Additional Instruction of 110323STOCK Firmware

Compared to the previous versions such as 100528STOCK, the latest generation of stock racing firmware named "**110323STOCK**" has the following improvements:

1. Stronger and better acceleration.
2. Boost timing and Supercharger timing can be adjusted with the precision of 1 degree per step. **(Prior to the changes, the AMTS was set to 26.25° max, this version is set to 48° max plus the Supercharger timing's max value 16° = 64° total.)**
3. Supercharger timing and boost timing can be composited and be functional together (Total effective timing is up to 64°).
4. Supercharger timing increase rate (slope ramp) is adjustable.
5. More options for "Boost Start RPM" and "Boost Timing Acceleration" settings.
6. Increase brake force selection from 4 to 8 options.

CAUTION!

1. Once the 110323STOCK firmware has been loaded into the ESC, you can only use the **LCD Program Box or PC interface software** to set the ESC software parameters, neither the LED Programmer Card nor the SET button on the ESC are available for programming the ESC with this new firmware.

2. You must update the firmware of the LCD Programmer Box to **V1.07_110119** and be compatible with the 110323STOCK firmware of ESC.

Note: When upgrade the LCD program box firmware to **V1.07_110119** version, the upgrade process may be interrupted. Please try it again if that happened. Usually the upgrade process can be completed at the second try. We will solve this issue in the subsequent version in the future.

HOW TO UPDATE THE FIRMWARE OF THE LCD PROGRAM BOX?

Please see the link here: http://www.youtube.com/watch?v=YRGGCazwkro&feature=player_embedded

DESCRIPTION OF THE PROGRAMMABLE ITEMS ABOUT TURBO FUNCTION

#9. Boost Timing：It refers to the normal timing which is effective throughout the entire throttle range and affects the motor speed in the entire track (Curve and straight track). Please note this refers to the maximum value of the ESC internal timing, the actual timing is always dynamically changed every moment according to the motor RPM.

Boost Timing (Degree)	0° to 48° with the adjustment step of 1° increment. (on option #9)							
Option #9 (AMTS) for 528STOCK and 10323STOCK Boost Timing (comparison/different)								
528STOCK	1	2	3	4	5	6	7	8
	（0°）	（3.75°）	（7.50°）	（11.25°）	（15°）	（18.75°）	（22.50°）	（26.25°）
110323STOCK	6°	12°	18°	24°	30°	36°	42°	48°

Option #12 (Supercharger Timing) between 528STOCK and 110323STOCK (comparison/different)									
528STOCK	1	2	3	4	5	6	7	8	9
	（0°）	（1°）	（2°）	（3°）	（4°）	（5°）	（6°）	（7°）	（8°）
110323STOCK	0°	2°	4°	6°	8°	10°	12°	14°	16°

#10.   Supercharger Slope Rate (Degree/0.1s). It refers to the Supercharger Timing increase rate. The higher degrees of timing, the faster of the Supercharger Timing increase, and when used together you will experience quicker acceleration but sacrifice with high motor temperature.

Item	1	2	3	4	5	6
Supercharger Slope Rate (Degree/0.1s)	3°/0.1s	6°/0.1s	12°/0.1s	18°/0.1s	24°/0.1s	Full Supercharger Timing opened immediately

Example: Supercharger Timing (item #12) is set at 24° and Supercharger Slope Rate (item #10) is set to 3°/0.1s, it takes 0.8S to activate this 24°Turbo Timing.

#12.   Supercharger **Timing**：It is the additional timing that added to the Boost Timing (item #9) and only effective when the throttle is fully opened. It is ideal for open track layout with long straight away.

Supercharger Timing (Degree)	0° to 40° with the adjustment step of 1° increment.

The maximum amount of effective timing (Boost Timing #9 + Supercharger Timing #12) of the 110323STOCK firmware is designed to 64° (total). If the sum of "Boost Timing + Supercharger Timing" is more than 64°, only 64° is effective and the exceeding value will not apply.

Example 1:

Boost Timing set to 64°, Supercharger Timing set to 10°

64° timing can be activated before the throttle is fully opened, but no more timing can be activated after the throttle is fully opened.

