

## SANWA SYNCHRONIZED LINK SYSTEM

## USER MANUAL

Thank you for your purchasing SANWA SUPER VORTEX GENERATION 2, RX-482/RX-472/RX-47T Receiver.  
This is SANWA Synchronized Link (SSL) User's guide for use with M12S/EXZES ZZ and SUPER VORTEX GENERATION 2 and RX-482/RX-472/RX-47T. Before you start to use SSL, please read these instructions carefully to enjoy optimum performance.



### ABOUT SSL SYSTEM

When used with a SANWA M12S or Exzes ZZ transmitter, RX-482/RX-472/RX-47T receiver and the SANWA SUPER VORTEX GENERATION2 ESC, the SANWA Synchronized Link (SSL) system allows you to change many ESC programming values directly from the transmitter using the transmitter's CODE AUX function. In addition, telemetry data such as motor RPM, ESC temperature, motor temperature (if supported), and battery voltage can be read directly from the SUPER VORTEX GENERATION 2 ESC and displayed on the transmitter.



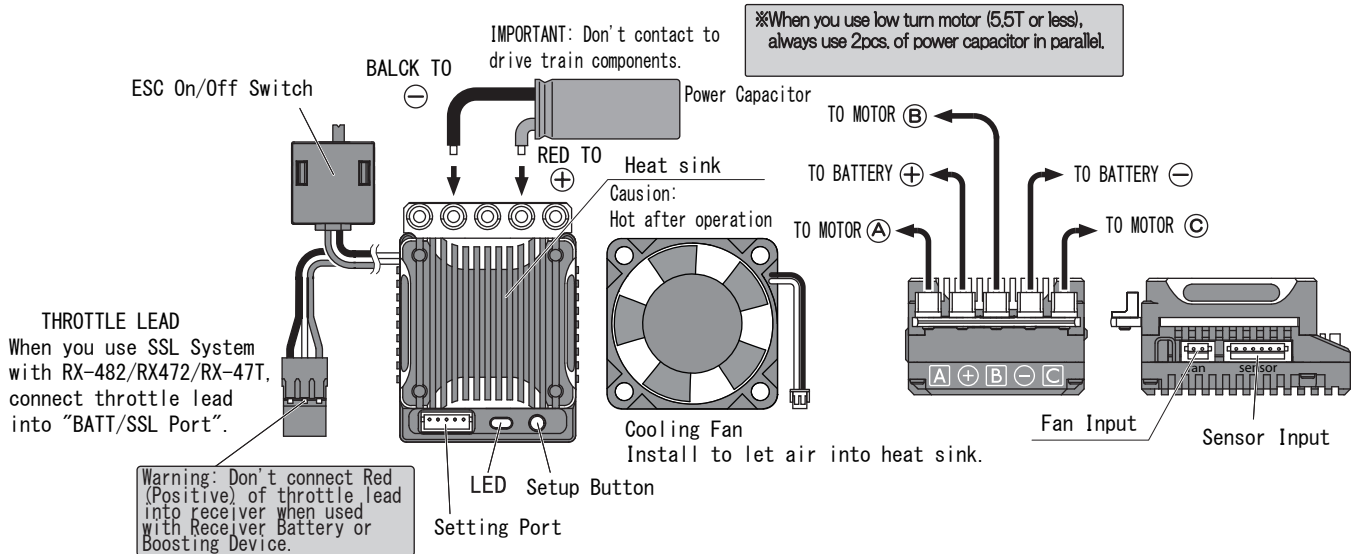
### OVERVIEW, CONNECTIONS AND MOUNTING

● Solder the included 12 AWG Power wire to connect ESC to battery and motor.

\*IMPORTANT: When soldering your battery connector and battery wires to the ESC, please observe correct polarity -positive to positive and negative to negative. When soldering the motor wires to the ESC and your motor, make sure that the wiring matches- A,B and C from the ESC to A, B and C on your motor.

\*WARNING: Do not leave the soldering iron on the mounting posts for any longer than is necessary to melt the solder. If the mounting posts overheat, it can damage the ESC. A suitably hot soldering should not be left on the mounting posts longer than about 5 seconds. If the solder is not melting within 5 seconds, use a hotter soldering iron.

Make sure to connect sensor cable to ESC and Motor.



### SSL-COMPATIBLE RECEIVER

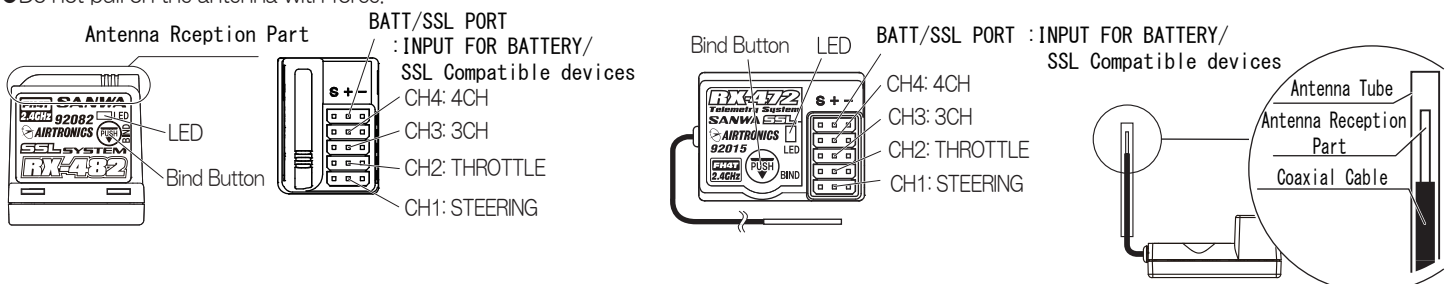
● Reception performance will be influenced by the installation place of receiver and antenna.

