A PACKAGES

DEC. 22, 1958

```
1         RUNCIBLE BASIC PACKAGE P 2 A
1          CASE INSTITUTE OF TECHNOLOGY
1                   AUGUST  1958
1            ASSEMBLED WITH HAND SOAP
              MIX
      STOP    OPT   0001   FIX 5   PER FORMAT
              DRU
              EQU  NGOGN     1801
              REG  91827
              EQU  TS009     1861
              EQU  TS004     1875
              EQU  XT003     1894
              EQU  XT001     1786
              EQU  CP017    90010
              BLA   1900     1997   EXPANDED
              REG  81915     1918   CLOCKING
      CL003   AUP            8003   GO TO TYPE      1900  10 1903 8003
              BOV  CP017    80005                   1903  47 1836 1919
      80001   LOD  4F       2F      EXTRACT         1915  69 1924 1927
      2       STD  NGOGN            ADDRESSES       1927  24 1801 1906
              RAU   8000            FROM            1906  60 8000 1913
              SLT   0004            CONSOLE         1913  35 0004 1923
              SRT   0007            SETTING         1923  30 0007 1940
              STU  XT003                            1940  21 1894 1947
              RAM   8002                            1947  67 8002 1905
              SLT   0003                            1905  35 0003 1914
              SUP   0017                            1914  11 0017 1921
              STU  90001    NGOGN                   1921  21 1827 1801
      4       LOD  5F       7F                      1924  69 1929 1919
      7       STD  CL000    5F                      1919  24 1925 1929
      5       LOD   8000            TEST FOR        1929  69 8000 1935
              BD9           0F      STATEMENT       1935  99 1939 1941
              RAM  XT003            NUMBER          1939  67 1894 1949
              SLO   0017            STOP            1949  16 0017 1930
              NZE           9F      ADDRESS 1       1930  45 1934 1928
              LOD   8000    0F                      1934  69 8000 1941
      0       BD8           8F                      1941  98 1908 1902
              RAL  90001            ADDRESS 2       1908  65 1827 1946
              NZE  8F                               1946  45 1902 1977
              LOD   0017    9F                      1977  69 0017 1928
      9       HLT   0011    8F                      1928  01 0011 1902
      8       RAM   0005            EXIT TO         1902  67 0005 1910
              ALO   0017            STATEMENT       1910  15 0017 1922
              LOD  CL000            IF NOT IN       1922  69 1925 1978
              BD9            8002   COMPLETE        1978  99 1984 8002
              STL  CL001    5F      TRACE MODE      1984  20 1990 1933
      80002   RAL  80001    (3F)                    1916  65 1915 1926   1871 : 69 1894 1926
      (3)     STU  9000[illegible]  [LOD 15003  FLOW TRACE  1926  24 1833 1948
                             STD 90007 - DISTRIBUTOR
              LOD  NGOGN            STORE           1948  69 1801 1907
              STD  90005            LOWER           1907  24 1831 1937
              LOD  0F                               1937  69 1942 1945
              STD  90001                            1945  24 1827 1943
              LOD  TS009            STORE           1943  69 1861 1964
              STD  90004            UPPER           1964  24 1830 1944
              LOD   0018            STORE           1944  69 0018 1974
              STD  90002            STMNT NO        1974  24 1828 1911
              STU  90003                            1911  21 1829 1901
              PCH  90001     8002                   1901  71 1827 8002
      0       ALF  FLO                              1942  66 7376 0000
      80003   LOD           2B                      1917  69 1920 1927
```

```
         NZE  6F      4B
6        RAM  XT003          TEST  FOR
         SLO    0017         START
         NZE  5B             TRACE
         LOD  8F      7B
80004    RAL  80003   3B     THE  WORKS
5        LOD  0F
         STD  CL002   1F
1        STD  90007   4F
4        STL  90005
         STU  90004          RESTORE
         RAL  CL002            8002  AND
         LOD    0017         BRING  IN
         SDA  90002          NEXT
         RAL  90005   CL002  INSTRCTION
0        RAL  CL001
         BMI  2F
         STD  90003
         LOD  0F
         STD  90001
         PCH  90001          PUNCH
         LOD  CL002          BEFORE
         SDA  NGOGN          EXECUTING
         SLT    0004
         SDA  CL002          TEST
         SUP  4F             FOR
         BMI  9F             BRANCH
         SCT    0006  9F
9        RSL  7F
         LOD  90003          ALTER
         BOV          3F     INSTRCTION
         SDA  TS004   3F     TO  RETAIN
3        SIA  XT001   6F     CONTROL
6        SRT    0003         PUT  MINUS
         SRT    0007         ZERO  IN
         AUP  90004          ACCUM
         BMI  8F      9F     RESTORE
8        SML  90005   8F     ACCUM  WITH
9        AML  90005   8F     SIGN  OF
8        LOD  90007   XT001  UPPER
7          00         1B
         LOD  NGOGN
         STD  CL002   4B
2        STD  XT001          ON  MINUS
         RSM  90007          INSTRCTION
         STD  CL001          FUDGE  UP
         LOD  1F             DISTRIBUTR
         SDA  90007   6B     AND  RUN
1          00   9999  5B     FULL  SPEED
4          00   0000    4000
0        ALF  COM
CL000      09   0000    0000
         PAT                 NONE  LEFT
         MIX
STOP     OPT    0002  FIX 5  PER FORMAT
         BLA    1583   1899  RESERVE  P1
         BLR    1850   1850
         BLR    1876   1877
         BLR    1888   1888
         REG  P1851    1860  READ   BAND
```

```
61    1920   45  1938  1924
62    1938   67  1894  1909
63    1909   16  0017  1971
64    1971   45  1929  1904
65    1904   69  1966  1919
66    1918   65  1917  1926
67    1933   69  1936  1932
68    1932   24  1986  1951
69    1951   24  1833  1993
70    1993   20  1831  1996
71    1996   21  1830  1983
72    1983   65  1986  1954
73    1954   69  0017  1973
74    1973   22  1828  1972
75    1972   65  1831  1986
76    1936   65  1990  1995
77    1995   46  1975  1912
78    1912   24  1829  1952
79    1952   69  1955  1963
80    1963   24  1827  1957
81    1957   71  1827  1982
82    1982   69  1986  1992
83    1992   22  1801  1959
84    1959   35  0004  1969
85    1969   22  1986  1989
86    1989   11  1979  1994
87    1994   46  1962  1931
88    1931   36  0006  1962
89    1962   66  1965  1970
90    1970   69  1829  1985
91    1985   47  1956  1981
92    1956   22  1875  1981
93    1981   23  1786  1953
94    1953   30  0003  1961
95    1961   30  0007  1976
96    1976   10  1830  1988
97    1988   46  1966  1967
98    1966   18  1831  1991
99    1967   17  1831  1991
100   1991   69  1833  1786
101   1965   00  1950  1951
102   1950   69  1801  1960
103   1960   24  1986  1993
104   1975   24  1786  1997
105   1997   68  1833  1987
106   1987   24  1990  1958
107   1958   69  1968  1980
108   1980   22  1833  1953
109   1968   00  9999  1933
110   1979   00  0000  4000
111   1955   63  7674  0000
112   1925   09  0000  0000
113
114
115
116
117
118
119
120
```

