Copy and Use RestrictionsF

The 8048 Assembler/Simulator/Programmer and thi

DisclaimerF

The 8048 Assembler/Simulator/Programmer software and this

Contacting the AuthorF

You can send any questions or report any problems t

The 8048 Assembler/Simulator development system

FilesF: Load, Save, Save as, XMem file, Print, DOS Shell, Burn,
Info and Q

EditF: Edit text buffer.

AssembleF: Assemble the source in text buffer.

SimulateF: Simulate source in text buffer.

ProgramF: Program, Blank check, Verify and Read chip.

OptionsF: Specify various system settings.

Each of these units are explained in greater detail in subsequent

p

Getting HelpF

You can receive help information from the 8048 program by

FilesF

The File menu allows you to load, save and print files as well as

Loading a fileF

To load a file (already on disk) into the text buffer perf

LoadF from the Files menu. You will be prompted to enter the file nam

Save a fileF

To save a file in the text buffer perform the following steps

SaveF from the File menu.

2. If this is new text (not loaded from a file)

Save a File Under a New NameF

To save a file in the text buffer under a ne

SaveF as from the File menu.

2. Enter the name of the file the text buffe

External Memory BufferF

The simulator allows you to execute commands which

XMem fileF from the main File menu.

2. Enter the name of the file containing the data. This file

Printing the Text BufferF

The 8048 Assembler/Simulator allows you to print

DOS ShellF

You can temporarily suspend the 8048 program and go to DOS by

DOS ShellF from the File menu. To return to the 8048
program type

EXITF at the DOS prompt.

BurnF

This command executes the DOS command BURN with the name of the

InfoF

Displays the status of the text buffer. Information on the name

Exiting the ProgramF

You can exit (quit) the 8048 program by selecting

QuitF from the

File Fmenu. You can also exit by pressing <ALT><X>.

EditorF

You can edit the text in the text buffer by selecting

EditF from the main menu. The editor will also be invoked automatically

The editor has the following single key commands:

<INSERT>F: Pressing the INSERT key toggles between insert and over
type mo

<DELETE>F: Pressing the DELETE key will remove the character under the cur

<HOME>F: Pressing the HOME key moves the cursor to the start of
the curren

<END>F: Pressing the END key will move the cursor to the END of
the curren

<PAGE UP>F: Pressing the PAGE UP key will display the previous
page of tex

<PAGE DOWN>F: Pressing the PAGE DOWN key will display the next
page of tex

<UP ARROW>F: Pressing the UP ARROW key moves the cursor up one line.

<DOWN ARROW>F: Pressing the DOWN ARROW key moves the cursor down one line.

<RIGHT ARROW>F: Pressing the RIGHT ARROW key moves the cursor one location

<LEFT ARROW>F: Pressing the left arrow key moves the cursor one location t

Compound key commandsF

The editor also has the following compound key comm

<CTLR><PAGE UP>F: Pressing the CTRL and PAGE UP key sequence will move the

<CTRL><PAGE DOWN>F: Pressing the CTRL and PAGE DOWN keys sequence will mov

<CTRL><Q> <CTRL><F>F: Find string. This command prompts you for a string

<CTRL><L>F: Repeat last find. This command positions the cursor just afte

Block command sequencesF

The editor has the following block manipulation c

<CTRL><K> <CTRL><B>F: Mark start of block. This command places the start

<CTRL><K> <CTRL><K>F: Mark the end of block. This command places the end

<CTRL><K> <CTRL><Y>F: Delete block. This command deletes the currently ma

<CTRL><K> <CTRL><W>F: Write block. This command writes the currently mark

<CTRL><K> <CTRL><R>F: Read block. This command copies the text from a fil

<CTRL><K> <CTRL><C>F: Copy block. This command copies the currently marke

AssemblerF

The source entered/loaded into the text buffer is assembled by

AssembleF from the main menu. The number of errors found in the source wi

SimulatorF

The simulator allows you to step through your source code

SimulateF from the main menu.

The simulator screen has five windows: sourc

on the processors external ports. P4, P5, P6 and P7 reflect the

st

ESC key is pressed the source line being executed will be displayed

ProgramF

This menu allows you to control the 8748 programmer connected to

The Program command within the Program menu will p

File/LoadF command.

2. Select

Program Ffrom the main menu. The Program menu will be displayed.

Program Ffrom the Program menu.

4. If the source code has already been as

assembled automatically. If errors are encountered you will

Blank checkF

The Blank check command will verify that the 8748/49 in the

ProgramF from the main menu. The Program menu will be displayed.

Blank check Ffrom the program menu. You will be prompted to insert th

3. Insert the chip to be blank checked into the programmers ZIF

VerifyF

The Verify command will compare the contents of the chip in the

ProgramF from the main menu. The Program menu will be displayed.

