

Key:	Identified and corrected values
	Modifications
	Removed/Not Required

Link to Assembly / Mod guide  
<http://stuff.fredcooke.com/spin1howto/spin1.html>

MCU		Element14 Order Code	Schematic pages: 1, 14
<b>MCU</b>	Free EMS Brain	<a href="#">1380343</a> MC9S12XDP512MAL	
<b>R177</b>	10K	<a href="#">1652909</a> 1% 0805 Package	
<b>R178</b>	10K	<a href="#">1652909</a> 1% 0805 Package	
<b>R179</b>	10K	<a href="#">1652909</a> 1% 0805 Package	
<b>R181</b>	10K	<a href="#">1652909</a> 1% 0805 Package	
<b>R180</b>	10K	<a href="#">1652909</a> 1% 0805 Package	
<b>C95</b>	0.2uF		
<b>C94</b>	680pF		
<b>C93</b>	3.8nF		
<b>R175</b>	3.3K		
<b>C96</b>	22pF	<a href="#">1414676</a> CAPACITOR, 0805, 22PF, 100V, NPO	
	15pF		
	33pF		
<b>C97</b>	22pF	<a href="#">1414676</a> CAPACITOR, 0805, 22PF, 100V, NPO	
	15pF		
	33pF		
<b>R176</b>	10M		May not be necessary
	1M		May not be necessary
<b>X3</b>	16MHz	<a href="#">1712841</a> CRYSTAL, TSX-3225, 16MHZ, 10PPM, 9PF	
<b>C98</b>	0.2uF		
<b>C99</b>	0.2uF		
<b>R251</b>	1K	<a href="#">1809300</a> 5% 0805 Package	Check for pull up mod?
<b>C100</b>	0.2uF		
<b>C101</b>	0.2uF		
<b>C102</b>	0.2uF		

  

USB		Schematic pages: 15	
<b>U20</b>	FT232RL	<a href="#">1146032</a> FTDI	
<b>C105</b>	0.1uF	<a href="#">8820120</a> CAPACITOR, 0805, 100NF, 50V	
	4.7uF		Mounted over top mod?
<b>C104</b>	100nF	<a href="#">8820120</a> CAPACITOR, 0805, 100NF, 50V	
<b>R184</b>	2K	<a href="#">9334084</a> 5% 0805 Package	
<b>R185</b>	Change to cap 10nF	<a href="#">9406352</a> CAPACITOR, 0805, 10NF, 50V	
<b>J1</b>	Mini usb connector	<a href="#">1355761</a> Mini USB - type b	
<b>D82</b>	LED tx	<a href="#">1226390</a> Red 0805 package	
<b>D83</b>	LED rx	<a href="#">1465996</a> Green 0805 package	
<b>R182</b>	470R	<a href="#">1809376</a> 5% 0805 Package	
<b>R183</b>	470R	<a href="#">1809376</a> 5% 0805 Package	

  

MCU Power		Schematic pages: 33	
<b>U2</b>	MIC2954	<a href="#">1556741</a> IC, REG LDO, 250MA, 5V, 0.5% --- SOT-223 Package	
<b>C5</b>	22uF	<a href="#">9229272</a> CAPACITOR TANT , 22UF, 35V, SMD	

C6	0.1uF	<a href="#">8820120</a>	CAPACITOR, 0805, 100NF, 50V
D92	Schottky	<a href="#">9556915</a>	SCHOTTKY RECTIFIER, 500mA, 20V, SOD-123
C2	10uF	<a href="#">1617365</a>	CAPACITOR TANT 10UF, 35V, RADIAL
C3	0.1uf	<a href="#">8820120</a>	CAPACITOR, 0805, 100NF, 50V
D1	1N4007	Not needed wire jumper	