277 and 285

988888 9600+

```
REG   W1878      1886    TEMP  STORE                  121
REG   J1877      1886    PUNCH  BAND                  122
REG   91827      1836    CLOCK  BAND                  123
BLA     1835     1835                                  124
SYN   TS001      1807    TEMP                          125
SYN   TS002      1899    STORAGES                      126
SYN   TS003      1741    PREDEFINED                    127
SYN   TS004      1875                                  128
SYN   TS005      1833                                  129
SYN   TS006      1867                                  130
SYN   TS007      1829                                  131
SYN   TS008      1782                                  132
SYN   TS009      1861                                  133
SYN   TS010      1831                                  134
SYN   TS011      1827                                  135
SYN   TS012      1828                                  136
SYN   XT001      1786                                  137
SYN   XT002      1862                                  138
SYN   XT003      1894                                  139
SYN   E  004     1841    STARTING                      140
SYN   E  005     1759    LOCATIONS                     141
SYN   E  006     1809    DEMANDED                      142
SYN   E  008     1808    BY                            143
SYN   E  009     1758    TYPE                          144
SYN   E  010     1890    B                             145
SYN   E  011     1891    PROCESSING                    146
SYN   E  016     1790                                  147
SYN   E  017     1840                                  148
SYN   E  500     1791                                  149
SYN   E  501     1783                                  150
EQU   ACC        0000                                  151
SYN   CP000      1832    CONSTANTS                     152
SYN   CP006      1849    PREDEFINED                    153
SYN   CP009      1837                                  154
SYN   CP017      1836                                  155
SYN   AHOHA      1874                                  156
SYN   NGOGN      1801                                  157
EQU   650        8000    XMODE  ONLY                   158
CP000   00   0000  0000                               159
90008   00   0000  0000                               160
3       ARGUMENT SEPARATION AS1                       161
        DUP    AS1                                    162
        NXT    4444    0000                           163
2 ACC   NOP    1F      1F                             164
1       RAU    ACC                    SPLIT  OFF      165
        SRT    0002                   DIGITAND        166
        STU    TS006                  AND             167
        RAM    8002                   EXPONENT        168
        STL    TS005   XT001          OF  8002        169
        NXT    4646    0000           AND  ACC        170
2 XT001 NOP    AS001   AS001          AND  PUT        171
        NXT    0908    0000           INTO            172
2 TS006 NOP    TS004   TS004          TEMPORARY       173
  AS001 STD    XT001   AS002          STORAGE         174
  AS002 SLT    0008                                   175
        STU    TS004                                  176
        RAM    8002                                   177
        STL    TS003   1B                             178
        EQU    AS1     8000                           179
3       END ARGUMENT SEPARATION AS1                   180

                1832    00  0000  0000                159
-               1834  -  00  0000  0000                160
                0000    00  1594  1594                164
                1594    60  0000  1605                165
                1605    30  0002  1611                166
                1611    21  1867  1620                167
                1620    67  8002  1629                168
                1629    20  1833  1786                169
                1786    00  1583  1583                171
                1867    00  1875  1875                173
                1583    24  1786  1589                174
                1589    35  0008  1615                175
                1615    21  1875  1628                176
                1628    67  8002  1587                177
                1587    20  1741  1594                178
```

```
3        NORMALIZING  ROUTINE  NR1
            DUP    NR1
            NXT   1212     4646
2  ACC      NOP  XT002    NR001   PRECISION          0000    00  1862  1608
   NR001    STD  XT002    NR002   ENDING             1608    24  1862  1665
   NR002    NZE           3F      ROUTINE            1665    45  1619  1670
            SCT   0000    1F      RESULT  IN         1619    36  0000  1591
            NXT   4140     0908   ACCUMLATRS
2  ACC      NOP  TS003    TS002   WITH  DEC          0000    00  1741  1899
            NXT   1716     0000   POINT
2  TS003    NOP  TS001    TS001   3  FROM            1741    00  1807  1807
   1        STL  TS002            LEFT  END          1591    20  1899  1602
            BOV  2F               OF  UPPER          1602    47  1613  1607
            SRT   0002            ACCUMULATR         1607    30  0002  1663
            ALO   8002                               1663    15  8002  1621
            SLO   8002            ROUGH              1621    16  8002  1679
            SCT   0002            EXPONENT           1679    36  0002  1585
            STU  TS003            IN                 1585    21  1741  1644
            ALO  TS002            TS001              1644    15  1899  1604
            SLT   0008                               1604    35  0008  1623
            RAM   8002                               1623    67  8002  1631
            SLO  CP001                               1631    16  1584  1592
            STU  NGOGN                               1592    21  1801  1654
            SLO  TS001                               1654    16  1807  1661
            BMI           AL901   CHECK  IF          1661    46  1614  1616
            NZU  AL002            IN  BOUNDS         1614    44  1617  1618
            SRT   0008                               1618    30  0008  1637
            SML  TS003                               1637    18  1741  1595
            SIA  ACC              STORE              1595    23  0000  1704
            RAL   8001    XT002   RESULT             1704    65  8001  1862
   2        SCT   0000            INTO  ACC          1613    36  0000  1635
            ALO   8001    1B                         1635    15  8001  1591
   3        STL  ACC      XT002                      1670    20  0000  1862
   CP001     12   1000     0000                      1584    12  1000  0000
            EQU    NR1     8000
3        END  NORMALIZING  ROUTINE  NR1
3        FLT  ADD    E  008
            PUD  653              ACCEPT  X
3
            DUP    008
            NXT   4646     0000
2  AS001    NOP  1F       1F                         1583    00  1630  1630
   1        SLO  TS003            CALCULATE          1630    16  1741  1645
            SLT   0001            DIFFERENCE         1645    35  0001  1601
            NZU  6F               OF                 1601    44  1655  1606
            SRT   0005            EXPONENTS          1606    30  0005  1669
            LOD  4F       2F      SET  UP            1669    69  1622  1625
   2        SDA  TS007            SHIFT  INST        1625    22  1829  1632
            BMI  3F               PUT  ROUGH         1632    46  1685  1600
            RAU  TS004            EXPONENT           1600    60  1875  1680
            LOD  TS005            INTO  TS001        1680    69  1833  1593
            STD  TS001                               1593    24  1807  1610
            LOD  TS006    TS007                      1610    69  1867  1829
   3        BOV  AL002                               1685    47  1617  1694
            RAU  TS006                               1694    60  1867  1672
            LOD  TS003                               1672    69  1741  1598
            STD  TS001                               1598    24  1807  1612
            LOD  TS004    TS007                      1612    69  1875  1829
2  TS007    SRD   0000    5F                         1829    31  0000  1603
   4        SRT   0000    5F      IF  OVERFLO        1622    30  0000  1603
```

```
     5          AUP    8001                    DONT
                BOV    XT002     NR002         NORMALIZE
     6          LOD               2B
                SRD    0000      5B            BIG MOVE
                NXT    4040       0000
   2 XT002      NOP    E 008     1E008
   - E 008      STD    XT002                   SET UP
                LOD    9F                      ERROR
                STD    AHOHA     2E008         DISPLAY
     1E008      STD    XT002     2E008         2ND ENT
     2E008      LOD    1B        AS001
     9          HLT    0008      XT002
                EQU     008       8000
   3          END  FLT  ADD       E 008
   3          FLT  MPY    E 009
                PUD    653                     ACCEPT X
   3
                DUP     009
                NXT    4646       0000
   2 AS001      NOP    1F        1F
     1          ALO    TS003                   FIND NEW
                SLO    CP002                   EXPONENT
                STL    TS001
                NZU    AL002                   CHEK RANGE
                RAU    TS006
                NXT    0000       2930
                MPY    TS004                   MULTIPLY
                SLT    0003      NR002         NORMALIZE
     CP002       50    0000       0000
                NXT    4040       0000
   2 XT002      NOP    E 009     1E009
   - E 009      STD    XT002                   SET UP
                LOD    9F                      ERROR
                STD    AHOHA     2E009         DISPLAY
     1E009      STD    XT002     2E009         2ND ENT
     2E009      LOD    1B        AS001
     9          HLT    0009      XT002
                EQU     009       8000
   3          END  FLT  MPY       E 009
   3          FLT  DIV    E 006
                PUD    653                     ACCEPT X
   3
                DUP     006
                NXT    4646       0000
   2 AS001      NOP    1F        1F
     1          SLO    TS003
                STL    TS002
                RAL    TS006
                SLT    0001                    CATCH
                STL    TS008                   DIVISION
                NZE              AL003         BY ZERO
                RAL    CP003
                SLO    TS002                   FIND NEW
                STL    TS001                   EXPONENT
                NZU    AL002                   CHEK RANGE
                RAU    TS004
                DVR    TS008                   DIVIDE
                RAU    8002      NR002         NORMALIZE
     CP003       48    0000       0000
                NXT    4040       0000
```

```
241     1603     10  8001  1609
242     1609     47  1862  1665
243     1655     69  1722  1625
244     1722     31  0000  1603
245
246     1862     00  1808  1659
247     1808   - 24  1862  1715
248     1715     69  1668  1671
249     1671     24  1874  1627
250     1659     24  1862  1627
251     1627     69  1630  1583
252     1668     01  0008  1862
253
254
255
256
257
258
259
260     1583     00  1730  1730
261     1730     15  1741  1695
262     1695     16  1648  1653