VerifyF from the program menu. You will be prompted to insert the 874

Read chipF

Selecting Read chip from the Program menu loads the values

ProgramF from the main menu. The Program menu will be displayed.

Read chipF from the program menu. You will be prompted to insert the

OptionsF

The options menu allows you to specify your system configu

Printer portF

Before you can use the Print command you must specify which

Printer portF from the main Options menu.

2. Select 1, 2 or 3 for LPT1, L

Monitor typeF

If you are using a monochrome monitor you will need to infor

MonitorF from the main Options menu.

2. Select the monitor type

MonochromeF or

ColorF.

File generationF

You can have various files generated during assembly of y

FileF

generationF menu are:

Generate list fileF: setting this option to YES will cause the assembler t

Generate symbol fileF: setting this option to YES will cause the assembler

Generate instruction countF: setting this option to YES will cause the ass

Generate hex fileF: setting this option to YES will cause the assembler to

Tab widthF

You can specify the tab width used in the editor by selecting

TabF

widthF from the main Options menu. Then enter the number of spaces. The

buffer but inserts an appropriate number of blanks to fill to the n

Simulator output radixF

You can have the simulator display values in decim

Set output radixF from the main Options menu.

2. Select the output radix

Home directoryF

You can run the this program from the same directory or a

Home directoryF from the main Options menu. A window will open prompt

Chip typeF

Setting the chip type allows you to specify the target CPU type

Chip typeF from the main Options menu.

2. Select the target CPU 8748, 8749 or 8050. Selecting 8050

w

Programmer portF

Before you can use the Programmer you must specify which

Programmer portF from the main Options menu.

2. Select 1, 2 or 3 for LPT1

Save configurationF

You can save any of the changes you make in the

OptionsF menu as
defaults. To do this select

Save configurationF from the main Options menu. This configuration file w

Appendix A - 8048 source formatF

The assembler mnemonics, labels and symbo

LABELF: Each line of source can contain an optional label. Labels may con

OPCODEF: Opcodes can be either a 8048 mnemonic or an assembler directive.

Opcodes must be separated from labels and operands by at least one

OPERANDF: Operands are added after a mnemonic or directive to indicate wha

COMMENTF: Comments begin with a semicolon and instruct the
assemble to ign

SYMBOLF: A symbol is a character string which represents a specific value.

EQUATIONSF: The assembler has a built in equation evaluator.

Opcodes requi

use can be used in expressions if their value is not required on

th

Appendix B - Assembler DirectivesF

The following is a list of directives s

ORGF: Originate. Resets the program counter (at assembly time) to a speci

EQUF: Equates a value with a character string (Symbol). i.e. the source l

SETF: Like EQU, SET sets a symbol to a specific value. A symbols value ca

DBF: Define byte. This directive places a value or string of values at th

DWF: Define word. This directive places a value or string of values at th

DSF: Define space. This directive will allocated a specified number of me

PAGE rowsF: where rows is optional. If omitted the listing file
is addvan

%TITLE "title string": Fthis directive allows you to specify the
title to

%SUBTTL "subtitle string": Fthis directive allows you to specify
the subti

%TOPMAR val: Fallows you to specify the number of lines in the top margin.

%BOTMAR val: Fallows you to specify the number of lines in the bottom marg

ENDF: Instructs the assembler to stop assembling the source file (ignore a

either when it reaches an END directive or the end of the text buff

Appendix C - 8048 Instruction SetF

Instruction Set SummaryF

MnemonicF

DescriptionF

Bytes CyclesF

AccumulatorF				
	ADD A,R	Add register to A	1	1

Input/OutputF

	IN A,P	Input port to A	1

RegistersF

	INC R	Increment register	1	1

BranchF

	JMP addr	Jump unconditional	2	2

SubroutineF

	CALL addr	Jump to subroutine	2	2

FlagsF				
	CLR C	Clear Carry	1	1

Data MovesF

MOV A,R	Move register to A	1	1

Timer/CounterF

	MOV A,T	Read Timer/Counter	1

ControlF

EN I	Enable external Interrupt	1	1	
NOP	No Operation	1	1	

Symbols and Abbreviations UsedF

A	Accumulator
AC	Auxi

ADD A,Rr

Add Register Contents to Ac

ANLD Pp,A

Logical AND Port 4-7 with Accumulator Mask

(Pp)

DEC A

Decrement Accumulator

(A) <- (A) - 1

DEC Rr

JBb address

Jump If Accumulator Bit is Set

If Bb = 1

JNI address

Jump If Interrupt Input Is Low

If I = 0

JT1 address

Jump If Test 1 Is High

If T1 = 1

(P

MOV @Ri,A

Move Accumulator Contents to Data Memory

((Ri))

ORL A,#data

Logical OR Accumulator With Immediate Mask

(A

RR A

Rotate Right Without Carry

(An) <- (An+1)

(A

XCHD A,@Ri

Exchange Accumulator and Data Memory 4-Bit Data