Secondary Power		Schematic pages: 34	
U4	LM2937	<a href="#">9486038</a>	LM2937ET-5.0 IC, V REG LDO +5.0V, 2937, TO-220-3
D4	1N4007	<a href="#">1324152</a>	DIODE, STANDARD, 1A, 1000V, DO-41
C8	10uF	<a href="#">1617365</a>	CAPACITOR TANT 10UF, 35V, RADIAL
C9	0.1uF	<a href="#">8820120</a>	CAPACITOR, 0805, 100NF, 50V
C10	22uF	<a href="#">9229272</a>	CAPACITOR TANT , 22UF, 35V, SMD
C11	10uF	<a href="#">1617365</a>	CAPACITOR TANT 10UF, 35V, RADIAL
C12	0.1uF	<a href="#">8820120</a>	CAPACITOR, 0805, 100NF, 50V
Q19	Shutdown	circuit design flawed do not use	
Q18	Shutdown	circuit design flawed do not use	
R227	Shutdown	circuit design flawed do not use	
R226	Shutdown	circuit design flawed do not use	
D3	1N4007		
R2	Not needed	wire jumper too U4	

Battery Voltage Reference		Schematic pages: 53	
R105	3.9K	<a href="#">1887296</a>	1% 0805 Package
R106	1K	<a href="#">1506077</a>	0.1% 0805 Package
R52	Error on pcb ----> Jumper	<a href="#">1809596</a>	0805 Jumper
C31	0.1uF	<a href="#">8820120</a>	CAPACITOR, 0805, 100NF, 50V
D36	Schottky	<a href="#">9556915</a>	SCHOTTKY RECTIFIER, 500mA, 20V, SOD-123
D35	Schottky	<a href="#">9556915</a>	SCHOTTKY RECTIFIER, 500mA, 20V, SOD-123
R49	470R	<a href="#">1809376</a>	5% 0805 Package

Manifold Absolute Pressure		Schematic pages: 1, 44, 47	
U6	MPX4250A	<a href="#">1457153</a> Pressure Sensor with Barb	Mouser <a href="#">841-MPX4250AP</a>
C23	0.1uF	<a href="#">8820120</a> CAPACITOR, 0805, 100NF, 50V	
C24	47pF	<a href="#">1759199</a> MLCC, 0805, NP0, 50V, 47PF	
C66	0.22uF	<a href="#">1759172</a> MLCC, 0805, X7R, 25V, 220NF	
R134	470R	<a href="#">1809376</a> 5% 0805 Package	
R50	Jumper	<a href="#">1809596</a> 0805 Jumper	
R47	Jumper	<a href="#">1809596</a> 0805 Jumper	
D31	Not used no connection		
D32	Not used no connection		
C29	Not used no connection		

Off Board Manifold Air Pressure (Use this and NOT the above if you plan on having off board MAP sensor : ie OEM MAP)			
U6	MPX4250A	<a href="#">1457153</a> Pressure Sensor with Barb	Mouser <a href="#">841-MPX4250AP</a>
C23	0.1uF	<a href="#">8820120</a> CAPACITOR, 0805, 100NF, 50V	
C24	47pF	<a href="#">1759199</a> MLCC, 0805, NP0, 50V, 47PF	
C66	0.22uF	<a href="#">1759172</a> MLCC, 0805, X7R, 25V, 220NF	
R134	470R	<a href="#">1809376</a> 5% 0805 Package	
R51	Jumper	<a href="#">1809596</a> 0805 Jumper	
R48	Jumper	<a href="#">1809596</a> 0805 Jumper	
D33	Schotty	<a href="#">9556915</a> SCHOTTKY RECTIFIER, 500mA, 20V, SOD-123	
D34	Schotty	<a href="#">9556915</a> SCHOTTKY RECTIFIER, 500mA, 20V, SOD-123	
C29	0.1uF	<a href="#">8820120</a> CAPACITOR, 0805, 100NF, 50V	