When you use RX-482 (built-in antenna type receiver), install receiver with antenna reception part in a high position.

● When you use RX-472 or RX-47T, mount antenna in antenna tube to protect antenna reception part (the thin tip at the end of the coaxial cable).

● Do not bend Antenna Reception Part. Do not bend Antenna Coaxial Cable acutely.

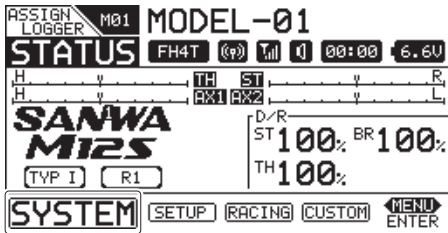
● Do not pull on the antenna with force.



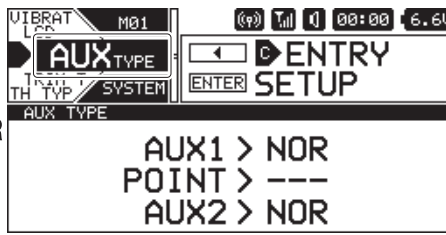
# M12S AND EXZES ZZ TRANSMITTER SETUP

● Set AUX TYPE in system menu of M12S or EXZES ZZ. The SANWA Synchronized Link (SSL) will not function if the transmitter is not set up correctly. To be able to change Super Vortex Generation2 ESC Programming values remotely, AUX (Auxiliary Type1) must be programmed to "CODE 10". \*Default setting is "NOR" which is not compatible with SSL.

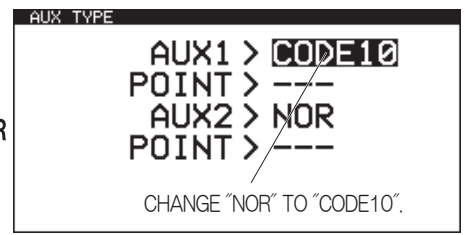
## "STATUS" SCREEN



## "AUX TYPE" SCREEN



## "AUX TYPE SETTING" SCREEN



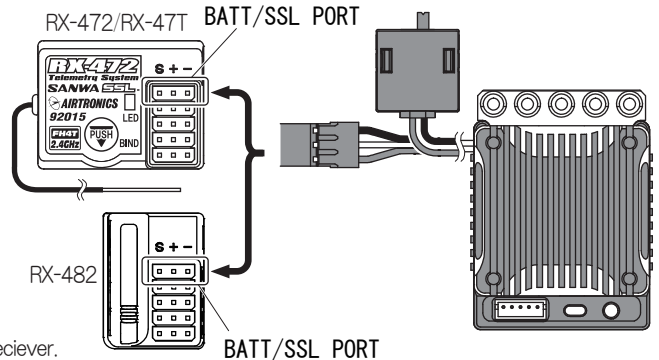
# RECEIVER AND SUPER VORTEX Generation2 ESC SETUP

● Plug the SUPER VORTEX Generation2 ESC throttle lead into the BATT/SSL port in receiver.

WARNING: Never plug a non-SSL compatible device into the SSL port in the receiver.  
If for some reason you don't want to utilize the SSL and telemetry features, or if you're using a non-SSL compatible ESC, plug the ESC throttle lead into the CH2 - ESC port.

- Bind transmitter and receiver. When binding M12S/EXZES ZZ and receiver, MODULATION must be "FH4T". If modulation is set as "FH3/FH3F", SSL will not function.
- When SSL function is active, response mode is SSL original response mode. Response Movement is between SSR and SHR.

\* If you want to set "NOR/SHR/SSR" mode, save the setting values you chose by transmitter SSL, in Super Vortex Generation2 ESC itself.  
And then plug the throttle lead into CH2 in receiver.  
\* If race regulation prohibit the use of CODE AUX (CH3, CH4), plug the throttle lead into CH2 in receiver.



# TRANSMITTER SETUP AND CALIBRATING THROTTLE END POINTS

● Prior to setting up ESC, set up your transmitter as described in the below table.

D/R-TH	THROTTLE • DUAL RATE	HIGH SIDE/BRAKE SIDE	TH 100% / BR 100%
EPA-TH	THROTTLE • END POINT ADJUST	HIGH SIDE	100% H
EPA/TH	THROTTLE • END POINT ADJUST	BRAKE SIDE	100% B/L
EXP-TH	THROTTLE EXPONENTIAL	HIGH SIDE/BRAKE SIDE	OFF / 0%
ARC-TH	THROTTLE • ADJUSTABLE RATE CONTROL	HIGH SIDE/BRAKE SIDE	OFF / 0%
THROTTLE TRIM			CENTER
SUB TRIM-TH SUBTRIM • THROTTLE			0
THROTTLE REVERSE			NOR or REV It cannot be changed after setup.

● Set up "NEUTRAL/HIGH POINT/LOW POINT" as the below instruction.

- Verify that the ESC On/Off switch is turned OFF and the ESC is not plugged into your battery. Remove the pinion gear from motor to prevent any chance of a runaway model during the calibration process. While the throttle trigger in the neutral position, turn your transmitter ON.
- Plug the ESC into battery and turn the ESC On/Off switch ON. Press and hold the Setup Button. The Setup LED will turn solid green.
- While the throttle trigger in the neutral position, press the Setup Button. The Setup LED will turn solid blue, indicating the throttle neutral position is stored.
- While holding the throttle trigger in the full throttle position, press the Setup Button. The Setup LED will turn solid red, indicating the full throttle position is stored. Release the throttle trigger.
- While holding the throttle trigger in the full brake position, press the Setup Button. The Setup LEDs will turn solid red, blue, and green, indicating the full brake position is stored and the calibration process is complete. Release the throttle trigger.

