BASIC Loader Program

```
10 REM**** BASIC LOADER FOR CIRCSUB ****
20 FORI=50432TO50432+498
30 READA:POKEI,A
40 CC=CC+A
50 NEXT I
60 READA:IFA<>CCTHENPRINT"CHECKSUM ERROR"
100 DATA0,63,89,108,123,137,149,159
110 DATA169,177,185,193,199,205,211
120 DATA216,221,226,230,233,237,240
130 DATA243,245,247,249,251,252,253
140 DATA254,255,255,255,255,255,254
150 DATA253,252,251,249,247,245,243
160 DATA240,237,233,230,226,221,216
170 DATA211,205,199,193,185,177,169
180 DATA159,149,137,123,108,89,63,0
190 DATA205,0,100,80,2,16,16,0,0,0,29
200 DATA1,31,1,100,100,100,100,0,0,120
210 DATA100,0,0,72,138,72,152,72,173
220 DATA68,197,41,31,141,70,197,173,68
230 DATA197,160,5,74,136,208,252,141
240 DATA69,197,173,65,197,56,237,68
250 DATA197,141,77,197,141,75,197,173
260 DATA66,197,233,0,141,78,197,141,76
270 DATA197,173,67,197,141,79,197,141
280 DATA80,197,169,0,170,141,71,197
290 DATA189,0,197,160,3,74,136,208,252
300 DATA141,87,197,189,0,197,41,7,141
310 DATA88,197,172,68,197,169,0,141,72
320 DATA197,141,73,197,141,74,197,173
330 DATA72,197,24,109,88,197,141,72
340 DATA197,201,8,144,23,56,233,8,141
350 DATA72,197,173,73,197,24,105,1,141
360 DATA73,197,173,74,197,105,0,141,74
370 DATA197,173,73,197,24,109,87,197
380 DATA141,73,197,173,74,197,105,0
390 DATA141,74,197,136,208,198,160,5
400 DATA78,74,197,110,73,197,110,72
410 DATA197,136,208,244,173,72,197,201
420 DATA16,144,9,173,73,197,24,105,1
430 DATA141,73,197,173,67,197,56,237
440 DATA73,197,141,81,197,173,81,197
450 DATA141,86,197,173,79,197,141,85
460 DATA197,32,165,198,173,67,197,24
470 DATA109,73,197,141,82,197,173,82
480 DATA197,141,86,197,173,80,197,141
490 DATA85,197,32,165,198,173,77,197
500 DATA141,75,197,173,78,197,141,76
510 DATA197,173,81,197,141,79,197,173
520 DATA82,197,141,80,197,173,71,197
530 DATA24,109,70,197,141,71,197,201
540 DATA32,144,26,173,71,197,56,233,32
550 DATA141,71,197,173,77,197,24,105,1
560 DATA141,77,197,173,76,197,105,0
570 DATA141,78,197,173,77,197,24,109
580 DATA69,197,141,77,197,173,78,197
590 DATA105,0,141,78,197,232,224,65
600 DATA240,3,76,153,197,104,168,104
610 DATA170,104,96,169,0,141,83,197
620 DATA141,84,197,173,75,197,205,77
630 DATA197,208,3,238,83,197,173,85
640 DATA197,205,86,197,208,3,238,84
650 DATA197,173,83,197,45,84,197,208
660 DATA39,173,75,197,141,0,195,173,76
670 DATA197,141,1,195,173,85,197,141,4
680 DATA195,173,77,197,141,2,195,173
690 DATA78,197,141,3,195,173,86,197
700 DATA141,5,195,32,14,195,96
710 DATA67223:REM*CHECKSUM*
```

Circsub Program

```
;++++++++++++++++++
;++++++++++++++++++
;++                ++
;++  CIRCSUB 64   ++
;++                ++
;++++++++++++++++++
;++++++++++++++++++
;++++ LINESUB VARIABLES ++++
;
LINSUB = $C00E
X1LO   = $C300
X1HI   = $C301
X2LO   = $C302
X2HI   = $C303
