

First, get your computer set up.

- 1. Save the .zip file called MPFI_Adj_10x20_Installer.zip that is attached to this email to the root directory of your C: drive (that is C:\). DO NOT DELETE THIS FILE AFTER INSTALLATION. PRESERVE IT IN THE EVENT THAT YOU NEED TO REPEAT THE INSTALLATION.
- 2. Unzip the ZIP file named MPFI_Adj_10x20_Installer.zip that was sent in the email. Unzip all contents to the root directory of your C: drive (that is C:\).
- 3. Use Windows Explorer to view the files in directory C: $\$
- 4. You should see a file called MPFI_setup.bat
- 5. Double click on this .bat file to install the software.
- 6. This .bat file will build a subdirectory called C:\MPFI_Adj_10Rx20C on your PC and move the appropriate files into it. After this .bat file runs, it cleans up unnecessary files from the C:\ directory that were temporarily installed by the zip file extraction.
- 7. Using Windows Explorer navigate to this C:\MPFI_Adj_10Rx20C folder or subdirectory.





- 8. The contents of this folder should be:
 - a. MPFI_Adj_10Rx20C_rebuild.bat
 - b. MPLINK.EXE
 - c. _MPLINK.EXE
 - d. MP2HEX.EXE
 - e. MPASMWIN.EXE
 - f. MPCOFF.EXE
 - g. MPCOD.EXE
 - h. MP2COD.EXE
 - i. P16F737.INC
 - j. MPFI_Source_Relo.o
 - k. MPFI_Table_Relo.O
 - l. 16f737_MPFI_Relo.lkr
- 9. This .bat file will also build a subdirectory called C:\MPFI_Adj_10Rx20C \HEX_Files on your PC. The HEX files that get built into it.
- 10. After you use the Excel file to create test files you can use the Windows Explorer navigate to this C:\PIC_Projects\HEX_Files folder or subdirectory.
- 11. The contents of this folder should look like this:
 - a. MPFI
 - b. MPFI.hex



- 12. The .hex file is the file that you need to program the ACM using the programmer.
- 13. You can rename this hex file to a filename that is meaningful to you by right mouse clicking on the file name and choosing Rename from the popup menu.

How to Build Hex Files from User Defined Excel Tables



- 14. The installer will also create a backup directory called :\MPFI_Adj_10Rx20C \Backup_Files to preserve several master files in case you accidentally delete them from the C:\PIC_Projects folder. This folder will contain the following backup files (as pictured below).
 - a. MPFI_Source_Relo.o
 - b. MPFI_Table_Relo.O
 - c. 16f737_MPFI_Relo.lkr
 - d. MPFI_Adj_10Rx20C_rebuild.bat
 - e. MPFI_setup.bat
 - f. MPFI_Table_Adj_10x20_Macro.xls
 - g. MPFI_Table_Adj_10x20.xls (may not appear in listing)



Next, here's how to update the hex file with new table information.

1. BEFORE YOU PERFORM ANY OF THE FOLLOWING STEPS, MAKE SURE THAT THE ANALYSIS TOOLPACK ADD-IN IS INSTALLED IN EXCEL. THIS PROCESS WILL NOT WORK WITHOUT DOING THIS. FROM THE UPPER TOOLBAR IN EXCEL, SELECT Tools>Add-Ins AND CHECK THE CHECKBOX LABELED Analysis Toolpack (pictured below)



2. Use the Excel spreadsheet to modify the values that you wish on the spreadsheet Lookup Table tab, remembering to set all the VTS and Anti-Knock cells. Failure to include a value for every cell will result in unpredictable results.

Copyrighted and Confidential Information of Joseph P. King, Jr., Joseph P. King III, White Oak Research and White Oak Audio Design. No further distribution allowed without the written permission of the copyright holders. March 23, 2007 Procedure Revision F