## ● LED THROTTLE POSITION CONDITION INDICATORS

● SUPER VORTEX Gen.2 ESC LED INDICATES THE BELOW ACCORDING TO THROTTLE POSITION WHEN THROTTLE LEAD IS PLUGGED INTO "BATT/SSL PORT" IN RX-472/ RX-482/ RX-47T.

THROTTLE TRIGGER POSITION	LED
NEUTRAL (SSL VALID)-BOOST OFF	SOLID GREEN & FLASHING BLUE
NEUTRAL (SSL INVALID)-BOOST ON	FLASHING GREEN & SOLID BLUE
ANY THROTTLE SETTING OTHER THAN FULL	FLASHING GREEN RAPIDLY
FULL THROTTLE	SOLID BLUE
ANY BRAKE OR REVERSE SETTING OTHER THAN FULL	FLASHING RED RAPIDLY
FULL BRAKE OR FULL REVERSE	SOLID RED

※ If within SSL -CODE AUX, SETUP BUTTON of Super Vortex Gen.2 is pressed and held for approx. 4 seconds, the programming values chosen by transmitter remote setting will be saved in ESC itself. And SSL - CODE AUX will be invalid, indicating Flashing Green LED. If you press and hold the Setup Button again, SSL-CODE AUX will be valid. Refer to the Page 4.

● SUPER VORTEX Gen.2 ESC LED INDICATES THE BELOW ACCORDING TO THROTTLE POSITION WHEN THROTTLE LEAD IS PLUGGED INTO "CH2" IN RX-472/ RX-482/ RX-47T.

THROTTLE TRIGGER POSITION	LED
NEUTRAL - BOOST OFF	FLASHING BLUE
NEUTRAL - BOOST ON	SOLID BLUE
ANY THROTTLE SETTING OTHER THAN FULL (SSR mode)	FLASHING BLUE RAPIDLY
ANY THROTTLE SETTING OTHER THAN FULL (NOR/SHR mode)	FLASHING RED RAPIDLY
FULL THROTTLE	SOLID BLUE
ANY BRAKE OR REVERSE SETTING OTHER THAN FULL	FLASHING RED RAPIDLY
FULL BRAKE OR FULL REVERSE	SOLID RED

**WARNING: PROGRAMMING MODE 1-4 of SUPER VORTEX Generation2 is not compatible with SSL -CODE AUX.**

Change Programming Mode values by SETUP BUTTON of ESC. Only when MODE4 is #2 (Boost ON), MODE 10 - 13 will become active.

**MODE 1 (Cut-Off Voltage)** \*Ensure that the Cut-Off Voltage value you choose matches the battery type you're using.

	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11
flashes x 1blue	OFF	3.0v	3.3v	3.6v	4.0v	4.4v	4.8v	5.2v	5.6v	6.0v	6.4v

**MODE 2 (Reverse)** Enable or Disable Reverse function. Reverse is 50% of speed of forward.

	#1	#2
flashes x 2blue	Disabled	Enabled

**MODE 3 (Thermal Protection)** ESC and motor over-heat protection. Requires motor be equipped with temperature sensor.

	#1	#2	#3	#4	#5	#6
flashes x 3blue	120°C/80°C	120°C/90°C	120°C/100°C	120°C/110°C	120°C/120°C	OFF/OFF

**MODE 4 (Boost)** \*When throttle is in neutral, if #1 is set, Blue LED will be flashing and if #2 is set, Blue LED is solid on.

	#1	#2
flashes x 4blue	Disabled	Enabled

\*Only when #2 boost enabled is set, Mode 10, 11, 12 & 13 are valid.

IMPORTANT: Change Programming Mode Values by SETUP BUTTON of SUPER VORTEX Gen.2. \*Default values are shown in gray.

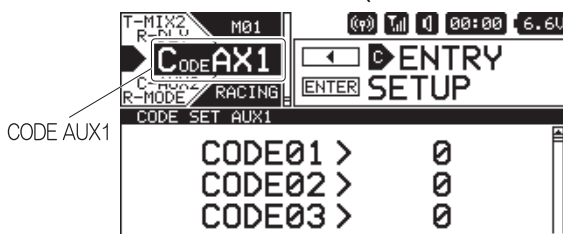
● SSL - CODE AUX allows you to change many programming mode values of SUPER VORTEX Gen.2 ESC directly from M12S/ EXZES ZZ Transmitter.

Change the values in CODE AUX 1 in Racing Mode Menu of M12S/ EXZES ZZ.

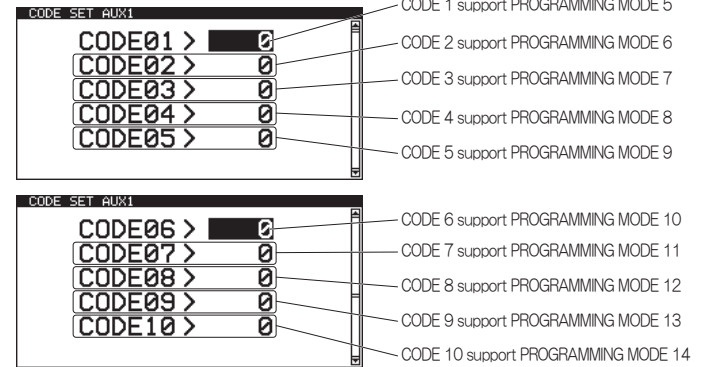
The functions supported by CODE AUX of SUPER VORTEX Gen.2.