263     1653     20  1807  1660
264     1660     44  1617  1664
265     1664     60  1867  1772
266
267     1772     19  1875  1657
268     1657     35  0003  1665
269     1648     50  0000  0000
270
271     1862     00  1758  1658
272     1758   - 24  1862  1765
273     1765     69  1718  1721
274     1721     24  1874  1677
275     1658     24  1862  1677
276     1677     69  1730  1583
277     1718     01  0009  1862
278
279
280
281
282
283
284
285     1583     00  1780  1780
286     1780     16  1741  1745
287     1745     20  1899  1662
288     1662     65  1867  1771
289     1771     35  0001  1727
290     1727     20  1782  1735
291     1735     45  1588  1590
292     1588     65  1641  1596
293     1596     16  1899  1703
294     1703     20  1807  1713
295     1713     44  1617  1719
296     1719     60  1875  1729
297     1729     64  1782  1651
298     1651     60  8002  1665
299     1641     48  0000  0000
300
```

```
 2  XT002  NOP  E 006   1E006                        1862     00  1809  1708
-   E 006  STD  XT002           SET UP               1809  -  24  1862  1815
           LOD  9F              ERROR                1815     69  1768  1821
           STD  AHOHA   2E006   DISPLAY              1821     24  1874  1777
    1E006  STD  XT002   2E006   2ND ENT              1708     24  1862  1777
    2E006  LOD  1B      AS001                        1777     69  1780  1583
    9      HLT   0006   XT002                        1768     01  0006  1862
           EQU    006    8000
 3       END FLT DIV     E 006
 3       FLT TO ACC     E 005
           PUD  653             ACCEPT X
 3
           DUP    005
           NXT   4040    2525
 2  XT002  NOP  E 005   2E005                        1862     00  1759  1626
-   E 005  STD  XT002   2E005   FLOAT TO             1759  -  24  1862  1626
    2E005  LOD  CP004           LOWER AND            1626     69  1643  1597
           STD  TS001   NR002   TO ACC               1597     24  1807  1665
    CP004   67   0000    0000                        1643     67  0000  0000
           EQU  1E005   E 005   2ND ENT
           EQU    005    8000
 3       END FLT TO ACC    E 005
 3       FLT TO LWR     E 004
           PUD  653             ACCEPT X
 3
           DUP    004
           NXT   4444    4040
 2  ACC    NOP  XT003   E 004                        0000     00  1894  1841
-   E 004  STD  XT003   2E004   FLOAT TO             1841  -  24  1894  1647
    2E004  LOD  ACC             LOWER ONLY           1647     69  0000  1753
           STD  TS006           SAVE ACC             1753     24  1867  1720
           LOD          1E005   USE E 005            1720     69  1673  1759
           LOD  TS006           AND                  1673     69  1867  1638
           STD  ACC     XT003   RESTORE              1638     24  0000  1894
           EQU  1E004   E 004   2ND ENT
           EQU    004    8000
 3       END FLT TO LWR    E 004
 3       FLT TO FIX      E 500
           PUD  653             ACCEPT X
 3
           DUP    500
           NXT   3333    0000
 2  ACC    NOP  2E500   2E500   UNNORMLIZD           0000     00  1633  1633
    2E500  LOD  CP005           FLOAT ADD            1633     69  1639  1646
           STD  ACC             OF ZERO              1646     24  0000  1681
           LOD          0V001   WITH 58              1681     69  1634  1687
           NXT   1918    0303   EXPONENT
           LOD  1F      1E008                        1634     69  1656  1659
 2  XT002  SLT   0001   2F                           1862     35  0001  1769
    1      SLT   0001   2F                           1656     35  0001  1769
    2      STL  TS004   SP003                        1769     20  1875  1586
    CP005   00   0000    0058                        1639     00  0000  0058
           NXT   4040    0000
 2  XT003  NOP  E 500   1E500                        1894     00  1791  1640
-   E 500  STD  XT003           SET UP               1791  -  24  1894  1697
           LOD  9F              ERROR                1697     69  1650  1818
           STD  AHOHA   2E500   DISPLAY              1818     24  1874  1633
    1E500  STD  XT003   2E500   2ND ENT              1640     24  1894  1633
    9      HLT   0500   XT003                        1650     01  0500  1894
           EQU    500    8000
```

```
3         END FLT TO FIX    E 500                                  361
3         SPECIAL   SP3                                            362
            DUP     SP3                                            363
     SP003  RAL    8003    XT003                                   364          1586     65 8003 1894
            EQU     SP3     8000                                   365
3         END   SPECIAL     SP3                                    366
3         OVERFLOW SET OV1                                         367
            DUP     OV1                                            368
     OV001  SCT    0002              TURN                           369          1687     36 0002 1693
            SRT    0002     8001     OVERFLOW                       370          1693     30 0002 8001
            EQU  OV002      9999     ON                             371
            EQU     OV1     8000                                   372
3         END OVERFLOW SET OV1                                     373
3         STORE DATA ADDRESS SD1                                   374
            DUP     SD1                                            375
            NXT    1717     4646                                   376
2  ACC      NOP  TS006    SD001    STORE D AD                     377          0000     00 1867 1763
     SD001  SDA  TS006     8001    AND EXIT                       378          1763     22 1867 8001
            EQU  SD002     9999    TO DISTRIB                     379
            EQU     SD1     8000                                   380
3         END STORE DATA ADDRESS SD1                               381
3         LOCATION CALCULATOR LC1                                  382
            DUP     LC1                                            383
            NXT    3636     4646                                   384
2  ACC      NOP  XT001    LC001    GIVEN AN                       385          0000     00 1786 1683
     LC001  STD  XT001    LC002    IDENT                          386          1683     24 1786 1689
     LC002  RAM    8002             CALCULATE                      387          1689     67 8002 1747
            SRT    0004             THE                            388          1747     30 0004 1707
            LOD                   SD001    LOCATION               389          1707     69 1710 1763
            ALO    9903             DISPLAY                        390          1710     15 9903 1757
            SLT    0006             RESULT AS                      391          1757     35 0006 1822
            SUP    8003             0OLLLL0000                     392          1822     11 8003 1779
            SRT    0002    XT001                                   393          1779     30 0002 1786
            EQU     LC1     8000                                   394
3         END LOCATION CALCULATOR LC1                              395
3         GENERAL  MOVE  GM1                                       396
            DUP     GM1                                            397
            NXT    1212     4040                                   398
2  ACC      NOP  XT002    GM001                                   399          0000     00 1862 1706
     GM001  STD  XT002    GM002    LOWER IS                       400          1706     24 1862 1872
     GM002  LOD  2F                KKXXXXYYYY                     401          1872     69 1675 1678
            SLT    0002                                           402          1678     35 0002 1636
            NZU                   XT002    MOVE KK                403          1636     44 1642 1862
            SLT    0002             CONSEC                         404          1642     35 0002 1599
            SDA  2F                LOCATIONS                      405          1599     22 1675 1690
            LOD  1F                FROM                           406          1690     69 1649 1652
            SRT    0004    SD001    XXXX                           407          1652     30 0004 1763
     1      LOD    0000    2F       TO                             408          1649     69 0000 1675
     2      STD   J0002             YYYY                           409          1675     24 1878 1696
            ALO   CP006    GM002                                   410          1696     15 1849 1872
     CP006    00    9998     9999    INCREMENT                      411          1849     00 9998 9999
            EQU     GM1     8000                                   412
3         END GENERAL MOVE GM1                                     413
3         READ     E 016                                           414
            DUP     016                                            415
            NXT    4444     4040                                   416
2  ACC      NOP  XT003    E 016                                   417          0000     00 1894 1790
-    E 016  STD  XT003    2E016    READ                           418          1790  -  24 1894 1698
     2E016  RCD   1876     1F       ROUTINE                        419          1698     70 1876 1748
     1      RSM  P0001                                             420          1748     68 1851 1705
```

```
               NZE          4F        FOUR PER         421      1705    45 1666 1737
               LOD  2F      LC001     CARD             422      1666    69 1676 1683
  2 XT001      ALO  3F      XT001                      423      1786    15 1739 1786
    2          ALO  3F                                 424      1676    15 1739 1743
               AUP  P0010                              425      1743    10 1860 1716
               AUP           8003                      426      1716    10 1819 8003
               LOD  P0002    8002                      427      1819    69 1852 8002
    3          STD   0000             STORE            428      1739    24 0000 1700
               RAM  P0010                              429      1700    67 1860 1624
               ALO  CP007                              430      1624    15 1731 1789
               STL  P0010                              431      1789    20 1860 1766
               ALO  1B       8002     RECYCLE          432      1766    15 1748 8002
     1876      RAM  P0001                              433      1876    67 1851 1756
               STL  TS009             SEVEN PER        434      1756    20 1861 1667
               LOD  2F      LC001     CARD             435      1667    69 1723 1683
  2 XT001      SRT   0002   3F                         436      1786    30 0002 1744
    2          SRT   0002   3F                         437      1723    30 0002 1744
    3          ALO  CP008             PREPARE          438      1744    15 1798 1754
               AUP  TS009             MOVE             439      1754    10 1861 1816
               SRT   0002             CONSTANT         440      1816    30 0002 1725
               RSM   8002                              441      1725    68 8002 1684
               LOD  4F      GM001                      442      1684    69 1737 1706
    4          RAL  P0001             TEST FOR         443      1737    65 1851 1686
               BMI  XT003   2E016     END OF SET       444      1686    46 1894 1698
