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Apple II, IIe and II+: Auto-Run Apple w/o DOS (2 of 2)

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Revised:        3/6/92
Security:       Everyone
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Article Created: 21 September 1984
Article Last Reviewed: 3 May 1988
Article Last Updated: 3 May 1988

For the next step a copy of the image of the application program needs to be
programmed into the EPROMs. The program starts at the address pointed to by
$67 and $68 and ends at the address pointed to by $AF and $B0. The contents
of the end address pointer, $AF and $B0, will be inserted in the control ROM
at locations $1F and $23. When control comes back through the input routine
pointer, Applesoft has already initialized $67 and $68. So the next step is
to move the image of the Applesoft program down to where it originally came
from. How this is done will depend on the hardware of the ROM card and the
length of the Applesoft program. If you use the Apple firmware card you will
have to address the soft switch to select the firmware card and then address
the switch again to re-select the Applesoft ROMs. With the ROMPLUS it could
be as simple as using the monitor move routine, $FE2C, to move a program of
less than 2 kilobytes long.

There is a little more initialization to be done before the Applesoft program
can be RUN. The end of program pointer mentioned earlier must be put into $69
and $6A and one more Applesoft routine must be called. Unfortunately this one
also drops into Applesoft's command mode so we have to modify the input
pointer again to point to a third part of the control ROM. Once this is done
the final initialization can be done with a jump to $D4F2.

And now the final part, we need to reset the input pointer so that the program
can input normally from the keyboard and actually RUN the program. To make
things easier there is a routine set by the Auto-Start ROM that will set the
input pointers to the keyboard at location $FE89. Then all that's left to do
is jump to $D566 which will run the program.

For a bit of finesse, if we put a $80 into location $D6, the user will not be
able to list the program. In fact any attempt to do any Applesoft command
except LOAD from cassette will cause the program to RUN. Also, by changing
the reset vectors in the Auto-Start ROM to point to the RUN routine, the

program will become very difficult to stop or modify. (To change the reset
vector, load memory starting at $3F2 with 66 D5 70. See page 36 and 37 of the
Apple II Reference manual for more details)

THE LISTING

This listing is all done relative to the start of the ROM so all address are
given as one byte. If you use an assembler, simply origin the code in RAM and
when it is programmed into the control ROM it will work just fine. The
routines are not arranged in order of execution so that the move routine will
be at the end since the length of the move routine will vary with the hardware
requirements. Just be sure that the three byte jump is inserted behind the
move routine.

```
* THE FIRST 4 INSTRUCTIONS LOOK LIKE A DISK BUT DON'T
* DO ANYTHING
*
00: 24 20       BIT $20
02: 24 00       BIT $00
04: 24 03       BIT $03
06: 24 3C       BIT $3C
*
* THIS PART INITIALIZES APPLESOFT AND GETS CONTROL BACK
* AT ENTRY2
*
08: A9 1A     ENTRY1  LDA # ENTRY2
0A: 85 38             STA KSWL
0C: A5 F8 07          LDA $07F8
0F: 85 39             STA KSWH
11: 4C 00 E0          JMP COLDSTART
*
* RESET INPUT TO THE KEYBOARD AND RUN THE PROGRAM
*
14: 20 8  1a   ENRTY3  JSR SETKBD
17: 4C 66 D5          JMP RUN
*
* FINISH INITIALIZATION & MOVE THE PROGRAM TEXT DOWN
* FROM THE ROMS
*
1A: A9 14     ENTRY2  LDA # ENTRY3
1C: 85 38             STA KSWL
1E: A9 LL             LDA # LENGTH-L
20: 85 69             STA LOMEML
22: A9 HH             LDA # LENGTH-H
24: 85 6A             STA LOMEMH


INSERT YOUR MOVE ROUTINE HERE FOLLOWED BY

  : 4C F2 D4          JMP INIT PART 2
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