  0774 00 1 01715         AXT TWT,1      SET RETURN
01706  0634 00 1 06131         SXA SECT2,1    ADDRESS.
01707  0760 00 0 00006         COM
01710  0602 00 0 00000         SLW            ALL ONES AT ZERO.
01711  0502 00 0 00000         CLS
01712  0304 00 0 00000         FAM            FORCE OVERFLOW.
01713  0074 00 4 06503         TSX ERROR-1,4  FAILED TO TRAP.
01714  0020 00 0 01704         TRA TW

01715 -0500 00 0 00000   TWT   CAL            CHECK PREFIX AND TAG.
01716 -0320 00 0 06050         ANA FERM+6     PREFIX AND TAG REMAIN.

*CHECK ACC COLS S,Q,P,AND 35.
01717  0074 00 4 05137         TSX ACB,4      ERROR IN WIRTING ZERO FOR
01720  0000 00 0 00002         HTR 2          F.P. TRAP. SHOULD HAVE
01721  0020 00 0 01704         TRA TW         P BIT. BITS IN ERROR
                                              IN IND. REG. AS OCTAL NOS.
                                              10{S,4{Q,2{P,1}{35

*CHECK ACC COLS 1 TO 34
01722  0074 00 4 05164         TSX ACCF,4     ERR. IN WRITING ZERO FOR
01723 +300000700000            OCT 300000700000     F.P. TRAP. CORRECT BI
                                              TS INM,
01724  0020 00 0 01704         TRA TW         BITS WRITTEN IN AC
                                              PREFIX AND TAG.

*CHECK ADDRESS AT ZERO
01725  0074 00 4 05177         TSX ZERO,4
01726  0000 00 0 01713         HTR TW+7       ERR. IN WRITING ADDRESS
01727  0020 00 0 01704         TRA TW         IN ZERO FOR F.P. TRAP.
01730  0074 00 4 06511         TSX OK,4       CORRECT ADD. IN MQ,
01731  0020 00 0 01704         TRA TW         ADDRESS WRITTEN IN ACC.



*CHECK TRAP WRITTING WITH ALL ZEROS AT ZERO.

01732  264746654060            BCD 1FPOV-
01733  0074 00 4 06265   TWA   TSX PART2,4    CLEAR,LIGHT 4 ON,ALL OS
01734  0774 00 1 01742         AXT TWAT,1     AT ZERO-
01735  0634 00 1 06131         SXA SECT2,1    SET RETURN ADDRESS.
01736  0500 00 0 05720         CLA SALON+6
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01737  0300 00 0 05720         FAD SALON+6   FORCE OVERFLOW.
01740  0074 00 4 06503         TSX ERROR-1,4 FAILED TO TRAP.
01741  0020 00 0 01733         TRA TWA

*CHECK PREFIX AND TAG AT ZERO,SHOULD BE 0.
01742 -0500 00 0 00000   TWAT  CAL
01743 -0320 00 0 06050         ANA FERM+6    DROP DEC. AND ADD.

*CHECK ACC COLS S,Q,P, AND 35.
01744  0074 00 4 05137         TSX ACB,4     S,Q,P,AND 35 SHOULD BE 0.
01745  0000 00 0 00000         HTR           ERROR IN WRITING ZERO IN
01746  0020 00 0 01733         TRA TWA       S,Q,P,AND 35. BITS IN ERROR
                                             IN IND. REG. AS OCTAL NOS.
                                             10{2,4{Q,2{P,1{35
*CHECK ACC COLS 1 TO 34.
01747  0074 00 4 05164         TSX ACCF,4    CHECK PREF. AND TAG.
01750  0000 00 0 00000         HTR           ERROR IN WRITING ZERO
01751  0020 00 0 01733         TRA TWA       PREF. AND TAG FOR F.P.
                                             CORRECT BITS IN MQ
                                             BITS WRITTEN IN ACC.

*CHECK ADDRESS WRITTEN AT ZERO.
01752  0074 00 4 05177         TSX ZERO,4
01753  0000 00 0 01740         HTR TWA+5     ERR. IN WRITING TRAP ADDRES
01754  0020 00 0 01733         TRA TWA       CORRECT ADDRESS IN
01755  0074 00 4 06511         TSX OK,4      MQ,ADDRESS WRITTEN IN ACC.
01756  0020 00 0 01733         TRA TWA


*UFM WITH UNDERFLOW.

01757  642644406060            BCD 1UFM-
01760  0074 00 4 06265   P6    TSX PART2,4   LITE 4 ON,CLEAR.
01761  0774 00 1 01767         AXT P6T,1
01762  0634 00 1 06131         SXA SECT2,1   RETURN ADDRESS
01763  0560 00 0 05537         LDQ K20       10.4
01764 -0260 00 0 05537         UFM K20       UNDERFLOW.
01765  0074 00 4 06503         TSX ERROR-1,4 FAILED TO TRAP
01766  0020 00 0 01760         TRA P6

*CHECK ACC COLS S,Q,P, AND 35.
01767  0074 00 4 05137   P6T   TSX ACB,4
01770  0000 00 0 00006         HTR 4+2       ERR. ACC S,Q,P, AND 35. SHOULD
01771  0020 00 0 01760         TRA P6        HAVE Q AND P. BITS IN
                                             ERR IN IND. REG. AS OCTAL NOS.
                                                10{S,4{Q,2{P,1{35

*CHECK ACC COLS 1 TO 34.
01772  0074 00 4 05164         TSX ACCF,4
01773 +220200000000            OCT 220200000000 ERR IN ACC 1 TO 34.
                                             CORRECT
01774  0020 00 0 01760         TRA P6        ANS. IN MQ,ORIG ANS. IN AC

01775  0074 00 4 06511         TSX OK,4      PROCEED OR
01776  0020 00 0 01760         TRA P6        REPEAT.
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*FLOATING POINT UNDERFLOW WITH FAD.

01777  262124406060            BCD 1FAD-
02000  0074 00 4 06265   P3    TSX PART2,4   LITE 4 ON,CLEAR.
02001  0774 00 1 02010         AXT P3T,1
02002  0634 00 1 06131         SXA SECT2,1   SET RETURN ADDRESS
02003  0500 00 0 05531         CLA K8        +007.1
02004  0300 00 0 05531         FAD K8        FORCE UNDERFLOW. MQ.
02005  0074 00 4 06503         TSX ERROR-1,4 FAILED TO TRAP
02006  0020 00 0 02000         TRA P3
02007  0020 00 0 02014         TRA *+5       CANT TEST TRIGS.

*CHECK OVERFLOW TRIGS.
02010  0074 00 4 05125   P3T   TSX UONLY,4   ACC OV. ON
02011  0020 00 0 02000         TRA P3
02012  0020 00 0 02014         TRA *+2       DIVIDE CHECK ON
02013  0020 00 0 02000         TRA P3

*CHECK ACC COLS S,Q,P, AND 35
02014  0074 00 4 05137         TSX ACB,4
02015  0000 00 0 00000         HTR           ERR. ACC S,Q,P, AND 35.
                                             SHOULD
02016  0020 00 0 02000         TRA P3        BE ZERO. BITS IN ERR. IN
                                             IND. REG. AS OCTAL NOS.
                                             10{S,4{Q,2{P,1{35.

*CHECK ACC COLS 1 TO 34.
02017  0074 00 4 05164         TSX ACCF,4
02020 +006400000000            OCT 006400000000    ERR ACC 1 TO 34.
                                             CORRECT
02021  0020 00 0 02000         TRA P3        ANS. IN MQ,ORIG. ANS. IN
                                             ACC.

*CHECK MQ COLS S TO 35
02022  0074 00 4 05174         TSX MQF,4
02023 +353000000000            OCT 353000000000    MQ ERR. CORRECT ANS.
                                             IN
02024  0020 00 0 02000         TRA P3        MQ,ORIG. ANS. IN ACC.

*CHECK TRAP ADDRESS AT ZERO.
02025  0074 00 4 05177         TSX ZERO,4
02026  0000 00 0 02005         HTR P3+5      ERR. IN TRAP ADDRESS,
02027  0020 00 0 02000         TRA P3        CORRECT ADDRESS IN MQ,
                                             ADDRESS WRITTEN IN ACC.
02030  0074 00 4 06511         TSX OK,4      PROCEED OR
02031  0020 00 0 02000         TRA P3        REPEAT.



*FLOATING POINT TRAP ON UNDERFLOW WITH FDP.

02032  262447406060            BCD 1FDP-
02033  0074 00 4 06265   F27   TSX PART2,4   LITE 4 ON,CLEAR.
02034  0774 00 1 02043         AXT F27T,1
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02035  0634 00 1 06131         SXA SECT2,1   SET RETURN ADDRESS
02036  0500 00 0 05510         CLA K0+2      033.404040440
02037  0241 00 0 05517         FDP K1+1      BY 344.440404040. UND.
02040  0074 00 4 06503         TSX ERROR-1,4 FAILED TO TRAP.
02041  0020 00 0 02033         TRA F27
02042  0020 00 0 02047         TRA *+5       CANT TEST TRIGS.

*CHECK OVERFLOW TRIGGERS.
02043  0074 00 4 05125   F27T  TSX UONLY,4   ACC OV. ON
02044  0020 00 0 02033         TRA F27
02045  0020 00 0 02047         TRA *+2       DIVIDE CHECK ON
02046  0020 00 0 02033         TRA F27


*CHECK ACC COLS S,Q,P, AND 35.
02047  0074 00 4 05137         TSX ACB,4
02050  0000 00 0 00000         HTR           ERR. ACC S,Q,P, AND 35
                                             SHOULD
02051  0020 00 0 02033         TRA F27       BE 0. BITS IN ERR IN
                                             IND. REG. AS OCTAL NOS.
                                             10{S,4{Q,2{P,1{35

*CHECK ACC COLS 1 TO 34.
02052  0074 00 4 05164         TSX ACCF,4
02053 +000423035700            OCT 000423035700 ERR. ACC 1 TO 34.
                                                CORRECT
02054  0020 00 0 02033         TRA F27       ANS. IN MQ,ORIG. ANS.
                                             IN ACC

*CHECK MQ COLS S TO 35
02055  0074 00 4 05174         TSX MQF,4
02056 +267715412642            OCT 267715412642    ERR IN MQ. CORRECT
                                                ANS.
02057  0020 00 0 02033         TRA F27       IN MQ,ORIG. ANS. IN ACC.
02060  0074 00 4 06511         TSX OK,4      PROCEED OR
02061  0020 00 0 02033         TRA F27       REPEAT.



*F.P. OVERFLOW WITH UFM.

02062  642644406060            BCD 1UFM-
02063  0074 00 4 06265   P5    TSX PART2,4   LITE 4 ON,CLEAR
02064  0774 00 1 02072         AXT P5T,1
02065  0634 00 1 06131         SXA SECT2,1   SET RETURN ADDRESS
02066  0560 00 0 05524         LDQ K2        377.4
02067 -0260 00 0 05534         UFM K13       233.4,OVERFLOW
02070  0074 00 4 06503         TSX ERROR-1,4 FAILED TO TRAP.
02071  0020 00 0 02063         TRA P5
*CHECK ACC COLS S,Q,P, AND 35.
02072  0074 00 4 05137   P5T   TSX ACB,4
02073  0000 00 0 00002         HTR 2         ERR. ACC S,Q,P, AND 35.
                                             SHOULD
02074  0020 00 0 02063         TRA P5        HAVE P. BITS IN ERROR IN
                                             IND. REG. AS OCTAL NOS.
                                             10{S,4{Q,2{P,1{35.
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*CHECK ACC COLS 1 TO 34.
02075  0074 00 4 05164         TSX ACCF,4
02076 +032200000000            OCT 032200000000   ERR. ACC 1 TO 34.
                                                  CORRECT
02077  0020 00 0 02063         TRA P5             ANS IN MQ,ORIG ANS. IN ACC.

02100  0074 00 4 06511         TSX OK,4           PROCEED OR
02101  0020 00 0 02063         TRA P5             REPEAT.



*CHECK F.P. TRAP ON OVERFLOW WITH FAD.

02102  262124406060            BCD 1FAD-
02103  0074 00 4 06265   F26   TSX PART2,4   LITE 4 ON,CLEAR.
02104  0774 00 1 02113         AXT F26T,1
02105  0634 00 1 06131         SXA SECT2,1   SET RETURN ADDRESS
02106  0500 00 0 05524         CLA K2        +377.4
02107  0300 00 0 05524         FAD K2        FORCE OVERFLOW.
02110  0074 00 4 06503         TSX ERROR-1,4 FAILED TO TRAP
02111  0020 00 0 02103         TRA F26
02112  0020 00 0 02117         TRA *+5       CANT TEST TRIGS.

02113  0074 00 4 05125   F26T  TSX OONLY,4   ACC OV ON
02114  0020 00 0 02103         TRA F26
02115  0020 00 0 02117         TRA *+2       DIVIDE CHECK ON
02116  0020 00 0 02103         TRA F26

*CHECK ACC COLS S,Q,P, AND 35
02117  0074 00 4 05137         TSX ACB,4
02120  0000 00 0 00002         HTR 2         ERR. ACC S,Q,P, AND 35.
                                             SHOULD
02121  0020 00 0 02103         TRA F26       HAVE P. BITS IN ERR. IN
                                             IND. REG. AS OCTAL NOS.
                                             10{S,4{Q,2{P,1{35.

*CHECK ACC COLS 1 TO 34.
02122  0074 00 4 05164         TSX ACCF,4
02123 +000400000000            OCT 000400000000    ERR. ACC 1 TO 34.
                                                   CORRECT
02124  0020 00 0 02103         TRA F26       ANS. IN MQ,ORIG. ANS. IN
                                             ACC.

02125  0074 00 4 06511         TSX OK,4      PROCEED OR
02126  0020 00 0 02103         TRA F26       REPEAT.



*FLOATING POINT OVERFLOW AND TRAP WITH FSM.

02127  266244406060            BCD 1FSM-
02130  0074 00 4 06265   P2    TSX PART2,4   LITE 4 ON,CLEAR.
02131  0774 00 1 02140         AXT P2T,1
02132  0634 00 1 06131         SXA SECT2,1   SET RETURN ADDRESS.
02133  0502 00 0 05527         CLS K3        -377.77777777
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02134  0306 00 0 05527         FSM K3         FORCE OVERFLOW
02135  0074 00 4 06503         TSX ERROR-1,4 FAILED TO TRAP
02136  0020 00 0 02130         TRA P2
02137  0020 00 0 02144         TRA *+5        CANT TEST TRIGGERS.

*CHECK OVERFLOW TRIGGERS.
02140  0074 00 4 05125   P2T   TSX OONLY,4    ACC OV. ON
02141  0020 00 0 02130         TRA P2
02142  0020 00 0 02144         TRA *+2        DIVIDE CHECK ON
02143  0020 00 0 02130         TRA P2

*CHECK ACC COLS S,Q,P, AND 35.
02144  0074 00 4 05137         TSX ACB,4
02145  0000 00 0 00013         HTR 1+2+8      ERR. ACC S,Q,P AND 35.
                                               SHOULD
02146  0020 00 0 02130         TRA P2         HAVE S,P, AND 35. BITS IN
                                               ERR. IN
                                               IND. REG. AS OCTAL NOS.
                                               10{S,4{Q,2{P,1{35

*CHECK ACC COLS 1 TO 34.
02147  0074 00 4 05164         TSX ACCF,4
02150 +000777777776            OCT 000777777776    ERR ACC 1 TO 34.
                                               CORRECT
02151  0020 00 0 02130         TRA P2         ANS IN MQ,ORIG ANS IN ACC.

*CHECK MQ COLS S TO 35
02152  0074 00 4 05174         TSX MQF,4
02153 -345000000000            OCT -345000000000    MQ ERR. CORRECT ANS.
02154  0020 00 0 02130         TRA P2         IN MQ,ORIG. ANS. IN ACC

*CHECK TRAP ADDRESS AT ZERO.
02155  0074 00 4 05177         TSX ZERO,4
02156  0000 00 0 02135         HTR P2+5       ERR IN TRAP ADDRESS.
02157  0020 00 0 02130         TRA P2         CORRECT ADDRESS IN MQ,
                                               ADDRESS WRITTEN IN ACC.
02160  0074 00 4 06511         TSX OK,4       PROCEED OR
02161  0020 00 0 02130         TRA P2         REPEAT.



*FLOATING POINT OVERFLOW WITH FDP. UNLIKE SIGNS.

02162  262447406060            BCD 1FDP-
02163  0074 00 4 06265   P11   TSX PART2,4    LITE 4 ON,CLEAR
02164  0774 00 1 02172         AXT P11T,1
02165  0634 00 1 06131         SXA SECT2,1    SET RETURN ADDRESS.
02166  0502 00 0 05524         CLS K2         -377.4
02167  0241 00 0 05537         FDP K20        10.4
02170  0074 00 4 06503         TSX ERROR-1,4 FAILED TO TRAP.
02171  0020 00 0 02163         TRA P11

*CHECK ACC COLS S,Q,P, AND 35.
02172  0074 00 4 05137   P11T  TSX ACB,4
02173  0000 00 0 00010         HTR 8          ERR. ACC S,Q,P, AND 35. SHOULD
02174  0020 00 0 02163         TRA P11        HAVE S. BITS IN ERR. IN
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                                          IND. REG. AS OCTAL NOS.
                                          10{S,4{Q,2{P,1{35.

*CHECK ACC COLS 1 TO 34.
02175  0074 00 4 05164         TSX ACCF,4
02176 +345000000000            OCT 345000000000   ERR ACC 1 TO 34.
                                          CORRECT
02177  0020 00 0 02163         TRA P11       ANS. IN MQ,ORIG. ANS.
                                          IN ACC.

*CHECK MQ COLS S TO 35.
02200  0074 00 4 05174         TSX MQF,4
02201 -170400000000            OCT -170400000000 MQ ERR. CORRECT ANS.
02202  0020 00 0 02163         TRA P11       IN MQ,ORIG. ANS. IN ACC.


02203  0074 00 4 06511         TSX OK,4      PROCEED OR
02204  0020 00 0 02163         TRA P11       REPEAT.



*F.P. TRAP ON OVERFLOW WITH FRN.
02205  265145406060            BCD 1FRN-
02206  0074 00 4 06265   F31   TSX PART2,4   LITE 4 ON,CLEAR.
02207  0774 00 1 02217         AXT F31T,1
02210  0634 00 1 06131         SXA SECT2,1   SET RETURN ADDRESSS.
02211  0500 00 0 05527         CLA K3        +3777.77777777
02212  0560 00 0 05517         LDQ K1+1      +344.440404040
02213  0760 00 0 00011         FRN
*WORST CASE,RIPPLE CARRY THROUGH FRACTION TO
*ACC COL 9,CARRY THROUGH CHARACTERISTIC TO P, AND TRAP.
02214  0074 00 4 06503         TSX ERROR-1,4 FAILED TO TRAP.
02215  0020 00 0 02206         TRA F31
02216  0020 00 0 02223         TRA *+5       CANT TEST TRIG.

*CHECK OV TRIGGERS.
02217  0074 00 4 05125   F31T  TSX OONLY,4   ACC OV ON
02220  0020 00 0 02206         TRA F31
02221  0020 00 0 02223         TRA *+2       DIVIDE CHECK ON
02222  0020 00 0 02206         TRA F31

*CHECK ACC COLS S,Q,P, AND 35.
02223  0074 00 4 05137         TSX ACB,4
02224  0000 00 0 00002         HTR 2         ERR. ACC S,Q,P AND 35.
                                          SHOULD
02225  0020 00 0 02206         TRA F31       HAVE P. BITS IN ERR. IN
                                          IND. REG. AS OCTAL NOS.
                                          10{2,4{Q,2{P,1{35.

*CHECK ACC COLS 1 TO 34.
02226  0074 00 4 05164         TSX ACCF,4
02227 +000400000000            OCT 000400000000    ERR ACC 1 TO 34.
                                          CORRECT
02230  0020 00 0 02206         TRA F31       ANS. IN MQ,ORIG ANS. IN ACC

*CHECK MQ COLS S TO 35.
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02231  0074 00 4 05174         TSX MQF,4
02232 +344440404040            OCT 344440404040    ERR IN MQ. CORRECT
                                                   ANS.
02233  0020 00 0 02206         TRA F31       IN MQ,ORIG. ANS IN ACC.

*CHECK TRAP ADDRESS AT ZERO.
02234  0074 00 4 05177         TSX ZERO,4
02235  0000 00 0 02214         HTR F31+6     ERR IN TRAP ADDRESS.
02236  0020 00 0 02206         TRA F31       CORRECT ADDRESS IN MQ,
                                             ADDRESS WRITTEN IN ACC.

*CHECK INDICATOR BITS IN DECREMENT OF ZERO.
02237  0074 00 4 05203         TSX BITS,4    CHECK BITS F31
02240  0000 06 0 00000         HTR 0,0,6     SHOULD HAVE 15 AND 16.
02241  0074 00 4 06504         TSX ERROR,4   CORRECT BITS IN MQ,
02242  0074 00 4 06511         TSX OK,4      ORIG. BITS IN ACC.
02243  0020 00 0 02206         TRA F31       PROCEED OR REPEAT.



*END PART 1 OF 9M05. GO ON TO PART 2, SECTION 1



*THERE ARE TWO SECTIOSN OF PART 2, THEY ARE
*SECTION 1, THE INDICATOR TEST, AND
*SECTION 2, RELIABILITY TEST.



*BEGIN PART 2 OF 9M05, 709 FLOATING POINT  TRAP DIAGNOSTIC,
*CHECKING THE WRITING OF THE INDICATOR BITS IN THE
*DECREMENT FIELD OF LOCATION ZERO. EVERY POSSIBLE BIT
*COMBINATION IS PROVIDED FOR. THE BITS INVOLVED ARE
*IN COLS 14, 15, 16, AND 17.
*NON-LINEAR PROGRAMMING MODE CONTINUES.

*UFA WITH OVER FLOW, BITS 15 AND 16

02244  642621406060            BCD 1UFA-
02245  0074 00 4 06265   IT1   TSX PART2,4   LIGHT 4 ON,CLEAR
02246  0774 00 1 02255         AXT *+7,1
02247  0634 00 1 06131         SXA SECT2,1        SET RETURN ADDRESS
02250  0500 00 0 05527         CLA K3             +377.777777777
02251 -0300 00 0 05527         UFA K3             SHOULD OVER FLOW
02252  0074 00 4 06503         TSX ERROR-1,4      FAILED TO TRAP
02253  0020 00 0 02245         TRA IT1
02254  0020 00 0 02261         TRA *+5       CANT TEST TRIGGERS

02255  0074 00 4 05125         TSX OONLY,4   ACC OV ON
02256  0020 00 0 02245         TRA IT1
02257  0020 00 0 02261         TRA *+2       DIVIDE CHECK ON
02260  0020 00 0 02245         TRA IT1

*CHECK ACC BITS S,P,Q,35. BITS IN ERROR PUT
*IN INDICATOR REG AS OCTAL NUMBERS AS FOLLOWS
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*10{S, 4{Q, 2{P, 1{35.

*CHECK ACC COLS S,Q,P,AND 35
02261  0074 00 4 05137         TSX ACB,4          SHOULD HAVE P AND 35
02262  0000 00 0 00003         HTR 2+1            BITS IN ERROR IN IND REG
                                              10{2,4{Q,2{P,1{35.
02263  0020 00 0 02245         TRA IT1

*CHECK ACC COLS 1 TO 34

02264  0074 00 4 05164         TSX ACCF,4         IF ERROR,
02265 +000777777776            OCT 000777777776   CORRECT ANS WILL BE
02266  0020 00 0 02245         TRA IT1            IN MQ, ORIG ANS IN ACC

*CHECK MQ COLS S TO 35.

02267  0074 00 4 05174         TSX MQF,4          IF ERROR, CORRECT ANS.
02270 +345000000000            OCT 345000000000   WILL BE IN MQ, ORIG
02271  0020 00 0 02245         TRA IT1            ANS IN ACC

*CHECK ADDRESS AT ZERO.

02272  0074 00 4 05177         TSX ZERO,4         CORRECT ADDRESS
02273  0000 00 0 02252         HTR IT1+5          WILL BE IN MQ,
02274  0020 00 0 02245         TRA IT1            ORIG ADDRESS IN AC

*CHECK INDICATOR BITS IN DECREMENT OF ZERO

02275  0074 00 4 05203         TSX BITS,4    CHECK BITS IT1
02276  0000 06 0 00000         HTR 0,0,6          CORRECT BITS PUT IN
02277  0074 00 4 06504         TSX ERROR,4        MQ, ORIG BITS IN ACC
02300  0074 00 4 06511         TSX OK,4           PROCEED OR
02301  0020 00 0 02245         TRA IT1            REPEAT.


*TRAP RELIABILITY, UFA, BITS 15 AND 16. 50 PASSES

02302  642621406060            BCD 1UFA-
02303  0074 00 4 06265   IT2   TSX PART2,4        CLEAR, TURN ON LITE 4
02304  0774 00 1 02307         AXT *+3,1     SET RETURN ADDRESS
02305  0634 00 1 06131         SXA SECT2,1
02306  0774 00 1 00064         AXT 52,1           REPEAT 50 TIMES
02307 -2 00001 1 02315         TNX *+6,1,1   REPEAT IT2 AFTER TRAP.
02310  0500 00 0 05527         CLA K3        377.777777777
02311 -0300 00 0 05527         UFA K3             FORCE OVER FLOW.
02312  0074 00 4 06503         TSX ERROR-1,4      FAILED TO TRAP
02313  0020 00 0 02303         TRA IT2            REPEAT.
02314  0020 00 0 02321         TRA *+5       CANT TEST TRIGS

02315  0074 00 4 05125         TSX OONLY,4   ACC OV. ON
02316  0020 00 0 02303         TRA IT2
02317  0020 00 0 02321         TRA *+2       DIVIDE CHECK ON
02320  0020 00 0 02303         TRA IT2

*CHECK ACC COLS S,Q,P, AND 35
02321  0074 00 4 05137         TSX ACB,4
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02322  0000 00 0 00003         HTR 2+1            BITS WRONG IN IND. REG
02323  0020 00 0 02303         TRA IT2            AS OCTAL NUMBERS
                                              10{S,4{Q,2{P,1{35

*CHECK ACC COLS 1 TO 34
02324  0074 00 4 05164         TSX ACCF,4         CHECK ACC 1 TO 34
02325 +000777777776            OCT 000777777776   CORRECT ANS IN MQ, ORIG
02326  0020 00 0 02303         TRA IT2            ANS IN ACC. S,P,Q,35 DRO

02327  0074 00 4 05174         TSX MQF,4          CHECK MQ S TO 35
02330 +345000000000            OCT 345000000000   CORRECT ANS IN MQ, ORIG
02331  0020 00 0 02303         TRA IT2            ANS IN ACC.

02332  0074 00 4 05177         TSX ZERO,4         CHECK TRAP ADDRESS
02333  0000 00 0 02312         HTR IT2+7          CORRECT ADD. IN MQ,
02334  0020 00 0 02303         TRA IT2            ORIG ADD. IN ACC.