    CP007       00   0002    0000                      445      1731    00 0002 0000
    CP008       18   5200    0000                      446      1798    18 5200 0000
               EQU  1E016   E 016                      447
               EQU    016    8000                      448
  3        END READ    E 016                           449
  3        PUNCH     E 017                             450
               DUP    017                              451
               NXT   4444    4040                      452
  2 ACC        NOP  XT003   E 017                      453      0000    00 1894 1840
- E 017        STD  XT003   2E017     PUNCH            454      1840  - 24 1894 1803
  2E017        SLT   0006             ROUTINE          455      1803    35 0006 1674
               MPY  CP007             STORE            456      1674    19 1731 1736
               STU  TS009             STMNT NO         457      1736    21 1861 1714
               NZU  1F                IF ZERO          458      1714    44 1795 1869
               SUP   8000             CONDITIONL       459      1869    11 8000 1785
               BMI  XT003   1F        ON 8000          460      1785    46 1894 1795
    1          STL  TS002   2F                         461      1795    20 1899 1702
    2          RSL  4F                SET PUNCH        462      1702    66 1711 1724
               STU  J0002             BAND TO          463      1724    21 1878 1734
               LOD          GM001     MINUS ZERO       464      1734    69 1793 1706
               RAU  P0000                              465      1793    60 1850 1755
               ALO  TS009             MAKE UP          466      1755    15 1861 1773
               SRT   0006             THE IDENT        467      1773    30 0006 1688
               AUP  TS002                              468      1688    10 1899 1712
               AUP           8003                      469      1712    10 1717 8003
               STL  J9999                              470      1717    20 1875 1794
               LOD  5F      LC001                      471      1794    69 1699 1683
    4           07  J0002   J0003                      472      1711    07 1878 1879
  2 XT001      BOV  7F      6F                         473      1786    47 1740 1692
    5          BOV  7F      6F        TEST FOUR        474      1699    47 1740 1692
    6          AUP  TS002             OR SEVEN         475      1692    10 1899 1770
               NZU          5F        PER CARD         476      1770    44 1774 1775
               SUP  CP007                              477      1774    11 1731 1738
               STU  TS002                              478      1738    21 1899 1752
               AUP  1F                GET              479      1752    10 1760 1868
               ALO           8002     VALUE            480      1868    15 1824 8002
```

```
                LOD    0000     8003
      1         STD  J0002
                RAL  TS002
                NZE  1F       3F        RECYCLE
      1         RAL  XT002
                ALO  CP009
                STL  XT002     8001
      3         LOD  CP010    3F
      3         SCT    0002   4F
      4         STD  J0010
                PCH  J0000
                BOV  XT003    2B
      5         ALO  6F                 SEVEN
                STL  TS005              PER CARD
                SCT    0002   1B        GET LOWER
      6           07   0001   J0002     AND UPPER
      7         ALO  8F                 LIMITS
                STL  TS001
                ALO  CP011
                SML  TS005
                BMI            1F       TEST FOR
                RSM  TS001     2F       END OF SET
      8           07   0000   J0002
      1         SLT    0004             LAST CARD
                SML  TS001              OF SET
                SCT    0002             PUT IDENT1
                STU  J0009              MINUS AND
                SRT    0002   2F        PREPARE
      2         LOD  7F       GM001     MOVE CONST
    2 XT002     RAL  CP012    8F
      7         RAL  CP012    8F
      8         LOD  J9999
                SIA  J0001              FIX UP
                ALO  P0001              IDENT1
                STL  P0001
                BOV  1F                 GET PROPER
                LOD  CP013     4B       CONTROL
      1         LOD  CP014     3B       WORD
      CP007       00   0002     0000
      CP009       00   0001     0000
      CP010       00   8000     0800
      CP011       00   0007     0000
      CP012       00   0000     0007
      CP013       00   8000     0008
      CP014       00   8800     0000
                EQU  1E017    E  017
                EQU    017     8000
    3         END  PUNCH     E  017
  -   E  501   HLT    0501     8765     PWR FIXFIX
  -   E  010   HLT    0010     8765     PWR FLTFLT
    3         ALARM  AL1
                DUP    AL1
      AL001     RAL  CP000    AL00H     ALARM1
      AL901     RAL  CP000    AL00C
      AL801     STD  XT002    AL901
      CP000       00   0000     0000
                EQU    AL1      8000
                DUP    ALO
      AL00C     LOD  AL00F    0V001     RESTRTABLE
      AL00H     BOV  AL00F    AL00F     UNCNDITNAL
```

```
 481    1824    69  0000  8003
 482    1760    24  1878  1682
 483    1682    65  1899  1805
 484    1805    45  1709  1761
 485    1709    65  1862  1732
 486    1732    15  1837  1746
 487    1746    20  1862  8001
 488    1761    69  1764  1767
 489    1767    36  0002  1823
 490    1823    24  1886  1742
 491    1742    71  1876  1781
 492    1781    47  1894  1702
 493    1775    15  1750  1726
 494    1726    20  1833  1797
 495    1797    36  0002  1709
 496    1750    07  0001  1878
 497    1740    15  1843  1848
 498    1848    20  1807  1810
 499    1810    15  1813  1776
 500    1776    18  1833  1787
 501    1787    46  1796  1893
 502    1796    68  1807  1845
 503    1843    07  0000  1878
 504    1893    35  0004  1701
 505    1701    18  1807  1817
 506    1817    36  0002  1873
 507    1873    21  1885  1788
 508    1788    30  0002  1845
 509    1845    69  1749  1706
 510    1862    65  1865  1820
 511    1749    65  1865  1820
 512    1820    69  1875  1887
 513    1887    23  1877  1784
 514    1784    15  1851  1792
 515    1792    20  1851  1804
 516    1804    47  1811  1762
 517    1762    69  1866  1823
 518    1811    69  1814  1767
 519    1731    00  0002  0000
 520    1837    00  0001  0000
 521    1764    00  8000  0800
 522    1813    00  0007  0000
 523    1865    00  0000  0007
 524    1866    00  8000  0008
 525    1814    00  8800  0000
 526
 527
 528
 529    1783  -  01  0501  8765
 530    1890  -  01  0010  8765
 531
 532
 533    1838    65  1832  1895
 534    1616    65  1832  1839
 535    1898    24  1862  1616
 536    1832    00  0000  0000
 537
 538
 539    1839    69  1751  1687
 540    1895    47  1751  1751
```

```
  ALOOF  ALO  AHOHA          GIVE ERROR         1751    15 1874 1800
         AUP  0017           INDICATION         1800    10 0017 1825
         BOV  1888    8888   AND STOP           1825    47 1888 8888
   1888  RAL  NGOGN   XT002  NGOGN IS           1888    65 1801 1862
         EQU    ALO   8000   ANSWER
3      END ALARM AL1
3      ALARM AL2
         DUP    AL2
  AL002  RAL  CP015   AL00H  ALARM2             1617    65 1844 1895
  AL902  RAL  CP015   AL00C                     1691    65 1844 1839
  AL802  STD  XT002   AL902                     1733    24 1862 1691
  CP015   01  0000    0000                      1844    01 0000 0000
         EQU    AL2   8000
3      END ALARM AL2
3      ALARM AL3
         DUP    AL3
  AL003  RAL  CP016   AL00H  ALARM3             1590    65 1846 1895
  AL903  RAL  CP016   AL00C                     1842    65 1846 1839
  AL803  STD  XT002   AL903                     1728    24 1862 1842
  CP016   02  0000    0000                      1846    02 0000 0000
         EQU    AL3   8000
3      END ALARM AL3
1
- E 011  STD  XT003          CLOCKING           1891 -  24 1894 1847
         STL  NGOGN          ROUTINE            1847    20 1801 1806
         STU  TS009                             1806    21 1861 1864
         RAU  0017                              1864    60 0017 1826
         AML  XT003                             1826    17 1894 1799
         STU  0018           STORE NEW          1799    21 0018 1871 -1896
         SRT  0004           STORE NEW          1871    30 0004 1896
         SLO  0004           STATEMENT          1896    16 0004 1812
         SIA  0017           NUMBER             1812    23 0017 1870
         RAM  8000           TEST IF            1870    67 8000 1778
         SLT  0001           MINIMUM            1778    35 0001 1835
         NZU  2E       5F    ONLY               1835    44 1889 1802
  5      RAM  0005           EXIT TO            1802    67 0005 1863
         ALO  0017    8002   TOOON              1863    15 0017 8002
  2      SUP  CP018                             1889    11 1892 1897
         BMI  CL003    5B                       1897    46 1900 1802
  CP017   10  8011    0080                      1836    10 8011 0080
  CP018   00  0000    0005                      1892    00 0000 0005
         BLA  1385    1582   RESERVE P2
         SYN  E 018   1558
         SYN  E 019   1508
3      PRECISION DIVIDE PD1
         DUP    PD1
         NXT  3636    4545
2 ACC    NOP  XT001   PD001                     0000    00 1786 1433
  PD001  STD  XT001   PD002  8003 8002          1433    24 1786 1400
  PD002  DIV  TS001          DIVIDED BY         1400    14 1807 1419
         STL  TS004          TS002              1419    20 1875 1431
         RAU  8003           [redacted]         1431    60 8003 1394
         DVR  TS001                             1394    64 1807 1415
         AUP  TS004   XT001                     1415    10 1875 1786
         EQU    PD1   8000
3      END PRECISION DIVIDE PD1
3      NATURAL LOG    E 018
         PUD 653             ACCEPT X
3
         DUP    018
```

```
2  TS001  SRT    0008   1F
   1      ALO    8002
          STU    TS003
          RAL    8001
          DVR    TS004
          NZE           3F
          ALO    TS006
          STL    TS006
          RAL    TS004
          ALO    CP022
          STL    TS004  2F
   2      RAU    TS003
          MPY    TS002  TS001
   3      RAU    TS006  TS013
2  XT001  NZU    4F     4F
   4      SCT    0000
          STU    TS006
          RAU    8002
          SLT    0008
          SRT    0004
          MPY    CP024
          LOD    1F
          SDA    TS013
          NZU    3B
          SRT    0005
          LOD           5F
          SRT    0000   1B
   5      SDA    TS001
          RAU    TS006
          STD    TS003
          MPY    8001
          ALO    8002
          STU    TS002
          LOD    CP023
          STD    TS004  2B
2  TS013  SRT    0007   2F
   1      SRT    0007   2F
   2      SRT    0001
          AUP    8003
          ALO    8002
          SRD    0002   6F
   6      STU    TS002
          STL    TS009
          RAU    TS008
          NZU           AL002
          SUP    CP002
          STD    TS001
          MPY    CP021
          AUP    TS002
          ALO    TS009  NR002
          NXT    1515     0000
2  XT002  NOP    2E018  2E018
   2E018  SLT    0008
          BMI    AL003
          NZU           AL003
          SUP    CP020
          BMI           2F
          AUP    8001
          LOD    CP019  3F
   2      AUP    8001
```