Atmospheric Absolute Pressure		Schematic pages: 1, 43, 47	
U5	MPX4100A	<a href="#">1555602</a> Presure sensor No barb, No Tabs	<a href="#">1703477</a> Barbed, No Tabs
C21	0.1uF	<a href="#">8820120</a> CAPACITOR, 0805, 100NF, 50V	
C20	47pF	<a href="#">1759199</a> MLCC, 0805, NP0, 50V, 47PF	
C19	Not used no connection		
R51	470R	<a href="#">1809376</a> 5% 0805 Package	
C29	0.22uF	<a href="#">1759172</a> MLCC, 0805, X7R, 25V, 220NF	
R48	Jumper		
D33	Not used no connection		
D34	Not used no connection	<a href="#">1809596</a> 0805 Jumper	
C30	Not used no connection		

Atmospheric Absolute Pressure (Use this and NOT the above you plan on having off board AAP sensor : ie OEM AAP)			
U5	MPX4100A	<a href="#">1555602</a> Presure sensor No barb, No Tabs	<a href="#">1703477</a> Barbed, No Tabs
C21	0.1uF	<a href="#">8820120</a> CAPACITOR, 0805, 100NF, 50V	
C20	47pF	<a href="#">1759199</a> MLCC, 0805, NP0, 50V, 47PF	
C19	Not used no connection		
R51	470R	<a href="#">1809376</a> 5% 0805 Package	
C29	0.22uF	<a href="#">1759172</a> MLCC, 0805, X7R, 25V, 220NF	
R48	Jumper	<a href="#">1809596</a> 0805 Jumper	
D33	Schotty	<a href="#">9556915</a> SCHOTTKY RECTIFIER, 500mA, 20V, SOD-123	
D34	Schotty	<a href="#">9556915</a> SCHOTTKY RECTIFIER, 500mA, 20V, SOD-123	
C30	0.1uF	<a href="#">8820120</a> CAPACITOR, 0805, 100NF, 50V	

RPM - VR Input 1			Schematic pages: 18, 45		
U29	MAX9924		<a href="#">1845719</a>	No Longer Stocked by Element14	<a href="#">Mouser NZ</a> <a href="#">700-MAX9924UAUB</a>
R214	10K		<a href="#">1652909</a>	1% 0805 Package	
C126	0.1uF		<a href="#">8820120</a>	CAPACITOR, 0805, 100NF, 50V	
C125	1nF		<a href="#">1414659</a>	CAPACITOR, 0805, 1NF, 200V, X7R	
R212	10K	1/4watt	<a href="#">1618242</a>	5% 0805 Package, 1/4W	
R213	10K	1/4watt	<a href="#">1618242</a>	5% 0805 Package, 1/4W	

RPM - VR Input 2			Schematic pages: 17, 46		
U30	MAX9924		<a href="#">1845719</a>	No Longer Stocked by Element14	<a href="#">Mouser NZ</a> <a href="#">700-MAX9924UAUB</a>
R217	10K		<a href="#">1652909</a>	1% 0805 Package	
C128	0.1uF		<a href="#">8820120</a>	CAPACITOR, 0805, 100NF, 50V	
C127	1nF		<a href="#">1414659</a>	CAPACITOR, 0805, 1NF, 200V, X7R	
R215	10K	1/4watt	<a href="#">1618242</a>	5% 0805 Package, 1/4W	
R216	10K	1/4watt	<a href="#">1618242</a>	5% 0805 Package, 1/4W	

Fuel Pump ---- note this is on sheet 51 of schematics "general_drive1.sch"			
Q8	Mosfet_N Channel	<a href="#">1017798</a>	MOSFET, N, LOGIC, TO-220
D46	LED	<a href="#">1465996</a>	Green 0805 package
R67	2.4K	<a href="#">1809376</a>	5% 0805 Package
R66	100K	<a href="#">1809303</a>	5% 0805 Package
R65	1K	<a href="#">1809300</a>	5% 0805 Package
R68	Not used no connection		
C37	Not used no connection		