02335  0074 00 4 05203         TSX BITS,4    CHECK BITS IT2
02336  0000 06 0 00000         HTR 0,0,6          CORRECT BITS PUT IN
02337  0074 00 4 06504         TSX ERROR,4        MQ, ORIG BITS IN ACC.
02340  0074 00 4 06511         TSX OK,4           PROCEED OR
02341  0020 00 0 02303         TRA IT2            REPEAT.


*FLOATING POINT UNDER FLOW, BIT 17

02342  642621406060            BCD 1UFA-
02343  0074 00 4 06265   IT3   TSX PART2,4        CLEAR, LIGHT 4 ON
02344  0774 00 1 02353         AXT *+7,1
02345  0634 00 1 06131         SXA SECT2,1        SET RETURN ADDRESS
02346  0500 00 0 05531         CLA K8             +007.1
02347 -0300 00 0 05531         UFA K8             UNDERFLOW
02350  0074 00 4 06503         TSX ERROR-1,4 FAILED TO TRAP.
02351  0020 00 0 02343         TRA IT3            REPEAT
02352  0020 00 0 02357         TRA *+5       CANT TEST TRIGGERS

02353  0074 00 4 05125         TSX UONLY,4   ACC OV. ON
02354  0020 00 0 02343         TRA IT3
02355  0020 00 0 02357         TRA *+2       DIVIDE CHECK ON
02356  0020 00 0 02343         TRA IT3

*CHECK ACC COLS S,Q,P,AND 35
02357  0074 00 4 05137         TSX ACB,4
02360  0000 00 0 00000         HTR 0              SHOULD ALL BE OF, WRONG
02361  0020 00 0 02343         TRA IT3            BITS IN IND-REG IN OCTAL
                                              10{S,4{Q,2{P,1{35

02362  0074 00 4 05164         TSX ACCF,4         CHECK AC 1 TO 34
02363 +007200000000            OCT 007200000000   CORRECT ANS IN MQ, ORIG
02364  0020 00 0 02343         TRA IT3            ANS IN ACC

02365  0074 00 4 05174         TSX MQF,4          CHECK MQ S TO 35,
02366 +354000000000            OCT 354000000000   CORRECT ANS. IN MQ
02367  0020 00 0 02343         TRA IT3            ORIG ANS IN ACC

02370  0074 00 4 05177         TSX ZERO,4         CHECK TRAP ADDRESS
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02371  0000 00 0 02350         HTR IT3+5          CORRECT ADD IN MQ
02372  0020 00 0 02343         TRA IT3            ORIG ADD IN ACC

02373  0074 00 4 05203         TSX BITS,4    CHECK BITS IT3
02374  0000 01 0 00000         HTR 0,0,1          CORRECT BITS IN MQ
02375  0074 00 4 06504         TSX ERROR,4        ORIG BITS IN ACC
02376  0074 00 4 06511         TSX OK,4           PROCEED OR
02377  0020 00 0 02343         TRA IT3            REPEAT.


*FAD UNDERFLOW, SIGNS ALIKE, NO EXHCANGE, NO 9 CARRY, BITS 16,17.

02400  262124406060            BCD 1FAD-
02401  0074 00 4 06265   IT4   TSX PART2,4        MAKE SURE AC OV OFF
02402  0761 00 0 00000         NOP                LIGHT 4 ON
02403  0774 00 1 02412         AXT *+7,1     SET RETURN
02404  0634 00 1 06131         SXA SECT2,1        ADDRESS
02405  0500 00 0 05723         CLA SALON+9        1.007777777
02406  0300 00 0 05722         FAD SALON+8        4.004444444
02407  0074 00 4 06503         TSX ERROR-1,4      FAILED TO TRAP
02410  0020 00 0 02401         TRA IT4            REPEAT TEST
02411  0020 00 0 02416         TRA *+5       DO NOT TEST OV TRIGGERS

02412  0074 00 4 05125         TSX UONLY,4   ACC OV. ON
02413  0020 00 0 02401         TRA IT4
02414  0020 00 0 02416         TRA *+2       DIVIDE CHECK ON
02415  0020 00 0 02401         TRA IT4

*CHECK ACC COLS S,Q,P,AND 35
02416  0074 00 4 05137         TSX ACB,4
02417  0000 00 0 00006         HTR 2+4            SHOULD HAVE P+Q ONLY
02420  0020 00 0 02401         TRA IT4            BITS IN ERROR IN IND
                                             REG AS OCTAL NUMBERS
                                             10{S,4{Q,2{P,1{35

02421  0074 00 4 05164         TSX ACCF,4         CHECK ACC COLS. 1 TO 34
02422 +376544444370            OCT 376544444370 CORRECT ANS.
02423  0020 00 0 02401         TRA IT4            IF ERROR, CORRECT ANS.
                                                  WILL BE IN MQ, ORIG ANS.

02424  0074 00 4 05174         TSX MQF,4          CHECK MQ COLS. S TO 35
02425 +343000000000            OCT 343000000000   CORRECT ANS.
02426  0020 00 0 02401         TRA IT4            IF ERROR, CORRECT ANS-
                                             WILL BE IN MQ,
                                             ORIG ANS. IN ACC

02427  0074 00 4 05177         TSX ZERO,4         CHECK ADDRESS AT ZERO
02430  0000 00 0 02407         HTR IT4+6          CORRECT ADDRESS, WILL
02431  0020 00 0 02401         TRA IT4            BE IN MQ IF ERROR, ORIG
                                                  WILL BE IN ACC

02432  0074 00 4 05203         TSX BITS,4    CHECK BITS IT4
02433  0000 03 0 00000         HTR 0,0,3          BITS 16 AND 17 ONLY
02434  0074 00 4 06504         TSX ERROR,4        WRONG ANS IN ACC, MQ COR
02435  0074 00 4 06511         TSX OK,4           PROCEED TO NEXT TEST
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02436  0020 00 0 02401         TRA IT4            REPEAT TEST.


*SIGNS UNLIKE, NO EXCHANGE, 9 CARRY, BITS 16 AND 17

02437  266222406060            BCD 1FSB-      SAME AS FAD EXCEPT SR SIGN
02440  0074 00 4 06265   IT5   TSX PART2,4         MAKE SURE ACC OV LIGHT 0
02441  0761 00 0 00000         NOP                 LIGHT 4 ON
02442  0774 00 1 02451         AXT *+7,1      SET RETURN ADDRESS
02443  0634 00 1 06131         SXA SECT2,1
02444  0500 00 0 05723         CLA SALON+9         1.007777777
02445  0302 00 0 05722         FSB SALON+8    4.004444444. MQ AND ACC ARE
                                               EXHCANGED ON STEP 3 TO COMP.

02446  0074 00 4 06503         TSX ERROR-1,4       FAILED TO TRAP
02447  0020 00 0 02440         TRA IT5
02450  0020 00 0 02455         TRA *+5        CAN NOT TEST TRIGGERS

02451  0074 00 4 05125         TSX UONLY,4    ACC OV. ON
02452  0020 00 0 02440         TRA IT5
02453  0020 00 0 02455         TRA *+2        DIVIDE CHECK ON
02454  0020 00 0 02440         TRA IT5

* CHECK ACC COLS S,Q,P, AND 35.
02455  0074 00 4 05137         TSX ACB,4
02456  0000 00 0 00016         HTR 2+4+8      SHOULD HAVE S,Q,P ONLY
02457  0020 00 0 02440         TRA IT5             WRONG BITS IN IND. REG.
                                               AS OCTAL NUMBERS.
                                               10{S,4{Q,2{P,1{35

02460  0074 00 4 05164         TSX ACCF,4          CHECK ACC COLS 1-34 ONLY
02461 +375711111020            OCT 375711111020 CORRECT ANS WILL BEIN MQ
02462  0020 00 0 02440         TRA IT5             IF ERROR, ORIG ANS. IN A

02463  0074 00 4 05174         TSX MQF,4           CHECK MQ, CORRECT ANS WI
02464 -342000000000            OCT -342000000000 BE IN MQ. ORIG ANS. IN
02465  0020 00 0 02440         TRA IT5             ACC IF ERROR.

02466  0074 00 4 05177         TSX ZERO,4          CHECK ADDRESS AT ZERO.
02467  0000 00 0 02446         HTR IT5+6           CORRECT ADD. WILL BE IN
02470  0020 00 0 02440         TRA IT5             ORIG ADD. IN ACC IF ERRO

02471  0074 00 4 05203         TSX BITS,4     CHECK BITS IT5
02472  0000 03 0 00000         HTR 0,0,3           SHOULD HAVE 16 AND 17 ON
02473  0074 00 4 06504         TSX ERROR,4         CORRECT BITS IN MQ
02474  0074 00 4 06511         TSX OK,4            ORIG. BITS IN ACC.
02475  0020 00 0 02440         TRA IT5


*UFM WITH OVERFLOW, BITS 15,16,17. 26 ZEROS IN MULTIPLYER

02476  642644406060            BCD 1UFM-
02477  0074 00 4 06265   IT6   TSX PART2,4         MAKE SURE ACC OV OFF
02500  0761 00 0 00000         NOP                 LIGHT 4 ON
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02501  0774 00 1 02510         AXT *+7,1     SET RETURN ADDRESS
02502  0634 00 1 06131         SXA SECT2,1
02503  0560 00 0 05524         LDQ K2             377.4
02504 -0260 00 0 05724         UFM SALON+10       277.4
02505  0074 00 4 06503         TSX ERROR-1,4      FAILED TO TRAP
02506  0020 00 0 02477         TRA IT6            REPEAT
02507  0020 00 0 02514         TRA *+5       CAN NOT TEST TRIGGERS

02510  0074 00 4 05125         TSX OONLY,4   ACC OV ON.
02511  0020 00 0 02477         TRA IT6
02512  0020 00 0 02514         TRA *+2       DIVIDE CHECK ON
02513  0020 00 0 02477         TRA IT6

*CHECK ACC COLS S,Q,P,AND 35
02514  0074 00 4 05137         TSX ACB,4
02515  0000 00 0 00002         HTR 2              SHOULD ONLY HAVE P
02516  0020 00 0 02477         TRA IT6            BITS IN ERROR IN IND. RE
                                              10{S,4{Q,2{P,1{35
                                              OCTAL

02517  0074 00 4 05164         TSX ACCF,4         CHECK ACC COLS 1 TO 34
02520 +076200000000            OCT 076200000000 CORRECT ANS. WILL BEIN
02521  0020 00 0 02477         TRA IT6            MQ, ORIG ANS IN ACC ON E

02522  0074 00 4 05174         TSX MQF,4          CHECK MQ
02523 +043000000000            OCT 043000000000 CORRECT,WILL BE IN MQ,
02524  0020 00 0 02477         TRA IT6            ORIG ANS. IN ACC

02525  0074 00 4 05177         TSX ZERO,4         CHECK TRAP ADDRESS
02526  0000 00 0 02505         HTR IT6+6          CORRECT WILL BE IN MQ,
02527  0020 00 0 02477         TRA IT6            ORIG. ADDRESS IN ACC

02530  0074 00 4 05203         TSX BITS,4    CHECK BITS IT6
02531  0000 07 0 00000         HTR 0,0,7          SHOULD HAVE 15,16,17
02532  0074 00 4 06504         TSX ERROR,4        CORRECT BITS IN MQ,
02533  0074 00 4 06511         TSX OK,4           ORIG BITS IN ACC.
02534  0020 00 0 02477         TRA IT6            REPEAT OR PROCEED



*FDP TO CHECK REMAINING BIT COMBINATIONS

*FDP UNDERFLOW, BITS 14, 17.

02535  262447406060            BCD 1FDP-
02536  0074 00 4 06265   IT7   TSX PART2,4   MAKE SURE ACC OV OFF
02537  0761 00 0 00000         NOP           LIGHT 4 ON
02540  0774 00 1 02547         AXT *+7,1     SET RETURN
02541  0634 00 1 06131         SXA SECT2,1   ADDRESS
02542  0500 00 0 05543         CLA K26            144.07
02543  0241 00 0 05544         FDP K27            345.7, UNDERFLOW
02544  0074 00 4 06503         TSX ERROR-1,4      FAILED TO TRAP
02545  0020 00 0 02536         TRA IT7
02546  0020 00 0 02553         TRA *+5       CAN NOT TEST TRIGGERS

02547  0074 00 4 05125         TSX UONLY,4   ACC OV. ON
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02550  0020 00 0 02536         TRA IT7
02551  0020 00 0 02553         TRA *+2       DIVIDE CHECK ON
02552  0020 00 0 02536         TRA IT7

*CHECK ACC COLS S,Q,P,AND 35
02553  0074 00 4 05137         TSX ACB,4
02554  0000 00 0 00000         HTR                SHOULD NOT HAVE ANY ONES
02555  0020 00 0 02536         TRA IT7            WRONG BITS IN IND. REG.
                                                  10{S, 4{Q, 2{P, 1{35

02556  0074 00 4 05164         TSX ACCF,4         CHECK ACC COLS 1-34
02557 +111000000000            OCT 111000000000   CORRECT ANS. IN MQ, ORIG
02560  0020 00 0 02536         TRA IT7            ANS. IN ACC

02561  0074 00 4 05174         TSX MQF,4          CHECK MQ S TO 35
02562 +377100000000            OCT 377100000000   CORRECT ANS. IN MQ, ORIG
02563  0020 00 0 02536         TRA IT7            ANS. IN ACC

02564  0074 00 4 05177         TSX ZERO,4         CHECK TRAP ADDRESS
02565  0000 00 0 02544         HTR IT7+6          CORRECT ADD IN MQ, ORIG
02566  0020 00 0 02536         TRA IT7            ADD. IN ACC

02567  0074 00 4 05203         TSX BITS,4    CHECK BITS IT7
02570  0000 11 0 00000         HTR 0,0,9          CORRECT BITS IN MQ, ORIG
02571  0074 00 4 06504         TSX ERROR,4        BITS IN ACC.
02572  0074 00 4 06511         TSX OK,4           PROCEED OR
02573  0020 00 0 02536         TRA IT7            REPEAT



*FDP UNDERFLOW, BITS 14,16,17, CALCULATE ACC FACTOR,
*SIGN UNLIKE

02574  262447406060            BCD 1FDP-
02575  0074 00 4 06265   IT8   TSX PART2,4        CLEAR, LIGHT 4 ON
02576  0502 00 0 05510         CLS K0+2           -033.404040404 IN ACC
02577  0774 00 1 05212         AXT SETIT,1        SKIP TO IT8 + 10
02600  0634 00 1 06131         SXA SECT2,1        IF TRAP ERROR. AND GO ON
                                                  WITH CORRECT ANS.
02601  0241 00 0 05725         FDP SALON+11       BY 2, SHOULD NOT TRAP
*IF TRAP OCCURS HERE,INDICATION OF TRAP ERROR
*WILL BE GIVEN FROM THE SUBROUTINE SET IT,THE
*CORRECT QUOTIENT WILL BE PLACED IN THE MQ
*WITH LDQ,AND TEST IT8 WILL CONTINUE FROM
*THIS POINT.
02602 -0754 00 0 00000         PXD                CLEAR ACC
02603  0760 00 0 00144         SLN 4
02604  0774 00 1 02613         AXT *+7,1
02605  0634 00 1 06131         SXA SECT2,1        SET RETURN ADDRESS
02606  0763 00 0 00043         LLS 35             -032.404040404 TO ACC
                                                SHOULD NOT GET ACC OV.
02607  0241 00 0 05517         FDP K1+1       BY 344.440404040, UND.
02610  0074 00 4 06503         TSX ERROR-1,4      FAILED TO TRAP
02611  0020 00 0 02575         TRA IT8
02612  0020 00 0 02617         TRA *+5       CAN NOT TEST TRIGS
```

```
02613  0074 00 4 05125         TSX UONLY,4   ACC OV. ON
02614  0020 00 0 02575         TRA IT8
02615  0020 00 0 02617         TRA *+2       DIVIDE CHECK ON
02616  0020 00 0 02575         TRA IT8

*CHECK ACC COLS S,Q,P,AND 35
02617  0074 00 4 05137         TSX ACB,4
02620  0000 00 0 00016         HTR 2+4+8     SHOULD HAVE S,Q,P. BITS IN
02621  0020 00 0 02575         TRA IT8            ERROR IN IND REG AS FOLL
                                                  10{S, 4{Q, 2{P, 1{35

02622  0074 00 4 05164         TSX ACCF,4        CHECK ACC COLS 1 TO 34
02623 +377423035700            OCT 377423035700  CORRECT, WILL BE IN MQ,
02624  0020 00 0 02575         TRA IT8           ANS. IN ACC.

02625  0074 00 4 05174         TSX MQF,4         CHECK MQ COLS S TO 35
02626 -266715412642            OCT -266715412642 CORRECT, WILL BE IN MQ,
02627  0020 00 0 02575         TRA IT8           ANS. IN ACC.

02630  0074 00 4 05177         TSX ZERO,4        CHECK TRAP ADDRESS
02631  0000 00 0 02610         HTR IT8+11        CORRECT, WILL BE IN MQ,
02632  0020 00 0 02575         TRA IT8           ADD. WILL BE IN ACC

02633  0074 00 4 05203         TSX BITS,4    CHECK BITS IT8
02634  0000 13 0 00000         HTR 0,0,11        CORRECT, WILL BE IN MQ,
02635  0074 00 4 06504         TSX ERROR,4       BITS IN ACC. WANT 14,16,
02636  0074 00 4 06511         TSX OK,4          PROCEED OR
02637  0020 00 0 02575         TRA IT8           REPEAT


*FDP WITH ACC UND., BITS 14,16 MQ OK.

02640  262447406060            BCD 1FDP-
02641  0074 00 4 06265   IT9   TSX PART2,4       LIGHT 4 ON
02642  0761 00 0 00000         NOP               ACC OV OFF
02643  0774 00 1 02652         AXT *+7,1     SET RETURN
02644  0634 00 1 06131         SXA SECT2,1       ADDRESS
02645  0500 00 0 05726         CLA SALON+12      32.404040404
02646  0241 00 0 05727         FDP SALON+13      32.440404040
02647  0074 00 4 06503         TSX ERROR-1,4     FAILED TO TRAP
02650  0020 00 0 02641         TRA IT9           REPEAT
02651  0020 00 0 02656         TRA *+5       CAN NOT TEST TRIGGERS

02652  0074 00 4 05125         TSX UONLY,4   ACC OV ON
02653  0020 00 0 02641         TRA IT9
02654  0020 00 0 02656         TRA *+2       DIVIDE CHECK ON
02655  0020 00 0 02641         TRA IT9

*CHECK ACC COLS S,Q,P,AND 35
02656  0074 00 4 05137         TSX ACB,4
02657  0000 00 0 00006         HTR 2+4       SHOULD HAVE Q,P.
02660  0020 00 0 02641         TRA IT9            WRONG BITS IN IND REG.
                                              AS OCTAL NUMBERS.
                                              10{S,4{Q,2{Q,1{35.
```

```
02661  0074 00 4 05164         TSX ACCF,4          CHECK ACC COLS 1 TO 34
02662 +377423035700            OCT 377423035700    CORRECT, WILL BE IN MQ,
02663  0020 00 0 02641         TRA IT9             ORIG ANS IN ACC

02664  0074 00 4 05174         TSX MQF,4           CHECK MQ COLS. S TO 35
02665 +200715412642            OCT 200715412642    CORRECT, WILL BE IN MQ,
02666  0020 00 0 02641         TRA IT9             ORIG ANS. IN ACC.

02667  0074 00 4 05177         TSX ZERO,4          CHECK TRAP ADDRESS
02670  0000 00 0 02647         HTR IT9+6           CORRECT, WILL BE IN MQ
02671  0020 00 0 02641         TRA IT9             ORIG ADD. IN ACC

02672  0074 00 4 05203         TSX BITS,4     CHECK BITS IT9
02673  0000 12 0 00000         HTR 0,0,10          CORRECT BITS IN MQ.
02674  0074 00 4 06504         TSX ERROR,4         ORIG BITS IN ACC.
02675  0074 00 4 06511         TSX OK,4            PROCEED OR
02676  0020 00 0 02641         TRA IT9             REPEAT


*FDP WITH MQ OV., ACC. OK. BITS 14,15,17.

02677  262447406060            BCD 1FDP-
02700  0074 00 4 06265   IT10  TSX PART2,4         LIGHT 4 ON
02701  0761 00 0 00000         NOP                 MAKE SURE ACC OF OFF
02702  0774 00 1 02711         AXT *+7,1      SET RETURN
02703  0634 00 1 06131         SXA SECT2,1         ADDRESS
02704  0500 00 0 05524         CLA K2              377.4
02705  0241 00 0 05537         FDP K20             10.4 SHOULD OVERFLOW
02706  0074 00 4 06503         TSX ERROR-1,4       FAILED TO TRAP
02707  0020 00 0 02700         TRA IT10            REPEAT
02710  0020 00 0 02715         TRA *+5        CAN NOT TEST TRIGGERS

02711  0074 00 4 05125         TSX OONLY,4    ACC OV. ON
02712  0020 00 0 02700         TRA IT10
02713  0020 00 0 02715         TRA *+2        DIVIDE CHECK ON
02714  0020 00 0 02700         TRA IT10

02715  0074 00 4 05137         TSX ACB,4           CHECK ACC COLS S,Q,P,35.
02716  0000 00 0 00000         HTR                 SHOULD ALL BE 0, WRONG B
02717  0020 00 0 02700         TRA IT10            IN IND REG AS FOLLOWS
                                                   10{S, 4{Q, 2{P, 1{35, OC

02720  0074 00 4 05164         TSX ACCF,4          CHECK ACC COLS 1 TO 34
02721 +345000000000            OCT 345000000000    CORRECT ANS. PUT IN MQ,
02722  0020 00 0 02700         TRA IT10            ORIG ANS. IN ACC.

02723  0074 00 4 05174         TSX MQF,4           CHECK MQ COLS S TO 35
02724 +170400000000            OCT 170400000000    CORRECT ANS PUT IN MQ,
02725  0020 00 0 02700         TRA IT10            ORIG ANS. IN ACC.

02726  0074 00 4 05177         TSX ZERO,4          CHECK TRAP ADDRESS
02727  0000 00 0 02706         HTR IT10+6          CORRECT ADDERSS PUT IN M
02730  0020 00 0 02700         TRA IT10            ORIG ADD. IN ACC
```

```
02731  0074 00 4 05203         TSX BITS,4    CHECK BITS IT10
02732  0000 15 0 00000         HTR 0,0,13         CORRECT BITS PUT IN MQ,
02733  0074 00 4 06504         TSX ERROR,4        ORIG BITS IN ACC.
02734  0074 00 4 06511         TSX OK,4           PROCEED OR
02735  0020 00 0 02700         TRA IT10           REPEAT


*END SECTION 1 OF PART 2 9M05. GO ON TO SECTION 2.


*FLOATING POINT ACCURACY AND RELIABILITY TESTS. INCLUDING
*SIMULATED APPLICATION PROGRAMMING OF CUSTOMER-TYPE
*PROBLEMS.


*FMP,23 ZEROS IN MULTIPLYER

02736  264447606060            BCD 1FMP
02737  0074 00 4 06211   ED    TSX CLEAR,4
02740  0500 00 0 05502         CLA DAVE      175.631463146
02741  0765 00 0 00043         LRS 35        SNEAKY
02742  0260 00 0 05503         FMP DAVE+1    -206.66


*CHECK ACC COLS S,Q,P,AND 35.

02743  0074 00 4 05137         TSX ACB,4     ERR,ACC S,Q,P,AND 35
02744  0000 00 0 00010         HTR 8         SHOULD HAVE S. BITS
02745  0020 00 0 02737         TRA ED        IN ERR IN IND. REG
                                             AS OCTAL NOS.
                                             10{S,4{S,2{P,1{35

*CHECK ACC COLS 1 TO 34

02746  0074 00 4 05164         TSX ACCF,4    ERR IN ACC 1 TO 34.
02747 +203531463146            OCT 203531463146 CORRECT ANS. IN MQ.
02750  0020 00 0 02737         TRA ED


*CHECK MQ COLS S TO 35

02751  0074 00 4 05174         TSX MQF,4     ERR IN MQ RESULT
02752 -150040000000            OCT -150040000000 CORRECT ANS IN MQ
02753  0020 00 0 02737         TRA ED        ORIG ANS IN ACC


02754  0074 00 4 06511         TSX OK,4      PROCEED OR
02755  0020 00 0 02737         TRA ED        REPEAT


*ALIGHT YOU GUYS,GET OVER AGAINST THAT WALL


*FMP AND FDP AND FRN AND FAD.
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02756  262447606060            BCD 1FDP
02757  0074 00 4 06211   EDDY  TSX CLEAR,4
02760  0502 00 0 05503         CLS DAVE+1     206.66
02761  0765 00 0 00043         LRS 35
02762  0260 00 0 05502         FMP DAVE       175.631463146
                                              ACC{203.531463146
                                              MQ{150.04

02763  0241 00 0 05502         FDP DAVE       175.631463146
                                              MQ{206.65777777
                                              ACC{150.571463146

02764  0131 00 0 00000         XCA            QUOT. TO ACC
02765  0760 00 0 00011         FRN            ACC{206.66
02766 -0600 00 0 05717         STQ SALON+5    SAVE REMAINDER
02767  0300 00 0 05503         FAD DAVE+1     -206.66
02770  0100 00 0 02773         TZE *+3
02771  0074 00 4 06503         TSX ERROR-1,4 ACC SHOULD BE
02772  0020 00 0 02757         TRA EDDY       ZERO AFTER THE
                                              ABOVE FAD INSTR.


*CHECK REMAINDER OF THE DIVISION.
02773  0074 00 4 05164         TSX ACCF,4     ERR IN REMAINDER
02774 +150571463146            OCT 150571463146  OF FDP, 7 INSTR ABOVE.
02775  0020 00 0 02757         TRA EDDY       CORRECT ANS. IN MQ


02776  0074 00 4 06511         TSX OK,4       PROCEED OR
02777  0020 00 0 02757         TRA EDDY       REPEAT



*FDP ACC CHARACTERISTIC CARRY TO ZERO

03000  262447606060            BCD 1FDP
03001  0074 00 4 06265   PHIL  TSX PART2,4
03002  0774 00 1 03020         AXT PHILT,1
03003  0634 00 1 06131         SXA SECT2,1    IN CASE OF TRAP
03004  0500 00 0 05504         CLA DAVE+2     033.404040404
03005  0241 00 0 05505         FDP DAVE+3     033.440404040

*CHECK ACC COLS S,Q,P,AND 35

03006  0074 00 4 05137         TSX ACB,4      S,Q,P,AND 35 SHOULD{0
03007  0000 00 0 00000         HTR            BITS IN ERR,IN IND.
03010  0020 00 0 03001         TRA PHIL       REG. AS OCTAL NOS.
                                              10{S,4{Q,2{P,1{35

*CHECK ACC COLS 1 TO 34

03011  0074 00 4 05164         TSX ACCF,4     ERR,ACC COLS 1 TO 34
03012 +000423035700            OCT 000423035700 CORRECT ANS. IN MQ
03013  0020 00 0 03001         TRA PHIL       ORIG. ANS. IN ACC
```

```
*CHECK MQ COLS S TO 35

03014  0074 00 4 05174         TSX MQF,4     ERR IN MQ RESULT
03015 +200715412642            OCT 200715412642 CORRECT ANS. IN MQ.
03016  0020 00 0 03001         TRA PHIL      ORIG ANS IN ACC.