EVALUATE SUM OF ODD POWERS OF Y OVER K UNTIL CONVERGENT

K RUNS THRU ODD INTEGERS

NORMALIZE

~~IF OVER~~ IF OVER FOUR SHIFTS NEEDED USE ONLY ONE TERM OF SERIES

PREPARE DOUBLE SHIFT ~~TO~~ TO STORE Y SQUARED

AFTER CONVERGING MULT BY TWO AND ADD PROPER MULTIPLE OF LN 10 TO RESULT

NORMALIZE

ALARMS IF NEGATIVE OR ZERO IF OVER RANGE BNUMSIG

DIVIDE ARG BY TEN AND ADJUST TO

```
601  1807  30  0008  1426
602  1426  15  8002  1386
603  1386  21  1741  1404
604  1404  65  8001  1469
605  1469  64  1875  1403
606  1403  45  1414  1464
607  1414  15  1867  1402
608  1402  20  1867  1420
609  1420  65  1875  1429
610  1429  15  1432  1388
611  1388  20  1875  1428
612  1428  60  1741  1395
613  1395  19  1899  1807
614  1464  60  1867  1421
615  1786  44  1389  1389
616  1389  36  0000  1411
617  1411  21  1867  1470
618  1470  60  8002  1479
619  1479  35  0008  1391
620  1391  30  0004  1407
621  1407  19  1410  1408
622  1408  69  1461  1417
623  1417  22  1421  1424
624  1424  44  1464  1478
625  1478  30  0005  1483
626  1483  69  1444  1397
627  1444  30  0000  1426
628  1397  22  1807  1413
629  1413  60  1867  1422
630  1422  24  1741  1494
631  1494  19  8001  1385
632  1385  15  8002  1544
633  1544  21  1899  1405
634  1405  69  1412  1416
635  1416  24  1875  1428
636  1421  30  0007  1387
637  1461  30  0007  1387
638  1387  30  0001  1393
639  1393  10  8003  1452
640  1452  15  8002  1463
641  1463  31  0002  1392
642  1392  21  1899  1406
643  1406  20  1861  1472
644  1472  60  1782  1442
645  1442  44  1445  1617
646  1445  11  1648  1453
647  1453  24  1807  1460
648  1460  19  1476  1474
649  1474  10  1899  1456
650  1456  15  1861  1665
651
652  1862  00  1427  1427
653  1427  35  0008  1399
654  1399  46  1590  1503
655  1503  44  1458  1590
656  1458  11  1513  1467
657  1467  46  1423  1524
658  1423  10  8001  1482
659  1482  69  1390  1449
660  1524  10  8001  1434
```

```
                  ALO  CP015   3F          MULTIPLY
                                           LATER
     3            STD  TS006
                  SLO    8002
                  STD  TS008
                  AUP  TS006              Y EQUALS
                  STU  TS001              X MINUS 1
                  SUP  TS006              OVER
                  SUP    8001             X PLUS 1
                  LOD            PD001    IS X 1
                  NZU  4B        6B
     CP002          50    0000     0000
     CP015          01    0000     0000
     CP019          00    1000     0000   CONSTANTS
     CP020          00    3162     2776   FOR
     CP021          23    0258     5092   LOG
     CP022          00    0000     0002   ROUTINE
     CP023          00    0000     0003
     CP024          00    0020     0001
                  NXT    4040     0000
   2 XT002        NOP  E 018     1E018
   - E 018        STD  XT002              SET UP
                  LOD  9F                 ERROR
                  STD  AHOHA     2E018    DISPLAY
     1E018        STD  XT002     2E018
     9            HLT    0018    XT002
                  EQU  ELN       E 018
                  EQU     018      8000
   3          END  NATURAL  LOG    E 018
   3          EXPONENTIAL  E      E 019
                  PUD  653                ACCEPT X
   3
                  DUP     019
                  NXT    4040      0000
   2 TS003        NOP  1F          1F
     1            STL  TS003              TAYLOR
                  RAU  TS002              SERIES
                  NXT    0000      4040   LOOP
                  MPY  TS006              UNTIL
                  SRD    0009             CONVERGENT
                  DVR  TS003
                  STL  TS002
                  NZE            2F
                  ALO  TS009
                  STL  TS009
                  RAL  TS003
                  ALO  CP027     1B
     2            RAU  TS009     NR002
   2 TS002        NOP    0000    2F
     2            SUP    8003
                  SLT    0008             STORE
                  STD  TS002              BENUMSIG
                  STD  TS006              ADJUST
                  ALO  CP003              GEMAGIND
                  STL  TS001              IS IT OUT
                  NZU  8F                 OFF BOUNDS
                  RAU  TS006
                  AUP  CP026
                  STU  TS009              INITIALIZE
                  RAL  CP022     1B       LOOP
                  NXT    1616      0000
```

```
661    1434    15  1844  1449
662    1449    24  1867  1520
663    1520    16  8002  1529
664    1529    24  1782  1435
665    1435    10  1867  1436
666    1436    21  1807  1462
667    1462    11  1867  1471
668    1471    11  8001  1477
669    1477    69  1430  1433
670    1430    44  1389  1392
671    1648    50  0000  0000
672    1844    01  0000  0000
673    1390    00  1000  0000
674    1513    00  3162  2776
675    1476    23  0258  5092
676    1432    00  0000  0002
677    1412    00  0000  0003
678    1410    00  0020  0001
679
680    1862    00  1558  1409
681    1558  - 24  1862  1465
682    1465    69  1418  1521
683    1521    24  1874  1427
684    1409    24  1862  1427
685    1418    01  0018  1862
686
687
688
689
690
691
692
693
694    1741    00  1437  1437
695    1437    20  1741  1396
696    1396    60  1899  1455
697
698    1455    19  1867  1515
699    1515    31  0009  1438
700    1438    64  1741  1486
701    1486    20  1899  1502
702    1502    45  1506  1457
703    1506    15  1861  1492
704    1492    20  1861  1425
705    1425    65  1741  1401
706    1401    15  1454  1437
707    1457    60  1861  1665
708    1899    00  0000  1505
709    1505    11  8003  1526
710    1526    35  0008  1446
711    1446    24  1899  1512
712    1512    24  1867  1488
713    1488    15  1641  1496
714    1496    20  1807  1510
715    1510    44  1546  1514
716    1514    60  1867  1532
717    1532    10  1536  1398
718    1398    21  1861  1564
719    1564    65  1432  1437
720
```

```
2  XT002  NOP  2E019   2E019
   2E019  SLT    0008
          STU  TS001
          RAM    8002
          SLO  CP030
          BMI  7F
          SLO  CP029
          BMI          8F
          ALO  CP025
          SRT    0004
          BMI          1F
          LOD  4F      3F
     1    LOD  5F      3F
     3    SDA  TS005
          RAU  TS001   TS005
2  TS005  SRT    0009  6F
     4    SRT    0009  6F
     5    SLT    0002  6F
     6    SRD    0008
          DIV  CP021   2B
     7    RAL  CP028   XT002
     8    RAL  TS001
          BMI          AL002
          LOD  CP028
          STD  NGOGN   AL901
  CP003     48   0000    0000
  CP025     03   0000    0000
  CP021     23   0258    5092
  CP022     00   0000    0002
  CP026     10   0000    0000
  CP027     00   0000    0001
  CP028     10   0000    0050
  CP029     12   0000    0000
  CP030     41   0000    0000
          NXT    4040    0000
2  XT002  NOP  E  019   1E019
-    E 019  STD  XT002
          LOD  9F
          STD  AHOHA   2E019
  1E019   STD  XT002   2E019
     9    HLT    0019  XT002
          EQU  EEXP    E 019
          EQU     019    8000
3          END  EXPONENTIAL E    E 019
3          PWR  FIX  FIX    E  501
          PUD  653                  ACCEPT X
3
          DUP    501
          NXT    3535    0000
2  ACC    NOP  1F      1F
     1    RAU  7F      2F
          NXT    0000    3130
     2    MPY  ACC
          BMI  5F
          NZE          6F
          SUP    8003
          STD  ACC
          NZE          3F
          RAU  TS009
          MPY  TS004
```