Coolant/Head Temperature		Schematic pages: 1, 48, 55	
C75	0.1uF	<a href="#">8820120</a>	CAPACITOR, 0805, 100NF, 50V
R149	470R	<a href="#">1809376</a>	0805 Package
C74	0.1uF	<a href="#">8820120</a>	CAPACITOR, 0805, 100NF, 50V
R160	jumper	<a href="#">1809596</a>	0805 Jumper
R164	jumper	<a href="#">1809596</a>	0805 Jumper
D60	Schottky	<a href="#">9556915</a>	SCHOTTKY RECTIFIER, 500mA, 20V, SOD-123
D61	Schottky	<a href="#">9556915</a>	SCHOTTKY RECTIFIER, 500mA, 20V, SOD-123
R147	2.4K	<a href="#">1887290</a>	1% 0805 Package
C73	Not used no connection		
C86	Not used no connection		
R148	Not used no connection		



Manifold Air Temperature		Schematic pages: 1, 24, 26	
C81	0.1uF	<a href="#">8820120</a>	CAPACITOR, 0805, 100NF, 50V
R155	470R	<a href="#">1809376</a>	0805 Package
C74	0.1uF	<a href="#">8820120</a>	CAPACITOR, 0805, 100NF, 50V
R170	jumper	<a href="#">1809596</a>	0805 Jumper
R174	jumper	<a href="#">1809596</a>	0805 Jumper
D72	Schottky	<a href="#">9556915</a>	SCHOTTKY RECTIFIER, 500mA, 20V, SOD-123
D73	Schottky	<a href="#">9556915</a>	SCHOTTKY RECTIFIER, 500mA, 20V, SOD-123
R153	2.4K	<a href="#">1887290</a>	1% 0805 Package
C79	Not used no connection		
R154	Not used no connection		
C92	Not used no connection		

Intake Air Temperature		Schematic pages: 1, 48, 56	
C78	0.1uF	<a href="#">8820120</a>	CAPACITOR, 0805, 100NF, 50V
R152	470R	<a href="#">1809376</a>	0805 Package
C77	0.1uF	<a href="#">8820120</a>	CAPACITOR, 0805, 100NF, 50V
R159	jumper	<a href="#">1809596</a>	0805 Jumper
R163	jumper	<a href="#">1809596</a>	0805 Jumper
D58	Schottky	<a href="#">9556915</a>	SCHOTTKY RECTIFIER, 500mA, 20V, SOD-123
D59	Schottky	<a href="#">9556915</a>	SCHOTTKY RECTIFIER, 500mA, 20V, SOD-123
R150	2.4K	<a href="#">1887290</a>	1% 0805 Package
C76	Not used no connection		
R151	Not used no connection		
C85	Not used no connection		

R173	470R	<a href="#">1809376</a>	0805 Package
C91	0.1uF	<a href="#">8820120</a>	CAPACITOR, 0805, 100NF, 50V
D71	Schottky	<a href="#">9556915</a>	SCHOTTKY RECTIFIER, 500mA, 20V, SOD-123
D70	Schottky	<a href="#">9556915</a>	SCHOTTKY RECTIFIER, 500mA, 20V, SOD-123