Change the programming mode values in CODE 1 - CODE10 according to your preference by multi-selector of transmitter.

"CODE AUX 1" SCREEN (IN RACING MODE MENU)



"CODE AUX 1 SETTING" SCREEN



Transmitter Function	SUPPORTED FUNCTION	VALUES	MOVEMENT
CODE AUX1 CODE1	MODE 5 THROTTLE PUNCH	0~100	It adjusts the punch when motor is started by throttle operation. Higher values increase the strongness of punch, Recommended Value for 17.5T Stock Motor is "60 - 80" .
CODE AUX1 CODE2	MODE 6 NEUTRAL BRAKE RATE	0~100	It changes the braking effectiveness as the throttle trigger is returned to neutral. Higher values increase the braking effectiveness.
CODE AUX1 CODE3	MODE 7 DRIVE FEEL	0~100	Higher values increase the smoothness of the throttle in the forward and return to the neutral directions.
CODE AUX1 CODE4	MODE 8 NEUTRAL BRAKE FEEL	0~100	Higher values increase the smoothness of the Neutral Brake Function.
CODE AUX1 CODE5	MODE 9 BRAKE FEEL	0~100	Higher values increase the smoothness of throttle in the brake and return to neutral directions.
CODE AUX1 CODE6	MODE 10 BOOST RATE	0~100	Higher values increase motor performance throughout the entire throttle range. Too high values can damage ESC or motor by overcurrent or overheat. *If the value is Zero, BOOST and TURBO are invalid.
CODE AUX1 CODE7	MODE 11 TURBO	0~50	It increases the Timing Advance at only the full throttle position by percentage chosen. Too high values can damage ESC or motor by overcurrent or overheat.
CODE AUX1 CODE8	MODE 12 BOOST STARTING RPM	0~100	It adjusts the starting position of RPM at which the Boost Timing becomes active. When the value is "0", boost starts at 23,000rpm. When the value is "100", boost starts at 3,000rpm. Every 200rpm changes according to 1 step. Recommended Value for 17.5T stock motor is "80 or around" .
CODE AUX1 CODE9	MODE 13 BOOST ACCELERATION	0~100	It increases the amount of boost rate per 1,000rpm. Recommended Value for 17.5T stock motor is "45 - 80", for 13.5T stock motor is "14 - 45", and for modified motor is "1 - 8" .
CODE AUX1 CODE10	MODE 14 NEUTRAL DEAD BAND	10~50	It adjusts "Play" (looseness) in Neutral range. "10" decrease "Play". And "50" increase "Play". Recommended value for 17.5T stock motor is "25 or less" and for modified motor is "25 or more" .

**WARNING:** On condition that CODE 1-CODE 10 in CODE AUX of M12S/EXZES ZZ is "0" and SSL-CODE AUX is valid, if Super VortexGen.2 ESC is powered on, Mode 5 - Mode 14 will be "#1". Change each programming values in CODE AUX 1 according to your preference.

**WARNING:** If you change programming values by the Setup button of Super VortexGen.2 ESC, on condition that SSL-CODE AUX is valid, the programming mode values set by Setup button will be applied to ESC. The programming mode values changed by the Setup button will be saved after returning to Operating Mode from Mode14.

**WARNING:** The above recommended values are for 1/10th EP Touring Car. It will change according to your motor, battery, or driving conditions.

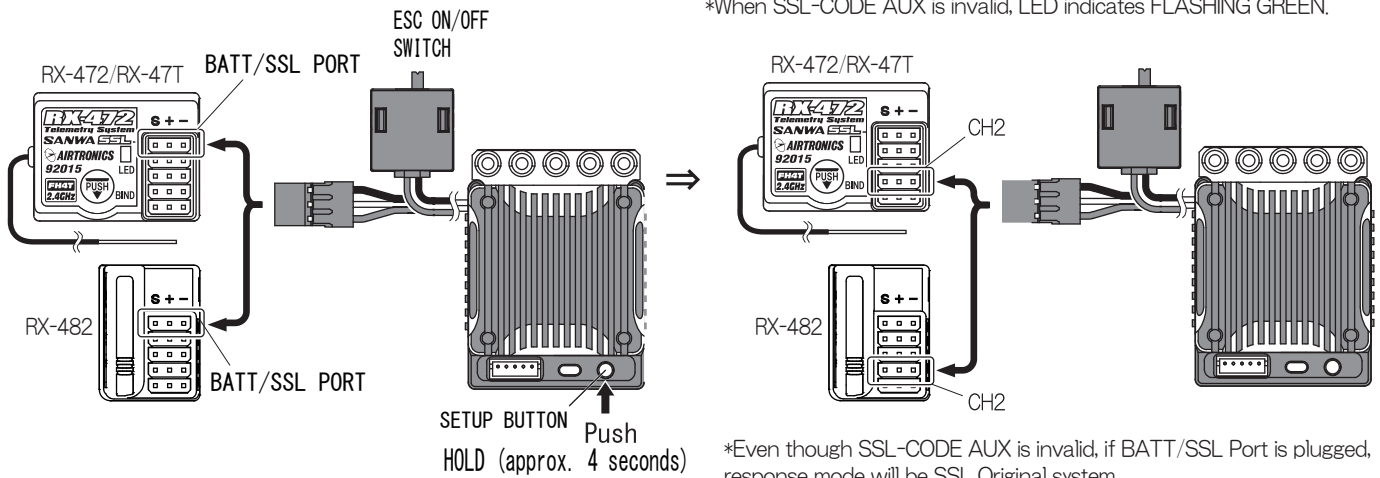
So adjust values while driving considering temperature of equipment.