STORE BENUMSIG IF GMAGIND UNDER 41 ANS IS 1 GEMAGIND BETWEEN 41 AND 53 SHIFT BNMS INTO PLACE AND DIVIDE BY LN 10 REMAINDER IS NEW BENUMSIG AND QUOTIENT IS NEW MANTISSA

CONSTANTS FOR EXPONENT ROUTINE

SET UP ERROR DISPLAY

TEST FOR END Y IS HALF Y IF Y WAS ODD NU IS MU TIMES NU

```
721   1862    00  1528  1528
722   1528    35  0008  1495
723   1495    21  1807  1560
724   1560    67  8002  1519
725   1519    16  1522  1527
726   1527    46  1480  1481
727   1481    16  1484  1439
728   1439    46  1451  1546
729   1451    15  1504  1459
730   1459    30  0004  1569
731   1569    46  1572  1473
732   1572    69  1475  1530
733   1473    69  1576  1530
734   1530    22  1833  1440
735   1440    60  1807  1833
736   1833    30  0009  1450
737   1475    30  0009  1450
738   1576    35  0002  1450
739   1450    31  0008  1523
740   1523    14  1476  1505
741   1480    65  1490  1862
742   1546    65  1807  1511
743   1511    46  1525  1617
744   1525    69  1490  1545
745   1545    24  1801  1616
746   1641    48  0000  0000
747   1504    03  0000  0000
748   1476    23  0258  5092
749   1432    00  0000  0002
750   1536    10  0000  0000
751   1454    00  0000  0001
752   1490    10  0000  0050
753   1484    12  0000  0000
754   1522    41  0000  0000
755
756   1862    00  1508  1509
757   1508  - 24  1862  1565
758   1565    69  1468  1571
759   1571    24  1874  1528
760   1509    24  1862  1528
761   1468    01  0019  1862
762
763
764
765
766
767
768
769
770   0000    00  1538  1538
771   1538    60  1443  1447
772
773   1447    19  0000  1531
774   1531    46  1500  1485
775   1485    45  1540  1493
776   1540    11  8003  1497
777   1497    24  0000  1553
778   1553    45  1556  1518
779   1556    60  1861  1517
780   1517    19  1875  1499
```

```
                STL  TS009    3F
      3         RAU  TS004
                NXT    0303      2322      SQUARE MU AND RECYCLE
                MPY    8001
                NZU  AL002    4F
      4         STL  TS004    1B
      5         RSL  CP027                 Y NEGATIVE ALARM3 IF
                AML  TS004                 X  U  O
                BMI  AL003                 ZERO IF
                NZE  SP003                 X
                RSU  7F       2B           NU IS W ANSR
      6         RAL  TS009    XT003
      7           50   0000   ACC
      CP027       00   0000     0001
                NXT    4040     0000
  2   XT003     NOP  E 501    1E501        SET UP ERROR DISPLAY
- E 501         STD  XT003                 INITIALIZE NU TO 1
                LOD  9F                    MU TO X
                STD  AHOHA    2E501
      1E501     STD  XT003    2E501
      2E501     LOD  CP027
                STD  TS009    4B
      9         HLT    0501   XT003
                EQU     501     8000
  3           END  PWR  FIX  FIX     E  501
  3           PWR  FLT  FLT    E  010
                PUD  653                   ACCEPT X
  3
                DUP    010
                NXT    0303     0000
  2   AHOHA     NOP  2E010    2E010        IF ARGMNT ZERO TEST FOR POSTIV EXPONENT OTHERWISE SEE IF EXPONENT IS AN INTEBER
      2E010     STL  TS010
                NZE  1F
                RSL  ACC
                BMI  7F       AL003
      1         STL  TS013
                LOD  1F       AS001
  2   XT001     SLO  CP031    CP031
      1         SLO  CP031
                BMI           4F
                RAM  ACC
                STD  TS011
                LOD           1E500
                AUP  TS004
                NZU           5F
                RAL  TS013    2F
      2         LOD           1E018        GET LOG MPY BY ACC
                RAL  TS011                 GET ANTLOG
                LOD  1F       1E009        ADJUST SIGN
  2   XT002     LOD  3F       3F
      1         LOD  3F       1E019
      3         MPY  TS010    7F
      4         STU  TS010    6F
      5         DIV  CP022
                NZU  6F       4B           IF EVEN INTEGER ANSWER IS POSITIVE
      6         RAM  TS013    2B
      7         RAL    8003
                STL  ACC      XT004
      CP022       00   0000     0002
      CP031       58   0000     0000
```

```
781     1499    20  1861  1518
782     1518    60  1875  1581
783
784     1581    19  8001  1507
785     1507    44  1617  1554
786     1554    20  1875  1538
787     1500    66  1454  1562
788     1562    17  1875  1579
789     1579    46  1590  1533
790     1533    45  1586  1487
791     1487    61  1443  1447
792     1493    65  1861  1894
793     1443    50  0000  0000
794     1454    00  0000  0001
795
796     1894    00  1783  1441
797     1783  - 24  1894  1501
798     1501    69  1568  1563
799     1563    24  1874  1448
800     1441    24  1894  1448
801     1448    69  1454  1557
802     1557    24  1861  1554
803     1568    01  0501  1894
804
805
806
807
808
809
810
811     1874    00  1577  1577
812     1577    20  1831  1534
813     1534    45  1491  1542
814     1542    66  0000  1555
815     1555    46  1559  1590
816     1491    20  1421  1574
817     1574    69  1578  1583
818     1786    16  1489  1489
819     1578    16  1489  1543
820     1543    46  1547  1552
821     1547    67  0000  1573
822     1573    24  1827  1582
823     1582    69  1535  1640
824     1535    10  1875  1561
825     1561    44  1567  1466
826     1567    65  1421  1539
827     1539    69  1550  1409
828     1550    65  1827  1498
829     1498    69  1551  1658
830     1862    69  1516  1516
831     1551    69  1516  1509
832     1516    19  1831  1559
833     1552    21  1831  1548
834     1466    14  1432  1541
835     1541    44  1548  1552
836     1548    67  1421  1539
837     1559    65  8003  1575
838     1575    20  0000  1570
839     1432    00  0000  0002
840     1489    58  0000  0000
```

```
2  XT002   NOP   2E019    2E019
   2E019   SLT     0008
           STU   TS001
           RAM     8002
           SLO   CP030
           BMI     7F
           SLO   CP029
           BMI             8F
           ALO   CP025
           SRT     0004
           BMI             1F
           LOD     4F      3F
   1       LOD     5F      3F
   3       SDA   TS005
           RAU   TS001     TS005
2  TS005   SRT     0009    6F
   4       SRT     0009    6F
   5       SLT     0002    6F
   6       SRD     0008
           DIV   CP021     2B
   7       RAL   CP028     XT002
   8       RAL   TS001
           BMI             AL002
           LOD   CP028
           STD   NGOGN     AL901
   CP003     48    0000      0000
   CP025     03    0000      0000
   CP021     23    0258      5092
   CP022     00    0000      0002
   CP026     10    0000      0000
   CP027     00    0000      0001
   CP028     10    0000      0050
   CP029     12    0000      0000
   CP030     41    0000      0000
           NXT     4040      0000
2  XT002   NOP   E  019    1E019
-  E 019   STD   XT002
           LOD   9F
           STD   AHOHA     2E019
   1E019   STD   XT002     2E019
   9       HLT     0019    XT002
           EQU   EEXP      E 019
           EQU     019     8000
3        END  EXPONENTIAL  E     E 019
3        PWR  FIX  FIX       E  501
           PUD   653                   ACCEPT X
3
           DUP     501
           NXT     3535      0000
2  ACC     NOP   1F        1F
   1       RAU   7F        2F
           NXT     0000      3130
   2       MPY   ACC
           BMI   5F
           NZE             6F
           SUP     8003
           STD   ACC
           NZE             3F
           RAU   TS009
           MPY   TS004
```

