

## 16. MACHINE LANGUAGE SUBROUTINES

Advan BASIC allows you to insert assembly language codes easily into a BASIC program. You can even use mnemonics for the various 6502 commands. Another nice feature is that you can access program variables by name in your assembly language code. If you don't know how to program in assembly language, much of the following information will be difficult to understand. Probably you should pick up a book on 6502 assembly language programming before attempting to write an assembly language program.

Since Advan BASIC is compiled, most programs written in it will run considerably faster than in a non-compiled BASIC. There are situations, however, where you want maximum possible speed. Then you need the Advan BASIC machine language subroutine capability.

### MACHINE

The MACHINE command tells the compiler that the information which follows will be machine or assembly language code. Its format is

MACHINE linenumber

When the machine language program comes to an end, normally with an RTS command, control transfers back to the BASIC code. Execution resumes at the linenumber specified in the MACHINE command.

### CODE

The CODE command is used in several ways in the BASIC. It provides a way to enter data for the sound routines and for the PDISPLAY command. Its primary purpose, however, is to allow the entry of assembly language code. For example, LDA is the standard mnemonic code to load a number from a given source into the accumulator. Appendix E lists the 6502 mnemonics used by the Advan compiler.

CODE"LDA,FF,9F"

In the above line, the compiler translates LDA into machine code. FF and 9F are hex numbers which give the address of the number loaded into the accumulator. Note that, as is standard in 6502 code, the FF is the least significant part of the address, while 9F is the most significant part (i.e., the address is 9FFF). The following program will store an S in the lower right hand corner of the display screen:

```
100 MACHINE 200
110 CODE"LDAIM,33,STA,FF,9F,RTS"
200 END
```

The LDAIM assembly language code causes the 6502 to load the next number (33) into the accumulator. The STA causes the 6502 to store the accumulator (33) into memory location 9FFF, which corresponds to the lower right hand corner of the screen. In an ATARI computer, the hex number 33 is the screen code for an S. The RTS signals the end of the assembly language subroutine and causes control to transfer to line 200, as specified by the 200 in the MACHINE command. The following segment