**WARNING:** M12, EXZES Z, MT-4S, MT-S don't have CODE 10 function. CODE AUX of M12, EXZES Z, MT-4S, MT-S can change values only for throttle punch/neutral brake rate/drive feel/neutral brake feel/brake feel.

● If the regulation of races etc. prohibit the use of AUX (3CH/4CH) or you don't use SSL system, or you want to use NOR/SHR/SSR response mode, save the changed values in Super Vortex Gen.2 ESC itself and then plug throttle lead into CH2 in receivers.

1) Press and Hold the Setup button for approx. 4 seconds when the throttle lead is plugged into BATT/SSL PORT of RX-472/RX-482/RX-47T and ESC LED is SOLID GREEN indicating SSL-CODE AUX is valid.

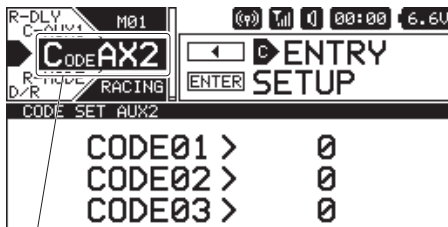
2) After holding the Setup button, SSL-CODE AUX will be changed to INVALID from VALID. When SSL-CODE AUX is changed to INVALID, each value changed from transmitter will be saved in SUPER VORTEX Gen.2. And then change to plug throttle lead into CH2 in receivers.  
\*When SSL-CODE AUX is invalid, LED indicates FLASHING GREEN.



## SETTING FOR CODE AUX2

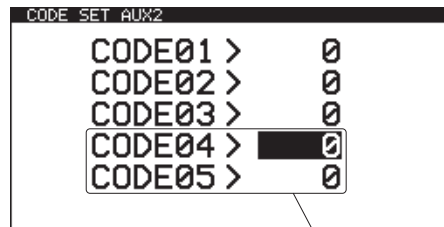
● When used with SUPER VORTEX Gen.2 ESC, M12S/EXZES ZZ transmitter, and RX-472/RX-482/RX-47T SSL-CODE AUX-Compatible receiver, you don't use CODE AUX 2. CODE AUX 2 will be used when you change the setting of SGS-01C/SGS-01D GYRO together with SUPER VORTEX Gen.2 ESC from transmitter.

"CODE AUX 2 SELECTION" SCREEN (IN RACING MENU)



CODE AUX2

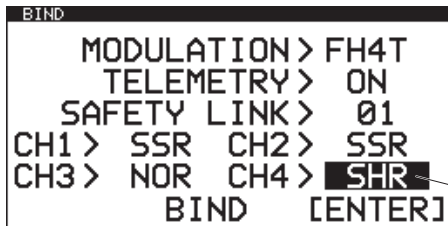
"CODE AUX 2 SETTING" SCREEN



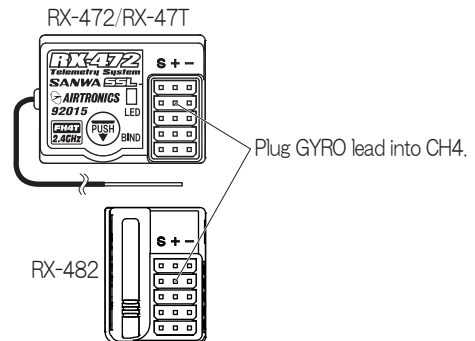
FOR GYRO SETTING

● When you use GYRO together with SUPER VORTEX Gen.2 ESC, plug the GYRO lead into CH4 in receiver, and set CH4 as SHR (response mode) from transmitter when binding. If any other response mode than SHR is set, transmitter remote setting for Gyro is invalid.

"SETTING" SCREEN



CH4 should be "SHR" when binding.



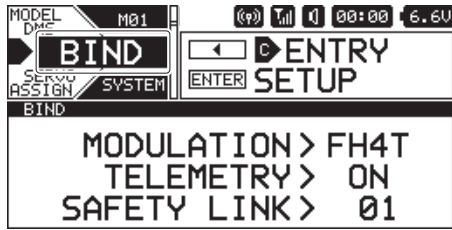
\*Refer to the user's manual of gyro regarding setting of Gyro.



●When used with M12S/EXZES ZZ transmitter, RX-472/RX-482/RX-47T receiver and SUPER VORTEX Gen.2 ESC, SSL-CODE AUX and SSL-Telemetry allows you to confirm telemetry data on RPM of motor, battery volatge, ESC temperature, and motor temperature (if supported by motor) without other sensors by transmitter. In addition, it allows to receive the buzzer or vibration alarm about the volatge and temperature set by transmitter so it prevents damage of your equipment.

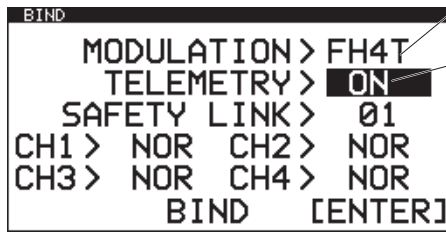
1) Set MODULATION as "FH4" and set Telemetry as "ON" in BIND MENU from SYSTEM MENU.

"BIND SELECTION" SCREEN in SYSTEM MENU



⇒  
ENTER

"SETTING" SCREEN

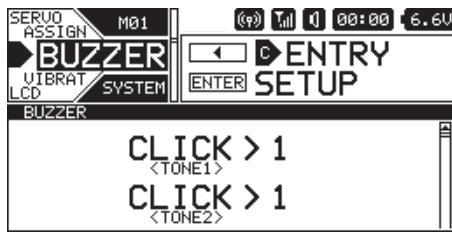


MODULATION should be "FH4T/FH4".

TELEMETRY should be "ON".