03017  0020 00 0 03024         TRA *+5
03020  0534 00 1 00000   PHILT LXA 0,1       TRAP ADDRESS TO XRA
03021  1 77777 1 03022         TXI *+1,1,-1  XRA-1
03022  0074 00 4 06503         TSX ERROR-1,4 TRAP ERR,ADDRESS OF
03023  0020 00 0 03001         TRA PHIL      INSTR. WHICH CAUSED
                                             TRAP IS IN XRA.


03024  0074 00 4 06511         TSX OK,4      PROCEED OR
03025  0020 00 0 03001         TRA PHIL      REPEAT.



*NORMALIZE FROM  MQ, NO EXCHANGE

03026  262124606060            BCD 1FAD
03027  0074 00 4 06265   RAY   TSX PART2,4   CLEAR,LIGHT 4 ON.
03030  0774 00 1 03044         AXT RAYT,1    SET RETURN ADDRESS
03031  0634 00 1 06131         SXA SECT2,1   IN CASE OF TRAP.
03032  0302 00 0 06016         FSB COEF      -201.4
03033  0300 00 0 06044         FAD FERM+2    +263.0{-201.4
03034  0760 00 0 00002         CHS           ACC SHOULD NOW BE +.
03035  0340 00 0 06016         CAS COEF      CHECK
03036  0020 00 0 03040         TRA *+2       ERROR
03037  0020 00 0 03047         TRA RAYT+3    OK
03040  0560 00 0 06016         LDQ COEF      ACC ERROR,MQ HAS
03041  0074 00 4 06503         TSX ERROR-1,4 CORRECT ANS.,ORIG
03042  0020 00 0 03027         TRA RAY       ANS IN ACC,
                                             SIGN INVERTED.
03043  0020 00 0 03047         TRA RAYT+3    IF ACC IS ZERO,INDICATES
                                             NORMALIZE  FAILURE.
03044  0534 00 1 00000   RAYT  LXA 0,1       TRAP ADDRESS TO XRA.
03045  1 77777 1 03046         TXI *+1,1,-1  XRA-1
03046  0074 00 4 06504         TSX ERROR,4   TRAP ERROR,ADDRESS OF
03047  0074 00 4 06511         TSX OK,4      INSTRUCTION THAT CAUSED
03050  0020 00 0 03027         TRA RAY       TRAP IN XRA.



* NORMALIZE FROM  MQ, EXCHANGE

03051  262124606060            BCD 1FAD
03052  0074 00 4 06265   RAYA  TSX PART2,4   CLEAR,LIGHT 40N.
03053  0774 00 1 03066         AXT RAYAT,1   SET RETURN ADDRESS
03054  0634 00 1 06131         SXA SECT2,1   IN CASE OF TRAP.
03055  0502 00 0 06044         CLS FERM+2    -263.0
03056  0300 00 0 06016         FAD COEF      +201.4{+201.4
03057  0340 00 0 06016         CAS COEF      CHECK
03060  0020 00 0 03062         TRA *+2       ERROR
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03061  0020 00 0 03071         TRA RAYAT+3   OK
03062  0560 00 0 06016         LDQ COEF
03063  0074 00 4 06503         TSX ERROR-1,4 ACC ERROR. CORRECTANS.
03064  0020 00 0 03052         TRA RAYA      IN MQ,ORIGANS. IN ACC,
03065  0020 00 0 03071         TRA RAYAT+3   IF ACC ZERO,INDICATES
                                             NORMALIZE  FAILURE.
03066  0534 00 1 00000   RAYAT LXA 0,1       TRAP ADDRESS TO XRA.
03067  1 77777 1 03070         TXI *+1,1,-1  XRA-1
03070  0074 00 4 06504         TSX ERROR,4   TRAP ERROR,ADDRESS OF
03071  0074 00 4 06511         TSX OK,4      INSTRUCTION THAT CAUSED
03072  0020 00 0 03052         TRA RAYA      TRAP IN XRA.



* NORMALIZE FROM  MQ, WITH DIFFERENT EXCHANGE SITUATIONS.

03073  262124606060            BCD 1FAD
03074  0074 00 4 06265   RAYB  TSX PART2,4   CLEAR,LIGHT 4 ON.
03075  0774 00 1 03117         AXT RAYBT,1   SET RETURN ADDRESS
03076  0634 00 1 06131         SXA SECT2,1   IN CASE OF TRAP.

03077  0500 00 0 06044         CLA FERM+2    +263.0
03100  0302 00 0 06016         FSB COEF      -201.4,EXCHANGE ACC
                                             AND SR. ACC{-201.4
03101  0300 00 0 06044         FAD FERM+2    NO EXCHANGE,ACC{-201.4
03102  0300 00 0 06016         FAD COEF      ACC AND MQ SHOULD ZERO.
03103  0302 00 0 06016         FSB COEF      -201.4
03104  0300 00 0 06044         FAD FERM+2    NO EXCHANGE,ACC{-201.4
                                             MQ{-146.0
*CHECK ACC COLS S,Q,P,AND 35.
03105  0074 00 4 05137         TSX ACB,4     SHOULD HAVE SIGN BIT.
03106  0000 00 0 00010         HTR 8         BITS IN ERROR IN IND.
03107  0020 00 0 03074         TRA RAYB      REG AS OCTAL NUMBERS
                                             10{S,4{Q,2{P,1{35



*CHECK ACC COLS 1 TO 34.
03110  0074 00 4 05164         TSX ACCF,4    ACC ERROR,CORRECT ANS.
03111 +201400000000            OCT 201400000000    IN MQ,ORIG ANS. IN
                                             ACC.
03112  0020 00 0 03074         TRA RAYB      IF ACC ZERO,INDICATES
                                             PROBABLE
                                             NORMALIZE  FAILURE.
*CHECK MQ COLS S TO 35.
03113  0074 00 4 05174         TSX MQF,4     MQ ERROR,CORRECTANS
03114 -146000000000            OCT -146000000000   IN MQ,ORIG ANS IN ACC.
03115  0020 00 0 03074         TRA RAYB
03116  0020 00 0 03122         TRA RAYBT+3   FINISHED.

03117  0534 00 1 00000   RAYBT LXA 0,1       TRAP ADDRESS TO XRA.
03120  1 77777 1 03121         TXI *+1,1,-1  XRA-1
03121  0074 00 4 06504         TSX ERROR,4   TRAP ERROR,ADDRESS OF
03122  0074 00 4 06511         TSX OK,4      INSTRUCTION THAT CAUSED
03123  0020 00 0 03074         TRA RAYB      TRAP IN XRA.
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*9 OV OPERATION TEST WITH FAD,NO EXCHANGE.
03124  262124606060            BCD 1FAD
03125  0074 00 4 06265   RELA  TSX PART2,4   CLEAR,LIGHT 4 ON.
03126  0774 00 1 03176         AXT RELAT,1   SET RETURN ADDRESS
03127  0634 00 1 06131         SXA SECT2,1   IN CASE OF TRAP.
03130 -0754 00 0 00000         PXD           MAKE SURE ACC CLEAR.
03131  0300 00 0 06051         FAD RTA       +233.00000001{201.4
03132  0300 00 0 06052         FAD RTA+1     +201.6{202.5
03133  0300 00 0 06053         FAD RTA+2     +202.6{203.54
03134  0300 00 0 06054         FAD RTA+3     +203.6{204.56
03135  0300 00 0 06055         FAD RTA+4     +204.6{205.57
03136  0300 00 0 06056         FAD RTA+5     +205.6{206.574
03137  0300 00 0 06057         FAD RTA+6     +206.6{207.576
03140  0300 00 0 06060         FAD RTA+7     +207.6{210.577
03141  0300 00 0 06061         FAD RTA+8     +210.6{211.5774
03142  0300 00 0 06062         FAD RTA+9     +211.6{212.5776
03143  0300 00 0 06063         FAD RTA+10    +212.6{213.5777
03144  0300 00 0 06064         FAD RTA+11    +213.6{214.57774
03145  0300 00 0 06065         FAD RTA+12    +214.6{215.57776
03146  0300 00 0 06066         FAD RTA+13    +215.6{216.57777
03147  0300 00 0 06067         FAD RTA+14    +216.6{217.577774
03150  0300 00 0 06070         FAD RTA+15    +217.6{220.577776
03151  0300 00 0 06071         FAD RTA+16    +220.6{221.577777
03152  0300 00 0 06072         FAD RTA+17    +221.6{222.5777774
03153  0300 00 0 06073         FAD RTA+18    +222.6{223.5777776
03154  0300 00 0 06074         FAD RTA+19    +223.6{224.5777777
03155  0300 00 0 06075         FAD RTA+20    +224.6{225.57777774
03156  0300 00 0 06076         FAD RTA+21    +225.6{226.57777776
03157  0300 00 0 06077         FAD RTA+22    +226.6{227.57777777
03160  0300 00 0 06100         FAD RTA+23    +227.6{230.577777774
03161  0300 00 0 06101         FAD RTA+24    +230.6{231.577777776
03162  0300 00 0 06102         FAD RTA+25    +231.6{232.577777777
03163  0300 00 0 06103         FAD RTA+26    +232.6{233.577777777
                                             MQ{200.4
*CHECK ACC S,Q,P,AND 35.
03164  0074 00 4 05137         TSX ACB,4     ACC ERROR,COLS S,Q,P,AND 35
03165  0000 00 0 00001         HTR 1         SHOULD HAVE 35 ONLY.
03166  0020 00 0 03125         TRA RELA      BITS IN ERROR IN IND.
                                             REG. AS OCTAL NUMBERS.
                                             10{S,4{Q,2{P,1{35
*CHECK ACC COLS 1 TO 34.
03167  0074 00 4 05164         TSX ACCF,4    ACC ERROR,COLS 1 TO 34.
03170 +233577777776            OCT 233577777776    CORRECT ANS. WILL BE
                                             IN MQ,
03171  0020 00 0 03125         TRA RELA      ORIG. ANS. IN ACC.

*CHECK MQ COLS S TO 35.
03172  0074 00 4 05174         TSX MQF,4     MQ ERROR,COLS S,TO 35.
03173 +200400000000            OCT 200400000000    CORRECTANS WILL BE IN
03174  0020 00 0 03125         TRA RELA      MQ,ORIG ANS IN ACC.
03175  0020 00 0 03201         TRA RELAT+3   FINISHED.
03176  0534 00 1 00000   RELAT LXA 0,1       TRAP ADDRESS IN XRA.
03177  1 77777 1 03200         TXI *+1,1,-1  XRA-1
03200  0074 00 4 06504         TSX ERROR,4   TRAP ERROR,ADDRESS OF
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                                                    INSTRUCTION THAT CAUSED
                                                    TRAP IN XRA.
03201  0074 00 4 06511         TSX OK,4        PROCEED OR
03202  0020 00 0 03125         TRA RELA        REPEAT



*NO 9 OV OPERATION WITH FMP.

03203  264447606060            BCD 1FMP
03204  0074 00 4 06265   RELB  TSX PART2,4    CLEAR,LIGHT 4 ON.
03205  0774 00 1 03234         AXT RELBT,1     SET RETURN ADDRESS
03206  0634 00 1 06131         SXA SECT2,1     IN CASE OF TRAP.
03207  0560 00 0 06104   RELBC LDQ RTB         201.400000001
03210  0260 00 0 06104         FMP RTB         ACC 201.4000000002,
                                                MQ 146.0000000002
03211  0260 00 0 06104         FMP RTB         ACC 146.0000000002,
                                                MQ 113.0000000004
03212  0260 00 0 06104         FMP RTB         ACC 113.0000000004
                                                MQ 060.0000000010
03213  0260 00 0 06104         FMP RTB         ACC 060.0000000010
                                                MQ 025.0000000020
03214  0260 00 0 06105         FMP RTB+1       ACC 125.0000000020
                                                MQ 072.0000000040
03215  0260 00 0 06104         FMP RTB         ACC 072.0000000040
                                                MQ 037.0000000100
03216  0260 00 0 06106         FMP RTB+2       ACC 223.000000100
                                                MQ 170.0000000200
03217  0260 00 0 06104         FMP RTB         ACC 170.0000000200
                                                MQ 135.0000000400
03220  0260 00 0 06104         FMP RTB         ACC 135.0000000400
                                                MQ 102.0000001000
03221  0260 00 0 06104         FMP RTB         ACC 102.0000001000
                                                MQ 047.0000002000

                                                WHOLE LOT OF SHAKEN
                                                GOING ON.


*COUNTING FROM RELBC TO THIS POINT,
*SHOULD TAKE 71 CYCLES.

*CHECK ACC COLS S,Q,P, AND 35.
03222  0074 00 4 05137         TSX ACB,4       ALL SHOULD BE ZERO
03223  0000 00 0 00000         HTR             BITS IN ERROR IN IND.
03224  0020 00 0 03204         TRA RELB        REG. AS OCTAL NUMBERS.
                                                10{S,4{Q,2{P,1{35
*CHECK ACC COLS 1 TO 34.
03225  0074 00 4 05164         TSX ACCF,4
03226 +102000001000            OCT 102000001000 ERR IN ACC 1 TO 34
                                                CORRECT
03227  0020 00 0 03204         TRA RELB        ANS. IN MQ,ORIG ANS. IN
                                                ACC.

*CHECK MQ COLS S TO 35.
03230  0074 00 4 05174         TSX MQF,4
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03231 +047000002000           OCT 047000002000 MQ ERR. CORRECT ANS.
                                               IN
03232  0020 00 0 03204         TRA RELB      MQ,ORIG ANS. IN ACC.
03233  0020 00 0 03237         TRA RELBT+3   FINISHED.

03234  0534 00 1 00000   RELBT LXA 0,1       TRAP ADDRESS TO XRA.
03235  1 77777 1 03236         TXI *+1,1,-1  XRA-1
03236  0074 00 4 06504         TSX ERROR,4   TRAP ERROR,ADDRESS
                                             OF INSTRUCTION THAT
                                             CAUSED TRAP IN XRA.
03237  0074 00 4 06511         TSX OK,4      PROCEED OR
03240  0020 00 0 03204         TRA RELB      REPEAT.



*9 OV OPERATION WITH FMP.

03241  264447606060            BCD 1FMP
03242  0074 00 4 06265   RELC  TSX PART2,4   CLEAR,LIGHT 4 ON.
03243  0774 00 1 03272         AXT RELCT,1   SET RETURN ADDRESS
03244  0634 00 1 06131         SXA SECT2,1   IN CASE OF TRAP
03245  0560 00 0 06111         LDQ RTC+2     177.600000003
03246  0260 00 0 06110         FMP RTC+1     ACC 376.440000004
                                             MQ 343.4000000011
03247  0260 00 0 06107         FMP RTC       ACC 376.600000020
                                             MQ 343.400000066
03250  0260 00 0 06107         FMP RTC       ACC 376.600000124
                                             MQ 343.000000504
03251  0260 00 0 06107         FMP RTC       ACC 376.000000746
                                             MQ 343.000003630
03252  0260 00 0 06107         FMP RTC       ACC 376.0000005544
                                             MQ 343.000026620
03253  0260 00 0 06107         FMP RTC       ACC 376.0000022130
                                             MQ 343.000210540
03254  0260 00 0 06107         FMP RTC       ACC 376.000315020
                                             MQ 343.001464100
03255  0260 00 0 06107         FMP RTC       ACC 376.002316140
                                             MQ 343.011470600
03256  0260 00 0 06107         FMP RTC       ACC 376.016325100
                                             MQ 343.071524400
03257  0260 00 0 06107         FMP RTC       ACC 376.126376600
                                             MQ 343.531773000

*CHECK ACC COLS S,Q,P, AND 35.
03260  0074 00 4 05137         TSX ACB,4     SHOULD ALL BE ZERO.
03261  0000 00 0 00000         HTR           ERR IN ACC S,Q,P, AND 35.
                                             BITS IN
03262  0020 00 0 03242         TRA RELC      ERR. IN IND. REG. AS OCTAL
                                             NOS. 10{S,4{Q,2{P,1{35

*CHECK ACC COLS 1 TO 34.
03263  0074 00 4 05164         TSX ACCF,4    ACC ERROR,COLS 1 TO 34.
03264 +376126376600           OCT 376126376600 CORRECT ANS. WILL BE
03265  0020 00 0 03242         TRA RELC      IN Q,ORIG. ANS. IN ACC.

*CHECK MQ COLS S TO 35.
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03266  0074 00 4 05174         TSX MQF,4     MQ ERROR.
03267 +343531773000            OCT 343531773000 CORRECT ANS. WILL BE
03270  0020 00 0 03242         TRA RELC      IN MQ,ORIG ANS IN ACC.

03271  0020 00 0 03275         TRA RELCT+3   FINISHED.


03272  0534 00 1 00000   RELCT LXA 0,1       TRAP ADDRESS
03273  1 77777 1 03274         TXI *+1,1,-1  XRA-1
03274  0074 00 4 06504         TSX ERROR,4   TRAP ERROR,ADDRESS
                                             OF INSTRUCTION WHICH
                                             CAUSED TRAP IN XRA
03275  0074 00 4 06511         TSX OK,4      PROCEED OR
03276  0020 00 0 03242         TRA RELC      REPEAT.



*9 OV OPERATION WITH FRN.

03277  265145606060            BCD 1FRN
03300  0074 00 4 06211   RELD  TSX CLEAR,4   CLEAR
03301  0500 00 0 06045         CLA FERM+3    200.77777777
03302  0560 00 0 06016         LDQ COEF      201.4
03303  0760 00 0 00011         FRN           ACC{MQ{201.4
                                             SHOULD NOT TRAP.
*CHECK ACC COLS S,Q,P, AND 35.
03304  0074 00 4 05137         TSX ACB,4     ERR IN ACC S,Q,P, AND 35.
                                             SHOULD
03305  0000 00 0 00000         HTR           ALL BE ZERO. BITS IN ERR IN
03306  0020 00 0 03300         TRA RELD      IND. REG. AS OCTAL NOS.
                                             10{S,4{Q,2{P,1{35

*CHECK ACC COLS 1 TO 34.
03307  0074 00 4 05164         TSX ACCF,4    ACC ERROR,COLS 1 TO 34.
03310 +201400000000            OCT 201400000000    CORRECT ANS IN MQ.
03311  0020 00 0 03300         TRA RELD      ORIG. ANS. IN ACC.

*CHECK MQ COLS S TO 35.
03312  0074 00 4 05174         TSX MQF,4     MQ ERROR.
03313 +201400000000            OCT 201400000000     CORRECT ANS,PUT IN MQ
03314  0020 00 0 03300         TRA RELD      ORIG. ANS. IN ACC.

03315  0074 00 4 06511         TSX OK,4      PROCEED OR
03316  0020 00 0 03300         TRA RELD      REPEAT



*9 OV OPERATION WITH FRN AFTER FDP,FMP, AND FAD.

03317  265145606060            BCD 1FRN
03320  0074 00 4 06265   RELE  TSX PART2,4   CLEAR,LIGHT 4 ON.
03321  0774 00 1 03343         AXT RELET,1   SET RETURN ADDRESS
03322  0634 00 1 06131         SXA SECT2,1   INCASE OF TRAP.
03323  0500 00 0 06045         CLA FERM+3    200.777777777
03324  0241 00 0 06045         FDP FERM+3    MQ{201.4
03325  0260 00 0 06046         FMP FERM+4    ACC{177.7777777
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03326  0300 00 0 06047         FAD FERM+5    ACC{200.7777777
                                             MQ{145.4
03327  0760 00 0 00011         FRN           ACC{201.4
03330  0302 00 0 06016         FSB COEF      ACC AND MQ NOW ZERO.

*CHECK ACC COLS S,Q,P, AND 35.
03331  0074 00 4 05137         TSX ACB,4     ERR IN ACC S,Q,P, AND 35.
                                             SHOULD
03332  0000 00 0 00000         HTR           ALL BE ZERO. BITS IN ERR.
                                             IN
03333  0020 00 0 03320         TRA RELE      IND. REG. AS OCTAL NOS.
                                             10{S,4{Q,2{P,1{35
*CHECK ACC COLS 1 TO 34.
03334  0074 00 4 05164         TSX ACCF,4    ACC ERR. COLS 1 TO 34.
03335  0000 00 0 00000         HTR           CORRECT ANS. IN MQ,
03336  0020 00 0 03320         TRA RELE      ORIG ANS IN ACC.

*CHECK MQ COLS S TO 35.
03337  0074 00 4 05174         TSX MQF,4     MQ ERROR.
03340  0000 00 0 00000         HTR           CORRECT ANS IN MQ,
03341  0020 00 0 03320         TRA RELE      ORIG ANS IN ACC.
03342  0020 00 0 03346         TRA RELET+3

03343  0534 00 1 00000   RELET LXA 0,1        TRAP ADDRESS IN XRA.
03344  1 77777 1 03345         TXI *+1,1,-1  XRA-1
03345  0074 00 4 06504         TSX ERROR,4   TRAP ERROR,ADDRESS OF
03346  0074 00 4 06511         TSX OK,4      INSTRUCTION THAT CAUSED
03347  0020 00 0 03320         TRA RELE      TRAP IN XRA.



*FLOATING-TO-FIXED, FIXED-TO-FLOATING INTEGER
*TRANSLATION, AUTOMATIC MODE.
03350  642621606060            BCD 1UFA
03351  0074 00 4 06265   FXFLA TSX PART2,4   CLEAR,LITE 4 ON.
03352  0774 00 1 03421         AXT FXAT,1    SET RETURN ADDRESS
03353  0634 00 1 06131         SXA SECT2,1   IN CASE OF TRAP.
03354  0500 00 0 05733         CLA A         L202.4{2
03355 -0300 00 0 05562         UFA K40+2     L233.0
03356 -0320 00 0 05707         ANA KK        FIXED POINT 2 NOW IN ACC.

03357  0340 00 0 06042         CAS FERM      CHECK.
03360  1 00000 0 03362         TXI *+2       ERROR IN FIXING.
03361  0020 00 0 03367         TRA *+6       OK
03362 -0600 00 0 06115         STQ Q         SAVE MQ.
03363  0560 00 0 06042         LDQ FERM      CORRECT ANS IN MQ.
03364  0074 00 4 06503         TSX ERROR-1,4 ACC WRONG,MQ RIGHT.
03365  0020 00 0 03351         TRA FXFLA
03366  0560 00 0 06115         LDQ Q         RESTORE MQ
03367  0131 00 0 00000         XCA           CHECK MQ FACTOR
03370  0340 00 0 05551         CAS K34+2     L200.0
03371  1 00000 0 03373         TXI *+2       ERROR
03372  0020 00 0 03376         TRA *+4       OK
03373  0560 00 0 05551         LDQ K34+2     CORRECT ANS IN MQ
03374  0074 00 4 06503         TSX ERROR-1,4 ERROR IN MQ FACTOR,
03375  0020 00 0 03351         TRA FXFLA     CORRECT ANS IN MQ,
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                                                ORIG ANS. IN ACC

*TRY TO FLOAT A 2 AND RECOVER ORIG. NUMBER.
03376  0500 00 0 06042         CLA FERM      L2
03377 -0501 00 0 05562         ORA K40+2     L233.0
03400  0300 00 0 05562         FAD K40+2     L233.0
03401  0340 00 0 05733         CAS A         CHECK,SHOULD{202.4
03402  1 00000 0 03404         TXI *+2       ERROR
03403  0020 00 0 03411         TRA *+6       OK

03404 -0600 00 0 06115         STQ Q         SAVE MQ.
03405  0560 00 0 05733         LDQ A
03406  0074 00 4 06503         TSX ERROR-1,4 ERROR IN FLOATING A 2
03407  0020 00 0 03351         TRA FXFLA     CORRECT ANS IN MQ,
                                             ORIG ANS IN ACC
03410  0560 00 0 06115         LDQ Q         RESTORE MQ.
03411  0131 00 0 00000         XCA           CHECK MQ FACTOR
03412  0340 00 0 06043         CAS FERM+1    L147.0
03413  1 00000 0 03415         TXI *+2       WRONG
03414  0020 00 0 03424         TRA *+8       OK

03415  0560 00 0 06043         LDQ FERM+1    L147.0
03416  0074 00 4 06503         TSX ERROR-1,4 MQ ERROR,CORRECT
03417  0020 00 0 03351         TRA FXFLA     ANS IN MQ,ORIG ANS
03420  0020 00 0 03424         TRA FXAT+3    IN ACC.

03421  0534 00 1 00000   FXAT  LXA 0,1       TRAP ADDRESS TO XRA.
03422  1 77777 1 03423         TXI *+1,1,-1  XRA-1
03423  0074 00 4 06504         TSX ERROR,4   TRAP ERROR,ADDRESS
                                             OF INSTRUCTION
                                             WHICH CAUSED TRAP
                                             IS IN XRA.
03424  0074 00 4 06511         TSX OK,4      PROCEED OR
03425  0020 00 0 03351         TRA FXFLA     REPEAT



*FLOATING-TO-FIXED,FIXED-TO-FLOATING INTEGER TRANSLATION,
*MANUAL MODE. THE VALUE IN THE KEYS WILL BE ENTERED IF,
*S IS DOWN,AND THE NUMBER IS A FLOATING-POINT INTEGER
*WITH CHARACTERISTIC GREATER THEN 200 AND LESS
*THAN 233 OCTAL. S IS NOT ENTERED.

03426  642621606060            BCD 1UFA
03427  0074 00 4 06265   FXFLM TSX PART2,4   CLEAR,LIGHT 4 ON.
03430  0774 00 1 03450         AXT FXMT,1    SET RETURN ADDRESS
03431  0634 00 1 06131         SXA SECT2,1   IN CASE OF TRAP.
03432  0074 00 4 05266         TSX ENK,4     CHECK FOR MANUAL
                                             ENTERY.
03433  0020 00 0 03453         TRA FXMT+3    NO MANUAL ENTERY.

03434  0500 00 0 05712         CLA SALON     MANUAL ENTERY IN SALON.
03435 -0300 00 0 05562         UFA K40+2     L233.0
03436 -0320 00 0 05707         ANA KK        FIXED NO. NOW IN ACC.
                                             TRY TO RECOVER ORIG
                                             NUMBER AND CHECK.
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03437 -0501 00 0 05562         ORA K40+2     L233.0
03440  0300 00 0 05562         FAD K40+2     FLOAT.
03441  0340 00 0 05712         CAS SALON     CHECK.
03442  1 00000 0 03444         TXI *+2       ERROR
03443  0020 00 0 03453         TRA FXMT+3    OK

03444  0560 00 0 05712         LDQ SALON     CORRECT TO MQ
03445  0074 00 4 06503         TSX ERROR-1,4 TRANSLATION ERROR.
03446  0020 00 0 03427         TRA FXFLM     CORRECT ANS IN MQ,
03447  0020 00 0 03453         TRA FXMT+3    ERROR IN ACC.