How to Build Hex Files from User Defined Excel Tables



How to Build Hex Files from User Defined Excel Tables

1																									
Microsoft Excel - MPFI_Ta	ble_Adj_10x2	_Macro.x	ls .																						5 🗙
🔹 o Security 🤌	決止の。																								-
() Ele Edit Yew Insert	Format Look	Data Win	dow Helt	p																	Ty	pe a quest	ion for he	ф. н.	. # x
	7 13, 1 X C	1 1	1 - 1 - 1	- I 🗃 🔍	Σ - ∱\$	11 🏨 🎝 🤋	0% - *	ACM	Arial		- 10	- B Z	U I III	日 田 川	1 5 %	· € *	리) 군	律/田・4	a - <u>A</u> -						
Snagtt 📷 Window																									
		12	RAT	N 17 8																					
A39 - 🗲 4	1.75			-																					
A	Ð	C	D	EFO	н	IJK	L	M N	0 P	QR	S	T	UV	W	X Y	Z AA	AB	AC AD	AE AF	AG	AH A	AJ	AK	AL A	M
1 ALERT! To use this sp	readsheet m	ake sure	that the	Analysis To	olpack A	dd-In is en:	abled. To	enable t	this from th	e toolba	r pick	Tools>Ad	d-Ins an	d check	the Anal	ysis Tool	pack che	ckbox							19
2 Time entries are in millised	conds of on time	with values	ranging t	from 0 to 6.3 m	illisecond	s in 0.1 millise	cond interv	als (examp	les, 1.1, 2.5, 0	.7, etc)	1														
3 If you wish to turn on the V	tech solenoid, ei	ster a 1 in th	e approp	priate VTS cell																					
4 If you wish to turn on the A	nti-Knock Fifter,	enter a 1 in	the appro	opriate AK cell							_								_			_	_		_
2 6 Fotosta al Clastic Francisco	3.005.07								_		-	-			-				-	-		-	-		
7 Internal Clock Prediency	2.00E+07								_				-						_						
8 Prescalar Value	16																		-			-	-		
9 TMR0 Overflow count (d)	109																						_		
10 IMR0 Period	4.704E-04																								
11																						-			
12 RPM			1000		1375		1750		212	5	1	2500			2875		3250	1	3	625		4	100		L
13 msec count			120.00		87.27		68.57		66.4			48.00			41.74		36.92		3	3.10		30	00		8 -1
14 1/2 msec (512us) count			234.38		170.45		133.93		110.2	9		93.75			81.52		72.12		6	1.66		58	59		
16 470 Austra count			100 100		106.62		146 77		120.0			102.04			94		70.40		7/	41		65	30		
17 Count Rounddown(h)			200.10 FF		165.53		143.77		120.0	8		102.04			68		10.43			48		03	35		
18 1/4 msec (256us) count			468.75		340.91		267.86		220.5	á.		187 50		11	63.04		144.23		125	2.31		117	19		
19 Count Roundup(h)			1D5		155		#NUM		DI	Ď		BC			A4		91			82			76		
20 MAP Voltage	R Justified	L Justified																							