Y1     = $C304
Y2     = $C305
*      = $C500
;
;++++ CIRCSUB VARIABLES ++++
;
TABLE  *=*+65          ; LOOK UP TABLE
XCTRLO *=*+1
XCTRHI *=*+1
YCTR   *=*+1
RADIUS *=*+1
INTR   *=*+1
REMR   *=*+1
TOTX   *=*+1
RESREM *=*+1
RESLO  *=*+1
RESHI  *=*+1
OLDXLO *=*+1
OLDXHI *=*+1
NEWXLO *=*+1
NEWXHI *=*+1
OLDYA  *=*+1
OLDYB  *=*+1
NEWYA  *=*+1
NEWYB  *=*+1
XFLAG  *=*+1
YFLAG  *=*+1
OLDY   *=*+1
NEWY   *=*+1
INTTAB *=*+1
REMTAB *=*+1
;
;++++ PUSH REGISTERS ONTO STACK ++++
;
        PHA
        TXA
        PHA
        TYA
        PHA
;
;++++ CALC INT(R/32) AND REMR ++++
;
AD 44 C5        LDA RADIUS
29 1F           AND #$1F
8D 46 C5        STA REMR
AD 44 C5        LDA RADIUS
A0 05           LDY #$05
4A      LOOP1   LSR A
88              DEY
D0 FC           BNE LOOP1
8D 45 C5        STA INTR
;
;++++ CALC INITIAL X COORDINATE++++
;
AD 41 C5        LDA XCTRLO
38              SEC
ED 44 C5        SBC RADIUS
8D 4D C5        STA NEWXLO
8D 4E C5        STA OLDXLO
AD 42 C5        LDA XCTRHI
E9 00           SBC #$00
8D 4E C5        STA NEWXHI
8D 4C C5        STA OLDXHI
;
;++++ SET INITIAL OLD Y VALUES ++++
;
AD 43 C5        LDA YCTR
8D 4F C5        STA OLDYA
8D 50 C5        STA OLDYB
;
;++++ ZERO COUNT AND TOTX ++++
;
A9 00           LDA #$00
AA              TAX
8D 47 C5        STA TOTX
;
;++++ CALC INTTAB AND REMTAB ++++
;
NEXTPT
BD 00 C5        LDA TABLE,X
A0 03           LDY #$03
        LOOP2
4A              LSR A
88              DEY
D0 FC           BNE LOOP2
8D 57 C5        STA INTTAB
;
BD 00 C5        LDA TABLE,X
29 07           AND #$07
8D 58 C5        STA REMTAB
;
;++++ MULTIPLY TABLE BY RADIUS ++++
;
AC 44 C5        LDY RADIUS
A9 00           LDA #$00
8D 48 C5        STA RESREM
8D 49 C5        STA RESLO       ;ZERO ANSWER
8D 4A C5        STA RESHI
;
AD 48 C5  AGAIN LDA RESREM
18              CLC
6D 58 C5        ADC REMTAB
8D 48 C5        STA RESREM
C9 08           CMP #$08        ;>= 8?
90 17           BCC NOCARR
38              SEC
E9 08           SBC #$08        ;RESET REM
8D 48 C5        STA RESREM
AD 49 C5        LDA RESLO
18              CLC
69 01           ADC #$01        ;INC RESULT
8D 49 C5        STA RESLO
AD 4A C5        LDA RESHI
69 00           ADC #$00
8D 4A C5        STA RESHI
        NOCARR
AD 49 C5        LDA RESLO
18              CLC
6D 57 C5        ADC INTTAB      ; ADD INTEGER PART
8D 49 C5        STA RESLO
AD 4A C5        LDA RESHI
69 00           ADC #$00
8D 4A C5        STA RESHI
88              DEY
D0 C6           BNE AGAIN
;
;++++ DIVIDE RESULT BY 32 ++++
;
A0 05           LDY #$05
        LOOP3
4E 4A C5        LSR RESHI
6E 49 C5        ROR RESLO
6E 48 C5        ROR RESREM
88              DEY
D0 F4           BNE LOOP3
;
AD 48 C5        LDA RESREM
C9 10           CMP #$10        ; REM >=16?