03450  0534 00 1 00000   FXMT  LXA 0,1       TRAP ADDRESS TO XRA.
03451  1 77777 1 03452         TXI *+1,1,-1  XRA-1
03452  0074 00 4 06504         TSX ERROR,4   TRAP ERROR,ADDRESS
                                             OF INSTRUCTION WHICH
                                             CAUSED TRAP IN XRA.
03453  0074 00 4 06511         TSX OK,4      PROCEED OR
03454  0020 00 0 03427         TRA FXFLM     REPEAT.



*SOLUT ION OF, A EQUALS R+LQB+QB, WHERE
*Q{A/B, AND R{ REMAINDER
*LQB IS THE LOW ORDER PART OF THE F.P. PRODUCT QB.
*THE LOW ORDER PART OF THE SUM HAS A ZERO FRACTION.


03455  264746476260            BCD 1FPOPS    AT1
03456  0074 00 4 06265   AT1   TSX PART2,4   CLEAR,LITE 4 ON
03457  0761 00 0 03506         NOP AT1A
03460  0534 00 1 03457         LXA *-1,1     SET RETURN ADDRESS
03461  0634 00 1 06131         SXA SECT2,1         IN CASE OF TRAP
03462  0761 00 0 00000         NOP
03463  0774 00 1 00012         AXT 10,1            LOAD XRA WITH OCTAL 12

*LOOP NOW INITIALIZED, FIRST SOLVE FOR Q, THEN FOR A.

03464  0500 00 1 05745         CLA A+10,1
03465  0241 00 1 05757         FDP B+10,1           Q IN MQ, R IN ACC
03466  0760 00 0 00012         DCT
03467  0020 00 0 03513         TRA AT1A+5           SHOULD HAVE DIVIDED
03470  0601 00 0 05757         STO FREE             SAVE R
03471  0260 00 1 05757         FMP B+10,1    QB
03472  0601 00 0 05717         STO SALON+5          SAVE QB
03473 -0754 00 0 00000         PXD                 CLEAR ACC
03474  0763 00 0 00043         LLS 35              LQB TO ACC
03475  0300 00 0 05757         FAD FREE            +R
03476  0300 00 0 05717         FAD SALON+5         +QB
03477  0402 00 1 05745         SUB A+10,1          CHECK CACLULATIONS
03500 -0100 00 0 03516         TNZ AT1A+8          ACC SHOULD BE ZERO
03501 -0773 00 0 00011         RQL 9
03502 -0763 00 0 00033         LGL 27                FMQ TO ACC
03503 -0100 00 0 03521         TNZ AT1A+11        ACC SHOULD BE ZERO.
03504  2 00001 1 03464         TIX AT1+6,1,1 NEXT FACTOS.
03505  0020 00 0 03524         TRA AT1A+14        FINISHED
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*ERROR CHECK ROUTINES FOLLOW, PROGRAM TAKES 10 PASSES,
*PASS ON WHICH ERROR OCCURED, IN OCTAL, INFERRED AS
*FOLLOWS, P{12-XRA+1. DIFFERENT FACTOS ON EACH PASS.


03506  0534 00 2 00000   AT1A  LXA 0,2            TRAP IN ERROR,
03507  1 77777 2 03510         TXI *+1,2,-1  TRAP ADD. IN XRB.
03510  0074 00 4 06503         TSX ERROR-1,4 PASS ON WHICH TRAP OCCURED,
03511  0020 00 0 03456         TRA AT1             IN OCTAL, P{12-XRA+1.
03512  0020 00 0 03504         TRA AT1+22          GO ON TO NEXT PASS

03513  0074 00 4 06503         TSX ERROR-1,4       DCT ON, SHOULD HAVE DIVI
03514  0020 00 0 03456         TRA AT1       AT AT1+7
03515  0020 00 0 03504         TRA AT1+22          GO ON TO NEXT PASS
03516  0074 00 4 06503         TSX ERROR-1,4       CALCULATION IN ERROR, AC
03517  0020 00 0 03456         TRA AT1       WAS NOT ZERO AT AT1+18.
03520  0020 00 0 03504         TRA AT1+22          GO ON TO NEXT PASS
03521  0074 00 4 06503         TSX ERROR-1,4       FMQ WAS NOT ZERO.
03522  0020 00 0 03456         TRA AT1       AT AT1+21
03523  0020 00 0 03504         TRA AT1+22          GO ON TO NEXT PASS
03524  0074 00 4 06511         TSX OK,4            FINISHED, PROCEED OR
03525  0020 00 0 03456         TRA AT1             REPEAT.


*SQUARE ROOT,SHOULD NOT TRAP. USES FAD AND FDP

03526  262447262124            BCD 1FDPFAD
03527  0074 00 4 06265   AT2   TSX PART2,4   TURN OFF TRIG,CLEAR
03530  0761 00 0 00000         NOP           LIGHT 4 ON.
03531  0774 00 1 03545         AXT *+12,1    SET RETURN ADDRESS
03532  0634 00 1 06131         SXA SECT2,1      IN CASE OF TRAP
03533  0500 00 0 05747         CLA B+2       16 DECIMAL{205.4
03534  0074 00 4 05224         TSX SQRT,4
03535  0021 00 0 03542         TTR *+5
03536  0402 00 0 05730         SUB SALON+14  4 DECIMAL EQUALS 203.4
03537  0100 00 0 03550         TZE *+9
03540  0400 00 0 05730         ADD SALON+14        ERROR, REPLACE ACC
03541  0560 00 0 05730         LDQ SALON+14        CORRECT ANS. IN MQ
03542  0074 00 4 06503         TSX ERROR-1,4       SQUARE ROOT ERROR
03543  0020 00 0 03527         TRA AT2
03544  0020 00 0 03550         TRA *+4       GO ON

03545  0534 00 1 00000         LXA 0,1       TRAP ADDRESS TO XRA.
03546  1 77777 1 03547         TXI *+1,1,-1  XRA-1
03547  0074 00 4 06504         TSX ERROR,4   TRAP ERROR. ADDRESS OF
                                             INST. THAT CASUED TRAP
                                             IS IN XRA

03550  0074 00 4 06511         TSX OK,4            PROCEED OR
03551  0020 00 0 03527         TRA AT2             REPEAT


*THE QUADRATIC FORMULA, 3 PASSES, 2 ANSWERS EACH PASS.
*IN CASE AN ERROR IS DECTECTED, THE CORRECT ANS. WILL
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*BE PL ACE D IN MQ, ORIGINAL ANS. REMAINS IN AC.

03552  264746476260            BCD 1FPOPS
03553  0074 00 4 06265   AT3   TSX PART2,4   LIGHT 4 ON, CLEAR
03554 -0500 00 0 03602         CAL AT3+23         SET RETURN ADDRESS
03555  0621 00 0 06131         STA SECT2          IN CASE OF TRAP
03556 -0534 00 1 03570         LXD AT3+13,1       21 TO XRA
03557  0560 00 1 06016         LDQ COEF,1         A
03560  0260 00 1 06020         FMP COEF+2,1       AXC
03561  0361 00 0 05731         ACL SALON+15       X4
03562  0601 00 0 05757         STO FREE           4AC
03563  0560 00 1 06017         LDQ COEF+1,1       B
03564  0260 00 1 06017         FMP COEF+1,1       B SQUARED
03565  0302 00 0 05757         FSB FREE           -4AC
03566  0340 00 1 06021         CAS COEF+3,1       CHECK RADICAN
03567  1 00000 0 03571         TXI *+2       ERROR
03570  1 00025 0 03575         TXI *+5,0,21  OK
03571  0560 00 1 06021         LDQ COEF+3,1       CORRECT ANS IN MQ
03572  0074 00 4 06503         TSX ERROR-1,4 ERR. IN B SQRD-4AC
03573  0020 00 0 03553         TRA AT3            REPEAT
03574  0500 00 1 06021         CLA COEF+3,1       GO ON WITH CORRECT
                                                  RADICAN
                                                  R{SQUARE ROOT OF
03575  0074 00 4 05224         TSX SQRT,4         B SQUARE ROOT OF
03576  0021 00 0 03603         TTR *+5       ERROR IN RADICAN
03577  0340 00 1 06022         CAS COEF+4,1       CHECK SQUARE ROOT
03600  0021 00 0 03602         TTR *+2       ERROR
03601  1 00000 0 03607         TXI *+6       OK
03602  0761 00 0 03657         NOP AT3A
03603  0560 00 1 06022         LDQ COEF+4,1       CORRECT ANS. IN MQ
03604  0074 00 4 06503         TSX ERROR-1,4      ERROR IN SQUARE ROOT
03605  0020 00 0 03553         TRA AT3            REPEAT
03606  0500 00 1 06022         CLA COEF+4,1       GO ON WITH CORRECT R

03607  0760 00 0 00012         DCT                TURN OFF DC TRIG
03610  0761 00 0 00000         NOP
03611  0601 00 0 05757         STO FREE
03612  0560 00 1 06016         LDQ COEF,1         A{201.4
03613  0260 00 0 05725         FMP SALON+11       2A{202.4
03614  0601 00 0 05760         STO FREE+1
03615  0502 00 1 06017         CLS COEF+1,1       -B
03616  0300 00 0 05757         FAD FREE           -B+R
03617  0241 00 0 05760         FDP FREE+1         -B+R/2A
03620  0760 00 0 00012         DCT                SHOULD DIVIDE
03621  0021 00 0 03623         TTR *+2       ERROR
03622  1 00000 0 03626         TXI *+4       OK
03623  0560 00 1 06023         LDQ COEF+5,1       CORRECT QUOTIENT
03624  0074 00 4 06503         TSX ERROR-1,4      DCT ERROR ON FDP
03625  0020 00 0 03553         TRA AT3            REPEAT

03626  0131 00 0 00000         XCA
03627  0340 00 1 06023         CAS COEF+5,1       CHECK FIRST ANS.
03630  0021 00 0 03632         TTR *+2       ERROR
03631  1 00000 0 03635         TXI *+4       OK
03632  0560 00 1 06023         LDQ COEF+5,1       CORRECT ANS. IN MQ
03633  0074 00 4 06503         TSX ERROR-1,4      FIRST ANS. WRONG
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03634  0020 00 0 03553         TRA AT3            REPEAT

03635  0502 00 1 06017         CLS COEF+1,1       -B
03636  0302 00 0 05757         FSB FREE           -B-R
03637  0241 00 0 05760         FDP FREE+1         -B-R/2A
03640  0760 00 0 00012         DCT                SHOULD DIVIDE
03641  0021 00 0 03643         TTR *+2       ERROR
03642  1 00000 0 03646         TXI *+4       OK
03643  0560 00 1 06024         LDQ COEF+6,1       CORRECT QUOTIENT
03644  0074 00 4 06503         TSX ERROR-1,4      DCT ERROR ON FDP
03645  0020 00 0 03553         TRA AT3            REPEAT

03646  0131 00 0 00000         XCA
03647  0340 00 1 06024         CAS COEF+6,1       CHECK SECOND ANS
03650  0021 00 0 03652         TTR *+2       ERROR
03651  1 00000 0 03655         TXI *+4
03652  0560 00 1 06024         LDQ COEF+6,1       CORRECT ANS IN MQ
03653  0074 00 4 06503         TSX ERROR-1,4      SECOND ANS WRONG
03654  0020 00 0 03553         TRA AT3            REPEAT

03655  2 00007 1 03557         TIX AT3+4,1,7      NEXT PASS
03656  0020 00 0 03664         TRA *+6       FINISHED

03657  0534 00 2 00000   AT3A  LXA 0,2        TRAP ADDRESS IN XRB.
03660  1 77777 2 03661         TXI *+1,2,-1  XRB-1.
03661  0074 00 4 06503         TSX ERROR-1,4 TRAP ERROR,ADDRESS OF
03662  0020 00 0 03553         TRA AT3       INST. THAT CAUSED TRAP
03663  0020 00 0 03655         TRA *-6       IS IN XRB.

03664  0074 00 4 06511         TSX OK,4      PROCEED OR
03665  0020 00 0 03553         TRA AT3       REPEAT.


*THEOREM OF FERMAT. GIVEN A PRIME NUMBER P,
*FIND SMALLEST PRIME A LESS THAN P,NOT COUNTING
*ONE,SUCH THAT THE P-1 POWER OF A IS THE
*FIRST POWER OF A TO YEILD UNITY MODULO P.
*A IS CALLED THE PRIMITIVE ROOT OF P.

03666  264746476260            BCD 1FPOPS
03667  0074 00 4 06265   AT4A  TSX PART2,4   CLEAR,LIGHT 4 ON
03670  0760 00 0 00141         SLN 1         ONE ON TO SIGNAL
                                             PRIMITIVE ROOT PROG. ON.
03671  0774 00 1 00010         AXT 8,1       4 PASSES
03672  0774 00 2 03740         AXT AT4AT,2   SET RETURN ADDRESS
03673  0634 00 2 06131         SXA SECT2,2   IN CASE OF TRAP.
03674  0500 00 1 06042         CLA FERM,1    PRIME TO ACC.
03675  0074 00 4 05313         TSX PRIRT,4   GET PRIMITIVE ROOT.
03676  1 00000 0 03724         TXI RATS      ERROR,PRIMES SHOULD
                                             BE WITHIN RANGE.
03677  1 00000 0 03730         TXI RATS+4    ERROR,THESE VALUES
                                             ARE PRIMES.
03700  1 00000 0 03734         TXI MACH      ERROR,DIVIDEND SHOULD BE
                                             GREATER THAN QUOT. TIMES
                                             DIV.
03701 -0600 00 0 05764         STQ FREE+5    SUCCESFUL RETURN HERE.
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03702  0340 00 1 06043         CAS FERM+1,1  CHECK ROOT.
03703  1 00000 0 03705         TXI *+2       ERROR.
03704  0020 00 0 03710         TRA *+4       OK

03705  0560 00 1 06043         LDQ FERM+1,1  CORRECT ROOT IN MQ.
03706  0074 00 4 06503         TSX ERROR-1,4 WRONG ROOT IN ACC.
03707  0020 00 0 03667         TRA AT4A
*ON ERROR,PRIME USED IN SALON,VALUES
*ARE STORED STARTING AT PRIMS UP TO PRIMS+8
*IN THIS ORDER,PRIME,ITS ROOT,PRIME,ITS ROOT, ETC.

*THE PRIME NUMBERS USED ANS THE RESPECTIVE
*ROOTS THAT SHOULD BE CALCULATED ARE GIVEN
*BELOW IN THE ORDER OF THEIR APPEARENCE...

*         PRIME    ROOT      XRA WILL
*                            HAVE *

*         OCTAL    OCTAL     OCTAL

*         202.6    202.4       10

*         203.7    202.6        6

*         207.604  203.5        4

*         212.7624 203.7        2

*        DECIMAL  DECIMAL      OCTAL

*          3        2          10

*          7        3           6

*         97        5           4

*         997       7           2

*                            *. EXCEPT AT MACH
*                            OR FOR TRAP ERROR.



03710  0500 00 0 05764         CLA FREE+5    CHECK MQ FACTOR.
03711  0300 00 0 06016         FAD COEF      MQ FACTOR +1 SHOULD
03712  0340 00 1 06042         CAS FERM,1    BE { ORIG. PRIME.
03713  1 00000 0 03715         TXI *+2       ERROR.
03714  0020 00 0 03745         TRA AT4AR     OK.
03715  0500 00 1 06042         CLA FERM,1    ORIG. PRIME
03716  0302 00 0 06016         FSB COEF      -1
03717  0131 00 0 00000         XCA           CORRECT ANS TO MQ
03720  0500 00 0 05764         CLA FREE+5    RESTORE ACC.
03721  0074 00 4 06503         TSX ERROR-1,4 ERROR IN MQ FACTOR,
03722  0020 00 0 03667         TRA AT4A      CORRECT ANS IN MQ,ORIG.
                                             ANS IN ACC.
03723  0020 00 0 03745         TRA AT4AR
```

```
03724  0560 00 1 06043   RATS  LDQ FERM+1,1  CORRECT ROOT IN MQ.
03725  0074 00 4 06503         TSX ERROR-1,4 ERROR,ALL THESE PRIMES
03726  0020 00 0 03667         TRA AT4A      ARE WITHIN RANGE,ACC
                                             HAS PRIME,MQ THE ROOT.
03727  0020 00 0 03745         TRA AT4AR
03730  0560 00 1 06043         LDQ FERM+1,1  CORRECT ROOT IN MQ.
03731  0074 00 4 06503         TSX ERROR-1,4 ERROR,ALL THESE NOS.
03732  0020 00 0 03667         TRA AT4A      ARE PRIME NOS. AND
                                             SHOULD NEVER YEILD
                                             ZERO AT PRIRT+29.
03733  0020 00 0 03745         TRA AT4AR

03734  0074 00 4 06503   MACH  TSX ERROR-1,4 MACHINE ERROR
*THE MACHINE SAYS THAT,ON DIVISION WITH REMAINDER,THE DIVIDEND DOES NOT
*EXCEED THE PRODUCT OF THE INTEGRAL PART OF THE QUOTIENT X DIVISOR
*BY ONE OR MORE. THIS SITUATION IS NOT POSSIBLE
*WITH POSITIVE NOS. OCCURED AT PRIRT+30,OR PRIRT+33.
*WITH PRIME NOS,THIS PRODUCT IS ALWAYS AT LEAST
*ONE LESS THAN THE DIVIDEN OR IS EXACTLY EQUAL TO
*THE DIVIDEND. IN THIS CALCULATIONS,HOWEVER,WE SHOULD
*NEVER HAVE AN EQUALS CONDITION,THSI HAS BEEN
*PROVIDED FOR AT RATS+4. SEE ALSO MACHE.
03735  0020 00 0 03667         TRA AT4A

03736  0534 00 1 05371         LXA PRIRT+46,1    RESTORE XRA
03737  0020 00 0 03745         TRA AT4AR     NEXT PASS

03740  0534 00 2 00000   AT4AT LXA 0,2       TRAP ADDRESS IN XRB
03741  1 77777 2 03742         TXI *+1,2,-1  XRB-1
03742  0074 00 4 06503         TSX ERROR-1,4 TRAPERROR,ADDRESS OF
                                             INSTRUCTION THAT
03743  0020 00 0 03667         TRA AT4A      CAUSED TRAP IN XRB.

03744  0534 00 1 05371         LXA PRIRT+46,1    RESTORE XRA.
03745  2 00002 1 03674   AT4AR TIX AT4A+5,1,2 NEXT PASS
03746  0074 00 4 06511         TSX OK,4      FINISHED
03747  0020 00 0 03667         TRA AT4A      REPEAT OR PROCEED



*END PART OF 9M05, GO ON TO PART 3.



*PART 3 OF 9M05, FLOATING POINT WITH INDIRECTION ADDRESSING.
*PART 3 DUPLICATES PART 2 WITH THE ADDITION OF INDIRECT ADDRESSING.
*THERE ARE 2 SECTIONS OF PART 3, THEY ARE
*SECTION 1, TESTING F. P. TRAP AND THE INDICATOR BITS AT ZERO, AND
*SECTION 2, FLOATING POINT RELIABILITY WITH INDIRECT ADDRESSING.
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*CURSORY CHECK.
*F.P. OPNS. WITH INDIRECT ADDRESSING.

03750  262124606060            BCD 1FAD
03751  0074 00 4 06211   IND   TSX CLEAR,4   CLEAR.
03752  0760 00 0 00143         SLN 3         LITE 3 ON TO SIGNAL
                                             IND. ADD. TEST.
03753  0500 00 0 06016         CLA COEF      201.4
03754  0300 60 0 03753         FAD* *-1      {202.4
*CHECK ACC COLS S,Q,P, AND 35.
03755  0074 00 4 05137         TSX ACB,4     S,Q,P, AND 35 SHOULD{0.
03756  0000 00 0 00000         HTR           BITS IN ERROR IN
03757  0020 00 0 03751         TRA IND       IND REG. AS OCTAL NOS.
                                             10{S,4{Q,2{P,1{35
*CHECK ACC COLS 1 TO 34.
03760  0074 00 4 05164         TSX ACCF,4    ACC ERROR,COLS 1 TO 34.
03761 +202400000000            OCT 202400000000     CORRECT ANS. WILL BE
03762  0020 00 0 03751         TRA IND       IN MQ,ORIG ANS IN ACC.

*CHECK MQ  COLS S TO 35.
03763  0074 00 4 05174         TSX MQF,4     MQ ERROR.
03764 +147000000000            OCT 147000000000     CORRECT ANS. WILL BE
03765  0020 00 0 03751         TRA IND       IN MQ,ORIG ANS IN ACC.
03766  0074 00 4 06511         TSX OK,4      PROCEED OR
03767  0020 00 0 03751         TRA IND       REPEAT



*FMP WITH INDIRECT ADDRESSING.

03770  264447606060            BCD 1FMP
03771  0074 00 4 06211   INDA  TSX CLEAR,4   CLEAR.
03772  0760 00 0 00143         SLN 3         SIGNAL IND. ADD. TEST.
03773  0560 00 0 05730         LDQ SALON+14  203.4
03774  0260 60 0 03773         FMP* *-1      {205.4
*CHECK ACC COLS S,Q,P, AND 35.
03775  0074 00 4 05137         TSX ACB,4     S,Q,P, AND 35 SHOULD BE 0.
03776  0000 00 0 00000         HTR           BITS IN ERROR IN IND. REG.
03777  0020 00 0 03771         TRA INDA      10{S,4{Q,2{P,1{35,OCTAL.

*CHECK ACC COLS 1 TO 34.
04000  0074 00 4 05164         TSX ACCF,4    ERR IN ACC 1 TO 34.
04001 +205400000000            OCT 205400000000    CORRECT ANS. IN MQ,
04002  0020 00 0 03771         TRA INDA      ORIG. ANS. IN ACC.

*CHECK MQ COLS S TO 35.
04003  0074 00 4 05174         TSX MQF,4     ERR. IN MQ RESULT.
04004 +152000000000            OCT 152000000000    CORRECT ANS IN MQ,
04005  0020 00 0 03771         TRA INDA      ORIG, ANS. IN ACC.
04006  0074 00 4 06511         TSX OK,4      PROCEED OR
04007  0020 00 0 03771         TRA INDA      REPEAT.



*FDP WITH INDIRECT ADDRESSING.
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04010  262447606060            BCD 1FDP
04011  0074 00 4 06211   INDB  TSX CLEAR,4   CLEAR.
04012  0760 00 0 00143         SLN 3         SIGNAL IND. ADD. TEST.
04013  0500 00 0 05747         CLA B+2       205.4
04014  0241 60 0 03773         FDP* INDA+2   BY 203.4{203.4
*CHECK ACC COLS S,Q,P, AND 35.
04015  0074 00 4 05137         TSX ACB,4     S,Q,P, AND 35 SHOULD BE 0.
04016  0000 00 0 00000         HTR           BITS IN ERROR IN IND. REG.
04017  0020 00 0 04011         TRA INDB      10{S,4{Q,2{P,1{35, OCTAL.

*CHECK ACC COLS 1 TO 34.
04020  0074 00 4 05164         TSX ACCF,4    ERR. IN ACC 1 TO 34.
04021 +153000000000            OCT 153000000000 CORRECT ANS. IN MQ
04022  0020 00 0 04011         TRA INDB      ORIG. ANS. IN ACC.

*CHECK MQ COLS S TO 35.
04023  0074 00 4 05174         TSX MQF,4     ERR. IN MQ.
04024 +203400000000            OCT 203400000000    CORRECT ANS. IN MQ,
04025  0020 00 0 04011         TRA INDB      ORIG. ANS. IN ACC.
04026  0074 00 4 06511         TSX OK,4      PROCEED OR
04027  0020 00 0 04011         TRA INDB      REPEAT



*REPEAT IT1 THROUGH IT10 CHECKING INDICATOR BITS
*IN DECREMENT OF ZERO,BITS 14,15,16, AND 17,
*FOR FLOATING POINT TRAP,WITH INDIRECT ADDRESING.

*UFA WITH OVERFLOW,BITS 15 AND 16,INDIRECT ADDRESSING.

04030  642621406060            BCD 1UFA-
04031  0074 00 4 06270   IDIA  TSX PART3,4   CLEAR,LITES 3 AND 4 ON.
04032  0774 00 1 04041         AXT IDIAT,1
04033  0634 00 1 06131         SXA SECT2,1   SET RETURN ADDRESS
04034  0500 60 0 02250         CLA* IT1+3    +377.77777777
04035 -0300 60 0 02250         UFA* IT1+3    SHOULD OVER FLOW
04036  0074 00 4 06503         TSX ERROR-1,4 FAILED TO TRAP
04037  0020 00 0 04031         TRA IDIA
04040  0020 00 0 04045         TRA *+5       CANT TEST TRIGGERS

*CHECK OVERFLOW TRIGS.
04041  0074 00 4 05125   IDIAT TSX OONLY,4   ACC OV ON
04042  0020 00 0 04031         TRA IDIA
04043  0020 00 0 04045         TRA *+2       DIVIDE CHECK ON
04044  0020 00 0 04031         TRA IDIA

*CHECK ACC BITS S,P,Q,AND 35.BITS IN ERROR PUT
*IN INDICATOR REG. AS OCATL NUMBERS AS FOLLOWS,
*10{S, 4{Q, 2{P, 1{35.

*CHECK ACC COLS S,Q,P,AND 35
04045  0074 00 4 05137         TSX ACB,4     SHOULD HAVE P AND 35
04046  0000 00 0 00003         HTR 2+1       BITS IN ERROR IN IND REG
04047  0020 00 0 04031         TRA IDIA      INDICATOR REG.

*CHECK ACC COLS 1 TO 34
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04050  0074 00 4 05164         TSX ACCF,4    ERR ACC COLS 1 TO 34
04051 +000777777776            OCT 000777777776    CORRECT ANS WILL BE
04052  0020 00 0 04031         TRA IDIA      IN MQ, ORIG ANS IN ACC

*CHECK MQ COLS S TO 35.

04053  0074 00 4 05174         TSX MQF,4
04054 +345000000000            OCT 345000000000    MQ ERROR,CORRECT ANS.
                                                   IN
04055  0020 00 0 04031         TRA IDIA      MQ,ORIG ANS IN ACC.

*CHECK ADDRESS AT ZERO.

04056  0074 00 4 05177         TSX ZERO,4
04057  0000 00 0 04036         HTR IDIA+5    ERROR IN TRAP ADDRESS,
04060  0020 00 0 04031         TRA IDIA      CORRECT ADDRESS IN MQ,ORIG
                                             ADDRESS IN AC.