Injector 1			Schematic pages: 1, 27		
R203	1K	<a href="#">1809300</a>	5% 0805 Package		
R257	2.4K	<a href="#">1809376</a>	0805 Package		
D110	LED	<a href="#">1465996</a>	Green 0805 package		
D89	Not used no connection YET	Option A	Option B		
Q15	VNB10N07	<a href="#">686-8518P</a>	RS components VNP10N07 Omnifet	<a href="#">511-VNP14NV04-E</a>	Mouser N-Ch 40V 14A OmniFET
C118	Change to R=100K and mod to ground on pin 3 of u26 when not using "Peak and Hold" Circuit --> May not be needed				
Injector 2			Schematic pages: 1, 28		
R200	1K	<a href="#">1809300</a>	5% 0805 Package		
R256	2.4K	<a href="#">1809376</a>	0805 Package		
D109	LED	<a href="#">1465996</a>	Green 0805 package		
D88	Not used no connection YET	Option A	Option B		
Q14	VNB10N07	<a href="#">686-8518P</a>	RS components VNP10N07 Omnifet	<a href="#">511-VNP14NV04-E</a>	Mouser N- MOSFET, N, LOGIC, TO-220
C116	Change to R=100K and mod to ground on pin 3 of u25 when not using "Peak and Hold" Circuit --> May not be needed				
Injector 3			Schematic pages: 1, 29		
R197	1K	<a href="#">1809300</a>	5% 0805 Package		
R255	2.4K	<a href="#">1809376</a>	0805 Package		
D108	LED	<a href="#">1465996</a>	Green 0805 package		
D87	Not used no connection YET	Option A	Option B		
Q13	VNB10N07	<a href="#">686-8518P</a>	RS components VNP10N07 Omnifet	<a href="#">511-VNP14NV04-E</a>	Mouser N- MOSFET, N, LOGIC, TO-220
C114	Change to R=100K and mod to ground on pin 3 of u24 when not using "Peak and Hold" Circuit --> May not be needed				
Injector 4			Schematic pages: 1, 30		
R194	1K	<a href="#">1809300</a>	5% 0805 Package		
R254	2.4K	<a href="#">1809376</a>	0805 Package		
D107	LED	<a href="#">1465996</a>	Green 0805 package		
D86	Not used no connection YET	Option A	Option B		
Q12	VNB10N07	<a href="#">686-8518P</a>	RS components VNP10N07 Omnifet	<a href="#">511-VNP14NV04-E</a>	Mouser N- MOSFET, N, LOGIC, TO-220
C112	Change to R=100K and mod to ground on pin 3 of u23 when not using "Peak and Hold" Circuit --> May not be needed				
Injector 5			Schematic pages: 1, 31		
R191	1K	<a href="#">1809300</a>	5% 0805 Package		
R253	2.4K	<a href="#">1809376</a>	0805 Package		
D106	LED	<a href="#">1465996</a>	Green 0805 package		
D85	Not used no connection YET	Option A	Option B		
Q11	VNB10N07	<a href="#">686-8518P</a>	RS components VNP10N07 Omnifet	<a href="#">511-VNP14NV04-E</a>	Mouser N- MOSFET, N, LOGIC, TO-220
C110	Change to R=100K and mod to ground on pin 3 of u22 when not using "Peak and Hold" Circuit --> May not be needed				
Injector 6			Schematic pages: 1, 32		
R188	1K	<a href="#">1809300</a>	5% 0805 Package		
R252	2.4K	<a href="#">1809376</a>	0805 Package		
D105	LED	<a href="#">1465996</a>	Green 0805 package		
D84	Not used no connection YET	Option A	Option B		
Q10	VNB10N07	<a href="#">686-8518P</a>	RS components VNP10N07 Omnifet	<a href="#">511-VNP14NV04-E</a>	Mouser N- MOSFET, N, LOGIC, TO-220
C108	Change to R=100K and mod to ground on pin 3 of u21 when not using "Peak and Hold" Circuit --> May not be needed				
Injector 7			Schematic pages: 1, 20		

R206	1K	<a href="#">1809300</a>	5% 0805 Package		
R258	2.4K	<a href="#">1809376</a>	0805 Package		
D111	LED	<a href="#">1465996</a>	Green 0805 package		
D90	Not used no connection YET	Option A		Option B	
Q16	VNB10N07	<a href="#">686-8518P</a>	RS components VNP10N07 Omnifet	<a href="#">511-VNP14NV04-E</a>	Mouser N- MOSFET, N, LOGIC, TO-220
C120	Change to R=100K and mod to ground on pin 3 of u20 when not using "Peak and Hold" Circuit --> May not be needed				

Injector 8			Schematic pages: 1, 19		
R209	1K	<a href="#">1809300</a>	5% 0805 Package		
R259	2.4K	<a href="#">1809376</a>	0805 Package		
D112	LED	<a href="#">1465996</a>	Green 0805 package		
D91	Not used no connection YET	Option A		Option B	
Q17	VNB10N07	<a href="#">686-8518P</a>	RS components VNP10N07 Omnifet	<a href="#">511-VNP14NV04-E</a>	Mouser N- MOSFET, N, LOGIC, TO-220
C122	Change to R=100K and mod to ground on pin 3 of u19 when not using "Peak and Hold" Circuit --> May not be needed				

