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AUTO-START BASIC PROGRAMS WITH MACHINE LANGUAGE

The method of making auto-start cartridges described in the companion publication "AUTO-START BASIC PROGRAMS" is unusual in that the BASIC program runs where it is- in memory. This is advantageous for VIC 20 users because all the computer RAM is left available for variable storage. There are situations where this is not desirable particularly if the BASIC program contains embedded or appended machine language routines. Often, these routines will work only if they occupy specific memory areas.

The easiest way to put this kind of program on a cartridge is to use an auto-boot routine that "downloads" the program from the cartridge before running it. The program occupies the same RAM locations it would had it been loaded from tape or diskette.

HOW TO PROCEED (VIC-20)

First type in the following program and 'SAVE' it on cassette disk or EPROM:

```
1  REM VIC 20 DOWNLOADING
2  REM AUTO-BOOT ROUTINE
3  FORI=0TO92
4  READ A
5  POKE40960+I,A
6  NEXT
7  DATA11,160,86,255,65,48,195,194
8  DATA205,255,255,32,141,253,32,82
9  DATA253,32,249,253,32,24,229,32
10 DATA91,228,32,164,227,169,117,141
11 DATA40,3,169,254,141,41,3,169
12 DATA92,133,193,169,159,133,194,165
13 DATA44,133,164,169,0,168,133,163
14 DATA145,163,200,198,164,230,194,230
15 DATA164,177,193,145,163,200,208,249
16 DATA173,10,160,197,164,176,238,133
17 DATA46,173,9,160,133,45,32,89
18 DATA198,88,76,174,199
```

This program will be used to put the downloading auto-boot routine in place when needed.

Making the Cartridge

Step 1- Install 8k of expansion RAM in BLOCK 5. (49060-49151 or \$A000-\$BFFF). Install additional expansion RAM in BLOCK 1 (8192-16383 or \$2000-3FFF) if needed by your program.

Step 2- Load the AUTO-BOOT program above and RUN it.

Step 3- Poke the top of basic pointer up as follows:

```
POKE55,0:POKE56,192 <CR>
```

Step 4- Load PROMOS 1.1 V20 and RUN it.

Step 5- Zero the PROMENADE programming socket using the 'Z' command.

Step 6- Load your object program (the one which is to become the cartridge). Do not RUN it.

Step 7- Transfer the start of variables pointer to the auto-boot routine by doing the following:

```
POKE40969,PEEK(45):POKE40970,PEEK(46) <CR>
```

Step 8- Install an erased EPROM in the PROMENADE programming socket.

Step 9- Use the PROMOS ' π ' command to program the auto-boot routine into the beginning of your EPROM:

π 40960,41052,0,<CW>,<PMW> <CR> Use the values of CW
and PMW from the manual.

Step 10- Calculate <MEM STRT> and <MEM END> as follows:

```
<MEM STRT> = PEEK(43) + 256*PEEK(44)
<MEM END> = PEEK(45) + 256*PEEK(46) - 1
```

Step 11- Finish programming your EPROM using another ' π ' command as follows:

π <MEM STRT>,<MEM END>,93,<CW>,<PMW> <CR>

<MEM STRT> and <MEM END> are the values you calculated in step 10.

NOTES: The longest program that can be put on cartridge using this method is 8099 bytes. The auto-boot routine disables the RESTORE key and the keyboard break (RUN/STOP).

HOW TO PROCEED (C 64)

First type in the following program and 'SAVE' it on cassette, disk or EPROM:

```
1  REM C 64 DOWNLOADING
2  REM AUTO-BOOT ROUTINE
3  FORI=0TO91
4  READ A
5  POKE49152+I,A
6  NEXT
7  DATA11,128,188,254,195,194,205,56
8  DATA48,255,255,142,22,208,32,163
9  DATA253,32,80,253,32,21,253,32
10 DATA24,229,32,83,228,32,191,227
11 DATA169,39,141,40,3,169,254,141
12 DATA41,3,169,92,133,193,169,127
13 DATA133,194,169,1,133,163,169,7
14 DATA133,164,160,0,230,194,230,164
15 DATA177,193,145,163,200,208,249,173
16 DATA10,128,197,164,176,238,133,46
17 DATA173,9,128,133,45,32,89,166
18 DATA88,76,174,167
```

This program will be used to put the downloading auto-boot routine in place when needed.

Making the Cartridge

Step 1- Load the AUTO-BOOT program above and RUN it.

Step 2- Poke the top of basic pointer up as follows:

```
POKE55,0:POKE56,208 <CR>
```

Step 3- Load PROMOS 1.0 C64 and RUN it.

Step 4- Zero the PROMENADE programming socket using the 'Z' command.

Step 5- Load your object program (the one that is to become the cartridge). Do not RUN it.

Step 6- Transfer the start of variables pointer to the auto-boot routine by doing the following:

```
POKE49161,PEEK(45):POKE49162,PEEK(46) <CR>
```

Step 7- Install an erased EPROM in the PROMENADE programming socket.

Step 8- Use the PROMOS ' π ' command to program the auto-boot routine into the beginning of your EPROM:

π 49152,49243,0,<CW>,<PMW> <CR> Use values of CW and PMW from the PROMENADE manual.

Step 9- Calculate <MEM END> as follows:

$\text{<MEM END>} = \text{PEEK}(45) + 256 * \text{PEEK}(46) - 1$

Step 10- Finish programming your EPROM using another ' π ' command as follows:

π 2049,<MEM END>,92,<CW>,<PMW>

<MEM END> is the value you calculated in step 9.

NOTES: The longest program that can be put on the EPROM using this method is 8100 bytes. The auto-boot routine disables the PESTORE key and the keyboard break (RUN/STOP).