```
4189  003231' 000000  000301    69080        301
4190  003232' 000000  000057    69100        057
4191  003233' 000000  000174    69120        174
4192  003234' 000000  000164    69140        164      ; =.07528964
4193  003235' 000000  000061    69160        061
4194  003236' 000000  000232    69180        232
4195  003237' 000000  000175    69200        175
4196  003240' 000000  000204    69220        204      ; .1065626
4197  003241' 000000  000075    69240        075
4198  003242' 000000  000132    69260        132
4199  003243' 000000  000175    69280        175
4200  003244' 000000  000310    69300        310      ; =.142089
4201  003245' 000000  000177    69320        177
4202  003246' 000000  000221    69340        221
4203  003247' 000000  000176    69360        176
4204  003250' 000000  000344    69380        344      ; .1999355
4205  003251' 000000  000273    69400        273
4206  003252' 000000  000114    69420        114
4207  003253' 000000  000176    69440        176
4208  003254' 000000  000154    69460        154      ; =.3333315
4209  003255' 000000  000252    69480        252
4210  003256' 000000  000252    69500        252
4211  003257' 000000  000177    69520        177
4212  003260' 000000  000000    69540        000      ; 1.0
4213  003261' 000000  000000    69560        000
4214  003262' 000000  000000    69580        000
4215  003263' 000000  000201    69600        201>
4216                             69620  PAGE
```

```
4217                             69640  SUBTTL  SYSTEM INITIALIZATION CODE
4218                             69660  RADIX   10              ;IN ALL NON-MATH PACKAGE CODE
4219                             69680  ;THIS IS THE SYSTEM INITIALIZATION CODE
4220                             69700  ;IT SHOULD BE LOADED AT THE END OF THE BASIC
4221                             69720  ;INTERPRETER
4222
4223                             69760  INTERNAL     INIT
4224
4225                             69800  EXTERNAL     CRDO,LINGET,QINLIN,READY,SCRTCH,STROUT,REASON,BUF
4226                             69820  EXTERNAL     SNERR,OMERR,ILLFUN
4227
4228          145040             69860  FUNIO==<"0256+"0312>+"040+$CODE
4229  003264'                    69880  INITSA: BLOCK   10
4230  003276' 001000  000041     69900  INITAT: LXI     H,AUTTXT
4231  003277' 000000  004035'
4232  003300' 000000  003214'
4233  003301' 001000  000315     69920          CALL    STROUT
4234  003302' 000000  001763*
4235  003303' 000000  003277'
4236  003304'                    69940  INIT:
4237                             69960  IFN     REALIO,<
4238  003304' 001000  000333     69980          IN      1               ;IGNORE GARBAGE CHARACTER IN INTERFACE
4239  003305' 000000  000001
4240  003306' 001000  000333     70000          IN      "0255           ;SEE WHAT KIND OF I/O HE IS
4241  003307' 000000  000377
4242  003310' 001000  000346     70020          ANI     "0100           ;IS HE FUNNY TTY?
4243  003311' 000000  000100
4244  003312' 001000  000312     70040          JZ      NOTSIO
4245  003313' 000000  003343'
4246  003314' 000000  003302'
4247  003315' 001000  000041     70060          LXI     H,FUNIO
4248  003316' 000000  145040*
4249  003317' 000000  003313'
4250  003320' 001000  000042     70080          SHLD    CNLCA2##+2
4251  003321' 000000  000002*
4252  003322' 000000  003316'
4253  003323' 001000  000046     70100          MVI     H,"0310
4254  003324' 000000  000310
4255  003325' 001000  000042     70120          SHLD    CNLCA3##+2
4256  003326' 000000  000002*
4257  003327' 000000  003321'
4258                             70140  IFN     LENGTH,<
4259  003330' 001000  000046     70160          MVI     H,"0304         ;SUBSTITUE "CNZ"
4260  003331' 000000  000304
4261  003332' 001000  000042     70180          SHLD    CNLCA4##+2>
4262  003333' 000000  000002*
4263  003334' 000000  003326'
4264          145002             70200  FUNIO==SCODE+<"0256+"0312>+2
4265  003335' 001000  000041     70220          LXI     H,FUNIO
4266  003336' 000000  145002*
4267  003337' 000000  003333'
4268  003340' 001000  000042     70240          SHLD    CNLCA1##+2
4269  003341' 000000  000002*
```

```
4270  003342' 000000  003336'