21 2.65	021F	87C0		Time VTS AK		Time VTS AK		Time VTS /	NK HEX Valu	e TimeVT	SAK	HEX Value	Time VTS	AK HEXT	Value Tim	eVTS AK	HEX Value	TimeVTS A	K HEXV	alue Time	eVTS AK	HEX Va	lue Tim	eVTS A	<u>(</u> –I
22	0222	8000		0 0 0	00	0 0 0	00 00	0 0	0 0	0 0	0 0	00	0 0	0	00 0		00	0 0	0	00 0	0	0	00	0	0
23 2.75	0233	8000			00	0 0 0	100	0 0	0 0	0 0.5	0 0	05	0.0	0	00 1 1		00	17 0	0	11 21	0	0	15 24		
25 3.00	0266	9980	_					<u> </u>		0.01	-	0.5	0.0				00	1.1 1						1 1	-
26				0 0 0	00	0 0 0	00 00	0 0	0 0	0 1	0 0	0A	0 0	0	00 0	0 0	00	0 0	0	00 0	0 0	0	00 0	0	0
27 3.25	0299	A640									-			_								-			
28	0000	0.040			00	0 0 0	00 00	0 0	0	0 1.5	0 0	OF	0 0	0	00		00	이이	0	00 0		0	00	0	1
29 3.50	0200	0.040			0.01		100	0 0	0 0	0 2	0 0	14	0 0	0	00		00		0	00		0	00		1
31 3.75	0300	C000					a	VI VI	0	×L +L	VI VI		0 0		~~			<u> </u>		00	4 91	v .	~~	n vi	
32				0 0 0	00	0 0 0	00	0 0	0 0	0 2.5	0 0	19	0 0	0	00 0	0 0	00	0 0	0	00 0	0 0	0	00 0	1	0
33 4.00	0333	CCCO																				_	_		
34	0000	0.000			00	0 0 0	00	0 0	0 0	0 3	0 0	1E	0 0	0	00 0	0 0	00	0 0	0	00 0	0	0	00 0	1	0
30 4.20	0366	DARO	_		0.01	0 0 0	0.00	0 0	0 0	13.5	0 0	22	0 0	0	00		00		0	00		0	00	1 1	1
37 4.50	0399	E640			50		00[0 0	0		-1 0	*2	0 0		~~	1 01 0	00	of		00_0		-			-
38				0 0 0	00	0 0 0	00	0 0	0 0	0 4	0 0	28	0 0	0	00 0	0 0	00	0 0	0	00 0	0 0	0	00 0	1	1
39 4.75	0300	F300																							
40 Enter Proper	MAP Voltage Val	lue los		0 0 0	00	0 0 0	00	0 0	0 0	0 4.5	0 0	2D	0 0	0	00 0	0 0	00	0 0	0	00 0	0 0	0	00 0	1	1
41 Enter a value t	that is less than or e	equal to			LIEV		LIEV	_	UEV				_									-	_		
42 5.00 and 0.1 g	reater than cell A3	7			Nominal		HEA High Limit		Low Limi				_									-	_		
44 Map Voltage			2.840	note 1	0245	h	0246	h	024	4 h												-	-		
45 High Byte Val					02	h	02	h	0	2 h															
46 Low Byte Value (nex)					45	h	48	h	4	4 h															
47																									
48			Note 1: D	O NOT ENTER 1	HE FOLLO	WING DISALL	WED MAP	V VALUES	(all other valu	es betwee	n 0.005	and 4.995 a	re OK)						_	-		-	_		
49			0		1.246		2.496		3.74	7		4.996						$ \rightarrow $							
61			0.001		1.24/		2.43/		3.74	0		4.937										-			
52			0.002		1.240		2.499		3.74	9		4,999										-	-		-+-
62			0.004		1 75		2.400		27	6		6													×
LookUp Table (E	xport Table /												1			11									> I

