



alien COMMAND

ADVANCED

SETUP GUIDE



Setting up the CSM CL1 mixer with the Alien command on a 120 degree CCPM helicopter:

This is a basic installation guide, please read the manual for the CL1 mixer and the Alien Command before installing them.

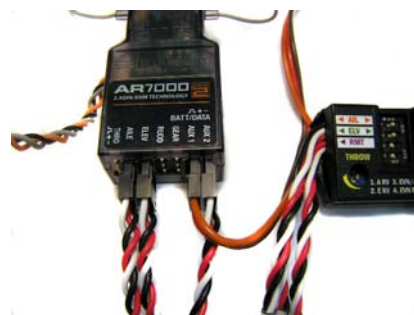
Position the CLI unit so that the led's are visible.

Turn off CCPM mixing in the transmitter.

The mixer takes separate collective, elevator and aileron signals and performs all the mixing functions for CCPM. Set the transmitter to single servo 90 degree swash plate. Set travel adjust (ATV) to maximum, this give the best resolution to calibrate the unit.

Connect the wires as below, heli tail towards you for left and right servo orientation.

SERVO	CL1	Alien Command	Receiver (DX6i, DX7)
Aileron (left)	Left channel	Aileron channel	Aileron channel (channel 2 Esky, Futaba and others)
Elevator servo (middle)	Center channel	Elevator channel	Elevator channel (channel 1 Esky, Futaba & others).
Pitch servo (right)	Right channel	NA	Aux 1 (channel 6 Esky, Futaba and others)



Rudder and gyro are as normal rudder servo to gyro, three wire from gyro to rudder channel (channel 4 Esky, Futaba & others), and gyro gain control to gear channel (channel 5 Esky, Futaba & others).

Turn the “throw” pot on the Alien command to minimum.

On the transmitter use the reverse menu to;

1. Adjust the AILERON servo direction so that the LED on the CL1 goes ON solid when the stick is moved to the RIGHT.
2. Adjust the ELEVATOR servo directions that the LED on the CL1 goes ON solid when the stick is moved UP (forward)

On Futaba this usually requires the elevator and collective channels to be reversed.

On JR transmitters this usually requires the aileron channel to be reversed.

Setting the collective pitch curve:

Set the pitch curve to be linear running from 0% at fully down, 50% at mid stick and 100% at fully up.

Setting the trims:

Centre the aileron and elevator trims and sub-trims.

Mixer settings:

Set the Mid Stick pulse length to match your radio system. This is 1500 for JR and Sanwa and 1520 for Futaba and Hitec. Note that the "AIL" and "ELE" LEDs flash when their respective signals are within a click of trim of the set mid stick value so you should find that with the cyclic stick centred (and no trims set) both these LEDs should be flashing. If not then check that no trim or sub trim is being used on these signals and, if needed, slightly adjust the mid stick value in the mixer until both these LEDs are flashing. (If this is not possible then the transmitter is somewhat out of adjustment and in this case a small amount of sub trim should then be used to align the aileron and elevator signals to correct for this).

Set Swash-plate phase correction to zero.

Set Swash-plate servo type to match the type of servos in use (if in doubt use "standard").

Set the Servo speed value to match the stated speed of the swash-plate servos at the voltage you are using. This is used to prevent transient elevator to collective interaction in 120 degree CCPM systems due to the greater distance travelled by the centre servo in elevator operation.

Disconnect motor or use throttle hold.

Using the software and interface cable for the CL1, adjust the settings for collective, elevator and Aileron sense, for the LEFT, RIGHT and CENTER servos until the swash-plate is moving correctly. Now centre the collective control. The "COL" LED will flash when the collective stick (left) is centred.

With the collective (left stick) centred:

Adjust the Trim values for each servo to level the swash-plate in the middle of its travel. Adjust the elevator gain values to obtain the correct elevator throw and to remove any aileron or collective



change with elevator control. Adjust the aileron gain values to obtain the correct aileron throw and to remove any elevator or collective change with aileron control.

With the collective fully UP:

Adjust the UP collective gain values to obtain the correct positive collective pitch range, i.e. max pitch.

With the collective fully DOWN:

Adjust the DOWN collective gain values to obtain the correct negative collective pitch range.

Once you have the correct pitch range it is best to remove the head and use a levelling gauge on the swash-plate to check the following.

With the collective fully UP:

Adjust the UP collective gain values to level the swash-plate in its fully up position.

Apply full left and right aileron while watching for any tendency for the swash-plate to tip forwards or backwards (Aileron to elevator interaction). Note in this type of interaction both left and right aileron deflection causes the same direction elevator movement (e.g. back elevator for both right and left aileron). If needed adjust the Aileron to elevator interaction corrector for UP collective until no elevator effect is seen with aileron deflection.

Now observe if there is any tendency for the collective pitch to change with application of the aileron control.