90 09           BCC NOCRRY
AD 49 C5        LDA RESLO
18              CLC
69 01           ADC #$01        ; ADD 1
8D 49 C5        STA RESLO
;
;++++ CALC 1ST Y COORDINATE ++++
;
AD 43 C5        LDA YCTR
38              SEC
ED 49 C5        SBC RESLO
8D 51 C5        STA NEWYA
;
;++++ DRAW LINE ++++
;
AD 51 C5        LDA NEWYA
8D 56 C5        STA NEWY
AD 4F C5        LDA OLDYA
8D 55 C5        STA OLDY
20 A5 C6        JSR DRAW
;
;++++ CALC 2ND Y COORDINATE ++++
;
AD 43 C5        LDA YCTR
18              CLC
6D 49 C5        ADC RESLO
8D 52 C5        STA NEWYB
;
;++++ DRAW LINE ++++
;
AD 52 C5        LDA NEWYB
8D 56 C5        STA NEWY
AD 50 C5        LDA OLDYB
8D 55 C5        STA OLDY
20 A5 C6        JSR DRAW
;
;++++ SWOP OLD FOR NEW ++++
;
AD 4D C5        LDA NEWXLO
8D 4B C5        STA OLDXLO
AD 4E C5        LDA NEWXHI
8D 4C C5        STA OLDXHI
AD 51 C5        LDA NEWYA
8D 4F C5        STA OLDYA
AD 52 C5        LDA NEWYB
8D 50 C5        STA OLDYB
;
;++++ ALTER X COORDINATE ++++
;
AD 47 C5        LDA TOTX
18              CLC
6D 46 C5        ADC REMR
8D 47 C5        STA TOTX        ;ADD REMR TO TOTAL
C9 20           CMP #$20        ;>=32?
90 1A           BCC NOINC
AD 47 C5        LDA TOTX
38              SEC
E9 20           SBC #$20        ;RESET TOTX
8D 47 C5        STA TOTX
AD 4D C5        LDA NEWXLO
18              CLC
69 01           ADC #$01        ; INC X COORD
8D 4D C5        STA NEWXLO
AD 4C C5        LDA OLDXHI
69 00           ADC #$00
8D 4E C5        STA NEWXHI
        NOINC
AD 4D C5        LDA NEWXLO
18              CLC
6D 45 C5        ADC INTR
8D 4D C5        STA NEWXLO
AD 4E C5        LDA NEWXHI
69 00           ADC #$00
8D 4E C5        STA NEWXHI
;
;++++ INCREMENT COUNTER ++++
;
E8              INX
E0 41           CPX #$41
F0 03           BEQ FINISH
4C 99 C5        JMP NEXTPT
;
;++++ PULL REGISTERS OFF STACK ++++
;
        FINISH
68              PLA
A8              TAY
68              PLA
AA              TAX
68              PLA
60              RTS
;
;++++ CHECK FOR SAME POINT ++++
;
        DRAW
A9 00           LDA #$00
8D 53 C5        STA XFLAG       ;ZERO FLAGS
8D 54 C5        STA YFLAG
;
AD 4B C5        LDA OLDXLO
CD 4D C5        CMP NEWXLO
D0 03           BNE NOXFLG
        NOXFLG
AD 55 C5        LDA OLDY
CD 56 C5        CMP NEWY
D0 03           BNE NOYFLG
EE 54 C5        INC YFLAG
        NOYFLG
AD 53 C5        LDA XFLAG
2D 54 C5        AND YFLAG
D0 27           BNE NODRAW
;
;++++ DRAW LINE ++++
;
AD 4B C5        LDA OLDXLO
8D 00 C3        STA X1LO
AD 4C C5        LDA OLDXHI
8D 01 C3        STA X1HI
AD 55 C5        LDA OLDY
8D 04 C3        STA Y1
AD 4D C5        LDA NEWXLO
8D 02 C3        STA X2LO
AD 4E C5        LDA NEWXHI
8D 03 C3        STA X2HI
AD 56 C5        LDA NEWY
8D 05 C3        STA Y2
;
20 0E C3        JSR LINSUB
;
        NODRAW
60              RTS
```