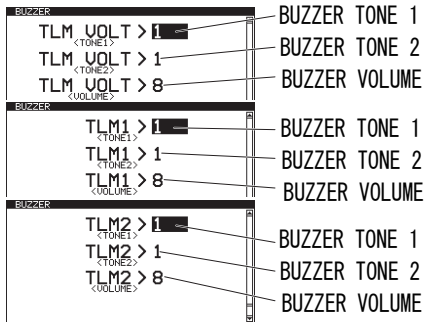
2) Setting for BUZZER in SYSTEM MENU

"BUZZER SELECTION" SCREEN in SYSTEM MENU



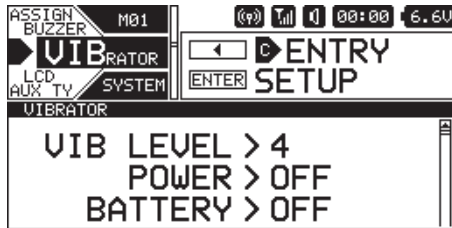
⇒  
ENTER

"BUZZER SETTING" SCREEN (TELEMETRY)



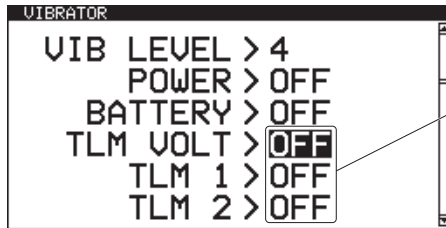
3) Setting for VIBRATOR in SYSTEM MENU

"VIBRATOR SELECTION" SCREEN in SYSTEM MENU



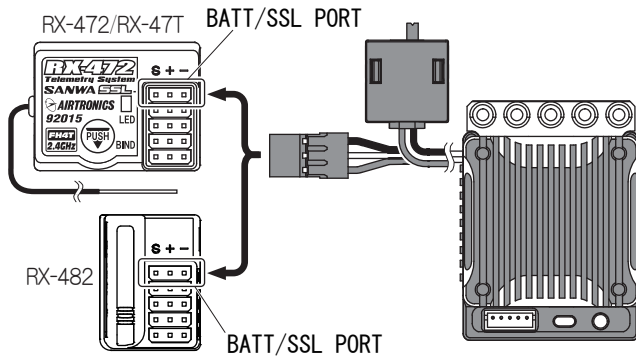
⇒  
ENTER

"VIBRATOR SETTING" SCREEN



Select ON or OFF according to your preference.

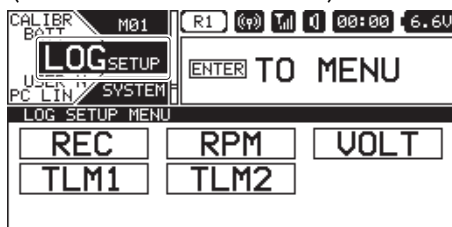
4) Plug throttle lead into BATT/SSL PORT in RX-472/RX-482/RX-47T receiver.



5) Setting for LOG VOLTAGE in SYSTEM MENU

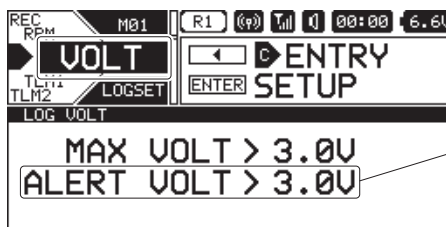
Set the voltage which actuates BUZZER/VIBRATOR.  
\*LOG VOLATGE is the voltage for your driving battery.

"LOG SETUP SELECTION" SCREEN  
(LOG SETUP in SYSTEM MENU)



⇒  
ENTER

"LOG VOLT SELECTION" SCREEN



Set the vaoltge which actuates BUZZER/VIBRATOR.

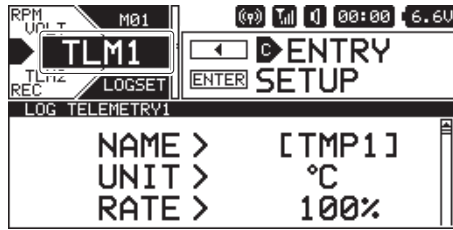
6) Setting for ALERT in TELEMETRY 1 and TELEMETRY 2 from LOG SETUP in SYSTEM MENU

- Setting for TLM1 ALERT

Set the temperature which actuates BUZZER/VIBRATOR in TLM1 ALERT in LOG SETUP.

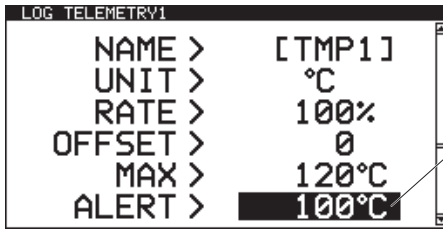
(\*Default setting for TLM1 is internal temperature of ESC.)

"TLM1 SELECTION" SCREEN (in SYSTEM MENU)



ENTER

"LOG TELEMETRY 1 SETTING" SCREEN



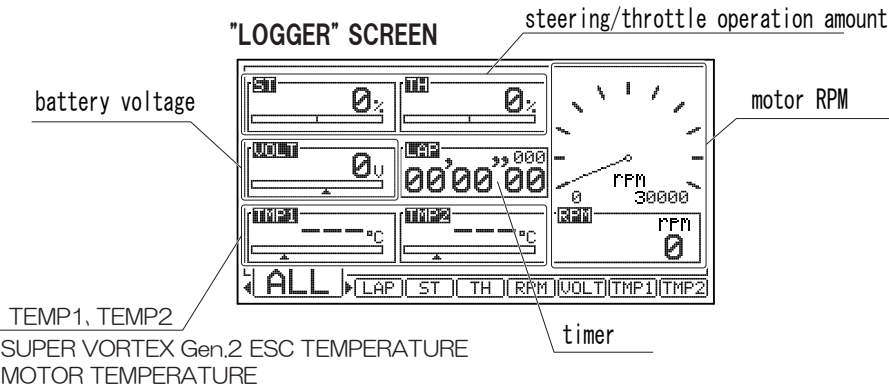
Set the temperature which actuates BUZZER/VIBRATOR.