Example 2:

Boost Timing set to 50°, Supercharger Timing set to 14°

50° timing can be activated before the throttle is fully opened, and the further 14°timing can be activated after the throttle is fully opened.

Boost Timing	*Supercharger Timing*	*Max timing before full throttle*	*Additional max timing after full throttle*	*Total Timing*	*Note*
48	*30*	*48*	*16*	*64*	
30	*10*	*30*	*10*	*40*	
20	*40*	*20*	*40*	*60*	
25	*40*	*25*	*39*	*64*	

#13.   Boost Start RPM：ESC begin to increase the internal timing when motor speed reaches the Boost Start RPM. A smaller Boost Start RPM value causes a faster rate of boost because the ESC increased the internal timing sooner.

Item	
Boost Start RPM (RPM)	1,000 to 15,000 RPM with the adjustment step of 1,000 RPM increment.

#14.   Supercharger Delay：This is the amount of time "full throttle" must be held BEFORE the Supercharger function engaged. If the full throttle time is less than the setting value, the Supercharger function will NOT be activated.

Item	1	2	3	4	5	6	7	8	9
Supercharger Delay(s)	0s	0.1s	0.2s	0.3s	0.4s	0.5s	0.6s	0.7s	0.8s

#15.   Boost Timing Acceleration：This refers to the RPM increment that triggers the Boost Timing increase of 1 Degree. The lower of the value (for example, use option #1), the harder of the acceleration. However, motor temperature will increase substantially.

Item	
Boost Timing Acceleration （RPM/Degree）	50 to 750 RPM/Deg, with the adjustment step of 50 RPM/Deg increment.

This parameter is often misunderstood. The boost timing change is caused by the RPM increment, so we use this Boost Timing Acceleration parameter to control the increase rate of Boost Timing.

So the changes from the motor's RPM caused the change of the Boost Timing when it is engaged.

Generally, the larger the timing you set, the more powerful of the motor will be. And the hotter (temperature) of the motor will be. Motor will get overheated or even destroyed if too much of timing applied when the motor is running at a low speed constantly. In order to solve the problem, we use the method of **Advance Dynamic Timing System**. The motor gets small amount of timing in the period of low speed, when the motor speed reaches the Boost Start RPM, the timing begin to increase along with the motor's RPM increase.

The relationship between Speed (rpm) and Timing			
Example 1 **Boost Start RPM** = 4000 **Boost Timing Acceleration** =200/degree		Example 2 **Boost Start RPM** =9000 **Boost Timing Acceleration** =400/degree	
Speed（RPM）	Timing	Speed (RPM)	Timing
<4000	0	<9000	0
4200	1	9400	1
4400	2	9800	2
4600	3	10200	3
4800	4	10600	4
5000	5	11000	5
5200	6	11400	6
5400	7	11800	7
5600	8	12200	8
5800	9	12600	9
6000	10	13000	10
6200	11	13400	11
6400	12	13800	12
6600	13	14200	13

6800	14	14600	14
7000	15	15000	15
7200	16	15400	16
7400	17	15800	17
7600	18	16200	18
7800	19	16600	19
8000	20	17000	20
8200	21	17400	21
8400	22	17800	22
8600	23	18200	23
8800	24	18600	24
9000	25	19000	25
9200	26	19400	26
9400	27	19800	27
9600	28	20200	28
9800	29	20600	29
10000	30	21000	30
10200	31	21400	31
10400	32	21800	32
10600	33	22200	33
10800	34	22600	34
11000	35	23000	35
11200	36	23400	36
11400	37	23800	37
11600	38	24200	38
11800	39	24600	39
12000	40	25000	40
12200	41	25400	41
12400	42	25800	42
12600	43	26200	43
12800	44	26600	44
13000	45	27000	45
13200	46	27400	46
13400	47	27800	47
13600	48	28200	48
13800	49	28600	49
14000	50	29000	50
14200	51	29400	51
14400	52	29800	52
14600	53	30200	53
14800	54	30600	54
15000	55	31000	55

15200	56	31400	56
15400	57	31800	57
15600	58	32200	58
15800	59	32600	59
16000	60	33000	60
16200	61	33400	61
16400	62	33800	62
16600	63	34200	63
16800	64	34600	64
>16800	64	>34600	64

Note: If the total value of "Boost Timing" is less than 64°, for example, set to 20°, the Timing will still be 20° even if the motor speed is higher than 8,000 RPM in example 1.