XOR logic			Schematic pages: 1	
R230	1K		<a href="#">1809300</a>	5% 0805 Package
R231	1K		<a href="#">1809300</a>	5% 0805 Package
R232	1K		<a href="#">1809300</a>	5% 0805 Package
R233	1K		<a href="#">1809300</a>	5% 0805 Package
R228	10K		<a href="#">1652909</a>	1% 0805 Package
R229	10K		<a href="#">1652909</a>	1% 0805 Package
C124	0.1uF		<a href="#">8820120</a>	CAPACITOR, 0805, 100NF, 50V
U33	XOR Gate		<a href="#">1740035</a>	LOGIC, QUAD 2-IN EX-OR GATE , 14SOIC
R Mod 100k pulldown			14 x	<a href="#">9342427</a> 1% Resistor, MF12 Package <-- will fit through via's
Ignition 1			Schematic pages: 1, 35, 42	
R29	2K	(Avalibility - 2k used instead of 2.4k)	<a href="#">9334084</a>	5% 0805 Package
D20	LED		<a href="#">1686068</a>	LED, SMD, 0805, ORANGE
			Option A	Option B
Q4	Mosfet_N Channel		<a href="#">686-8518P</a>	RS components VNP10N07 Omnifet
R7	Jumper		<a href="#">1809596</a>	0805 Jumper
R30	100K		<a href="#">1809303</a>	5% 0805 Package
R27	1K		<a href="#">1809300</a>	5% 0805 Package
D10	Schottky		<a href="#">9556915</a>	SCHOTTKY RECTIFIER, 500mA, 20V, SOD-123
D79	Internal in Mosfet			
R7	Not used			
D10	Not used			
ignition 2			Schematic pages: 1, 36, 41	
R25	2K	(Avalibility - 2k used instead of 2.4k)	<a href="#">9334084</a>	5% 0805 Package
D19	LED		<a href="#">1686068</a>	LED, SMD, 0805, ORANGE
			Option A	Option B
Q3	Mosfet_N Channel		<a href="#">686-8518P</a>	RS components VNP10N07 Omnifet
R9	Jumper		<a href="#">1809596</a>	0805 Jumper
R26	100K		<a href="#">1809303</a>	5% 0805 Package
R23	1K		<a href="#">1809300</a>	5% 0805 Package
D12	Schottky		<a href="#">9556915</a>	SCHOTTKY RECTIFIER, 500mA, 20V, SOD-123
D78	Internal in Mosfet			
R9	Not used			
D12	Not used			
ignition 3			Schematic pages: 1, 37, 40	
R21	2K	(Avalibility - 2k used instead of 2.4k)	<a href="#">9334084</a>	5% 0805 Package
D18	LED		<a href="#">1686068</a>	LED, SMD, 0805, ORANGE
			Option A	Option B
Q2	Mosfet_N Channel		<a href="#">686-8518P</a>	RS components VNP10N07 Omnifet
R11	Jumper		<a href="#">1809596</a>	0805 Jumper
R22	100K		<a href="#">1809303</a>	5% 0805 Package
R19	1K		<a href="#">1809300</a>	5% 0805 Package
D14	Schottky		<a href="#">9556915</a>	SCHOTTKY RECTIFIER, 500mA, 20V, SOD-123
R11	Not used			
D14	Not used			

D77 Internal in Mosfet

ignition 4 Schematic pages: 1, 38, 39

R17 2K (Avalibility - 2k used instead of 2.4k) [9334084](#) 5% 0805 Package  
D17 LED [1686068](#) LED, SMD, 0805, ORANGE

Option A

Option B

Q1 [686-8518P](#) RS components VNP10N07 Omnifet  
R13 Jumper [1809596](#) 0805 Jumper  
R18 100K [1809303](#) 5% 0805 Package  
R15 1K [1809300](#) 5% 0805 Package  
D16 Schottky [9556915](#) SCHOTTKY RECTIFIER, 500mA, 20V, SOD-123  
R13 Not used  
D16 Not used  
D76 Internal in Mosfet