*CHECK INDICATOR BITS IN DECREMENT OF ZERO
                                             SHOULD HAVE BITS 15,16.
04061  0074 00 4 05203         TSX BITS,4    CHECK BITS IT1
04062  0000 06 0 00000         HTR 0,0,6     CORRECT BITS PUT IN
04063  0074 00 4 06504         TSX ERROR,4   MQ, ORIG BITS IN ACC
04064  0074 00 4 06511         TSX OK,4      PROCEED OR
04065  0020 00 0 04031         TRA IDIA      REPEAT.


*TRAP RELIABILITY,UFA,BITS 15 AND 16,50 PASSES
*WITH INDIRECT ADDRESSING

04066  642621406060            BCD 1UFA-
04067  0074 00 4 06270   IDIB  TSX PART3,4   LITES 3 AND 4 ON,CLEAR.
04070  0774 00 1 04101         AXT IDIBT,1
04071  0634 00 1 06131         SXA SECT2,1   SET RETURN ADDRESS
04072  0774 00 1 00064         AXT 52,1      REPEAT 50 TIMES
04073 -2 00001 1 04101         TNX *+6,1,1
04074  0500 60 0 02310         CLA* IT2+5    377.77777777
04075 -0300 60 0 02310         UFA* IT2+5    FORCE OVERFLOW.
04076  0074 00 4 06503         TSX ERROR-1,4 FAILED TO TRAP
04077  0020 00 0 04067         TRA IDIB
04100  0020 00 0 04105         TRA *+5       CANT TEST TRIGS.

*CHECK OVERFLOW TRIGGERS.
04101  0074 00 4 05125   IDIBT TSX OONLY,4   ACC OV. ON
04102  0020 00 0 04067         TRA IDIB
04103  0020 00 0 04105         TRA *+2       DIVIDE CHECK ON
04104  0020 00 0 04067         TRA IDIB

*CHECK ACC COLS S,Q,P, AND 35
04105  0074 00 4 05137         TSX ACB,4
04106  0000 00 0 00003         HTR 2+1       SHOULD HAVE P AND 35,BITS
04107  0020 00 0 04067         TRA IDIB      IN ERROR IN IND. REG.
                                             10{S,4{Q,2{P,1{35

*CHECK ACC COLS 1 TO 34
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04110  0074 00 4 05164         TSX ACCF,4
04111 +000777777776            OCT 000777777776    ERR ACC 1 TO 34.
                                                   CORRECT
04112  0020 00 0 04067         TRA IDIB      ANS IN MQ,ORIG. ANS IN ACC.

*CHECK MQ S TO 35.
04113  0074 00 4 05174         TSX MQF,4
04114 +345000000000            OCT 345000000000    ERR IN MQ,CORRECT ANS
04115  0020 00 0 04067         TRA IDIB      IN MQ,ORIG ANS IN ACC.

*CHECK ADDRESS AT ZERO
04116  0074 00 4 05177         TSX ZERO,4
04117  0000 00 0 04076         HTR IDIB+7    ERR IN TRAP ADDRESS,CORRECT
04120  0020 00 0 04067         TRA IDIB      ADDRESS IN MQ,ADDRESS
                                             WRITTEN IN ACC.
*CHECK INDICATOR BITS IN DECREMENT OF ZERO.
04121  0074 00 4 05203         TSX BITS,4    CHECK BITS IDIB
04122  0000 06 0 00000         HTR 0,0,6     CORRECT BITS IN MQ
04123  0074 00 4 06504         TSX ERROR,4   ORIG BITS IN ACC
04124  0074 00 4 06511         TSX OK,4      PROCEED OR
04125  0020 00 0 04067         TRA IDIB      REPEAT.



*FLOATING POINT UNDER FLOW, BIT 17,INDIRECT ADDRESSING.

04126  642621406060            BCD 1UFA-
04127  0074 00 4 06270   IDIC  TSX PART3,4   LITES 3 AND 4 ON,CLEAR.
04130  0774 00 1 04137         AXT IDICT,1
04131  0634 00 1 06131         SXA SECT2,1   SET RETURN ADDRESS
04132  0500 60 0 02346         CLA* IT3+3    +007.1
04133 -0300 60 0 02346         UFA* IT3+3    UNDERFLOW
04134  0074 00 4 06503         TSX ERROR-1,4 FAILED TO TRAP.
04135  0020 00 0 04127         TRA IDIC      REPEAT
04136  0020 00 0 04143         TRA *+5       CANT TEST TRIGGERS

*CHECK OVERFLOW TRIGGERS.
04137  0074 00 4 05125   IDICT TSX UONLY,4   ACC OV. ON
04140  0020 00 0 04127         TRA IDIC
04141  0020 00 0 04143         TRA *+2       DIVIDE CHECK ON
04142  0020 00 0 04127         TRA IDIC

*CHECK ACC COLS S,Q,P,AND 35
04143  0074 00 4 05137         TSX ACB,4
04144  0000 00 0 00000         HTR 0         S,Q,P, AND 35 SHOULD BE
                                             ZERO.
04145  0020 00 0 04127         TRA IDIC      BITS IN ERR IN IND. REG.
                                             10{S,4{Q,2{P,1{35,OCTAL

*CHECK ACC COLS 1 TO 34.
04146  0074 00 4 05164         TSX ACCF,4
04147 +007200000000            OCT 007200000000   ERR IN ACC 1 TO 34,
                                                  CORRECT
04150  0020 00 0 04127         TRA IDIC      ANS. IN MQ,ORIG ANS. IN ACC
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*CHECK MQ COLS S TO 35.
04151  0074 00 4 05174         TSX MQF,4
04152 +354000000000            OCT 354000000000  ERR IN MQ,CORRECT ANS
04153  0020 00 0 04127         TRA IDIC      IN MQ,ORIG ANS IN ACC.

*CHECK TRAP ADDRESS AT ZERO
04154  0074 00 4 05177         TSX ZERO,4
04155  0000 00 0 04134         HTR IDIC+5    ERR IN TRAP ADDRESS,
04156  0020 00 0 04127         TRA IDIC      CORRECT ADD. IN MQ,ADDRESS
                                             WRITTEN IN ACC.

*CHECK INDICATOR BITS IN DECREMENT OF ZERO
04157  0074 00 4 05203         TSX BITS,4    CHECK BITS IDIC
04160  0000 01 0 00000         HTR 0,0,1     CORRECT BITS IN MQ
04161  0074 00 4 06504         TSX ERROR,4   ORIG BITS IN ACC
04162  0074 00 4 06511         TSX OK,4      PROCEED OR
04163  0020 00 0 04127         TRA IDIC      REPEAT.



*FAD UNDERFLOW,SIGNS ALIKE,NO EXHCANGE,NO 9 CARRY,
*BITS 16 AND 17. INDIRECT ADDRESSING.

04164  262124406060            BCD 1FAD-
04165  0074 00 4 06270   IDID  TSX PART3,4   LITES 3 AND 4 ON,CLEAR.
04166  0774 00 1 04175         AXT IDIDT,1
04167  0634 00 1 06131         SXA SECT2,1   SET RETURN ADDRESS
04170  0500 60 0 02405         CLA* IT4+4    1.007777777
04171  0300 60 0 02406         FAD* IT4+5    4.004444444,UNDERFLOW
04172  0074 00 4 06503         TSX ERROR-1,4 FAILED TO TRAP.
04173  0020 00 0 04165         TRA IDID
04174  0020 00 0 04201         TRA *+5       CANT TEST TRIGGERS

*CHECK OVERFLOW TRIGGER.
04175  0074 00 4 05125   IDIDT TSX UONLY,4   ACC OV. ON
04176  0020 00 0 04165         TRA IDID
04177  0020 00 0 04201         TRA *+2       DIVIDE CHECK ON
04200  0020 00 0 04165         TRA IDID

*CHECK ACC COLS S,Q,P,AND 35
04201  0074 00 4 05137         TSX ACB,4
04202  0000 00 0 00006         HTR 2+4       ERR. S,Q,P AND 35 SHOULD
                                             HAVE
04203  0020 00 0 04165         TRA IDID      P AND Q. BITS IN ERR IN
                                             IND. REG. AS OCTAL NOS.
                                             10{S,4{Q,2{P,1{35

*CHECK ACC COLS 1 TO 34.
04204  0074 00 4 05164         TSX ACCF,4
04205 +376544444370            OCT 376544444370 ERR IN ACC 1 TO 34,
                                             CORRECT
04206  0020 00 0 04165         TRA IDID      ANS. IN MQ,ORIG. ANS. IN
                                             ACC.

*CHECK MQ COLS S TO 35.
04207  0074 00 4 05174         TSX MQF,4
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04210 +343000000000           OCT 343000000000 CORRECT ANS.
04211  0020 00 0 04165         TRA IDID      IN MQ,ORIG ANS IN ACC.

*CHECK TRAP ADDRESS AT ZERO.
04212  0074 00 4 05177         TSX ZERO,4
04213  0000 00 0 04172         HTR IDID+5    ERR. IN TRAP ADDRESS.
04214  0020 00 0 04165         TRA IDID      CORRECT ADD. IN MQ,
                                             ADDRESS WRITTEN IN ACC.

*CHECK INDICATOR BITS IN DECREMENT OF ZERO
04215  0074 00 4 05203         TSX BITS,4    CHECK BITS IDID
04216  0000 03 0 00000         HTR 0,0,3     SHOULD HAVE BITS 16 AND 17
04217  0074 00 4 06504         TSX ERROR,4   CORRECT BITS IN MQ,
04220  0074 00 4 06511         TSX OK,4      ORIG BITS IN ACC
04221  0020 00 0 04165         TRA IDID      PROCEED OR REPEAT



*SIGNS UNLIKE,NO EXCHANGE,9 CARRY,BITS 16 AND 17
*INDIRECT ADDRESSING

04222  266222406060            BCD 1FSB-     SAME AS FAD EXCEPT SR SIGN
04223  0074 00 4 06270   IDIE  TSX PART3,4   LITE 3 AND 4 ON,CLEAR.
04224  0774 00 1 04233         AXT IDIET,1
04225  0634 00 1 06131         SXA SECT2,1   SET RETURN ADDRESS
04226  0500 60 0 02444         CLA* IT5+4    1.007777777
04227  0302 60 0 02445         FSB* IT5+5    4.004444444 UNDERFLOW.
                                             MQ AND ACC EXCHANGE ON
                                             STEP 3 TO COMP. MQ.
04230  0074 00 4 06503         TSX ERROR-1,4 FAILED TO TRAP.
04231  0020 00 0 04223         TRA IDIE
04232  0020 00 0 04237         TRA *+5       CANT TEST TRIGGERS

*CHECK OVERFLOW TRIGGERS.
04233  0074 00 4 05125   IDIET TSX UONLY,4   ACC OV. ON
04234  0020 00 0 04223         TRA IDIE
04235  0020 00 0 04237         TRA *+2       DIVIDE CHECK ON
04236  0020 00 0 04223         TRA IDIE

*CHECK ACC COLS S,Q,P, AND 35.
04237  0074 00 4 05137         TSX ACB,4
04240  0000 00 0 00016         HTR 2+4+8     ERR IN S,Q,P, AND 35,BITS
                                             IN
04241  0020 00 0 04223         TRA IDIE      ERR IN IND. REG. IN OCTAL.
                                             10{S,4{Q,2{P,1{35

*CHECK ACC COLS 1 TO 34.
04242  0074 00 4 05164         TSX ACCF,4
04243 +375711111020           OCT 375711111020 ERR IN ACC 1 TO 34,
04244  0020 00 0 04223         TRA IDIE      CORRECT ANS. IN MQ, ORIG.
                                             ANS. IN ACC.

*CHECK TRAP ADDRESS AT ZERO.
04245  0074 00 4 05177         TSX ZERO,4
04246  0000 00 0 04230         HTR IDIE+5    ERR IN TRAP ADDRESS,CORRECT
04247  0020 00 0 04223         TRA IDIE      ADDRESS IN MQ,ADDRESS
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                                          WRITTEN IN ACC.

*CHECK UNDICATOR BITS IN DECREMENT OF ZERO.
04250  0074 00 4 05203         TSX BITS,4    CHECK BITS IDIE
04251  0000 03 0 00000         HTR 0,0,3     SHOULD HAVE 16 AND 17,
                                             CORRECT
04252  0074 00 4 06504         TSX ERROR,4   BITS IN MQ,ORIG BITS IN ACC
04253  0074 00 4 06511         TSX OK,4      PROCEED OR
04254  0020 00 0 04223         TRA IDIE      REPEAT



*UFM WITH OVERFLOW,BITS 15,16,17.26 ZEROS IN
*MULTIPLYER. INDIRECT ADDRESSING.

04255  642644406060            BCD 1UFM-
04256  0074 00 4 06270   IDIF  TSX PART3,4   LITES 3 AND 4 ON,CLEAR.
04257  0774 00 1 04266         AXT *+7,1
04260  0634 00 1 06131         SXA SECT2,1   SET RETURN ADDRESS
04261  0560 60 0 02503         LDQ* IT6+4    377.4
04262 -0260 60 0 02504         UFM* IT6+5    BY 277.4,OVERFLOW.
04263  0074 00 4 06503         TSX ERROR-1,4 FAILED TO TRAP.
04264  0020 00 0 04256         TRA IDIF
04265  0020 00 0 04272         TRA *+5       CANT TEST TRIGGERS

*CHECK OVERFLOW TRIGGERS.
04266  0074 00 4 05125         TSX OONLY,4   ACC OV ON.
04267  0020 00 0 04256         TRA IDIF
04270  0020 00 0 04272         TRA *+2       DIVIDE CHECK ON
04271  0020 00 0 04256         TRA IDIF

*CHECK ACC COLS S,Q,P,AND 35
04272  0074 00 4 05137         TSX ACB,4
04273  0000 00 0 00002         HTR 2         ERR. ACC S,Q,P, AND 35.
                                             SHOULD
04274  0020 00 0 04256         TRA IDIF      HAVE P. BITS IN ERR. IN
                                             IND. REG. AS OCTAL NOS.
                                             10{S,4{Q,2{P,1{35

*CHECK ACC COLS 1 TO 34.
04275  0074 00 4 05164         TSX ACCF,4
04276 +076200000000            OCT 076200000000    ERR IN ACC COLS 1 TO
                                             34.
04277  0020 00 0 04256         TRA IDIF      CORRECT ANS IN MQ,ORIG.
                                             ANS IN ACC.

*CHECK MQ COLS S TO 35.
04300  0074 00 4 05174         TSX MQF,4
04301 +043000000000            OCT 043000000000 MQ ERR,CORRECT ANS IN
04302  0020 00 0 04256         TRA IDIF      MQ,ORIG ANS IN ACC

*CHECK TRAP ADDRESS AT ZERO
04303  0074 00 4 05177         TSX ZERO,4
04304  0000 00 0 04263         HTR IDIF+5    ERR. IN TRAP ADDRESS.
                                             CORRECT
04305  0020 00 0 04256         TRA IDIF      ADDERSS IN MQ,ADDRESS
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                                          WRITTEN IN ACC.

*CHECK INDICATOR BITS IN DECREMENT OF ZERO.

04306  0074 00 4 05203         TSX BITS,4    CHECK BITS IDIF
04307  0000 07 0 00000         HTR 0,0,7     SHOULD HAVE 15,16,17
                                             CORRECT
04310  0074 00 4 06504         TSX ERROR,4   BITS IN MQ, ORIG BITS IN ACC
04311  0074 00 4 06511         TSX OK,4      PROCEED OR
04312  0020 00 0 04256         TRA IDIF      REPEAT


*FDP TO CHECK REMAINING BIT COMBINATIONS.

*FDP UNDERFLOW,BITS 14, 17. INDIRECT ADDRESSING.

04313  262447406060            BCD 1FDP-
04314  0074 00 4 06270   IDIG  TSX PART3,4   LITES 3 AND 4 ON,CLEAR.
04315  0774 00 1 04324         AXT IDIGT,1
04316  0634 00 1 06131         SXA SECT2,1   SET RETURN ADDRESS
04317  0500 60 0 02542         CLA* IT7+4    144.07
04320  0241 60 0 02543         FDP* IT7+5    BY 345.7 UNDERFLOW.
04321  0074 00 4 06503         TSX ERROR-1,4 FAILED TO TRAP.
04322  0020 00 0 04314         TRA IDIG
04323  0020 00 0 04330         TRA *+5       CANT TEST TRIGGERS,

*CHECK OVERFLOW TRIGGERS.
04324  0074 00 4 05125   IDIGT TSX UONLY,4   ACC OV. ON
04325  0020 00 0 04314         TRA IDIG
04326  0020 00 0 04330         TRA *+2       DIVIDE CHECK ON
04327  0020 00 0 04314         TRA IDIG

*CHECK ACC COLS S,Q,P,AND 35.
04330  0074 00 4 05137         TSX ACB,4
04331  0000 00 0 00000         HTR           ERR. ACC S,Q,P, AND 35,
                                             SHOULD BE
04332  0020 00 0 04314         TRA IDIG      ZERO,BITS IN ERR IN IND.
                                             REG. AS OCTAL NUMBERS.
                                             10{S, 4{Q, 2{P, 1{35

*CHECK ACC COLS 1 TO 34.
04333  0074 00 4 05164         TSX ACCF,4
04334 +111000000000            OCT 111000000000   ERR IN ACC 1 TO 34,
                                             CORRECT
04335  0020 00 0 04314         TRA IDIG      ANS IN MQ,ORIG ANS IN ACC.

*CHECK MQ COLS S TO 35.
04336  0074 00 4 05174         TSX MQF,4
04337 +377100000000            OCT 377100000000   ERR IN MQ,CORRECT ANS
04340  0020 00 0 04314         TRA IDIG      IN MQ,ORIG ANS IN ACC.

*CHECK TRAP ADDRESS AT ZERO.
04341  0074 00 4 05177         TSX ZERO,4
04342  0000 00 0 04321         HTR IDIG+5    ERR IN TRAP ADDRESS,CORRECT
04343  0020 00 0 04314         TRA IDIG      ADDRESS IN MQ,ADDRESS
                                             WRITTEN IN ACC.
```

```
*CHECK INDICATOR BITS IN DECREMENT OF ZERO.
04344  0074 00 4 05203         TSX BITS,4    CHECK BITS IDIG
04345  0000 11 0 00000         HTR 0,0,9     SHOULD HAVE14,17. CORRECT
04346  0074 00 4 06504         TSX ERROR,4   BITS IN MQ,ORIG BITS IN ACC
04347  0074 00 4 06511         TSX OK,4      PROCEED OR
04350  0020 00 0 04314         TRA IDIG      REPEAT



*FDP UNDERFLOW, BITS 14,16,17, CALCULATE ACC. FACTOR,
*SIGN UNLIKE. INDIRECT ADDRESSING.

04351  262447406060            BCD 1FDP-
04352  0074 00 4 06270   IDIH  TSX PART3,4   LITES 3 AND 4 ON,CLEAR.
04353  0774 00 1 05217         AXT SETID,1   SKIP TO IDIH+5 IF TRAP
04354  0634 00 1 06131         SXA SECT2,1   ERROR,AND CONTINUE WITH
                                             CORRECT ACC FACTOR.
04355  0502 60 0 02576         CLS* IT8+1    -033.404040404 IN ACC.
04356  0241 60 0 02601         FDP* IT8+4    BY 202.4,SHOULD NOT TRAP.
*IF TRAP OCCURS HERE,INDICATION OF TRAP ERROR
*WILL BE GIVEN FROM THE SUBROUTINE SETID,THE
*CORRECT QUOTIENT WILL BE PLACED IN THE MQ
*WITH LDQ INDIRECTLY ADDRESSED,AND TEST WILL
*CONTINUE FROM THIS POINT.
04357  0774 00 1 04367         AXT IDIHT,1
04360  0634 00 1 06131         SXA SECT2,1   SET RETURN ADDRESS
04361 -0754 00 0 00000         PXD           CLEAR ACC.
04362  0763 00 0 00043         LLS 35        -032.404040404 TO ACC
                                             SHOULD NOT GET ACC OV.
04363  0241 60 0 02607         FDP* IT8+10   BY 344.440404040,UNDERFLOW.
04364  0074 00 4 06503         TSX ERROR-1,4 FAILED TO TRAP.
04365  0020 00 0 04352         TRA IDIH
04366  0020 00 0 04373         TRA *+5       CANT TEST TRIGS

*CHECK OVERFLOW TRIGGERS.
04367  0074 00 4 05125   IDIHT TSX UONLY,4   ACC OV. ON
04370  0020 00 0 04352         TRA IDIH
04371  0020 00 0 04373         TRA *+2       DIVIDE CHECK ON
04372  0020 00 0 04352         TRA IDIH

*CHECK ACC COLS S,Q,P,AND 35
04373  0074 00 4 05137         TSX ACB,4
04374  0000 00 0 00016         HTR 2+4+8     ERR,ACC S,Q,P, AND 35
                                             SHOULD
04375  0020 00 0 04352         TRA IDIH      HAVE S,Q,P. BITS IN ERR. IN
                                             IND. REG. AS OCTAL NUMBERS.
                                                  10{S, 4{Q, 2{P, 1{35

*CHECK ACC COLS 1 TO 34.
04376  0074 00 4 05164         TSX ACCF,4
04377 +377423035700            OCT 377423035700    ERR IN ACC 1 TO 34,
                                             CORRECT
04400  0020 00 0 04352         TRA IDIH      ANS. IN MQ, ORIG. ANS. IN
                                             ACC.
```

```
*CHECK MQ COLS S TO 35
04401  0074 00 4 05174         TSX MQF,4
04402 -266715412642            OCT -266715412642  ERR. IN MQ,CORRECT
                                                  ANS.
04403  0020 00 0 04352         TRA IDIH       IN MQ,ORIG. ANS. IN ACC.

*CHECK TRAP ADDRESS AT ZERO.
04404  0074 00 4 05177         TSX ZERO,4
04405  0000 00 0 04364         HTR IDIH+10    ERR. IN TRAP ADDRESS,
                                              CORRECT
04406  0020 00 0 04352         TRA IDIH       ADDRESS IN MQ,ADDRESS
                                              WRITTEN IN ACC.

*CHECK INDICATOR BITS IN DECREMENT OF ZERO.
04407  0074 00 4 05203         TSX BITS,4     CHECK BITS IDIH
04410  0000 13 0 00000         HTR 0,0,11
04411  0074 00 4 06504         TSX ERROR,4    SHOULD HAVE 14,16,17.
                                              CORRECT
04412  0074 00 4 06511         TSX OK,4       BITS IN MQ,ORIG. BITS IN
                                              ACC.
04413  0020 00 0 04352         TRA IDIH       PROCEED OR REPEAT



*FDP WITH ACC UND,BITS 14,16 MQ OK.
*INDIRECT ADDRESSING.

04414  262447406060            BCD 1FDP-
04415  0074 00 4 06270   IDIK  TSX PART3,4   LITES 3 AND 4 ON,CLEAR.
04416  0774 00 1 04425         AXT IDIKT,1
04417  0634 00 1 06131         SXA SECT2,1    SET RETURN ADDRESS
04420  0500 60 0 02645         CLA* IT9+4     32.404040404
04421  0241 60 0 02646         FDP* IT9+5     BY 32.440404040 UND.FLOW.
04422  0074 00 4 06503         TSX ERROR-1,4 FAILED TO TRAP
04423  0020 00 0 04415         TRA IDIK
04424  0020 00 0 04431         TRA *+5        CANT TEST TRIGGERS.

*CHECK OVERFLOW TRIGGERS.
04425  0074 00 4 05125   IDIKT TSX UONLY,4   ACC OV ON
04426  0020 00 0 04415         TRA IDIK
04427  0020 00 0 04431         TRA *+2        DIVIDE CHECK ON
04430  0020 00 0 04415         TRA IDIK

*CHECK ACC COLS S,Q,P,AND 35
04431  0074 00 4 05137         TSX ACB,4
04432  0000 00 0 00006         HTR 2+4        ERR,ACC S,Q,P, AND 35,
                                              SHOULD
04433  0020 00 0 04415         TRA IDIK       HAVE Q,P. BITS IN ERR IN
                                              IND. REG. AS OCTAL NUMBERS.
                                              10{S,4{Q,2{Q,1{35.

*CHECK ACC COLS 1 TO 34.
04434  0074 00 4 05164         TSX ACCF,4
04435 +377423035700            OCT 377423035700    ERR IN ACC 1 TO 34,
                                              CORRECT
04436  0020 00 0 04415         TRA IDIK       ANS. IN MQ,ORIG ANS. IN AC
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```
*CHECK MQ COLS S TO 35.
04437  0074 00 4 05174         TSX MQF,4
04440 +200715412642            OCT 200715412642    ERR IN MQ,CORRECT ANS
04441  0020 00 0 04415         TRA IDIK      IN MQ,ORIG. ANS. IN ACC.

*CHECK TRAP ADDRESS AT ZERO
04442  0074 00 4 05177         TSX ZERO,4
04443  0000 00 0 04422         HTR IDIK+5    ERR IN TRAP ADDRESS,CORRECT
04444  0020 00 0 04415         TRA IDIK      ADDRESS IN MQ,ADDRESS
                                             WRITTEN IN ACC.

*CHECK INDICATOR BITS IN DECREMENT OF ZERO
04445  0074 00 4 05203         TSX BITS,4    CHECK BITS IDIK
04446  0000 12 0 00000         HTR 0,0,10    SHOULD HAVE 14,15. CORRECT
04447  0074 00 4 06504         TSX ERROR,4   BITS IN MQ,ORIG. BITS IN
                                             ACC.
04450  0074 00 4 06511         TSX OK,4      PROCEED OR
04451  0020 00 0 04415         TRA IDIK      REPEAT



*FDP WITH MQ OV., ACC. OK. BITS 14,15,17.
*INDIRECT ADDRESSING

04452  262447406060            BCD 1FDP-
04453  0074 00 4 06270   IDIL  TSX PART3,4   LITES 3 AND 4 ON,CLEAR.
04454  0774 00 1 04463         AXT IDILT,1
04455  0634 00 1 06131         SXA SECT2,1   SET RETURN ADDRESS
04456  0500 60 0 02704         CLA* IT10+4   377.4
04457  0241 60 0 02705         FDP* IT10+5   BY 10.4,OVERFLOW.
04460  0074 00 4 06503         TSX ERROR-1,4 FAILED TO TRAP.
04461  0020 00 0 04453         TRA IDIL
04462  0020 00 0 04467         TRA *+5       CANT TEST TRIGGERS

*CHECK OVERFLOW TRIGGERS
04463  0074 00 4 05125   IDILT TSX OONLY,4   ACC OV. ON
04464  0020 00 0 04453         TRA IDIL
04465  0020 00 0 04467         TRA *+2       DIVIDE CHECK ON
04466  0020 00 0 04453         TRA IDIL

*CHECK ACC COLS S,Q,P, AND 35.
04467  0074 00 4 05137         TSX ACB,4
04470  0000 00 0 00000         HTR           ERR,ACC S,Q,P, AND 35
                                             SHOULD
04471  0020 00 0 04453         TRA IDIL      ALL{0,BITS IN ERR. IN
                                             IND. REG. AS OCTAL NOS.
                                             10{S, 4{Q, 2{P, 1{35

*CHECK ACC COLS 1 TO 34.
04472  0074 00 4 05164         TSX ACCF,4
04473 +345000000000            OCT 345000000000     ERR IN ACC 1 TO 34,
                                             CORRECT
04474  0020 00 0 04453         TRA IDIL      ANS. IN MQ,ORIG. ANS. IN
                                             ACC.
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```
*CHECK MQ COLS S TO 35.
04475  0074 00 4 05174         TSX MQF,4
04476 +170400000000            OCT 170400000000    ERR IN MQ,CORRECT ANS
04477  0020 00 0 04453         TRA IDIL      IN MQ,ORIG. ANS. IN ACC.