4271  003343' 001000  000333    70260   NOTSIO: IN     "0255
4272  003344' 000000  000377
4273  003345' 001000  000346    70280           ANI    "040
4274  003346' 000000  000040
4275  003347' 001000  000312    70300           JZ     NOTPIO
4276  003350' 000000  003400'
4277  003351' 000000  003341'
4278          145002            70320   FUNIO==SCODE+<"0256*"0312>+2
4279  003352' 001000  000041    70340           LXI    H,FUNIO
4280  003353' 000000  145002*
4281  003354' 000000  003350'
4282  003355' 001000  000042    70360           SHLD   CNLCA2+2
4283  003356' 000000  000002*
4284  003357' 000000  003353'
4285  003360' 001000  000046    70380           MVI    H,"0310
4286  003361' 000000  000310
4287  003362' 001000  000042    70400           SHLD   CNLCA3+2
4288  003363' 000000  000002*
4289  003364' 000000  003356'
4290                            70420   IFN     LENGTH,<
4291  003365' 001000  000046    70440           MVI    H,"0304
4292  003366' 000000  000304
4293  003367' 001000  000042    70460           SHLD   CNLCA4+2>
4294  003370' 000000  000002*
4295  003371' 000000  003363'
4296          145001            70480   FUNIO==SCODE+<"0256*"0312>+1
4297  003372' 001000  000041    70500           LXI    H,FUNIO
4298  003373' 000000  145001*
4299  003374' 000000  003370'
4300  003375' 001000  000042    70520           SHLD   CNLCA1+2
4301  003376' 000000  000002*
4302  003377' 000000  003373'
4303  003400'                   70540   NOTPIO:>
4304  003400' 001000  000041    70560           LXI    H,SCODE+"065535
4305  003401' 000000  177777*
4306  003402' 000000  003376'
4307  003403' 001000  000042    70580           SHLD   CURLIN##    ;IN CASE OF ERROR MESSAGE
4308  003404' 000000  000000*
4309  003405' 000000  003401'
4310  003406' 001000  000041    70600           LXI    H,TSTACK    ;SET UP TEMP STACK
4311  003407' 000000  004315*
4312  003410' 000000  003404'
4313  003411' 001000  000371    70620           SPHL
4314  003412' 001000  000042    70640           SHLD   STKTOP##
4315  003413' 000000  000000*
4316  003414' 000000  003407'
4317                            70660   IFN     CONTRW,<
4318  003415' 001000  000257    70680           XRA    A
4319  003416' 001000  000062    70700           STA    CNTWFL##>
4320  003417' 000000  000000*
4321  003420' 000000  003413'
4322  003421' 001000  000315    70720           CALL   CRDO        ;TYPE A CR
```

```
4323  003422' 000000  000000*
4324  003423' 000000  003417'
4325                            70740   IFN     STRING,<
4326  003424' 001000  000041    70760           LXI    H,TEMPST##
4327  003425' 000000  000000*
4328  003426' 000000  003422'
4329  003427' 001000  000042    70780           SHLD   TEMPPT##>
4330  003430' 000000  000000*
4331  003431' 000000  003425'
4332                            70800   IFN     REALIO,<
4333  003432' 001000  000041    70820           LXI    H,MEMORY    ;ASK HOW MUCH MEMORY AVAILABLE
4334  003433' 000000  004243*
4335  003434' 000000  003430'
4336  003435' 001000  000315    70840           CALL   STROUT      ;CALL THE STRING PRINTER
4337  003436' 000000  003300*
4338  003437' 000000  003435'
4339  003440' 001000  000315    70860           CALL   QINLIN      ;GET A LINE OF INPUT
4340  003441' 000000  000020*
4341  003442' 000000  003436'
4342  003443' 001000  000327    70880           CHRGET             ;GET A CHAR
4343  003444' 001000  000376    70900           CPI    "A"
4344  003445' 000000  000101
4345  003446' 001000  000312    70920           JZ     INITAT
4346  003447' 000000  003276*
4347  003450' 000000  003441'
4348  003451' 001000  000267    70940           ORA    A
4349  003452' 001000  000302    70960           JNZ    USEDE9      ;NON ZERO, DONT USE DEFAULT
4350  003453' 000000  003501'
4351  003454' 000000  003447'
4352  003455' 001000  000041    70980           LXI    H,LASTWR
4353  003456' 000000  004257*
4354  003457' 000000  003453'
4355  003460' 001000  000043    71000   LOOPMM: INX    H
4356  003461' 001000  000076    71020           MVI    A,311
4357  003462' 000000  000467
4358  003463' 001000  000167    71040           MOV    M,A
4359  003464' 001000  000276    71060           CMP    M