3. When you are done building a table that suits your needs, click on the ACM button pictured in the center of the upper toolbar. If everything builds correctly you should get the screen below. Click OK.

MPASM v5.06	×												
Assembly Successful.													
MPFI_TABLE_RELO.ASM													
100%													
Errors:	0												
Warnings:													
Reported: Suppressed:	U 0												
Messages:													
Reported:	0												
Suppressed:	U												
Lines Assembled:	600												
<u>✓ О</u> К	? <u>H</u> elp												

4. This will automatically build the corresponding hex file and store it in the C:\MPFI_Adj_10Rx20C \HEX_Files folder. You will see a dialog box as below when this succeeds. Click OK to continue.

Copyrighted and Confidential Information of Joseph P. King, Jr., Joseph P. King III, White Oak Research and White Oak Audio Design.

No further distribution allowed without the written permission of the copyright holders. March 23, 2007 Procedure Revision F

How to Build Hex Files from User Defined Excel Tables

	1																							
X	Microsoft Excel - MPFI_T	able_Adj_10x20	_Macro.x	ls																				
	🔰 👂 Security 🥭	1 🛠 🔟 🛷 📮																						
:21	File Edit View Insert	Format Tools	Data Win	dow <u>H</u> el	P														T	ype a c	uestion for	help		. 8 ×
ID		 \ & @a 🕅 +	19 + B	. Σ	- 4↓ ∰1 @0 [ACM		Arial		-	10 🗸	B	IU	= =	E 30	-3+	\$ %	, €	€.0	.00 1			37 -	A -
: 5	Spagit Window	-								and 1	BEO				Cable and									_
	Shage E			-																				
			: 2		7= 17 😵 📮																			
	▼ fx	4.75																						
1	A	В	C	D	E F G	Н	1	JK	L	M	N	0	Р	Q	R	S	Т	U	V	W	Х	Y	Z	AA 🔽
1	ALERT! To use this s	preadsheet ma	ke sure	that the	Analysis To	olpack A	dd-In	is ena	bled. T	o ena	able 1	this f	from the	tool	bar p	bick 1	Tools>A	dd-In	is and	d che	ck the /	Analy	sis T	00
2 Time entries are in milliseconds of on time with values ranging from 0 to 6.3 milliseconds in 0.1 millisecond intervals (examples, 1.1, 2.5, 0.7, etc)																								
3	If you wish to turn on the \	Vtech solenoid, en	ter a 1 in tl	ne approp	oriate VTS cell																			
4	If you wish to turn on the <i>l</i>	Anti-Knock Filter, e	enter a 1 in	the appr	opriate AK cell											_				_			-	
5	External Cleak Framiona	2.005.07																-						
7	External Clock Prequency	2.0000707						-		-						-		-		-				
8	Prescalar Value	16	-							-								-		_		-		
9	TMR0 Overflow count (d)	109																						
10	TMR0 Period	4.704E-04																						
11								1																
12	RPM			1000		1375											2500)			2875			
13	msec count			120.00		87.27		-	Build Success!								48.00)			41.74			
14	1/2 msec (512us) count			234.38		170.45			Europe Te				La uno di-		с. II. I.	du	93.75	i –			81.52			
15	Count Roundup(h)			EB		AB			Export Table saved successfully! HEX file successfully built! (Return Code = 2156)								5E				52			
16	470.4 usec count			255.10		185.53			(Recum Code = 2100)								102.04				88.73			
17	Count Rounadown(n)		-	460.75		340.04			OK								107.50)			162.04			
10	Count Roundun/b)		-	400.75		155						OR					107.00 BC				8/			
20	MAP Voltage	R-Justified	L.Justified	105		100			-	-		_		-		_					01			
21	2.65	021F	87C0		Time VTS AK		Time V	TS AK		Time	VTS /	AK F	HEX Value	Time	VTS .	AK F	HEX Value	Time	VTS .	AK F	EX Value	Time	VTS	AK
22					0 0 0	00	0	0 0	00	0	0	0	00	0	0	0	00	0	0	0	00	0	0	0
23	2.75	0233	8000															1		8			-	
24					0 0 0	00	0	0 0	00	0	0	0	00	0.5	0	0	05	0.9	0	0	09	1.3	0	0
25	3.00	0266	9980							_														
26					0 0 0	00	0	0 0] 00	0	0	0	00	1	0	0	0A		0	0	00	0	0	0
2/	3.25	U299	A640			0.01	0	01 0	1		01	- 01	00	1.5	01	- 01		-	01	- 01	00	01	01	
28	2.50	1 0000	0240			00	0	U U	J UL		U	0	00	1.5	U	0	UF		<u> </u>		001		0	
30	3.50	J 02CD	0340			00	n	0 0	00	D D	0	0	00	2	0	0	17		ρl	0	00	DI	pl	0
31	3.75	0300	C000		0 0 0	001		0 0			9			- 4	0	0			<u> </u>		00			
32	0.10	1 0000	5000			00	0	0 0	1 00		0	0	00	2.5	0	0	19		0	0	00		0	0
33	4.00	0333	CCC0			25 F.															25.5			
34					0 0 0	00	0	0 0	00	0	0	0	00	3	0	0	1E	0	0	0	00	0	0	0
35	4.25	0366	D980																					
36	1.00	0200	5649			00	U	0 0	J 00		U	U	00	3.6	U	U	23			0	00		0	
31	4.50	1 0388	E640			00	0	0 0	0.00		0	- 01	00		01	0	20		o l	0	00	DI	p]	0
14 4	🕞 🗃 LookUn Table /	Export Table /				001	01	01 0	,	0	0		00	41	0	01	28	1 01	01	01	001	01	01	
Dec	du (Lookop Table /										-	(age)												
Read	uy																				NUP	4		

- 5. You should rename the HEX file named MPFI.hex to a filename that is meaningful to you by right mouse clicking on the file name and choosing Rename from the popup menu. Make sure you keep the .hex suffix or the file will not work. If you don't change the file name, the next time the process above is run, it will overwrite the previous contents of this file.
- 6. The .hex file is the file that will get programmed into the MPFI controller using the programming procedure provided in a separate procedure.