STORE BENUMSIG IF GMAGIND UNDER 41 ANS IS 1 GEMAGIND BETWEEN 41 AND 53 SHIFT BNMS INTO PLACE AND DIVIDE BY LN 10 REMAINDER IS NEW BENUMSIG AND QUOTIENT IS NEW MANTISSA

CONSTANTS FOR EXPONENT ROUTINE

SET UP ERROR DISPLAY

TEST FOR END Y IS HALF Y IF Y WAS ODD NU IS MU TIMES NU

```
721     1862     00  1528  1528
722     1528     35  0008  1495
723     1495     21  1807  1560
724     1560     67  8002  1519
725     1519     16  1522  1527
726     1527     46  1480  1481
727     1481     16  1484  1439
728     1439     46  1451  1546
729     1451     15  1504  1459
730     1459     30  0004  1569
731     1569     46  1572  1473
732     1572     69  1475  1530
733     1473     69  1576  1530
734     1530     22  1833  1440
735     1440     60  1807  1833
736     1833     30  0009  1450
737     1475     30  0009  1450
738     1576     35  0002  1450
739     1450     31  0008  1523
740     1523     14  1476  1505
741     1480     65  1490  1862
742     1546     65  1807  1511
743     1511     46  1525  1617
744     1525     69  1490  1545
745     1545     24  1801  1616
746     1641     48  0000  0000
747     1504     03  0000  0000
748     1476     23  0258  5092
749     1432     00  0000  0002
750     1536     10  0000  0000
751     1454     00  0000  0001
752     1490     10  0000  0050
753     1484     12  0000  0000
754     1522     41  0000  0000
755
756     1862     00  1508  1509
757     1508  -  24  1862  1565
758     1565     69  1468  1571
759     1571     24  1874  1528
760     1509     24  1862  1528
761     1468     01  0019  1862
762
763
764
765
766
767
768
769
770     0000     00  1538  1538
771     1538     60  1443  1447
772
773     1447     19  0000  1531
774     1531     46  1500  1485
775     1485     45  1540  1493
776     1540     11  8003  1497
777     1497     24  0000  1553
778     1553     45  1556  1518
779     1556     60  1861  1517
780     1517     19  1875  1499
```

```
                STL  TS009    3F
      3         RAU  TS004
                NXT    0303      2322      SQUARE MU AND RECYCLE
                MPY    8001
                NZU  AL002    4F
      4         STL  TS004    1B
      5         RSL  CP027                 Y NEGATIVE ALARMS IF
                AML  TS004                 X  U  O
                BMI  AL003                 ZERO IF
                NZE  SP003                 X
                RSU  7F       2B           NU IS W ANSR
      6         RAL  TS009    XT003
      7           50   0000   ACC
      CP027       00   0000     0001
                NXT    4040     0000
  2   XT003     NOP  E 501    1E501        SET UP ERROR DISPLAY
- E 501         STD  XT003                 INITIALIZE NU TO 1
                LOD  9F                    MU TO X
                STD  AHOHA    2E501
      1E501     STD  XT003    2E501
      2E501     LOD  CP027
                STD  TS009    4B
      9         HLT    0501   XT003
                EQU     501     8000
  3           END  PWR  FIX  FIX     E  501
  3           PWR  FLT  FLT    E  010
                PUD  653                   ACCEPT X
  3
                DUP    010
                NXT    0303      0000
  2   AHOHA     NOP  2E010    2E010        IF ARGMNT ZERO TEST FOR POSITIV EXPONENT OTHERWISE SEE IF EXPONENT IS AN INTEGER
      2E010     STL  TS010
                NZE  1F
                RSL  ACC
                BMI  7F       AL003
      1         STL  TS013
                LOD  1F       AS001
  2   XT001     SLO  CP031    CP031
      1         SLO  CP031
                BMI           4F
                RAM  ACC
                STD  TS011
                LOD           1E500
                AUP  TS004
                NZU           5F
                RAL  TS013    2F
      2         LOD           1E018        GET LOG MPY BY ACC
                RAL  TS011                 GET ANTLOG
                LOD  1F       1E009        ADJUST SIGN
  2   XT002     LOD  3F       3F
      1         LOD  3F       1E019
      3         MPY  TS010    7F
      4         STU  TS010    6F
      5         DIV  CP022
                NZU  6F       4B           IF EVEN INTEGER ANSWER IS POSITIVE
      6         RAM  TS013    2B
      7         RAL    8003
                STL  ACC      XT004
      CP022       00   0000     0002
      CP031       58   0000     0000
```

```
781     1499    20  1861  1518
782     1518    60  1875  1581
783
784     1581    19  8001  1507
785     1507    44  1617  1554
786     1554    20  1875  1538
787     1500    66  1454  1562
788     1562    17  1875  1579
789     1579    46  1590  1533
790     1533    45  1586  1487
791     1487    61  1443  1447
792     1493    65  1861  1894
793     1443    50  0000  0000
794     1454    00  0000  0001
795
796     1894    00  1783  1441
797     1783  - 24  1894  1501
798     1501    69  1568  1563
799     1563    24  1874  1448
800     1441    24  1894  1448
801     1448    69  1454  1557
802     1557    24  1861  1554
803     1568    01  0501  1894
804
805
806
807
808
809
810
811     1874    00  1577  1577
812     1577    20  1831  1534
813     1534    45  1491  1542
814     1542    66  0000  1555
815     1555    46  1559  1590
816     1491    20  1421  1574
817     1574    69  1578  1583
818     1786    16  1489  1489
819     1578    16  1489  1543
820     1543    46  1547  1552
821     1547    67  0000  1573
822     1573    24  1827  1582
823     1582    69  1535  1640
824     1535    10  1875  1561
825     1561    44  1567  1466
826     1567    65  1421  1539
827     1539    69  1550  1409
828     1550    65  1827  1498
829     1498    69  1551  1658
830     1862    69  1516  1516
831     1551    69  1516  1509
832     1516    19  1831  1559
833     1552    21  1831  1548
834     1466    14  1432  1541
835     1541    44  1548  1552
836     1548    67  1421  1539
837     1559    65  8003  1575
838     1575    20  0000  1570
839     1432    00  0000  0002
840     1489    58  0000  0000
```

```
                NXT   4040     0000
  2  XT004      NOP   E 010    1E010
  -  E 010      STD   XT004                    SET UP
                LOD   9F                       ERROR
                STD   AHOHA    2E010           DISPLAY
             1E010 STD  XT004   2E010
             9     HLT   0010   XT004
                   EQU     010    8000
  3          END  PWR  FLT  FLT     E 010
  1
             J0010 RCD  J0004     1998    ALTER READ
             J0005   00   0000     0000    CARD COUNT
                   PAT                    NONE LEFT
                   PST
                   EQU  NGOGN     1801
                   EQU  TS009     1861
                   EQU  TS004     1875
                   EQU  XT003     1894
                   EQU  XT001     1786
                   EQU  CP017     1836
                   EQU  CL003     1900
                   EQU  CL000     1925
                   EQU  CL001     1990
                   EQU  CL002     1986
                   EQU  TS001     1807
                   EQU  TS002     1899
                   EQU  TS003     1741
                   EQU  TS005     1833
                   EQU  TS006     1867
                   EQU  TS007     1829
                   EQU  TS008     1782
                   EQU  TS010     1831
                   EQU  TS011     1827
                   EQU  TS012     1828
                   EQU  XT002     1862
                   EQU  E  004    1841
                   EQU  E  005    1759
                   EQU  E  006    1809
                   EQU  E  008    1808
                   EQU  E  009    1758
                   EQU  E  010    1890
                   EQU  E  011    1891
                   EQU  E  016    1790
                   EQU  E  017    1840
                   EQU  E  500    1791
                   EQU  E  501    1783
                   EQU  ACC       0000
                   EQU  CP000     1832
                   EQU  CP006     1849
                   EQU  CP009     1837
                   EQU  AHOHA     1874