4360  003465' 001000  000302    71080           JNZ    USEDEF
4361  003466' 000000  003515'
4362  003467' 000000  003456'
4363  003470' 001000  000075    71100           DCR    A
4364  003471' 001000  000167    71120           MOV    M,A
4365  003472' 001000  000276    71140           CMP    M
4366  003473' 001000  000312    71160           JZ     LOOPMM
4367  003474' 000000  003460*
4368  003475' 000000  003466'
4369  003476' 001000  000303    71180           JMP    USEDEF
4370  003477' 000000  003515'
4371  003500' 000000  003474'
4372  003501' 001000  000041    71200   USEDE9: LXI    M,BUF
4373  003502' 000000  000000*
4374  003503' 000000  003477'
4375  003504' 001000  000315    71220           CALL   LINGET      ;GET DECIMAL AMOUNT OF MEMORY IN [D,E]
```

```
4376  003505' 000000  000000*
4377  003506' 000000  003502'
4378  003507' 001000  000267         71240         ORA     A
4379  003510' 001000  000302         71260         JNZ     SNERR        ;MAKE SURE HE HAS A TERMINATOR
4380  003511' 000000  003505*
4381  003512' 000000  003505'
4382  003513' 001000  000353         71280         XCHG
4383  003514' 001000  000053         71300         DCX     H
4384  003515' 001000  000053         71320  USEDEF: DCX     H>
4385                                  71340  IFE    REALIO,<
4386                                  71360         LXI     M,SCODE+16190>
4387  003516' 001000  000345         71380         PUSH    M            ;ALSO SAVE FOR LATER
4388  003517' 001000  000041         71400  TTYW:   LXI     M,TTYWID
4389  003520' 000000  004127'
4390  003521' 000000  003511'
4391  003522' 001000  000315         71420         CALL    STROUT
4392  003523' 000000  003436*
4393  003524' 000000  003520'
4394  003525' 001000  000315         71440         CALL    QINLIN
4395  003526' 000000  003441*
4396  003527' 000000  003523'
4397  003530' 001000  000327         71460         CHRGET
4398  003531' 001000  000267         71480         ORA     A
4399  003532' 001000  000312         71500         JZ      DFLENT
4400  003533' 000000  003604'
4401  003534' 000000  003526'
4402  003535' 001000  000041         71520         LXI     H,BUF
4403  003536' 000000  003502*
4404  003537' 000000  003533'
4405  003540' 001000  000315         71540         CALL    LINGET
4406  003541' 000000  003505*
4407  003542' 000000  003536'
4408  003543' 001000  000172         71560         MOV     A,D
4409  003544' 001000  000267         71580         ORA     A
4410  003546' 001000  000302         71600         JNZ     TTYW
4411  003546' 000000  003517'
4412  003547' 000000  003541'
4413  003550' 001000  000173         71620         MOV     A,E
4414  003551' 001000  000376         71640         CPI     16
4415  003552' 000000  000020
4416  003553' 001000  000332         71660         JC      TTYW
4417  003554' 000000  003517'
4418  003555' 000000  003546'
4419  003556' 001000  000062         71680         STA     LINPT1##     ;DECLARE LINPT1 EXTERNAL
4420  003557' 000000  000000*
4421  003560' 000000  003554'
4422                                  71700  IFN    LENGTH,<
4423  003561' 001000  000062         71720         STA     LINPT2##>
4424  003562' 000000  000000*
4425  003563' 000000  003557'
4426                                  71740  IFN    STRING,<
4427  003564' 001000  000062         71760         STA     LINPT3##>
4428  003565' 000000  000000*
```

```
4429  003566' 000000  003562'
4430  003567' 001000  000326         71780  MORCPS: SUI     14
4431  003570' 000000  000016
4432  003571' 001000  000322         71800         JNC     MORCPS
4433  003572' 000000  003567'
4434  003573' 000000  003565'
4435  003574' 001000  000326         71820         ADI     28
4436  003575' 000000  000034
4437  003576' 001000  000057         71840         CMA
4438  003577' 001000  000074         71860         INR     A
4439  003600' 001000  000203         71880         ADD     E
4440  003601' 001000  000062         71900         STA     LINPT4##
4441  003602' 000000  000000*
4442  003603' 000000  003576'
4443  003604'                        71920  DFLENT:
4444                                  71940  IFN    STRING,<              ;SET UP DEFAULT STRING SPACE