SUMMARY

1. The way to get a higher top speed:
    A. Increase Timing
    B. Reduce FDR
    C. Increase acceleration
       If the straightaway of the track is not long enough and the acceleration is not strong enough. And the car need to slow down at the end of the straight while the motor does not have enough high speed. In that case, racer may mistakenly think that the top speed is not high enough. But the real reason is the weakness of acceleration, so we need to increase acceleration/punch.
2. The way to increase the acceleration (launch/entering):
    A. Increase Timing
    B. Reduce Boost Start RPM or reduce Boost Timing Acceleration
    C. Increase FDR (higher value final drive = smaller pinion, bigger spur)
    D. Increase Supercharger Time Delay (longer delay time)
    E. Increase Supercharger Slope Rate
    F. Increase Start Punch (This is the programmable item #4 - DRRS of the ESC, please check the user manual of the ESC)
3. The way to decrease motor temperature and get a longer running time:
    A. Reduce Timing
    B. Increase Boost Start RPM or increase Boost Timing Acceleration
    C. Increase Supercharger Time Delay (longer delay time)
    D. Reduce Supercharger Slope Rate

The table below is a recommended setting list. (2 cells Lipo, Motor endbell physical timing is 5° to 10°)

Car	Motor	FDR	#9 Boost Timing	#10 Supercharger Slope Rate	#12 Supercharger Timing	#13 Boost Start RPM	#14 Supercharger Time Delay	#15 Boost Timing ACC
1/10 On-Road	11.5T	6.0-7.0	34°-42°	18°/0.1s	16°-26°	4000	0.4s	300-450
	13.5T	5.0-7.0	34°-54°	18°/0.1s	20°-30°	3000	0.4s	200-300
	17.5T	5.0-7.0	34°-55°	18°/0.1s	20°-30°	2000/3000	0.2s	150-300
1/10 Off-Road	11.5T	7.5-9.5	12°	6°/0.1s	4°	6000	Off	400-500
	13.5T	7.0-9.0	16°	6°/0.1s	8°	5000	Off	200-350
	17.5T	7.0-8.5	20°	6°/0.1s	12°	3000	Off	200-350

The **FDR** (final drive ratio) depends on the track condition. Generally, **Lowering** your FDR numerically(adding more teeth to your pinion gear or decreasing the number of teeth on your spur gear) you will get a higher top speed on a larger track with a long straight, or **Raising** your FDR numerically(subtracting teeth from your pinion gear or adding teeth to your spur gear) will improve the punch out of the corner in the small track

For more up to date ESC software setup, please visit Speed Passion website for more information. Or click on the link below…..

http://www.speedpassion.net/us/escsetup.asp

Tested 110323Stock software on V3 1S 17.5 motor on TC with 2S lipo on indoor carpet track (dated 03-16-2011 sample)

Motor : Speed Passion V3 1S 17.5 motor with full timing 10° on end bell.

Battery: Speed Power 6500mah 65C 2S lipo

Car: Tamiya 416WC with ProDrive chassis and weight

Track: Chicago Underground Raceway (48 x 90) Indoor carpet

Final Drive Ratio: 7.5

Running Mode: Forward with Brake

Drag Brake: 10%

Voltage Protection: None

DRRS: Level 8

Brake Force: 75%

Reverse Force: 75%

Initial Brake: 0%

Neutral Range: 6%

Boost Timing: 40°

Turbo Slope: 18 units /1 sec

Overheat Protection: OFF

Turbo Timing: 24°

Boost Start RPM: 2000 rpm

Turbo Delay: OFF (or 0.1 sec the most, at this size of track)

Timing Accelerate/Slope: 350rpm/unit