- Setting for TLM2 ALERT

Set the temperature which actuates BUZZER/VIBRATOR in TLM2 ALERT in LOG SETUP like TLM1.

(\*Default setting for TLM2 is internal temperature of motor. If your motor don't have temperature sensor, it will not function.)

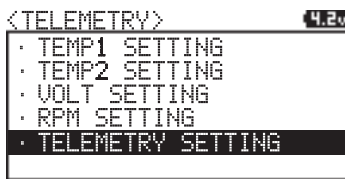
○The above setting allows to actuate BUZZER or VIBRATOR when the battery voltage and equipment temperature reach the set values. When SSL-TELEMETRY is active, LOGGER SCREEN display motor RPM, Battery Voltage, Temperature 1 and Temperature 2 on real time. Real-time display for motor RPM, Battery Voltage, Temperature 1 and Temperature 2 is also possible for MT-4S. It is available by setting in TELEMETRY SETTING MENU.



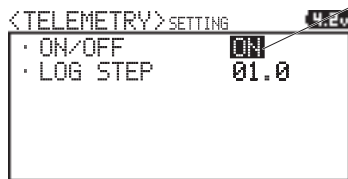
●When used with MT-4S/MT-S transmitter, SSL-CODE AUX and SSL-Telemetry allows you to confirm telemetry data on RPM of motor, battery voltage, ESC temperature, and motor temperature (if supported by motor) without other sensors by transmitter. In addition, it allows to receive the buzzer or vibration alarm about the voltage and temperature set by transmitter so it prevents damage of your equipment.

WARNING: MT-4S and MT-S is not compatible CODE 10. So the function compatible with CODE 10 of SUPER VORTEX Gen.2 ESC cannot be controlled from transmitter remotely.

1) TELEMETRY SETTING in SYSTEM MENU

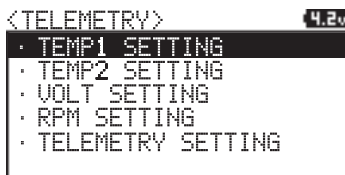


ENTER

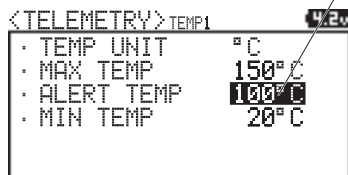


If OFF, Telemetry will not work.

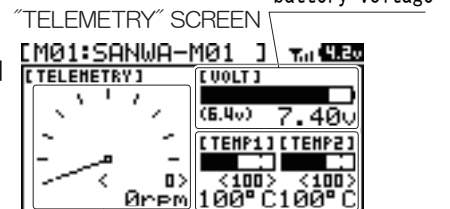
2) TEMP1, TEMP2 ALERT SETTING



ENTER



Set the temperature which actuates ALERT.  
Set TEMP2 as well as TEMP1.

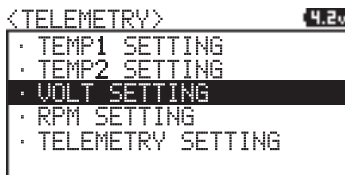


motor RPM

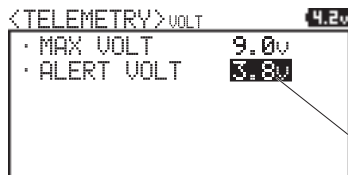
TEMP1, TEMP2

TEMP1: SUPER VORTEX Gen.2 TEMPERATURE  
TEMP2: MOTOR TEMPERATURE

3) VOLT ALERT SETTING



ENTER



Set the voltage which actuates ALERT.

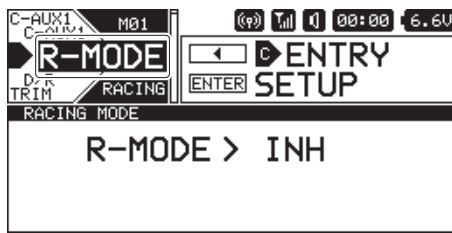
● RACING MODE function of M12S/EXZES ZZ allows you to set the several patterns on the values of SUPER VORTEX Gen.2 in advance to call up the desired setting easily according to your motor features or your preference.

WARNING: When SSL-CODE AUX is invalid, you cannot change setting by RACING MODE.

• SETTING FOR RACING MODE

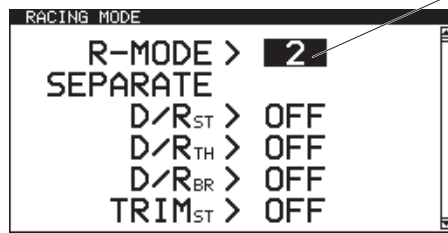
RACING MODE in RACING MENU → [INF] → Set [2] ~ [5]

“RACING MODE SELECTION” SCREEN



⇒  
ENTER

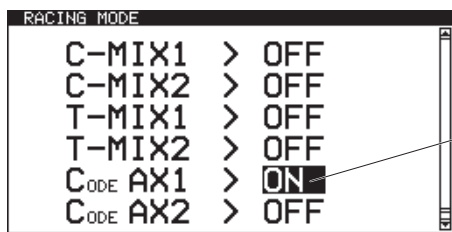
“RACING MODE SETTING” SCREEN



Select [2] ~ [5] according to your preference.