*CHECK TRAP ADDRESS AT ZERO.
04500  0074 00 4 05177         TSX ZERO,4
04501  0000 00 0 04460         HTR IDIL+5    ERR IN TRAP ADDRESS.
04502  0020 00 0 04453         TRA IDIL      CORRECT ADD. IN MQ,ADDRESS
                                             WRITTEN IN ACC.

*CHECK INDICATOR BITS IN DECREMENT OF ZERO.
04503  0074 00 4 05203         TSX BITS,4    CHECK BITS IDIL
04504  0000 15 0 00000         HTR 0,0,13    SHOULD HAVE 14,15,17.
                                             CORRECT
04505  0074 00 4 06504         TSX ERROR,4   BITS IN MQ,ORIG BITS IN ACC
04506  0074 00 4 06511         TSX OK,4      PROCEED OR
04507  0020 00 0 04453         TRA IDIL      REPEAT



*END SECTION 1 OF PART 3, GO ON TO SECTION 2.



*SECTION 2 OF PART 3  OF 9M05, FLOATING POINT
*RELIABILITY, REPEAT SECTION 2 OF PART 2 WITH THE ADDITION
*OF INDIRECT ADDRESSING.

*9 OV OPERATION TEST WITH FAD,NO EXCHANGE.

04510  262124606060            BCD 1FAD
04511  0074 00 4 06270   IDRA  TSX PART3,4   LITES 3 AND 4 ON,CLEAR
04512  0774 00 1 04562         AXT IDRAT,1   SET RETURN ADDRESS
04513  0634 00 1 06131         SXA SECT2,1   IN CASE OF TRAP.
04514 -0754 00 0 00000         PXD           CLEAR ACC.
04515  0300 60 0 03131         FAD* RELA+4   +233.000000001{201.4
                                             WORST CASE NORMALIZE.
04516  0300 60 0 03132         FAD* RELA+5   +201.6{202.5
04517  0300 60 0 03133         FAD* RELA+6   +202.6{203.54
04520  0300 60 0 03134         FAD* RELA+7   +203.6{204.56
04521  0300 60 0 03135         FAD* RELA+8   +204.6{205.57
04522  0300 60 0 03136         FAD* RELA+9   +205.6{206.574
04523  0300 60 0 03137         FAD* RELA+10  +206.6{207.576
04524  0300 60 0 03140         FAD* RELA+11  +207.6{210.577
04525  0300 60 0 03141         FAD* RELA+12  +210.6{211.5774
04526  0300 60 0 03142         FAD* RELA+13  +211.6{212.5776
04527  0300 60 0 03143         FAD* RELA+14  +212.6{213.5777
04530  0300 60 0 03144         FAD* RELA+15  +213.6{214.57774
04531  0300 60 0 03145         FAD* RELA+16  +214.6{215.57776
04532  0300 60 0 03146         FAD* RELA+17  +215.6{216.57777
04533  0300 60 0 03147         FAD* RELA+18  +216.6{217.577774
04534  0300 60 0 03150         FAD* RELA+19  +217.6{220.577776
04535  0300 60 0 03151         FAD* RELA+20  +220.6{221.577777
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04536  0300 60 0 03152         FAD* RELA+21  +221.6{222.5777774
04537  0300 60 0 03153         FAD* RELA+22  +222.6{223.5777776
04540  0300 60 0 03154         FAD* RELA+23  +223.6{224.5777777
04541  0300 60 0 03155         FAD* RELA+24  +224.6{225.57777774
04542  0300 60 0 03156         FAD* RELA+25  +225.6{226.57777776
04543  0300 60 0 03157         FAD* RELA+26  +226.6{227.57777777
04544  0300 60 0 03160         FAD* RELA+27  +227.6{230.577777774
04545  0300 60 0 03161         FAD* RELA+28  +230.6{231.577777776
04546  0300 60 0 03162         FAD* RELA+29  +231.6{232.577777777
04547  0300 60 0 03163         FAD* RELA+30  +232.6{233.577777777
                                             MQ{200.4
*CHECK ACC S,Q,P,AND 35.
04550  0074 00 4 05137         TSX ACB,4
04551  0000 00 0 00001         HTR 1         ERR. ACC S,Q,P, AND 35.
                                             SHOULD AHVE
04552  0020 00 0 04511         TRA IDRA      35. BITS IN ERR. IN IND.
                                             REG.
                                             10{S,4{Q,2{P,1{35
*CHECK ACC COLS 1 TO 34.
04553  0074 00 4 05164         TSX ACCF,4
04554 +233577777776            OCT 233577777776    ACC ERR,COLS 1 TO 34.
                                             CORRECT
04555  0020 00 0 04511         TRA IDRA      ANS. IN MQ.ORIG. ANS. IN
                                             ACC.

*CHECK MQ COLS S TO 35.
04556  0074 00 4 05174         TSX MQF,4
04557 +200400000000            OCT 200400000000    MQ ERR. CORRECT ANS.
04560  0020 00 0 04511         TRA IDRA      IN MQ,ORIG ANS. IN ACC.
04561  0020 00 0 04565         TRA IDRAT+3   FINISHED


04562  0534 00 1 00000   IDRAT LXA 0,1       TRAP ADDRESS IN XRA.
04563  1 77777 1 04564         TXI *+1,1,-1  XRA-1
04564  0074 00 4 06504         TSX ERROR,4   TRAP ERROR,ADDRESS OF
                                             INST. THAT CAUSED TRAP
                                             IN XRA.
04565  0074 00 4 06511         TSX OK,4      FINISHED,PROCEED
04566  0020 00 0 04511         TRA IDRA      OR REPEAT



*REPEAT RELC WITH INDIRECT ADDRESSING

*NO 9 OV OPERATION WITH FMP.

04567  264447606060            BCD 1FMP
04570  0074 00 4 06270   IDRB  TSX PART3,4   LITES 3 AND 4 ON.CLEAR.
04571  0774 00 1 04620         AXT IDRBT,1   SET RETURN ADDRESS
04572  0634 00 1 06131         SXA SECT2,1   IN CASE OF TRAP
04573  0560 60 0 03245         LDQ* RELC+3   177.600000003
04574  0260 60 0 03246         FMP* RELC+4   ACC 376.440000004
                                             MQ 343.4000000011
04575  0260 60 0 03247         FMP* RELC+5   ACC 376.600000020
                                             MQ 343.400000066
04576  0260 60 0 03250         FMP* RELC+6   ACC 376.600000124
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                                                    MQ 343.000000504
04577  0260 60 0 03251         FMP* RELC+7         ACC 376.000000746
                                                    MQ 343.000003630
04600  0260 60 0 03252         FMP* RELC+8         ACC 376.0000005544
                                                    MQ 343.000026620
04601  0260 60 0 03253         FMP* RELC+9 ACC 376.0000022130
                                                    MQ 343.000210540
04602  0260 60 0 03254         FMP* RELC+10        ACC 376.000315020
                                                    MQ 343.001464100
04603  0260 60 0 03255         FMP* RELC+11        ACC 376.002316140
                                                    MQ 343.011470600
04604  0260 60 0 03256         FMP* RELC+12        ACC 376.016325100
                                                    MQ 343.071524400
04605  0260 60 0 03257         FMP* RELC+13        ACC 376.126376600
                                                    MQ 343.531773000

*CHECK ACC COLS S,Q,P, AND 35.
04606  0074 00 4 05137         TSX ACB,4
04607  0000 00 0 00000         HTR                 ERR. ACC S,Q,P, AND 35.
                                                    SHOULD
04610  0020 00 0 04570         TRA IDRB            ALL BE 0. BITS IN ERR. IN
                                                    IND. REG. AS OCTAL NOS.
                                                    10{S,4{Q,2{P,1{35

*CHECK ACC COLS 1 TO 34.
04611  0074 00 4 05164         TSX ACCF,4
04612 +376126376600            OCT 376126376600 ERRIN ACC 1 TO 34,
                                                    CORRECT
04613  0020 00 0 04570         TRA IDRB            ANS. IN MQ,ORIG. ANS. IN
                                                    ACC.

*CHECK MQ COLS S TO 35.
04614  0074 00 4 05174         TSX MQF,4
04615 +343531773000            OCT 343531773000 MQ ERR. CORRECT ANS.
                                                    IN
04616  0020 00 0 04570         TRA IDRB            MQ,ORIG. ANS. IN ACC.

04617  0020 00 0 04623         TRA IDRBT+3         FINISHED

04620  0534 00 1 00000   IDRBT LXA 0,1             TRAP ADDRESS TO XRA
04621  1 77777 1 04622         TXI *+1,1,-1        XRA-1
04622  0074 00 4 06504         TSX ERROR,4         TRAP ERROR,ADDRESS OF
                                                    INST. THAT CAUSED
                                                    TRAP IN XRA.
04623  0074 00 4 06511         TSX OK,4            FINISHED. PROCEED
04624  0020 00 0 04570         TRA IDRB            OR REPEAT.



*REPEAT RELE WITH INDIRECT ADDRESSING.

*9 OV OPERATION WITH FRN AFTER FDP,FMP, AND FAD.

04625  265145606060            BCD 1FRN
04626  0074 00 4 06270   IDRC  TSX PART3,4         LITES 3 AND 3 ON,CLEAR.
04627  0774 00 1 04651         AXT IDRCT,1         SET RETURN ADDRESS
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04630  0634 00 1 06131         SXA SECT2,1   INCASE OF TRAP.
04631  0500 60 0 03323         CLA* RELE+3   200.777777777
04632  0241 60 0 03324         FDP* RELE+4   MQ{201.4
04633  0260 60 0 03325         FMP* RELE+5   ACC{177.7777777
04634  0300 60 0 03326         FAD* RELE+6   ACC{200.7777777
                                             MQ{145.4
04635  0760 00 0 00011         FRN           ACC{201.4
04636  0302 60 0 03330         FSB* RELE+8   ACC AND MQ NOW ZERO.

*CHECK ACC COLS S,Q,P, AND 35.
04637  0074 00 4 05137         TSX ACB,4
04640  0000 00 0 00000         HTR           ERR. ACC S,Q,P, AND 35
                                             SHOULD
04641  0020 00 0 04626         TRA IDRC      BE ZERO. BITS IN ERR. IN
                                             IND. REG. AS OCTAL NOS.
                                             10{S,4{Q,2{P,1{35

*CHECK ACC COLS 1 TO 34.
04642  0074 00 4 05164         TSX ACCF,4
04643  0000 00 0 00000         HTR           ERR IN ACC 1 TO 34. CORRECT
04644  0020 00 0 04626         TRA IDRC      ANS. IN MQ,ORIG. ANS. IN
                                             ACC.

*CHECK MQ COLS S TO 35.
04645  0074 00 4 05174         TSX MQF,4
04646  0000 00 0 00000         HTR           ERR. IN MQ. CORRECT ANS.
04647  0020 00 0 04626         TRA IDRC      IN MQ,ORIG. ANS. IN ACC.

04650  0020 00 0 04654         TRA IDRCT+3   FINISHED


04651  0534 00 1 00000   IDRCT LXA 0,1       TRAP ADDRESS IN XRA.
04652  1 77777 1 04653         TXI *+1,1,-1  XRA-1
04653  0074 00 4 06504         TSX ERROR,4   TRAP ERROR. ADDRESS OF
                                             INST. THAT CAUSED TRAP
                                             IS IN XRA.
04654  0074 00 4 06511         TSX OK,4      FINISHED. PROCEEED
04655  0020 00 0 04626         TRA IDRC      OR REPEAT



*FLOATING POINT ACCURACY ANDRELIABILITY TESTS
*WITH INDIRECT ADDRESSING.

*REPEAT AT1 WITH INDIRECT ADDRESSING.

*SOLUTION OF, A{R+LQB+QB,WHERE
*Q{A/B, AND R{REMAINDER.
*LQB IS THE LOW ORDER PART OF THE F.P. PRODUCT QB.
*THE LOW ORDER PART OF THE SUM HAS A ZERO FRACTION.

04656  264746476260            BCD 1FPOPS
04657  0074 00 4 06270   IDA1  TSX PART3,4   LITES 3 AND 4 ON,CLEAR.
04660  0774 00 1 04705         AXT IDA1T,1   SET RETURN ADDRESS
04661  0634 00 1 06131         SXA SECT2,1   IN CASE OF TRAP
04662  0774 00 1 00012         AXT 10,1      LOAD XRA. 10 PASSES.
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04663  0500 60 0 03464         CLA* AT1+6
04664  0241 60 0 03465         FDP* AT1+7    Q IN MQ, R IN ACC
04665  0760 00 0 00012         DCT
04666  0020 00 0 04712         TRA IDA1+27   SHOULD HAVE DIVIDED
04667  0601 60 0 03470         STO* AT1+10   SAVE R
04670  0260 60 0 03471         FMP* AT1+11   QB
04671  0601 60 0 03472         STO* AT1+12   SAVE QB
04672 -0754 00 0 00000         PXD           CLEAR ACC
04673  0763 00 0 00043         LLS 35        LQB TO ACC,SHOULD NOT OV.
04674  0300 60 0 03475         FAD* AT1+15   +R
04675  0300 60 0 03476         FAD* AT1+16   +QB
04676  0402 60 0 03477         SUB* AT1+17   CHECK CACLULATIONS.
04677 -0100 00 0 04715         TNZ IDA1+30   ACC SHOULD BE ZERO.
04700 -0773 00 0 00011         RQL 9
04701 -0763 00 0 00033         LGL 27        F.MQ. TO ACC.
04702 -0100 00 0 04720         TNZ IDA1+33   ACC SHOULD BE ZERO.
04703  2 00001 1 04663         TIX IDA1+4,1,1    NEXT FACTOS.
04704  0020 00 0 04723         TRA IDA1+36   FINISHED.

*CHECK ROUTINES FOLLOW, PROGRAM TAKES 10 PASSES,
*PASS ON WHICH ERROR OCCURED, IN OCTAL, INFERRED AS
*FOLLOWS, P{12-XRA+1. DIFFERENT FACTOS ON EACH PASS.


04705  0534 00 2 00000   IDA1T LXA 0,2       TRAP ADDRESS TO XRB.
04706  1 77777 2 04707         TXI *+1,2,-1  XRB-1
04707  0074 00 4 06503         TSX ERROR-1,4 TRAP ERROR,ADDRESS OF
04710  0020 00 0 04657         TRA IDA1      INST. THAT CAUSED TRAP IN
                                             XRB.
04711  0020 00 0 04703         TRA IDA1+20   GO ON TO NEXT PASS

04712  0074 00 4 06503         TSX ERROR-1,4 DIV. CHECK ON,SHOULD
04713  0020 00 0 04657         TRA IDA1      HAVE DIVIDED. AT IDA1+5.
04714  0020 00 0 04703         TRA IDA1+20   GO ON TO NEXT PASS.


04715  0074 00 4 06503         TSX ERROR-1,4 CALCULATION IN ERROR,ACC
04716  0020 00 0 04657         TRA IDA1      WAS NOT ZERO AT IDA1+16.
04717  0020 00 0 04703         TRA IDA1+20   GO ON TO NEXT PASS.

04720  0074 00 4 06503         TSX ERROR-1,4 F. MQ. WAS NOT ZERO AT
04721  0020 00 0 04657         TRA IDA1      IDA+19.
04722  0020 00 0 04703         TRA IDA1+20   GO ON TO NEXT PASS.

04723  0074 00 4 06511         TSX OK,4      FINISHED,PROCEED
04724  0020 00 0 04657         TRA IDA1      OR REPEAT.



*REPEAT AT3 WITH INDIRECT ADDRESSING. THE
*SQUARE ROOT SUB-ROUTINE WITH INDIRECT ADDRESSING
*IS USED.

*THE QUADRATIC FORMULA,3 PASSES,2 ANSWERS EACH PASS.
04725  264746476260            BCD 1FPOPS
04726  0074 00 4 06270   IDA2  TSX PART3,4   LITES 3 AND 4 ON,CLEAR.
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04727 -0500 00 0 04755        CAL IDA2+23   SET RETURN ADDRESS
04730  0621 00 0 06131        STA SECT2     IN CASE OF TRAP.
04731 -0534 00 1 04743        LXD IDA2+13,1 21 TO XRA
04732  0560 60 0 03557        LDQ* AT3+4     A
04733  0260 60 0 03560        FMP* AT3+5      AXC
04734  0361 60 0 03561        ACL* AT3+6        X4
04735  0601 60 0 03562        STO* AT3+7    4AC
04736  0560 60 0 03563        LDQ* AT3+8    B
04737  0260 60 0 03564        FMP* AT3+9      B SQUARED
04740  0302 60 0 03565        FSB* AT3+10           -4AC
04741  0340 60 0 03566        CAS* AT3+11   CHECK RADICAN
04742  1 00000 0 04744        TXI *+2       ERROR.
04743  1 00025 0 04750        TXI *+5,0,21  OK.

04744  0560 60 0 03571        LDQ* AT3+14   CORRECT ANS IN MQ.
04745  0074 00 4 06503        TSX ERROR-1,4 ERR. IN B SQRD-4AC
04746  0020 00 0 04726        TRA IDA2
                                             PLACE CORRECT RADICAND.
04747  0500 60 0 03574        CLA* AT3+17   IN ACC AND CONTINUE.

04750  0074 00 4 05246        TSX SQRI,4    GET R,WHERE R{SQUARE-
                                             ROOT OF B SQRD-4AC.
04751  0021 00 0 04756        TTR *+5       ERROR,RADICAN SHOULD
                                             HAVE BEEN PLUS.
04752  0340 60 0 03577        CAS* AT3+20   CHECK SQUARE ROOT
04753  0021 00 0 04755        TTR *+2       ERROR.
04754  1 00000 0 04762        TXI *+6       OK
04755  0761 00 0 05032        NOP IDA2T
04756  0560 60 0 03603        LDQ* AT3+24   CORRECT ANS. IN MQ
04757  0074 00 4 06503        TSX ERROR-1,4 ERROR IN SQUARE ROOT.
04760  0020 00 0 04726        TRA IDA2
04761  0500 60 0 03606        CLA* AT3+27   GO ON WITH CORRECT R.

04762  0760 00 0 00012        DCT           TURN OFF DC TRIG.
04763  0761 00 0 00000        NOP
04764  0601 60 0 03611        STO* AT3+30
04765  0560 60 0 03612        LDQ* AT3+31   A{201.4
04766  0260 60 0 03613        FMP* AT3+32   2A{202.4
04767  0601 60 0 03614        STO* AT3+33
04770  0502 60 0 03615        CLS* AT3+34   -B
04771  0300 60 0 03616        FAD* AT3+35     +R
04772  0241 60 0 03617        FDP* AT3+36       /2A
04773  0760 00 0 00012        DCT           SHOULD DIVIDE
04774  0021 00 0 04776        TTR *+2       ERROR
04775  1 00000 0 05001        TXI *+4       OK

04776  0560 60 0 03623        LDQ* AT3+40   CORRECT QUOTIENT TO MQ.
04777  0074 00 4 06503        TSX ERROR-1,4 DC ON,ERROR.
05000  0020 00 0 04726        TRA IDA2

