

New Technical Notes

Macintosh



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Developer Support

MPW Assembler Q&As

Platforms & Tools

M.PT.MPWAssy.Q&As

Revised by: Developer Support Center

October 1992

Written by: Developer Support Center

October 1990

This Technical Note contains a collection of Q&As relating to a specific topic—questions you've sent the Developer Support Center (DSC) along with answers from the DSC engineers. While DSC engineers have checked the Q&A content for accuracy, the Q&A Technical Notes don't have the editing and organization of other Technical Notes. The Q&A function is to get new technical information and updates to you quickly, saving the polish for when the information migrates into reference manuals.

Q&As are now included with Technical Notes to make access to technical updates easier for you. If you have comments or suggestions about Q&A content or distribution, please let us know by sending an AppleLink to DEVFEEDBACK. Apple Partners may send technical questions about Q&A content to DEVSUPPORT for resolution.

⌈New Q&As and Q&As revised this month are marked with a bar in the side margin.

Using “far” addressing model with MPW Assembler

Written: 6/7/91

Last reviewed: 8/1/92

Now that MPW includes the “far” addressing model, how does one use the assembler with the far model? For example, how does one generate a “jsr.l symbol” that the linker will recognize as a “far” reference?

—

The MPW Assembler does support the new “far” runtime model; it's documented in the “MPW 3.2 Run-Time Architecture” release note, included with recent versions of MPW that support the new model. (The path to this note on E.T.O. #4 is E.T.O. #4:Tools - Objects:Macintosh Programmer's Workshop:MPW QR4:QR4 Notes:MPW QR4 Run-Time Architecture.)

The specific example to your parenthetical question is “JSR (symbol).L”, but you should see the release note for background information and important caveats.

MPW 3.2 ASM generic instruction conversions

Written: 8/21/91

Last reviewed: 8/1/92

Where are the MPW 3.2 Assembler “generic instruction conversions”? After upgrading from MPW Assembler 3.1 to 3.2, I noticed while debugging some of my code that an Adda

instruction was converted to Lea for me. While I appreciate this (it saves cycles) I didn't expect it nor can I find where it's documented. The cover letter that came with 3.2 says that Asm has "new optimizations" but doesn't elaborate. I have found Appendix A in the 3.0 documentation that describes some obvious optimizations. Where is the corresponding list of optimizations for 3.2?

—

You correctly noted that the 3.2 Assembler supports optimization of instructions which were previously not optimized. The following additional optimizations are available:

```
ADD    #<Data>,An    [-8 <= data <= -1]  =====>  SUBQ    #-<Data>,An
ADDA   #<Data>,An    [-8 <= data <= -1]  =====>  SUBQ    #-<Data>,An
ADDI   #<Data>,An    [-8 <= data <= -1]  =====>  SUBQ    #-<Data>,An

SUB    #<Data>,An    [-8 <= data <= -1]  =====>  ADDQ    #-<Data>,An
SUBA   #<Data>,An    [-8 <= data <= -1]  =====>  ADDQ    #-<Data>,An
SUBI   #<Data>,An    [-8 <= data <= -1]  =====>  ADDQ    #-<Data>,An
```

These optimizations only occur when the Assembler understands the operand to be a negative number. Since the Assembler operates on 32-bit arithmetic, the operand value must be written as a negative number to activate the optimization, regardless of the size (B, W, L) of the instruction. Thus, in a byte operation, the operand must specify "-1" instead of "\$FF," even though, unoptimized, they would both compile to the same instruction.

```
ADDI   #<Data>,<EA3>  [+1 <= data <= +8]  =====>  ADDQ    #<Data>,<EA3>
SUBI   #<Data>,<EA3>  [+1 <= data <= +8]  =====>  SUBQ    #<Data>,<EA3>
ADD.I  #<data>,An    [-32767 <= data <= +32767] =====>  LEA    <Data>(An),An
```

MPW Assembler and "~" character

Written: 10/17/91

Last reviewed: 8/1/92

When I try to turn on Macintosh interrupts after simple diagnostics, the MPW Assembler reports an error, as follows:

```
# 303:      ANDI.W    #~$0700,SR
### Error 54 ### Illegal/missing operands or opcode not allowed for target
machine
```

Is there a way to get this to work?

—

Using the tilde character on a one's complement operation in MPW Assembler can give confusing results. The assembler, in its infinite wisdom, treats all constants as signed 32-bit values. Therefore, \$0700 is really treated as \$00000700. The one's complement of this is \$FFFFFF8FF, which is too large a value for an ANDI.W instruction. The syntax that will work is:

```
ANDI.W    #~$FFFF0700,SR
```