4445  003604' 001000  000021         71960         LXI     D,SCODE+^D65536-^D50+1
4446  003605' 000000  177717*
4447  003606' 000000  003602'
4448  003607' 001000  000341         71980         POP     H
4449  003610' 001000  000042         72000         SHLD    MEMSIZ##      ;SAVE IN REAL MEMORY SIZE
4450  003611' 000000  000000*
4451  003612' 000000  003605'
4452  003613' 001000  000042         72020         SHLD    FRETOP##      ;STRINGS START FROM HERE DOWN
4453  003614' 000000  000000*
4454  003615' 000000  003611'
4455  003616' 001000  000031         72040         DAD     D             ;CALC STRBOT BY SUBTRACTING 200 FROM STKTOP
4456  003617' 001000  000322         72060         JNC     OMERR         ;MUST BE POSITIVE
4457  003620' 000000  000000*
4458  003621' 000000  003614'
4459  003622' 001000  000053         72080         DCX     H             ;ONE LOWER IS STKTOP
4460  003623' 001000  000345         72100         PUSH    M>            ;SAVE IT ON THE STACK
4461                                  72120  IFE    EXTFNC,<
4462                                  72140
4463                                  72160  ; FUNCTION DELETION ROUTINE FOR 4K MACHINE
4464                                  72180  ; TO ADD A NEW FUNCTION JUST UPDATE TBLOO
4465                                  72200
4466                                  72220  ASKAGN: LXI     H,TBLOO       ;START OF FUNCTION TABLE
4467                                  72240  LOPASK: PUSHM                 ;PUT ON CANDIDATE FOR START OF FREE MEMORY
4468                                  72260         LXI     D,TBDASK      ;DONE ASKING?
4469                                  72280         COMPAR
4470                                  72300         JZ      FINFUN        ;YES, GET FIRST FREE MEM LOC
4471                                  72320                               ;INTO [D,E] AND QUIT
4472                                  72340         PUSHM                 ;PUT ON MESSAGE LOCATION
4473                                  72360         XTHL                  ;[H,L]=MESSAGE POINTER
4474                                  72380                               ;POINTER INTO TBLOO GOES ON THE STACK
4475                                  72400         CALL    STROUT        ;PRINT THE MESSAGE
4476                                  72420         CALL    QINLIN        ;SEE WHAT HE HAS TO SAY
4477                                  72440         CHRGET                ;SEE WHAT THE FIRST CHARACTER OF INPUT WAS
4478                                  72460         POP     H             ;POP OFF POINTER INTO TBLOO
4479                                  72480         CPI     "Y"
4480                                  72500  FINFUN: POP     D             ;POP OFF CANDIDATE FOR START OF
4481                                  72520                               ;FREE MEMORY
```

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4482                      72540         JZ      HAVFNS      ;HE WANTS IT SO WE ARE DONE
4483                      72560         CPI     "N"         ;IF A BAD ANSWER
4484                      72580         JNZ     ASKAGN      ;MAKE HIM START OVER
4485                      72600         PUSHM               ;PUSH ON FUNCTION CALL
4486                      72620                             ;LOCATION THAT WE FIX UP
4487                      72640         XTHL                ;(H,L)=FIXUP PLACE
4488                      72660                             ;POINTER INTO TBLDO GOES ON THE STACK
4489                      72680         LXI     D,ILLFUN    ;THIS IS WHAT WE STORE
4490                      72700         MOV     M,E
4491                      72720         INX     H
4492                      72740         MOV     M,D
4493                      72760         POP     H           ;GET TBLDO POINTER
4494                      72780         JMP     LOPASK>     ;GO ASK AGAIN FOR ANOTHER FUNCTION
4495                      72800     IFN   EXTFNC,<
4496   003624' 001000 000041    72820     ASKAGN: LXI  H,FNS   ;ASK IF WANTS SIN, COS, ATN,
4497   003625' 000000 004010'
4498   003626' 000000 003620'
4499   003627' 001000 000315    72840         CALL    STROUT      ;THE STRING
4500   003630' 000000 003523*
4501   003631' 000000 003625'
