

# **DEFT Macro/6809 Assembler**

---

- 1 Introduction** ..... 1
- 2 6809 Macro Assembler Operation** ..... 2
  - 2.1 TITLE: ..... 2
  - 2.2 SOURCE FILE: ..... 2
  - 2.3 OBJECT FILE: ..... 2
  - 2.4 LIST FILE: ..... 3
  - 2.5 Assembler Execution ..... 3
- 3 Source Listing** ..... 4



# 1 Introduction

---

The **DEFT Macro/6809** Assembler is a program that allows you to create machine language programs from Motorola 6809 Assembler language source programs created with **DEFT Edit**. **DEFT Macro/6809's** features include:

- Generation of machine language programs, directly executable by the 6809 micro-processor from Motorola 6809 Assembler language statements. Assembled programs can run up to 1000 times faster than interpretive BASIC programs.
- Separate assembly facilities which enable you to break up a large program and assemble it in pieces. These pieces can be written in either **DEFT Macro/6809** assembly language or **DEFT Pascal**.
- Assembler directives which provide the user with valuable assembly and source listing options.
- Powerful macro facilities which allow the user to define inline code sequences with one *macro instruction* in the source program.

## 2 6809 Macro Assembler Operation

---

The command *LOADM "ASSEMBLE":EXEC* will load **DEFT Macro/6809** into memory from disk drive 0 and begin its execution, which is in two phases. In the first phase you will see the **DEFT Macro/6809** screen with all of its prompts. This phase prompts the user to enter information required by the assembler for program assembly.

Upon the entry of the last prompted field, **DEFT Macro/6809** begins its second phase of operation. In this phase it assembles the source language program statements into a machine program in two passes. In the first pass, **DEFT Macro/6809** reads the source module file and generates the symbol table. In the second pass, it generates the corresponding machine instructions, saves the machine program version in an object module file, and generates the program source listing. After completing this pass, **DEFT Macro/6809** has finished its execution which is marked by the return of the BASIC OK prompt.

Each **DEFT Macro/6809** prompt and its possible replies are described in the following sections.

### 2.1 TITLE:

*TITLE*: requires the string of characters that you want to see at the top of each page of your assembly listing. You do not have to enter a title if you don't want to, but it does come in handy when you want to identify a source listing file at a glance.

### 2.2 SOURCE FILE:

*SOURCE FILE*: requires the entry of the name of the source file which contains the 6809 assembler language program that is to be assembled. The default file name extension is **ASM**. This means that if there is no extension specified with the entered file name, then **DEFT Macro/6809** adds the default extension of **ASM** to the file name before searching for that file.

### 2.3 OBJECT FILE:

*OBJECT FILE* requires the name of the object file that is to be created by **DEFT Macro/6809** to hold the newly created program object module. This can be either on tape or disk or the name can be omitted entirely if you do not wish to create an object file. The default extension is **OBJ**. If you do not specify an extension with the

---

file name entered here, then **DEFT Macro/6809** will add the default *OBJ* extension to your file name prior to actually creating that file.

## 2.4 LIST FILE:

*LIST FILE:* requires the name of the source listing file which is to be created by **DEFT Macro/6809** in its second phase of operation. This can be tape, disk, screen or printer or the name can be omitted entirely if you do not wish to create a list file. The default extension is *LST*. If you do not specify an extension with the file name entered here, then **DEFT Macro/6809** Assembler will add the default *LST* extension to your file name prior to actually creating that file.

## 2.5 Assembler Execution

After you have answered the *LIST FILE:* prompt the assembler will begin its first pass. During this first pass only the disk will appear to be doing anything. The assembler will begin printing on its second pass through the source code.

### 3 Source Listing

---

The following is a brief description of the **DEFT Macro/6809** Assembler's source listing.

1. *Header* - This is the first line at the top of the source listing followed by the page number for that page of the listing.
2. *Title* - The contents of this line are dictated by the programmer with a *title* directive.
3. *Subtitle* - The contents of this line are dictated by the programmer with a *subtitle* directive.
4. *Addressing Indicator* - This is an alphabetic character which prefixes the *Location Counter* to indicate how the instruction at that location is making a reference. An R indicates that an external relative reference is being made. An X indicates that an external absolute reference is being made. An N indicates that a local relative location is being referenced in an absolute mode.
5. *Location Counter* - This is the four digit number which immediately follows the line number. This four digit number is the hexadecimal representation of the program relative address at which this source code instruction would begin.
6. *Object Representation* - The set of numbers which immediately follows the location counter is a hexadecimal representation of the assembler instruction after the instruction has been converted into the object file machine language format. The very first two digits of this field represent the instruction's opcode. The remaining digits of this field represent the instruction's operands, where applicable.
7. *Symbol Table* - At the end of every assembler program, a symbol table is produced. Printed under this heading are the names of the symbols referenced by that program. Each element of this table is as follows:
  - *Symbol Value* - This is a four digit number which precedes every symbol table entry. This four digit number is a hexadecimal representation of the value or program relative address which the symbol is used to reference.
  - *Symbol Type* - This is the one to three character field which immediately follows the symbol value. This field identifies whether a symbol represents an absolute value (A), a program relative value (R), an external address (X), a public address

---

(P), or a duplicate reference (D).

- *Symbol Name* - This field immediately follows the symbol type. The symbol name is the string of characters used to reference a program value.
8. *Position Independence* - This is the third from the last line printed on the source listing. The character expression found on this line identifies whether the assembled program is position independent or non-position independent. PIC indicates that the resulting machine program contained in the program's object file is *Position Independent Code*.
  9. *SOURCE FILE* - This is the name of the source file containing the program source statements which generated this listing.
  10. *OBJECT FILE* - This is the name of the file which contained the program object at the end of this assembly.
  11. *Total Errors* - This is the last line printed on the program source listing and is the decimal number of errors encountered by **DEFT Macro/6809** during program assembly.

1. DEPT MACRO/6809 ASSEMBLER, V3.0 (C) 1984 DEPT SYSTEMS, INC. PAGE 1  
2.  
3.

\*\*\*\*\*  
\*  
\* FORMAT COMMAND NAMES  
\*  
\*\*\*\*\*

0000 COMMANDNAMES EQU \*  
PUBLIC COMMANDNAMES  
0000 03 FCB 3  
0001 45AF 4A FCC /ECL/  
0004 03 FCB 3  
0005 5458 54 FCC /TXT/  
0008 03 FCB 3  
0009 56A7 45 FCC /PGE/  
000C 03 FCB 3  
000D 48A4 52 FCC /HDR/  
0010 03 FCB 3  
0011 4654 52 FCC /FTR/  
0014 03 FCB 3  
0015 53AB 50 FCC /SKP/  
0018 03 FCB 3  
0019 46AC AC FCC /FLL/  
001C END

DEPT MACRO/6809 ASSEMBLER, V3.0 (C) 1984 DEPT SYSTEMS, INC. PAGE 2

7. SYMBOL TABLE  
0000 FB COMMANDNAMES  
8. FIC  
9. SOURCE FILE: FCRMATSP  
10. OBJECT FILE: FCRMATSP:1  
11. TOTAL ERRORS 0

Asm