                   EQU  650       8000
                   EQU  AS001     1583
                   EQU  AS002     1589
                   EQU     AS1    8000
                   EQU  NR001     1608
                   EQU  NR002     1665
                   EQU  CP001     1584
                   EQU  AL901     1616
                   EQU  AL002     1617
```

```
841
842          1570     00  1890  1566
843          1890  -  24  1570  1580
844          1580     69  1537  1549
845          1549     24  1874  1577
846          1566     24  1570  1577
847          1537     01  0010  1570
848
849
850
851          1886     70  1880  1998
852          1881     00  0000  0000
853
854
855
856
857
858
859
860
861
862
863
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866
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895
896
897
898
899
900
```

```
EQU     NR1     8000                    901
EQU  1E008      1659                    902
EQU  2E008      1627                    903
EQU     008     8000                    904
EQU  CP002      1648                    905
EQU  1E009      1658                    906
EQU  2E009      1677                    907
EQU     009     8000                    908
EQU  AL003      1590                    909
EQU  CP003      1641                    910
EQU  1E006      1708                    911
EQU  2E006      1777                    912
EQU     006     8000                    913
EQU  2E005      1626                    914
EQU  CP004      1643                    915
EQU  1E005      1759                    916
EQU     005     8000                    917
EQU  2E004      1647                    918
EQU  1E004      1841                    919
EQU     004     8000                    920
EQU  2E500      1633                    921
EQU  CP005      1639                    922
EQU  OV001      1687                    923
EQU  SP003      1586                    924
EQU  1E500      1640                    925
EQU     500     8000                    926
EQU     SP3     8000                    927
EQU  OV002      9999                    928
EQU     OV1     8000                    929
EQU  SD001      1763                    930
EQU  SD002      9999                    931
EQU     SD1     8000                    932
EQU  LC001      1683                    933
EQU  LC002      1689                    934
EQU     LC1     8000                    935
EQU  GM001      1706                    936
EQU  GM002      1872                    937
EQU     GM1     8000                    938
EQU  2E016      1698                    939
EQU  CP007      1731                    940
EQU  CP008      1798                    941
EQU  1E016      1790                    942
EQU     016     8000                    943
EQU  2E017      1803                    944
EQU  CP010      1764                    945
EQU  CP011      1813                    946
EQU  CP012      1865                    947
EQU  CP013      1866                    948
EQU  CP014      1814                    949
EQU  1E017      1840                    950
EQU     017     8000                    951
EQU  AL001      1838                    952
EQU  AL00H      1895                    953
EQU  AL00C      1839                    954
EQU  AL801      1898                    955
EQU     AL1     8000                    956
EQU  AL00F      1751                    957
EQU     AL0     8000                    958
EQU  CP015      1844                    959
EQU  AL902      1691                    960
```

```
                EQU  AL802      1733                961
                EQU     AL2     8000                962
                EQU  CP016      1846                963
                EQU  AL903      1842                964
                EQU  AL803      1728                965
                EQU     AL3     8000                966
                EQU  CP018      1892                967
                EQU  E  018     1558                968
                EQU  E  019     1508                969
                EQU  PD001      1433                970
                EQU  PD002      1400                971
                EQU     PD1     8000                972
                EQU  CP022      1432                973
                EQU  TS013      1421                974
                EQU  CP024      1410                975
                EQU  CP023      1412                976
                EQU  CP021      1476                977
                EQU  2E018      1427                978
                EQU  CP020      1513                979
                EQU  CP019      1390                980
                EQU  1E018      1409                981
                EQU  ELN        1558                982
                EQU     018     8000                983
                EQU  CP027      1454                984
                EQU  CP026      1536                985
                EQU  2E019      1528                986
                EQU  CP030      1522                987
                EQU  CP029      1484                988
                EQU  CP025      1504                989
                EQU  CP028      1490                990
                EQU  1E019      1509                991
                EQU  EEXP       1508                992
                EQU     019     8000                993
                EQU  1E501      1441                994
                EQU  2E501      1448                995
                EQU     501     8000                996
                EQU  2E010      1577                997
                EQU  CP031      1489                998
                EQU  XT004      1570                999
                EQU  1E010      1566               1001
                EQU     010     8000               1002
1           LOADING ROUTINE FOR PACKAGES           1003
     J00010 RCD J00004   8989 CHECK                1004   1886   70 1880 8989
     J00004 RAM P00001  90001 SEQUENTIAL           1005   1880   67 1851 1827
     90001  AUP J00005  J00002 COUNT               1006   1827   10 1881 1878
     J00002 SIA J00005  TS002                      1007   1878   23 1881 1899
     TS002  SRD   0000  TS006                      1008   1899   31 0000 1867
     TS006  SLO   8001  TS004                      1009   1867   16 8001 1875
     TS004  NZE CP006   90005                      1010   1875   45 1849 1831
     CP006    00  9998   9999 HANG UP              1011   1849   00 9998 9999
     90005  LOD XT001   TS003                      1012   1831   69 1786 1741
     TS003  STD XT003   ACC  INITIALIZE           1013   1741   24 1894 0000
     ACC    RAL P0007   J00001                     1014   0000   65 1857 1877
     J00001 SRT   0002  J00008                     1015   1877   30 0002 1884
     J00008 LOD AHOHA   90002                      1016   1884   69 1874 1828
     90002  SDA AHOHA   90003                      1017   1828   22 1874 1829
     90003  RAL XT003   P0000                      1018   1829   65 1894 1850
     P0000  ALO CP009   TS008 INCREMENT           1019   1850   15 1837 1782
     TS008  STL XT003   TS001 COUNTER             1020   1782   20 1894 1807
     TS001  SRT   0004  90004                      1021   1807   30 0004 1830
```

```
90004  ALO  90007   XT003                1022   1830   15  1833  1894
XT001  LOD  P0001   AHOHA                1023   1786   69  1851  1874
AHOHA  STD    8989  NGOGN  STORE INST    1024   1874   24  8989  1801
NGOGN  AUP  P0007   J0003  TRANSFER      1025   1801   10  1857  1879
J0003  SLO    8002    8001  TO            1026   1879   16  8002  8001
J0006  SRT    0008  J0008  SHIFT         1027   1882   30  0008  1884
J0007  SRT    0004  J0008  TABLE         1028   1883   30  0004  1884
J0009  SLT    0004  J0008                1029   1885   35  0004  1884
90007  ALO    1789    0030  FUDGER        1030   1833   15  1789  0030
CP009   00    0001    0000                1031   1837   00  0001  0000
```