4502   003632' 001000 000315    72860         CALL    QINLIN
4503   003633' 000000 003526*
4504   003634' 000000 003630'
4505   003635' 001000 000327    72880         CHRGET
4506   003636' 001000 000376    72900         CPI     "Y"
4507   003637' 000000 000131
4508   003640' 001000 000021    72920         LXI     D,INITSA    ;ASSUME NOT DELETE ANY FNS
4509   003641' 000000 003264'
4510   003642' 000000 003633'
4511   003643' 001000 000312    72940         JZ      HAVFNS      ;YUP,
4512   003644' 000000 003712'
4513   003645' 000000 003641'
4514   003646' 001000 000376    72960         CPI     "A"
4515   003647' 000000 000101
4516   003650' 001000 000312    72980         JZ      OKCHAR
4517   003651' 000000 003660'
4518   003652' 000000 003644'
4519   003653' 001000 000376    73000         CPI     "N"
4520   003654' 000000 000116
4521   003655' 001000 000302    73020         JNZ     ASKAGN
4522   003656' 000000 003624'
4523   003657' 000000 003651'
4524   003660' 001000 000041    73040     OKCHAR: LXI  H,ILLFUN   ;MAKE SURE BOMBS IF TRIES TO CALL THEM
4525   003661' 000000 000000*
4526   003662' 000000 003656'
4527   003663' 001000 000021    73060         LXI     D,ATN
4528   003664' 000000 003152'
4529   003665' 000000 003661'
4530   003666' 001000 000042    73080         SHLD    ATNFIX##
4531   003667' 000000 000000*
4532   003670' 000000 003664'
4533   003671' 001000 000376    73100         CPI     "A"         ;DELETE ATN BUT NOT SIN, COS?
4534   003672' 000000 000101
```

```
4535   003675' 001000 000312    73120         JZ      HAVFNS      ;TEST
4536   003674' 000000 003712'
4537   003675' 000000 003667'
4538   003676' 001000 000042    73140         SHLD    COSFIX##
4539   003677' 000000 000000*
4540   003700' 000000 003674'
4541   003701' 001000 000042    73160         SHLD    TANFIX##
4542   003702' 000000 000000*
4543   003703' 000000 003677'
4544   003704' 001000 000042    73180         SHLD    SINFIX##
4545   003705' 000000 000000*
4546   003706' 000000 003702'
4547   003707' 001000 000021    73200         LXI     D,COS>
4548   003710' 000000 002762'
4549   003711' 000000 003705'
4550   003712'                  73220     HAVFNS:                  ;TEXT ALWAYS PRECEDED BY ZERO
4551   003712' 001000 000353    73240         XCHG                ;PUT BOTTOM OF MEMORY IN (H,L)
4552   003713' 001000 000066    73260         MVI     M,0         ;STORE IT
4553   003714' 000000 000000
4554   003715' 001000 000043    73280         INX     H           ;INCREMENT POINTER
4555   003716' 001000 000042    73300         SHLD    TXTTAB##    ;SAVE BOTTOM OF MEMORY
4556   003717' 000000 000000*
4557   003720' 000000 003710'
4558   003721' 001000 000343    73320         XTHL
4559   003722' 001000 000021    73340         LXI     D,TSTACK
4560   003723' 000000 004315'
4561   003724' 000000 003717'
4562   003725' 001000 000347    73360         COMPAR
4563   003726' 001000 000332    73380         JC      OMERR
4564   003727' 000000 003620*
4565   003730' 000000 003723'
4566   003731' 001000 000321    73400         POP     D
4567   003732' 001000 000371    73420         SPHL
4568   003734' 001000 000042    73440         SHLD    STKTOP
4569   003734' 000000 003413*
4570   003735' 000000 003727'
4571   003736' 001000 000353    73460         XCHG
4572   003737' 001000 000315    73480         CALL    REASON
4573   003740' 000000 000000*
4574   003741' 000000 003734'
4575   003742' 001000 000173    73500         MOV     A,E         ;SUBRACT VARTAB FROM STKTOP
4576   003743' 001000 000225    73520         SUB     L           ;LOW PART
4577   003744' 001000 000157    73540         MOV     L,A         ;
4578   003745' 001000 000172    73560         MOV     A,D         ;HIGH PART
4579   003746' 001000 000234    73580         SBB     H           ;
4580   003747' 001000 000147    73600         MOV     H,A         ;LEAVE IN (B,C)
4581   003751' 001000 000001    73620         LXI     B,SCODE+65520
4582   003751' 000000 177760*
4583   003753' 000000 003740'
4584   003753' 001000 000011    73640         DAD     B
4585   003754' 001000 000315    73660         CALL    CROQ        ;TYPE CRLF
4586   003755' 000000 003422*
4587   003756' 000000 003751'
```