After setting [2~5] in RACING MODE, each menu will be displayed separately. Select CODE AUX1 and change setting from “OFF” to “ON”.

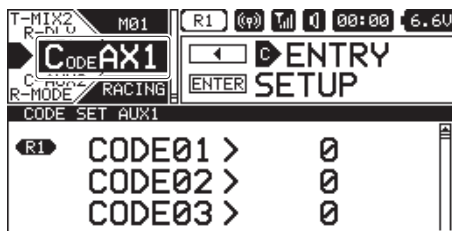
“RACING MODE SETTING” SCREEN



Set “ON”.

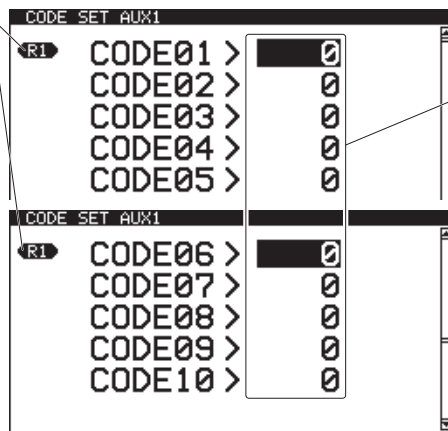
When Separate setting for CODE AUX 1 in RACING MODE is “ON”, it allows you to program the different Programming Values (CODE 1 - 10) for each RACING MODE (Racing Mode 1 - 5).

“CODE AUX 1 SELECTION” SCREEN



R-MODE Setting display  
⇒  
ENTER

“CODE AUX 1 SETTING” SCREEN



The different Programming Mode (CODE 1 -10) for each RACING MODE (Racing Mode 1-5) can be programmed.

In default setting, the switch of RACING MODE is assigned to Trim Lever 4 (TRM4) of M12S and Trim Lever 3 (TRM3) of EXZES ZZ. RACING MODE LED indicates the current racing mode while operating the assigned trim lever.

Trim Lever (TRM 4)

RACING MODE LED

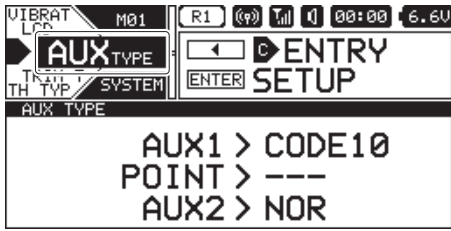
RACING MODE LED INDICATION						
LED MODE	OFF	R1	R2	R3	R4	R5
Racing LED	OFF	GREEN	MAGENTA	CYAN	YELLOW	WHITE

Trim Lever (TRM 3)

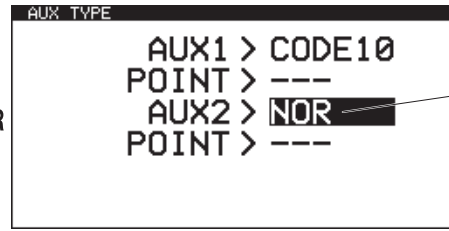
WARNING: When RACING MODE is switchable, if you hold SETUP BUTTON of ESC to disable SSL-CODE AUX function, the Programming Mode values of the selected RACING MODE will be saved in SUPER VORTEX Gen.2 ESC.

- AUX Channel of M12S/EXZES ZZ allows you to set an external device like Gyro, while using SSL system - CODE AUX 1 for Super Vortex Gen.2 ESC.. Use CODE AUX 2 for an external device.
- SETTING FOR AN EXTERNAL DEVICE BY CODE AUX 2  
Set AUX 2 in AUX TYPE from SYSTEM MENU as "NOR".

### "AUX TYPE" SCREEN

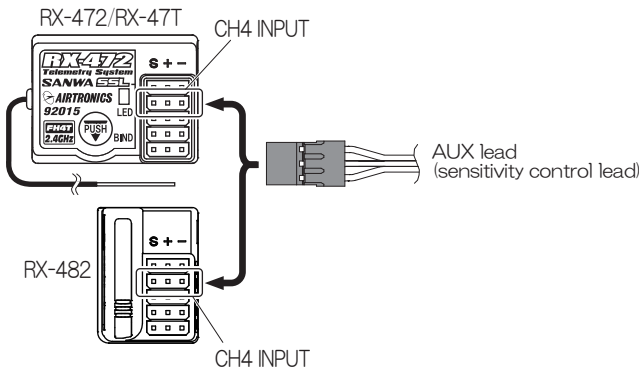


### "AUX TYPE SETTING" SCREEN



Set "NOR".

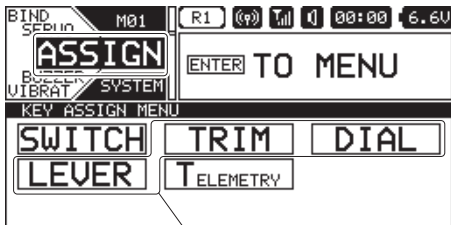
Plug sensitivity control device lead into CH4 in compatible-receiver.



### • HOW TO ADJUST SENSITIVITY CONTROL FOR AN EXTERNAL DEVICE

You can adjust sensitivity control for an external device by VOLUME/LEVER/TRIM which you assign with the function by CODE AUX2. In default, the function is assigned to LEVER. Assign the adjustment function to Trim or Dial or Lever according to your preference. Change the assignment from "ASSIGN" in SYSTEM MENU.

### "ASSIGN SELECTION" SCREEN



Select the item which you assign the function.  
Refer to the detailed explanation in user's manual for transmitter.