05001  0131 00 0 00000        XCA
05002  0340 60 0 03627        CAS* AT3+44   CHECK FIRST ANS.
05003  0021 00 0 05005        TTR *+2       ERROR
05004  1 00000 0 05010        TXI *+4       OK
05005  0560 60 0 03632        LDQ* AT3+47   CORRECT ANS. TO MQ.
05006  0074 00 4 06503        TSX ERROR-1,4 FIRST ANS. WRONG.
```

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05007  0020 00 0 04726         TRA IDA2

05010  0502 60 0 03635         CLS* AT3+50   -B
05011  0302 60 0 03636         FSB* AT3+51     -R
05012  0241 60 0 03637         FDP* AT3+52         /2A
05013  0760 00 0 00012         DCT           SHOULD DIVIDE.
05014  0021 00 0 05016         TTR *+2       ERROR.
05015  1 00000 0 05021         TXI *+4       OK
05016  0560 60 0 03643         LDQ* AT3+56   CORRECT QUOTIENT TO MQ.
05017  0074 00 4 06503         TSX ERROR-1,4 DC ON,ERROR.
05020  0020 00 0 04726         TRA IDA2

05021  0131 00 0 00000         XCA
05022  0340 60 0 03647         CAS* AT3+60   CHECK SECOND ANS.
05023  0021 00 0 05025         TTR *+2       ERROR
05024  1 00000 0 05030         TXI *+4
05025  0560 60 0 03652         LDQ* AT3+63   CORRECT ANS. IN MQ.
05026  0074 00 4 06503         TSX ERROR-1,4 SECOND ANS. WRONG
05027  0020 00 0 04726         TRA IDA2

05030  2 00007 1 04732         TIX IDA2+4,1,7    NEXT PASS
05031  0020 00 0 05037         TRA *+6

05032  0534 00 2 00000   IDA2T LXA 0,2        TRAP ADDRESS TO XRB.
05033  1 77777 2 05034         TXI *+1,2,-1  XRB-1.
05034  0074 00 4 06503         TSX ERROR-1,4 TRAP ERROR,ADD. OF INST.
05035  0020 00 0 04726         TRA IDA2      THAT CAUSED TRAP IN XRB.
05036  0020 00 0 05030         TRA *-6       GO ON TO NEXT PASS.

05037  0074 00 4 06511         TSX OK,4      FINISHED. PROCEED OR
05040  0020 00 0 04726         TRA IDA2      REPEAT.



*REPEAT AT4A WITH INDIRECT ADDRESSING. THE
*PRIMITIVE ROOT SUB-ROUTINE WITH INDIRECT
*ADDRESSING IS USED.

05041  264746476260            BCD 1FPOPS
05042  0074 00 4 06270   IDA3  TSX PART3,4   LITES 3 AND 4 ON,CLEAR.
05043  0760 00 0 00141         SLN 1         1 ON TO SIGNAL
                                             PRIMITIVE ROOT PROG. ON.
05044  0774 00 1 00010         AXT 8,1       4 PASSES
05045  0774 00 2 05113         AXT IDA3T,2   SET RETURN ADDRESS
05046  0634 00 2 06131         SXA SECT2,2   IN CASE OF TRAP.
05047  0500 60 0 03674         CLA* AT4A+5   PRIME TO ACC.
05050  0074 00 4 05374         TSX PRID,4    GET PRIMITIVE ROOT.
05051  1 00000 0 05077         TXI CATS      ERROR,PRIMES SHOULD
                                             BE WITHIN RANGE.
05052  1 00000 0 05103         TXI CATS+4    ERROR,THESE VALUES
                                             ARE PRIMES.
05053  1 00000 0 05107         TXI MACHE     ERROR,DIVIDEND SHOULD BE
                                             GREATER THAN QUOT. TIMES
                                             DIV.
05054 -0600 60 0 03701         STQ* AT4A+10  SUCCESFUL RETURN HERE.
05055  0340 60 0 03702         CAS* AT4A+11  CHECK ROOT.
```

```
05056  1 00000 0 05060         TXI *+2       ERROR.
05057  0020 00 0 05063         TRA *+4       OK

05060  0560 60 0 03705         LDQ* AT4A+14
05061  0074 00 4 06503         TSX ERROR-1,4 WRONG ROOT IN ACC.
05062  0020 00 0 05042         TRA IDA3

*ON ERROR,PRIME USED IN SALON,VALUES
*ARE STORED STARTING AT PRIMS UP TO PRIMS+8
*IN THIS ORDER,PRIME,ITS ROOT,PRIME,ITS ROOT, ETC.

*THE PRIME NUMBERS USED ANS THE RESPECTIVE
*ROOTS THAT SHOULD BE CALCULATED ARE GIVEN
*BELOW IN THE ORDER OF THEIR APPEARENCE...

*         PRIME    ROOT      XRA WILL
*                            HAVE *

*         OCTAL    OCTAL     OCTAL

*         202.6    202.4       10

*         203.7    202.6        6

*         207.604  203.5        4

*         212.7624 203.7        2

*        DECIMAL  DECIMAL      OCTAL

*          3        2          10

*          7        3           6

*         97        5           4

*         997       7           2

*                           *. EXCEPT AT MACH
*                           OR FOR TRAP ERROR.



05063  0500 60 0 03710         CLA* AT4A+17  CHECK MQ FACTOR.
05064  0300 60 0 03711         FAD* AT4A+18  MQ FACTOR +1 SHOULD
05065  0340 60 0 03712         CAS* AT4A+19  BE { ORIG. PRIME.
05066  1 00000 0 05070         TXI *+2       ERROR.
05067  0020 00 0 05120         TRA IDA3R     OK.
05070  0500 60 0 03715         CLA* AT4A+22  ORIG. PRIME
05071  0302 60 0 03716         FSB* AT4A+23  -1
05072  0131 00 0 00000         XCA           CORRECT ANS TO MQ
05073  0500 60 0 03720         CLA* AT4A+25  RESTORE ACC.
05074  0074 00 4 06503         TSX ERROR-1,4 ERROR IN MQ FACTOR,
05075  0020 00 0 05042         TRA IDA3      CORRECT ANS IN MQ,ORIG.
                                             ANS IN ACC.
05076  0020 00 0 05120         TRA IDA3R
```

```
05077  0560 60 0 03724   CATS  LDQ* RATS     CORRECT ROOT IN MQ.
05100  0074 00 4 06503         TSX ERROR-1,4 ERROR,ALL THESE PRIMES
05101  0020 00 0 05042         TRA IDA3      ARE WITHIN RANGE,
                                              ACC HAS PRIME,MQ THE ROOT.
05102  0020 00 0 05120         TRA IDA3R
05103  0560 60 0 03730         LDQ* AT4A+33
05104  0074 00 4 06503         TSX ERROR-1,4 CORRECT ROOT IN MQ
05105  0020 00 0 05042         TRA IDA3      ERR,ALL THESE NOS. ARE
                                              PRIME AND SHOULD
                                              NEVER YEILD ZERO
05106  0020 00 0 05120         TRA IDA3R     AT PRID+29.

05107  0074 00 4 06503   MACHE TSX ERROR-1,4 MACHINE ERROR
*THE PRODUCT OF THE INTEGRAL PART OF THE QUOTIENT
*TIMES THE DIVISOR IS ALWAYS AT LEAST ONE LESS THAN
*THE DIVIDENT WHEN USIGN PRIME NUMBERS.
*ERR OCCURED AT PRID+30, OR PRID+33. SEE ALSO MACH.
05110  0020 00 0 05042         TRA IDA3

05111  0534 00 1 05452         LXA PRID+46,1    RESTORE XRA.
05112  0020 00 0 05120         TRA IDA3R

05113  0534 00 2 00000   IDA3T LXA 0,2        TRAP ADDRESS IN XRB
05114  1 77777 2 05115         TXI *+1,2,-1  XRB-1
05115  0074 00 4 06503         TSX ERROR-1,4 TRAP ERR,ADDRESS OF INST.
05116  0020 00 0 05042         TRA IDA3      THAT CAUSED TRAP IN XRB.

05117  0534 00 1 05452         LXA PRID+46,1 RESTORE XRA
05120  2 00002 1 05047   IDA3R TIX IDA3+5,1,2    NEXT PASS.
05121  0074 00 4 06511         TSX OK,4      FINISHED,PROCEED
05122  0020 00 0 05042         TRA IDA3      OR REPEAT.



05123  0074 00 4 06174         TSX SPACE,4   COOL, MAN- 1 MEAN LIKE-
05124  0020 00 0 06303         TRA DONE      THE END.



*SERVICE AREA FOR PARTS 2 AND 3 OF 9M05.
*CHECKING AND SERVICE SUB-ROUTINE.
*CONSTANTS AND FREE AREAS FOR TEMPORARY STORAGE.



*SUBROUTINE TO CHECK THAT ACC OV AND DIVIDE-CHECK
*      TRIGGGERS ARE OFF.

05125 -0140 00 0 05127   UONLY TNO *+2        WAS ACC OV. ON,
05126  0020 00 0 06503         TRA ERROR-1   YES. ERROR LOCATION
                                              ALREADY IN XRC
05127  0760 00 0 00012         DCT
05130  2 00002 4 06503         TIX ERROR-1,4,2 DIVIDE CHECK ON.
```

```
                                                    ERROR LOC. IS IN XRC

05131  0020 00 4 00004         TRA 4,4             TRIGS OK.

                 05125   OONLY EQU UONLY
05132  0074 00 4 06174         TSX SPACE,4
05133  0074 00 4 06174         TSX SPACE,4
05134  0074 00 4 06174         TSX SPACE,4
05135  0074 00 4 06174         TSX SPACE,4
05136  0074 00 4 06174         TSX SPACE,4



*SUBROUTINE TO TEST ACC COLS. S,Q,P, AND 35.
*CORRECT BITS IN INDICATOR REGESTER,COLS 32 TO 35,
*AS FOLLOWS. 1{35,2{P,4{Q,10{S. ALL IN
*OCTAL. EXAMPLE... 11 OCTAL IN THE INDICATOR
*REGESTER MEANS WE SHOULD HAVE ONLY A BIT IN S, AND IW 35.
05137  0602 00 0 05717   ACB   SLW SALON+5    SAVE ACC P TO 35.
05140 -0600 00 0 06115         STQ Q          SAVE MQ.
05141  0441 00 4 00001         LDI 1,4        CORRECT BIT CODE TO IND.
                                               REG.
05142  0760 00 0 00001         LBT
05143  0020 00 0 05145         TRA *+2        FOR NO LOW BIT,GO ON.
05144  0051 00  000001         IIR 1          INVERT IND. REG. COL 35 ON
                                               L BIT
05145 -0760 00 0 00001         PBT
05146  0020 00 0 05150         TRA *+2        GO ON. NO P BIT.
05147  0051 00  000002         IIR 2          INVERT IND. REG. COL 34 ON
                                               P BIT.
05150  0765 00 0 00001         LRS 1          TO GET Q BIT
05151 -0760 00 0 00001         PBT
05152  0020 00 0 05154         TRA *+2        NO Q BIT,GO ON.
05153  0051 00  000004         IIR 4          INVERT IND. REG. COL 33 ON
                                               Q BIT.
05154  0120 00 0 05156         TPL *+2
05155  0051 00  000010         IIR 10         INVERT IND. REG. COL 32 ON
                                               S BIT.

                                               ALL IND. TRIGS. WILL BE
                                               OF IF ACC BITS WERE OK.

*IF RIGHT HALF OF INDICATOR REGESTER IS NOT ZERO,
*THEN ONE OR MORE OF THE ACC COLS S,Q,P, AND /OR 35
*IS IN ERROR,AND THE CODE FOR THE BITS THAT
*ARE WRONG IS NOW IN THE RIGHT HALF OF THE
*INDICATOR REGESTER AS AN OCTAL NUMBER. THE
*POSSIBLE OCTAL BIT CODES,AND THE CORRESPONDING
*COLS OF THE ACC WHICH ARE WRONG,ARE AS FOLLOWS.

*    BIT CODE      ACC COLS
*     OCTAL         WRONG
*       1             35

*       2             P
```

```
*       3             P AND 35

*       4             Q

*       5             Q AND 35

*       6             Q AND P

*       7             Q,P,AND 35

*      10             S

*      11             S AND 35

*      12             S AND P

*      13             S,P,AND 35

*      14             S AND Q

*      15             S,Q,AND 35

*      16             S,Q,AND P

*      17             S,Q,P,AND 35



05156  0763 00 0 00001         LLS 1          RESTORE ACC TO ORIG. VALUE.
05157 -0140 00 0 05160         TNO *+1        TURN OFF ACC OV. IN CASE IT
                                              WAS TURNED ON BY THEY
                                              PRECEEDING INSTRUCTION.

05160  0560 00 0 06115         LDQ Q          RESTORE MQ.

05161  0054 00  000017         RFT 17         SEE IF RIGHT HALF IND.
                                              REG. IS ZERO.

05162  2 00001 4 06503         TIX ERROR-1,4,1   NO,ERROR IN ACC S,Q,P,
                                              AND 35.
                                              TEST LOCATION -1 IS ALREADY
                                              IN XRC,IN COMP. FORM. ADD 1
                                              TO XRC AND GO TO ERROR -1,
                                              THEN
                                              CONTINUE PROGRAM.

05163  0020 00 4 00003         TRA 3,4        OK,IND. ARE ZERO,RETURN TO
                                              PROGRAM.


*CHECKING ACC COLS 1 TO 34. OTHER BITS ALREADY CHECKED

05164 -0754 00 0 00000   ACCF  PXD            CLEAR ACC.
05165  0401 00 0 05717         ADM SALON+5    DROP S+O.
05166 -0320 00 0 05720         ANA SALON+6    KNOCK OFF LOW BIT.
```

```
05167  0560 00 4 00001         LDQ 1,4       CORRECT ANS. IN MQ.
05170  0402 00 4 00001         SUB 1,4
05171  0100 00 4 00003         TZE 3,4       SHOULD TRANSFER
05172  0400 00 4 00001         ADD 1,4       REPLACE ORIG ANS.
05173  2 00001 4 06503         TIX ERROR-1,4,1    TEST LOC IN XRC.


*CHECK RESULTS IN MQ. COLS STO 35.

05174  0560 00 4 00001   MQF   LDQ 1,4       CORRECT ANS. IN MQ.
05175  0500 00 0 06115         CLA Q         ORIG. MQ RESULTS.
05176  0020 00 0 05170         TRA ACCF+4


*CHECK ADDRESS PORTION OF LOC. ZERO AFTER TRAP.

05177  0560 00 4 00001   ZERO  LDQ 1,4       CORRECT ADD. IN MQ.
05200  0534 00 1 00000         LXA 0,1
05201  0754 00 1 00000         PXA 0,1       ADD. TO ACC THROUGH XRA.
05202  0020 00 0 05170         TRA ACCF+4


*CHECK F.P. TRAP INDICATOR BITS IN DEC OF ZERO.

05203  0560 00 4 00001   BITS  LDQ 1,4       CORRECT BITS TO MQ.
05204 -0534 00 1 00000         LXD 0,1
05205 -0754 00 1 00000         PXD 0,1       BITS TO ACC THROUGH XRA.
05206  0340 00 4 00001         CAS 1,4
05207  0020 00 4 00002         TRA 2,4       WRONG BITS
05210  0020 00 4 00003         TRA 3,4       BITS OK
05211  0020 00 4 00002         TRA 2,4       WRONG BITS


05212  0074 00 4 06503   SETIT TSX ERROR-1,4 TRAP ERROR AT IT8+4.
05213  0020 00 0 02575         TRA IT8
05214  0074 00 4 06265         TSX PART2,4   CLEAR,LIGHT 4 ON.
05215  0560 00 0 05716         LDQ SALON+4   -32.404040404
05216  0020 00 0 02604         TRA IT8+7     CONTINUE IT8.

05217  0074 00 4 06503   SETID TSX ERROR-1,4 TRAP ERROR AT IDIH+4.
05220  0020 00 0 04352         TRA IDIH
05221  0074 00 4 06270         TSX PART3,4   LITES 3 AND 4 ON,CLEAR.
05222  0560 60 0 05215         LDQ* *-5      CORRECT VALUE TO MQ.
05223  0020 00 0 04357         TRA IDIH+5    CONTINUE IDIH.


*SQUARE ROOT SUBROUTINE. ROOT EXACT TO 9 OCTAL DIGITS.

05224 -0120 00 4 00001   SQRT  TMI 1,4       ERROR.
05225  0100 00 4 00002         TZE 2,4       OUT ON ZERO.
05226  0634 00 1 05242         SXA *+12,1    SAVE XRA.
05227  0774 00 1 00015         AXT 13,1      13 ITERATIONS
05230  0601 00 0 05757         STO FREE      N { RADICAND.
05231  0402 00 0 05244         SUB *+11      N/2
05232  0300 00 0 05245         FAD *+11      +1
05233  0601 00 0 05760         STO FREE+1    FIRST GUESS { X
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05234  0500 00 0 05757         CLA FREE      N
05235  0241 00 0 05760         FDP FREE+1    N/X
05236  0131 00 0 00000         XCA
05237  0300 00 0 05760         FAD FREE+1    +X
05240  0402 00 0 05244         SUB *+4       DIV. BY 2
05241  2 00001 1 05233         TIX *-6,1,1   REPEAT
05242  0774 00 1 00000         AXT 0,1       REPLACE XRA.
05243  0020 00 4 00002         TRA 2,4       EXIT.
05244 +001000000000            OCT 001000000000
05245 +201400000000            DEC 1.0



*SQUARE ROOT SUB-ROUTINE WITH INDIRECT ADDRESSING.

05246 -0120 00 4 00001   SQRI  TMI 1,4       ERROR
05247  0100 00 4 00002         TZE 2,4       FINISHED IF ZERO
05250  0634 00 1 05264         SXA SQRI+14,1 SAVE XRA.
05251  0774 00 1 00015         AXT 13,1      13 ITERATIONS
05252  0601 60 0 05230         STO* SQRT+4   N { RADICAND.
05253  0402 60 0 05231         SUB* SQRT+5   N/2
05254  0300 60 0 05232         FAD* SQRT+6   +1
05255  0601 60 0 05233         STO* SQRT+7   FIRST GUESS { X
05256  0500 60 0 05234         CLA* SQRT+8   N
05257  0241 60 0 05235         FDP* SQRT+9   N/X
05260  0131 00 0 00000         XCA
05261  0300 60 0 05237         FAD* SQRT+11  +X
05262  0402 60 0 05240         SUB* SQRT+12  DIV BY 2
05263  2 00001 1 05255         TIX *-6,1,1   REPEAT.
05264  0774 00 1 00000         AXT 0,1       REPLACE XRA.
05265  0020 00 4 00002         TRA 2,4       EXIT.



*TO ENTER KEYS,WILL ENTER ONLY IF
*S IS DOWN,AND THE VALUE IS A FLOATING POINT
*INTEGER WITH CHAR. GREATER THAN 200,LESS THEN 234.
*S IS NOT ENTERED.
                                       SUB-ROUTINE.
05266  0760 00 0 00004   ENK   ENK
05267  0131 00 0 00000         XCA           KEYS TO ACC
05270  0120 00 4 00001         TPL 1,4       NO ENTRY IF PLUS
05271  0602 00 0 05712         SLW SALON     DONT USE SIGN
05272  0760 00 0 00003         SSP
05273  0765 00 0 00033         LRS 27        CHAR. TO ADDRESS
05274  0340 00 0 06017         CAS L233      CHECK CHAR.
05275  0020 00 4 00001         TRA 1,4       TO HIGH.
05276  0761 00 0 00000         NOP
05277  0340 00 0 05651         CAS K61       L201
05300  0761 00 0 00000         NOP
05301  0020 00 0 05303         TRA *+2       OK
05302  0020 00 4 00001         TRA 1,4       TOO LOW.
05303  0765 00 0 00010         LRS 8         SET MQ PLUS.
05304  0131 00 0 00000         XCA
05305 -0300 00 0 05562         UFA K40+2     CHECK FOR INTEGER.
05306 -0754 00 0 00000         PXD           CLEAR ACC.
```

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05307 -0773 00 0 00011         RQL 9          IF FMQ IS ZERO,THEN.
05310 -0763 00 0 00033         LGL 27         NUMBER IS AN INTEGER.
05311 -0100 00 4 00001         TNZ 1,4        NOT INTEGER
05312  0020 00 4 00002         TRA 2,4        OK.


*PRIMATIVE ROOT SUBROUTINE. PRIME IN ACC ON ENTERY.
*ROOT IN ACC, P-1 IN MQ ON EXIT.

05313  0601 00 0 05712   PRIRT STO SALON
05314  0302 00 0 05773         FSB COEF-19    -3
05315  0120 00 0 05320         TPL *+3
05316  0500 00 0 05712         CLA SALON
05317  0020 00 4 00001         TRA 1,4        OUT OF RANGE
05320  0300 00 0 06016         FAD COEF       +1
05321 -0300 00 0 05562         UFA K40+2      233.0
05322 -0320 00 0 05707         ANA KK         FIX
05323  0601 00 0 05713         STO SALON+1    TALLY COUNT.
05324  0771 00 0 00014         ARS 12         CHECK SIZE.
05325  0760 00 0 00001         LBT            4095 MAX
05326  0020 00 0 05330         TRA *+2        OK.
05327  0020 00 0 05316         TRA PRIRT+3    TOO HIGH.
05330  0634 00 1 05371         SXA PRIRT+46,1    SAVE XRA.
05331  0634 00 2 05372         SXA PRIRT+47,2    SAVE XRB.
05332  0774 00 1 00012         AXT 10,1       10 TRIAL ROOTS.
05333  0534 00 2 05713         LXA SALON+1,2 SET TALLY COUNT
                                              AND GO.
05334  0500 00 1 06032         CLA PRIMS,1    TRIAL ROOT.
05335  0602 00 0 05757         SLW FREE       DROP SIGN.
05336  0560 00 1 06032         LDQ PRIMS,1
05337  0260 00 0 05757         FMP FREE       GET DIVIDEND.
05340  0601 00 0 05760         STO FREE+1     SAVE DIVIDEND.
05341  0241 00 0 05712         FDP SALON      RE/P
05342  0131 00 0 00000         XCA
05343 -0300 00 0 05562         UFA K40+2      GET INTEGRAL
05344  0300 00 0 05562         FAD K40+2      PART OF QUOTIENT.
05345  0131 00 0 00000         XCA            INTEGRAL PART OF
05346  0260 00 0 05712         FMP SALON      QUOTIENT TIMES DIVISOR.
05347  0302 00 0 05760         FSB FREE+1     SHOULD GO ZERO OR MINUS.
05350  0100 00 0 05363         TZE *+11       NOT PRIME.
05351  0120 00 4 00003         TPL 3,4        ERROR IF NOT ZERO
                                              AND NOT MINUS.
05352  0300 00 0 06016         FAD COEF       IS THIS UNITY MOD P.
05353  0100 00 0 05364         TZE *+9        IF ZERO,ROOT FOUND
                                              IF TALLY CTR{1.

05354  0120 00 4 00003         TPL 3,4        IF NOT ZERO,MUST BE NEG.
05355  0302 00 0 06016         FSB COEF       RESTOR REMAINDER.
05356  2 00001 2 05335         TIX PRIRT+18,2,1  STEP TALLY CTR,TRY
                                              AGAIN.
                                              IF TALLY CTR {1 TRY
                                              ANOTHER ROOT
05357  2 00001 1 05333         TIX PRIRT+16,1,1
05360  0534 00 1 05371         LXA PRIRT+46,1     OUT OF ROOTS
05361  0534 00 2 05372         LXA PRIRT+47,2     RESTORE XRA AND XRB.
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05362  0020 00 0 05316         TRA PRIRT+3   PRIME OUT OF RANGE
05363  2 00001 4 05360         TIX *-3,4,1   NOT A PRIME NUMBER

05364  2 00001 2 05357         TIX *-5,2,1   IF TALLY CTR IS NOT {1,
                                             ROOT FOUND NO GOOD.
05365  0500 00 0 05712         CLA SALON     TALLY CTR {1,ROOT OK.
05366  0302 00 0 06016         FSB COEF      -1
05367  0131 00 0 00000         XCA           POWER TO MQ
05370  0500 00 1 06032         CLA PRIMS,1   ROOT TO ACC.
05371  0774 00 1 00000         AXT 0,1       RESTORE XRA.
05372  0774 00 2 00000         AXT 0,2       AND XRB.
05373  0020 00 4 00004         TRA 4,4       EXIT.


*PRIMITIVE ROOT SUB-ROUTINE WITH INDIRECT ADDRESSING.

05374  0601 60 0 05313   PRID  STO* PRIRT
05375  0302 60 0 05314         FSB* PRIRT+1  -3
05376  0120 00 0 05401         TPL *+3
05377  0500 60 0 05316         CLA* PRIRT+3  TO LOW
05400  0020 00 4 00001         TRA 1,4       PRIME OUT OF RANGE.
05401  0300 60 0 05320         FAD* PRIRT+5  +1
05402 -0300 60 0 05321         UFA* PRIRT+6  233.0
05403 -0320 60 0 05322         ANA* PRIRT+7  FIX
05404  0601 60 0 05323         STO* PRIRT+8  TALLY COUNT.
05405  0771 00 0 00014         ARS 12        CHECK SIZE.
05406  0760 00 0 00001         LBT           4095 MAX
05407  0020 00 0 05411         TRA *+2       OK.
05410  0020 00 0 05377         TRA PRID+3    TOO HIGH.
05411  0634 00 1 05452         SXA PRID+46,1 SAVE XRA.
05412  0634 00 2 05453         SXA PRID+47,2 SAVE XRB.
05413  0774 00 1 00012         AXT 10,1      10 TRIAL ROOTS.
05414  0534 00 2 05713         LXA SALON+1,2 SET TALLY COUNT
                                             AND GO.
05415  0500 60 0 05334         CLA* PRIRT+17 TRIAL ROOT.
05416  0602 60 0 05335         SLW* PRIRT+18 DROP SIGN.
05417  0560 60 0 05336         LDQ* PRIRT+19
05420  0260 60 0 05337         FMP* PRIRT+20 GET DIVIDEND.
05421  0601 60 0 05340         STO* PRIRT+21 SAVE DIVIDEND.
05422  0241 60 0 05341         FDP* PRIRT+22 RE/P
05423  0131 00 0 00000         XCA
05424 -0300 60 0 05343         UFA* PRIRT+24 GET INTEGRAL
05425  0300 60 0 05344         FAD* PRIRT+25 PART OF QUOTIENT.
05426  0131 00 0 00000         XCA           INTEGRAL PART OF
05427  0260 60 0 05346         FMP* PRIRT+27 QUOTIENT TIMES DIVISOR.
05430  0302 60 0 05347         FSB* PRIRT+28 SHOULD GO ZERO OR MINUS.
05431  0100 00 0 05444         TZE *+11      NOT PRIME.
05432  0120 00 4 00003         TPL 3,4       MACH ERROR IF NOT
                                             ZERO AND NOT MINUS.
05433  0300 60 0 05352         FAD* PRIRT+31 IS THIS UNITY MOD P.
05434  0100 00 0 05445         TZE *+9       IF ZERO,AND IF TALLY
                                             COUNT{1,ROOT FOUND.

05435  0120 00 4 00003         TPL 3,4       IF NOT ZERO,MUST BE-.
05436  0302 60 0 05355         FSB* PRIRT+34 RESTOR REMAINDER.
```

```
05437  2 00001 2 05416         TIX PRID+18,2,1  STEP TALLY CTR,TRY
                                                AGAIN,OR TRY
                                                ANOTHER ROOT
05440  2 00001 1 05414         TIX PRID+16,1,1
05441  0534 00 1 05452         LXA PRID+46,1 RESTORE XRA AND
05442  0534 00 2 05453         LXA PRID+47,2 XRB.
05443  0020 00 0 05377         TRA PRID+3    PRIME OUT OF RANGE
05444  2 00001 4 05441         TIX *-3,4,1   NOT A PRIME NUMBER

05445  2 00001 2 05440         TIX *-5,2,1   IF TALLY CTR IS NOT
                                                ONE,ROOT FOUND NO GOOD.
05446  0500 60 0 05365         CLA* PRIRT+42 IF TALLY COUNT IS ONE,
05447  0302 60 0 05366         FSB* PRIRT+43 ROOT OK.
05450  0131 00 0 00000         XCA           POWER TO MQ.
05451  0500 60 0 05370         CLA* PRIRT+45 ROOT TO ACC.
05452  0774 00 1 00000         AXT 0,1       RESTORE XRA.
05453  0774 00 2 00000         AXT 0,2       AND XRB.
05454  0020 00 4 00004         TRA 4,4       EXIT.




                                     CONSTANTS
05455 +233000000001      BOOZE OCT 233000000001
05456 +266000000000            OCT 266000000000
05457 +146000000000            OCT 146000000000
05460 +266400000000            OCT 266400000000
05461 +265377777777            OCT 265377777777
05462 +264777777776            OCT 264777777776
05463 +231000000004            OCT 231000000004
05464 +202400000000            DEC 2.0,-3.0
05465 -202600000000
05466 -147000000000            OCT -147000000000
05467 +233001777777            OCT 233001777777
05470 +224400000000            OCT 224400000000
05471 +171000000000            OCT 171000000000
05472 -223777777400            OCT -223777777400
05473 -170000000000            OCT -170000000000
05474 +201525252525            OCT 201525252525
05475 +234525252525            OCT 234525252525
05476 -234525252525            OCT -234525252525
05477 -201525252525            OCT -201525252525
05500 -201400000000            OCT -201400000000
05501 +267000000000            OCT 267000000000
05502 +175631463146      DAVE  OCT 175631463146
05503 -206660000000            OCT -206660000000
05504 +033404040404            OCT 033404040404
05505 +033440404040            OCT 033440404040
                                     GOODIES
05506 +000000000000      K0    OCT 0
05507 +033101010101            OCT 33101010101
05510 +033404040404            OCT 33404040404
05511 +033505050505            OCT 33505050505
05512 -033505050505            OCT -33505050505
```

```
05513 +033606060606           OCT 33606060606
05514 +033000000000           OCT 33000000000
05515 -033303030303           OCT -33303030303
05516 +344010101010     K1    OCT 344010101010
05517 +344440404040           OCT 344440404040
05520 +344450505050           OCT 344450505050
05521 -344010101010           OCT -344010101010
05522 -344347474747           OCT -344347474747
05523 +342404040404           OCT 342404040404
05524 +377400000000     K2    OCT +377400000000
05525 +200200000000           OCT 200200000000
05526 +267715412642           OCT 267715412642
05527 +377777777777     K3    OCT 377777777777
05530 +200377777777     K5    OCT 200377777777
05531 +007100000000     K8    OCT 7100000000
05532 +006400000000     K9    OCT 6400000000
05533 +007200000000     K11   OCT 7200000000
05534 +233400000000     K13   OCT 233400000000
05535 +215100000000     K14   OCT 215100000000
05536 +214600000000     K16   OCT 214600000000
05537 +010400000000     K20   OCT 10400000000
05540 +344040000000     K21   OCT 344040000000
05541 +343700000000     K23   OCT 343700000000
05542 +345000000000     K25   OCT 345000000000
05543 +144070000000     K26   OCT 144070000000
05544 +345700000000     K27   OCT 345700000000
05545 +111000000000     K30   OCT 111000000000
05546 +344700000000     K32   OCT 344700000000
05547 -233707070707     K34   OCT 633707070707
05550 +233707070707           OCT 233707070707
05551 +200000000000           OCT 200000000000
05552 -234600000000     K35   OCT 634600000000
05553 +234400000000           OCT 234400000000
05554 +233400000000     K36   OCT 233400000000
05555 +204600000000     K37   OCT 204600000000
05556 +201400000000           OCT 201400000000
05557 +204540000000           OCT 204540000000
05560 +211000000001     K40   OCT 211000000001
05561 +222000000001           OCT 222000000001
05562 +233000000000           OCT 233000000000
05563 +000000000200     K41   OCT 200
05564 +174000000001     K42   OCT 174000000001
05565 +170000000001           OCT 170000000001
05566 +164000000000           OCT 164000000000,131,+0
05567 +000000000131
05570 +000000000000
05571 +200000777777     K43   OCT 200000777777
05572 +200000000777           OCT 200000000777
05573 +145776000001           OCT 145776000001
05574 +200777777777           OCT 200777777777
05575 +200777770000     K44   OCT 200777770000
05576 +200777760000           OCT 200777760000
05577 +145100000000           OCT 145100000000
05600 +200333330000           OCT 200333330000
05601 +177666651111     K45   OCT 177666651111
05602 +144200000000           OCT 144200000000
```

```
05603 +233000000000      K46   OCT 233000000000
05604 +200070707070      K47   OCT 200070707070
05605 +200707070707            OCT 200707070707
05606 +000007070707            OCT 7070707,77777777
05607 +000077777777

*IN CERTAIN TAENIOGLOSSA AND IN THE STENGLOSSA, AMONG THE
*STREPTONEURA, AND IN THE NUDIBRANCHIA AND THE PULMONATA, THE
*COMMISSURES AER SHORTENED AND THE GANGLIA ARE CONCENTRATED IN THE
*HEAD.

05610 +200760000000      K50   OCT 200760000000
05611 +200700000000            OCT 200700000000
05612 +000300000000            OCT 300000000,433333333
05613 +000433333333
05614 +377070000000      K51   OCT 377070000000
05615 +344700000000            OCT 344700000000
05616 +344000000000            OCT 344000000000
05617 +233000000000            OCT 233000000000
05620 +376760000000      K52   OCT 376760000000
05621 +344070000000            OCT 344070000000
05622 +377700000000            OCT 377700000000
05623 +311000000000            OCT 311000000000
05624 +145000000000            OCT 145000000000
05625 +000777777777      K53   OCT 777777777
05626 +377000000000            OCT 377000000000
05627 -233007777777      K54   OCT 633007777777
05630 +233070000000            OCT 233070000000
05631 +230700000000            OCT 230700000000
05632 +377000000000      K55   OCT 377000000000
05633 +144070000000            OCT 144070000000
05634 +345700000000            OCT 345700000000
05635 +032070000000            OCT 32070000000
05636 +377252525253      K56   OCT 377252525253
05637 +377525242525            OCT 377525242525,777770000
05640 +000777770000
05641 +202100000000            OCT 202100000000
05642 +204100000000      K57   OCT 204100000000
05643 +204120000000            OCT 204120000000
05644 +202400000000            OCT 202400000000
05645 +204700000000            OCT 204700000000
05646 +205400000000      K60   OCT 205400000000
05647 +202500000000            OCT 202500000000
05650 +233200000000            OCT 233200000000
05651 +000000000201      K61   OCT 201,233000400000
05652 +233000400000
05653 +201777700000            OCT 201777700000
05654 +200777600000            OCT 200777600000
05655 +233000400001      K62   OCT 233000400001
05656 +222400001777            OCT 222400001777
05657 +167600000000            OCT 167600000000
05660 +224777777777            OCT 224777777777
05661 -233777777777      K63   OCT 633777777777
05662 -233774000000            OCT 633774000000
05663 +200774000000            OCT 200774000000
05664 +233077777777            OCT 233077777777
```

```
05665 -233777777776      K64   OCT 633777777776
05666 +233777777777            OCT 233777777777
05667 +201400000000            OCT 201400000000
05670 +377777777777      K65   OCT 377777777777,7100000000
05671 +007100000000
05672 +353000000000            OCT 353000000000
05673 +354000000000            OCT 354000000000
05674 +377400000000      K66   OCT 377400000000
05675 +200400000000            OCT 200400000000
05676 +010400000000            OCT 10400000000
05677 +173516274051      K67   OCT 173516274051
05700 +176444444445            OCT 176444444445
05701 +176444444443            OCT 176444444443
05702 -035241753062            OCT -435241753062
05703 +146300000000            OCT 146300000000
05704 +201433333333            OCT 201433333333
05705 +141202471361            OCT 141202471361
05706 +141202471361      K70   OCT 141202471361
05707 +000777777777      KK    OCT 000777777777    BLANK CH
05710 -377000000000      KK1   OCT 777000000000  BLANK FR
05711 +000000000000      T1    OCT 000000000000 TEMP STORAGE
05712  0000 00 0 00000   SALON HTR
05713  0000 00 0 00000         HTR
05714  0000 00 0 00000         HTR
05715  0000 00 0 00000         HTR
05716 -032404040404            OCT -032404040404
05717  0000 00 0 00000         HTR           TEMPO FRO ACC P-35
05720 +377777777776            OCT 377777777776    ALL 75,+,MASK
05721 +000777777776            OCT 000777777776
05722 +004004444444            OCT 004004444444
05723 +001007777777            OCT 001007777777
05724 +277400000000            OCT 277400000000
05725 +202400000000            DEC 2.0
05726 +032404040404            OCT 032404040404
05727 +032440404040            OCT 032440404040
05730 +203400000000            DEC 4.0
05731 +002000000000            OCT 002000000000
05732 +001000000000            OCT 001000000000
05733 +202400000000      A     DEC 2.0,8.0,-12.0,4.095E3,6.324E-19
05734 +204400000000
05735 -204600000000
05736 +214777700000
05737 +104565233127
05740 +223444572000            DEC 2.99764E5,-6.4E1,1.0,7.05
05741 -207400000000
05742 +201400000000
05743 +203703146314
05744 +201404040404            OCT 201404040404
05745 +201400000000      B     DEC 1.0,7.0,16.0,-4.095E3,6.282
05746 +203700000000
05747 +205400000000
05750 -214777700000
05751 +203622030446
05752 +223430717400            DEC 2.87647E5,-3.2E1,3.0,7.04
05753 -206400000000
05754 +202600000000
```

```
05755 +203702436560
05756 +203440404040            OCT 203440404040
                05757   FREE   BSS 10
05771 +201400000000            DEC 1.0,4.0,3.0,4.0,2.0,-1.0,-3.0
05772 +203400000000
05773 +202600000000
05774 +203400000000
05775 +202400000000
05776 -201400000000
05777 -202600000000
06000 +201400000000            DEC 1.0,6.0,-40.0,196.0,14.0,4.0,-10.0
06001 +203600000000
06002 -206500000000
06003 +210610000000
06004 +204700000000
06005 +203400000000
06006 -204500000000
06007 +201400000000            DEC 1.0,10.0,-144.0,676.0,26.0,8.0,-18.0
06010 +204500000000
06011 -210440000000
06012 +212522000000
06013 +205640000000
06014 +204400000000
06015 -205440000000
06016 +201400000000      COEF  DEC 1.0
06017 +000000000233      L233  OCT 233
06020 +202400000000            DEC 2.0,3.0,5.0,7.0 PRIME NOS
06021 +202600000000
06022 +203500000000
06023 +203700000000
06024 +204540000000            DEC 11.0,13.0,17.0,19.0,23.0,29.0
06025 +204640000000
06026 +205420000000
06027 +205460000000
06030 +205560000000
06031 +205720000000
06032 +202600000000      PRIMS DEC 3.0,2.0,7.0,3.0,97.0,5.0
06033 +202400000000
06034 +203700000000
06035 +202600000000
06036 +207604000000
06037 +203500000000
06040 +212762400000            DEC 997.0,7.0
06041 +203700000000
06042  0000 00 0 00002   FERM  HTR 2
06043 +147000000000            OCT 147000000000
06044 +263000000000            OCT 263000000000
06045 +200777777777            OCT 200777777777
06046 +177777777777            OCT 177777777777
06047 +200400000000            OCT 200400000000
06050 -300000700000            OCT -300000700000
06051 +233000000001      RTA   OCT 233000000001      UNORMALIZED 1
06052 +201600000000            OCT 201600000000
06053 +202600000000            OCT 202600000000
06054 +203600000000            OCT 203600000000
06055 +204600000000            OCT 204600000000
```

```
06056 +205600000000            OCT 205600000000
06057 +206600000000            OCT 206600000000
06060 +207600000000            OCT 207600000000
06061 +210600000000            OCT 210600000000
06062 +211600000000            OCT 211600000000
06063 +212600000000            OCT 212600000000
06064 +213600000000            OCT 213600000000
06065 +214600000000            OCT 214600000000
06066 +215600000000            OCT 215600000000
06067 +216600000000            OCT 216600000000
06070 +217600000000            OCT 217600000000
06071 +220600000000            OCT 220600000000
06072 +221600000000            OCT 221600000000
06073 +222600000000            OCT 222600000000
06074 +223600000000            OCT 223600000000
06075 +224600000000            OCT 224600000000
06076 +225600000000            OCT 225600000000
06077 +226600000000            OCT 226600000000
06100 +227600000000            OCT 227600000000
06101 +230600000000            OCT 230600000000
06102 +231600000000            OCT 231600000000
06103 +232600000000            OCT 232600000000
06104 +201400000001      RTB   OCT 201400000001
06105 +301400000001            OCT 301400000001
06106 +365400000001            OCT 365400000001
06107 +234600000003      RTC   OCT 234600000003
06110 +377600000003            OCT 377600000003
06111 +177600000003      TMODE OCT 177600000003
06112 +376400000000            OCT 376400000000
06113 +377400000000            OCT 377400000000
06114  0021 00 0 01644         TTR TR1E
06115  0000 00 0 00000   Q     HTR           TEMPO FROM MQ
06116  0000 00 0 00000   BIN   HTR
06117  0074 00 4 06174   CATCH TSX SPACE,4
06120  0000 00 0 00000   MONIT HTR           ADDRESS OF TEST
                                             THAT LAST ENTERED
                                             CLEAR GOES IN
                                             DECREMENT OF
                                             MONIT IN TWOS
                                             COMP. FORM.


*THE U.S. PRODUCTION OF COMPLETELY DENATURED INDUSTRIAL
*ALCHOHOL IN 37 PLANTS IN A. D. 1936, WAS .....
*          36,522,358
* IN WINE GALLONS.

*THIS IS MONITOR.


*F.P. TRAP SEQUENCE

06121 -0760 00 0 00007   SEQ   LTM           JUST IN CASE
06122 -0760 00 0 00144         SLT 4         WAS TRAP EXPECTED
06123  1 77777 0 06132         TXI WHAT,0,32767  NO,ERROR
06124  0760 00 0 00144         SLN 4         YES,TRAP EXPECTED
```

```
06125  3 00000 4 06156         TXH XRCE,4,0  IF XRC STILL ZERO
06126  0534 00 4 00000         LXA 0,4       OK
06127 -0634 00 4 06137         SXD COMP+2,4  SAVE TRAP ADDRESS
06130 -0534 00 4 06131         LXD SECT2,4   CLEAR XRC
06131  1 00000 0 00000   SECT2 TXI 0         RETURN

06132 -0634 00 1 06144   WHAT  SXD TRAP-2,1  LIT4 WAS OFF,WHA HAPON
06133  0534 00 1 00000         LXA 0,1       WAS AN ADDRESS PUT AT 0
06134 -3 00000 1 06171         TXL OUTER,1,0 IF NOT,ERROR
06135 -0634 00 1 05757   COMP  SXD FREE,1    IS SO,IS IT{LAST
06136 -0535 00 1 05757         LDC FREE,1    TRAP ADDRESS
06137  1 00000 1 06140         TXI *+1,1,0
06140 -3 00000 1 06171         TXL OUTER,1,0 IF ZERO,NO TRAP
                                             BUT SKIPED TO SPACE

06141  0534 00 1 00000         LXA 0,1
06142 -0634 00 1 06137         SXD COMP+2,1  SAVE TRAP ADDRESS
06143 -0534 00 1 06144         LXD TRAP-2,1  RESTORE XRA
06144  1 00000 0 06152         TXI FADED TRAP ERROR

06145  264760635147            BCD 1FP TRP
06146  0534 00 4 00000   TRAP  LXA 0,4       RETURN OT PROG
06147  0634 00 4 06151         SXA *+2,4
06150 -0534 00 4 06151         LXD *+1,4     RESTORE XRC
06151  1 00000 0 00000         TXI           RETURN

06152 -0634 00 4 06151   FADED SXD *-1,4     SAVE XRD
06153  0074 00 4 06503         TSX ERROR-1,4 TRAP IN ERROR,OR
06154  0020 00 0 06146         TRA TRAP      TRAP TO 10 IS ILLEGAL
06155  0020 00 0 06146         TRA TRAP      SEE ADDRESS AT ZERO.



06156 -0634 00 2 05757   XRCE  SXD FREE,2    SAVE XRB
06157 -0634 00 4 05760         SXD FREE+1,4  AND XRC
06160 -0534 00 2 05760         LXD FREE+1,2  MOVE XRC TO XRB
06161  1 00000 0 06163         TXI *+2
06162  316331442540            BCD 1ITIME-
06163  0074 00 4 06503         TSX ERROR-1,4 XRC WAS NOT ZERO,
                                             IN 9M05,ALL LEGAL
                                             TRAPS OCCURE WHEN
                                             XRC{0, IF XRC IS
                                             NOT{0,THEN EITHER,
                                             TRAP OCCURED WHEN
                                             IT SHOULD NOT HAVE,
                                             OR XRC WAS CHANGED
                                             BY TRAP OPERATION.
                                             THE VALUE WHICH WAS
                                             LOADED INTO XRC HAS
                                             BEEN MOVED TO XRB.
                                             ZERO HAS THE ERROR
                                             LOCATION +1.
06164  0761 00 0 06163         NOP XRCE+5
06165  0534 00 4 00000         LXA 0,4       SAVE TRAP
06166 -0634 00 4 06137         SXD COMP+2,4  ADDRESS
```

```
06167 -0534 00 2 05757         LXD FREE,2    RESTORE XRB
06170  0020 00 0 06130         TRA SECT2-1   RETURN OT TRAP PROG.
06171 -0534 00 1 06144   OUTER LXD TRAP-2,1  RESTORE XRA
06172  0074 00 4 06174         TSX SPACE,4   GOT TO 10 BY MISTAKE
06173  624721232560            BCD 1SPACE
06174 -0634 00 4 06116   SPACE SXD BIN,4     SPACE ADDRESS
06175 -0535 00 4 06116         LDC BIN,4     TRUE DECREMENT
06176 -0634 00 4 06116         SXD BIN,4     OF BIN
06177 -0535 00 4 06120         LDC MONIT,4   ADDRESS OF TEST
06200  0634 00 4 06116         SXA BIN,4     THAT LOST CONTROL
                                             TO ADDRESS
06201  0441 00 0 06116         LDI BIN       BIN TO IND.
06202  0074 00 4 06503         TSX ERROR-1,4 TRANSFERRED OUT OF
                                             CONTROL. THE ADDRESS
                                             FROM WHICH WE
                                             RECOVERD CONTROL IS
                                             IN DEC. OF THE
                                             INDICATORS,STARTING
                                             ADDRESS OF TEST WHICH
                                             WAS UNDERWAY IS IN
                                             THE ADDRESS OF THE
                                             INDICATORS.

06203  0761 00 0 06174         NOP SPACE
06204 -0534 00 4 06120         LXD MONIT,4
06205  0500 00 4 77776         CLA -2,4      RESET MONIT
06206  0737 00 2 00000         PAC 0,2       AND
06207 -0634 00 2 06120         SXD MONIT,2   RETURN TO
06210  0020 00 4 00000         TRA 0,4       PROPER SEQUENCE



*      PROGRAM SEQUENCE AND CONTROL MONITOR
                                             IN CASE
                                             9M05 TRIES TO
                                             SKIP-TO-MY-LOU.

06211  0760 00 0 00140   CLEAR SLF           LIGHTS OUT
06212  0760 00 0 00161         SWT 1
06213  0020 00 0 06215         TRA *+2       TEST 4
06214  0020 00 0 06217         TRA *+3
06215  0760 00 0 00164         SWT 4
06216  0020 00 0 06222         TRA *+4       NOT REPEATED
06217 -0754 00 4 00000         PXD 0,4       TEST REPEATED OR
06220  0402 00 0 06120         SUB MONIT     WILL BE REPEATED
06221  0100 00 0 06247         TZE RESET+1   IF ZERO,PROGRAM
                                             SEQUENCE OK


06222  0600 00 0 05757         STZ FREE
06223 -0634 00 4 05757         SXD FREE,4    SAVE TEST ADDRESS
06224  0500 00 4 77776         CLA -2,4      PRECEEDING TEST ADDRESS
06225  0737 00 4 00000         PAC 0,4       COMPLEMENT
```

```
06226 -0754 00 4 00000         PXD 0,4
06227  0402 00 0 06120         SUB MONIT      SHOULD BE ZERO
06230 -0534 00 4 05757         LXD FREE,4     RESTORE XRC
06231  0100 00 0 06247         TZE RESET+1    IF ZERO,NORMAL
                                              PROGRAM SEQUENCE OK.


06232  0760 00 0 00004         ENK            CHECK FOR MANUAL TRANSFER
06233  0131 00 0 00000         XCA
06234  0737 00 4 00000         PAC 0,4        COMPLEMENT KEYS ADDRESS
06235  0765 00 0 00025         LRS 21         CHECK TRA ONLY
06236  0402 00 0 05563         SUB K41        -0200
06237 -0100 00 0 06244         TNZ *+5        SEQUENCE SHORT IF NOT 0
06240 -0754 00 4 00000         PXD 0,4        OK,CHECK ADDRESS
06241  0402 00 0 05757         SUB FREE
06242 -0534 00 4 05757         LXD FREE,4     RESTORE
06243  0100 00 0 06247         TZE RESET+1    OK IF ZERO


06244 -0534 00 4 05757         LXD FREE,4     PROGRAM OUT OF
06245  0021 00 0 06174         TTR SPACE      SEQUENCE.


06246  0760 00 0 00140   RESET SLF            LIGHTS OUT
06247 -0634 00 4 06120         SXD MONIT,4    MONITOR
06250 -0535 00 4 06120         LDC MONIT,4
06251  1 00001 4 06252         TXI *+1,4,1    FOR RETURN
06252  0634 00 4 06264         SXA EXIT,4
06253 -0754 00 0 00000         PXD            CLEAR ACC
06254  0601 00 0 00000         STO            CLEAR ZERO
06255  0560 00 0 00000         LDQ            CLEAR MQ
06256  0140 00 0 06257         TOV *+1        TURN OFF
06257  0761 00 0 00000         NOP
06260  0760 00 0 00012         DCT
06261  0761 00 0 00000         NOP
06262  0044 00 0 00000         PAI            RESET
06263 -0534 00 7 00000         LXD 0,7        CLEAR XRA,XRB,XRC
06264  0020 00 0 00000   EXIT  TRA            RETURN TO PROG.
06265  0760 00 0 00140   PART2 SLF            LIGHTS OUT
06266  0760 00 0 00144         SLN 4          4 ON
06267  0020 00 0 06212         TRA CLEAR+1    CLEAR
06270  0760 00 0 00140   PART3 SLF            LIGHTS OUT
06271  0760 00 0 00143         SLN 3          LIGHT 3 ON
06272  0020 00 0 06266         TRA PART2+1    4 ON AND CLEAR


                                              SET MONITOR
06273  0774 00 1 00142   START AXT ERROR-2-WOW,1
06274  0500 00 0 06117         CLA CATCH      L TSX SPACE,4
06275  0601 00 1 06503   BURMA STO ERROR-1,1
06276  2 00001 1 06275         TIX BURMA,1,1
06277  0774 00 1 70000         AXT 32767-JJJ,1 FILL UP
06300  0601 00 1 00000   SHAVE STO 0,1        UPPER STORAGE
06301  2 00001 1 06300         TIX SHAVE,1,1
06302  0020 00 0 00030         TRA 24         BEGIN 9M05A
```

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06303  0760 00 0 00166   DONE  SWT 6          TEST 6
06304  0020 00 0 06306         TRA BBB        FINISHED
06305  0020 00 0 07713         TRA FFF        GO TO TEST SENSE SWITCH 3



06306  0074 00 4 06246   BBB   TSX RESET,4    CLEARN UP AND GO
06307  0500 00 0 06305         CLA *-2        POST RESTART
06310  0601 00 0 00000         STO            AT ZERO.
06311  0762 00 0 01321         RCDA           SELECT CARD READER
06312  0540 00 0 06340         RCHA WOW       PUSH LOAD
06313  0544 00 0 00000         LCHA           BUTTON
06314  0021 00 0 00001         TTR 1

06315  0760 00 0 00163   PRINT SWT 3          TEST SENSE SWITCH 3
06316  0020 00 0 06320         TRA *+2        IDENTIFY PROGRAM
06317  0020 00 0 06273         TRA START
06320  0774 00 1 00013         AXT 11,1       L13 IN XRA
06321  0766 00 0 01361         WPRA           SELECT PRINTER
06322  0760 00 0 01363         SPRA 3         SPACE PRINTER
06323  0540 00 0 06334         RCHA MMM       PRINT NOW PERFORMING
06324  0544 00 0 06335         LCHA MMM+1
06325  0544 00 0 06336         LCHA MMM+2
06326  0544 00 0 06335         LCHA MMM+1
06327  0500 00 0 06336         CLA MMM+2
06330  0402 00 0 07774         SUB HHH        L+2
06331  0621 00 0 06336         STA MMM+2
06332  2 00001 1 06325         TIX *-5,1,1
06333  0020 00 0 06273         TRA START

06334 -1 00001 0 07744   MMM   IOCT TTT,0,1
06335 -1 00001 0 05506         IOCT K0,0,1
06336 -1 00001 0 07746         IOCT TTT+2,0,1
06337 -1 00001 0 07747         IOCT TTT+3,0,1


06340 -100003000000      WOW   OCT -100003000000 S AND 2 ON,WC{3



*TRACING ROUTINE FOR 9M05


                 06341         ORG WOW+1
06341  0500 00 0 06511   TRACE CLA OK         INTERCPET
06342  0601 00 0 06423         STO MOVE       EACH
06343  0500 00 0 06350         CLA MODE-1
06344  0601 00 0 06511         STO OK
06345  0500 00 0 06435         CLA SHAKE
06346  0601 00 0 06303         STO DONE
06347  1 00000 0 06302         TXI SHAVE+2
06350  0021 00 0 06425         TTR SAVE

06351 -0634 00 4 06347   MODE  SXD *-2,4
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06352 -0535 00 4 06347         LDC *-3,4
06353  0634 00 4 06447         SXA GUTS,4
06354 -0535 00 4 06120         LDC MONIT,4
06355 -0634 00 4 06447         SXD GUTS,4
06356  0774 00 4 00024         AXT 20,4       CLEAR CARD
06357  0600 00 4 06477         STZ PTR+16,4   IMAGE
06360  2 00001 4 06357         TIX *-1,4,1
06361  0600 00 0 06450         STZ BIX        CLEAR BIT INDEX
06362  0560 00 0 06447         LDQ GUTS
06363  0766 00 0 01361         WPRA
06364  0774 00 2 00005         AXT 5,2
06365  0774 00 1 00002         AXT 2,1
06366  0500 00 0 06347         CLA MODE-2
06367  0630 00 0 06450         STP BIX
06370 -0754 00 0 00000         PXD
06371 -0763 00 0 00003         LGL 3
06372 -0754 00 0 00000   1RST  PXD
06373 -0763 00 0 00003         LGL 3
06374  0767 00 0 00001         ALS 1
06375  0402 00 0 06452         SUB ZL
06376  0621 00 0 06400         STA *+2
06377  0500 00 0 06450         CLA BIX
06400 -0602 00 0 06457         ORS PTR
06401  0771 00 0 00001         ARS 1
06402  0601 00 0 06450         STO BIX
06403  2 00001 2 06372         TIX 1RST,2,1
06404 -2 00001 1 06411         TNX BLOOD-1,1,1
06405  0771 00 0 00007         ARS 7
06406  0601 00 0 06450         STO BIX
06407  0774 00 2 00005         AXT 5,2
06410  0020 00 0 06370         TRA 1RST-2

06411  0540 00 0 06451         RCHA LINE
06412  0774 00 1 00000   BLOOD AXT 0,1
06413  0774 00 2 00000         AXT 0,2
06414  0774 00 4 00000         AXT 0,4
06415  0500 00 0 06444         CLA PREF
06416  0560 00 0 06445         LDQ PREF+1
06417  0763 00 0 00043         LLS 35
06420  0560 00 0 06446         LDQ PREF+2
06421  0140 00 0 06422         TOV *+1
06422  0060 00 0 06422         TCOA *
06423  0000 00 0 00000   MOVE  HTR
06424  0021 00 0 06512         TTR OK+1       EXIT

06425  0634 00 1 06412   SAVE  SXA BLOOD,1    ENTRY
06426  0634 00 2 06413         SXA BLOOD+1,2
06427  0634 00 4 06414         SXA BLOOD+2,4
06430 -0600 00 0 06446         STQ PREF+2
06431  0765 00 0 00043         LRS 35
06432 -0600 00 0 06445         STQ PREF+1
06433  0621 00 0 06444         STA PREF
06434  0021 00 0 06351         TTR MODE       PRINT
06435  0020 00 0 06436   SHAKE TRA SHAKE+1
06436  0500 00 0 06423         CLA MOVE       RESTORE OK
06437  0601 00 0 06511         STO OK
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06440  0500 00 0 06443         CLA RATLE     RESTORE DONE
06441  0601 00 0 06303         STO DONE
06442  0021 00 0 06273         TTR START     RESTART 9M05 AND
06443  0760 00 0 00166   RATLE SWT 6         ERASE TRACE

                                             CONSTANTS
                 06444   PREF  BSS 3
06447  0000 00 0 00000   GUTS  HTR
06450  0000 00 0 00000   BIX   HTR
06451  0000 24 0 06453   LINE  HTR NO,0,20   CONTROL WORD
06452  0000 00 0 06475   ZL    HTR PTR+14
                 06453   NO    BSS 4
                 06457   PTR   BSS 16        CARD IMAGE

                 06504   ERROR EQU 3396      6504 OCTAL
                 06511   OK    EQU 3401      6511 OCTAL
                 07700   PR    EQU 4032      7700
                 00004   M     EQU 4


                 07713         ORG 4043
07713  0760 00 0 00163   FFF   SWT 3         TEST SENSE SWITCH 3
07714  0020 00 0 07716         TRA *+2       COUNT PASSES
07715  0020 00 0 00030   RRR   TRA 24        REPEAT PROGRAM
07716  0500 00 0 07775         CLA HHH+1     COUNT OF 10 DECIMAL
07717  0402 00 0 07776         SUB HHH+2     L+1
07720  0601 00 0 07775         STO HHH+1     STORE IN COUNT
07721 -0100 00 0 07715         TNZ RRR       REPEAT TEST TILL ZERO
07722  0500 00 0 07777         CLA HHH+3     RESET
07723  0601 00 0 07775         STO HHH+1     COUNTER

07724  0774 00 1 00013         AXT 11,1
07725  0766 00 0 01361         WPRA          SELECT PRINTER
07726  0760 00 0 01363         SPRA 3        SPACE PRINTER
07727  0540 00 0 06335         RCHA MMM+1    PRINT NOW PERFORMING
07730  0544 00 0 07742         LCHA GGG
07731  0544 00 0 06335         LCHA MMM+1
07732  0544 00 0 07743         LCHA GGG+1
07733  0500 00 0 07743         CLA GGG+1
07734  0402 00 0 07774         SUB HHH       L+2
07735  0621 00 0 07743         STA GGG+1
07736  2 00001 1 07731         TIX *-5,1,1
07737  0500 00 0 06337         CLA MMM+3     RESTORE CONTROL WORD
07740  0601 00 0 07743         STO GGG+1
07741  0020 00 0 00030         TRA 24        REPEAT PROGRAM

07742 -1 00001 0 07745   GGG   IOCT TTT+1,0,1
07743 -1 00001 0 07747         IOCT TTT+3,0,1

*      PRINT IMAGE

07744 +000450201100      TTT   OCT 450201100        9L
07745 +001100000020            OCT 01100000020      9R
07746 +000000000000            OCT 0                8L
07747 +000000000000            OCT 0                8R
07750 +002002040000            OCT 2002040000       7L
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```
07751 +002204002000            OCT 2204002000       7R
07752 +030300010000            OCT 30300010000      6L
07753 +000400010000            OCT 400010000        6R
07754 +041004020010            OCT 41004020010      5L
07755 +000000200502            OCT 200502           5R
07756 +000020400040            OCT 20400040         4L
07757 +000020004010            OCT 20004010         4R
07760 +000000002400            OCT 2400             3L
07761 +000000021200            OCT 21200            3R
07762 +000000004000            OCT 4000             2L
07763 +000001500000            OCT 1500000          2R
07764 +000000100000            OCT 100000           1L
07765 +020042000000            OCT 20042000000      1R
07766 +010000006020            OCT 10000006020      0L
07767 +010001500204            OCT 10001500204      0R
07770 +062564030040            OCT 62564030040     11L
07771 +003524017010            OCT 3524017010      11R
07772 +001212741400            OCT 1212741400      12L
07773 +000242220500            OCT 242220500       12R

07774 +000000000002      HHH   OCT 2
07775 +000000000012            OCT 12
07776 +000000000001            OCT 1
07777 +000000000012      JJJ   OCT 12
                 06315          END PRINT
```

EOF*