Note in this type of interaction both left and right aileron tend to cause the same direction of collective change (e.g. Reduction in collective for both left and right aileron). Remove any such tendencies by adjustment of the

Aileron to collective interaction corrector for UP collective:

Now apply full forward and back elevator and observe any change in collective. In this type of interaction both forward and back elevator cause the same direction of collective change (e.g. Reduction of collective for both forward and back elevator). Remove any such tendency using the Elevator to collective interaction corrector for UP collective.

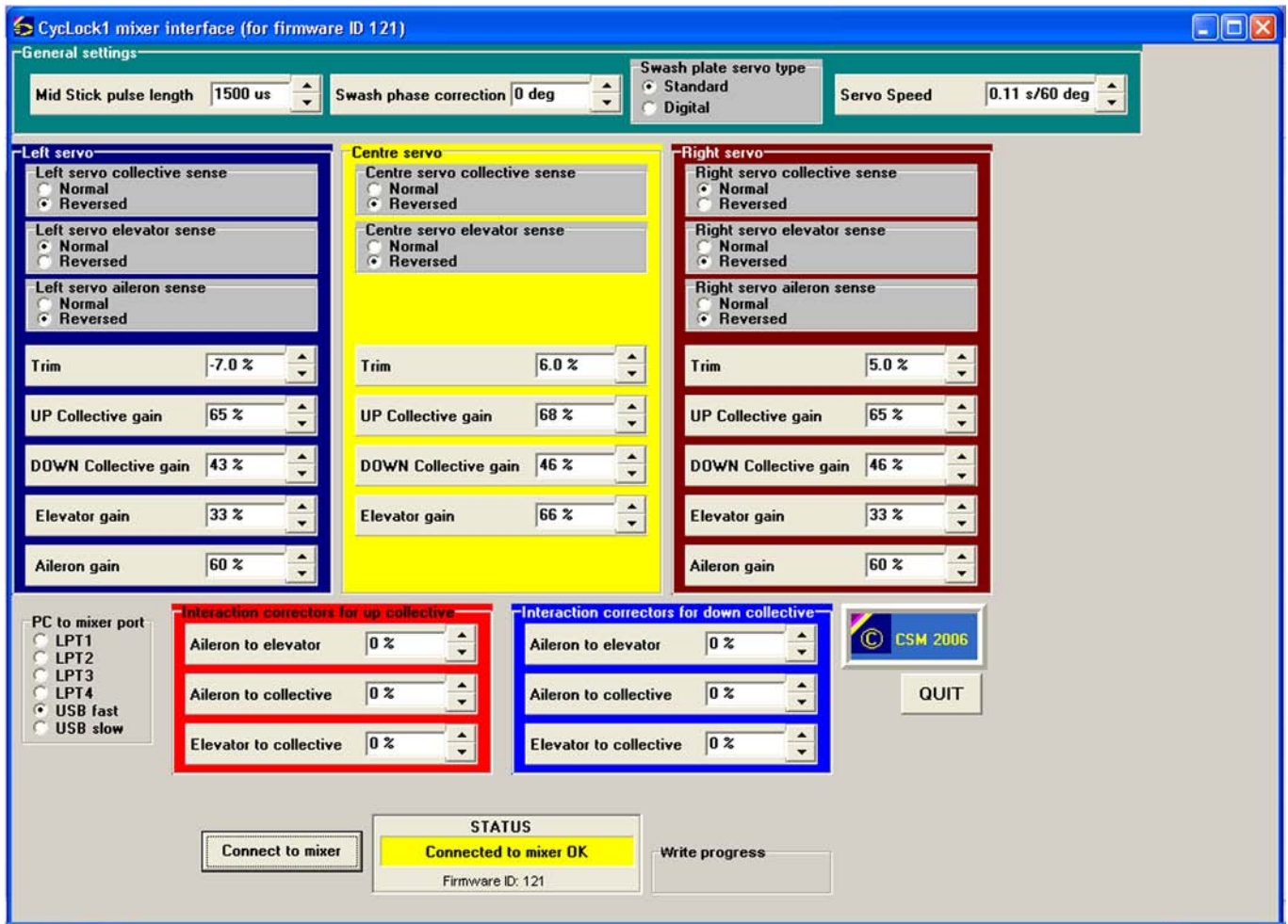
With the collective fully DOWN:

Adjust the DOWN collective gain values to level the swash-plate at its minimum position.

Adjust the interaction correctors for DOWN collective to remove any Aileron-elevator, Aileron collective and Elevator-collective interactions as described for the UP collective position above.

The picture on the **next page** shows the settings for a Trex 450 SE v2, this can be used a guide for setting up but since every servo etc will be slightly different follow the instructions above to set up you heli.





Flight testing:

Minor adjustments to the settings should be made in the light of flight tests. Two typical adjustments are:

In upright full climb helicopter moves to your right. Correct by increasing the UP collective gain for the right servo and decreasing the UP collective gain for the left servo.

In inverted full climb helicopter moves to your left. This cannot be done with the Alien Command in operation.

Correct by increasing the DOWN collective gain for the right servo and decrease the DOWN collective gain for the left servo.

The last adjustment to make is the Swash-plate phase correction. Swash-plate phase errors cause aileron to elevator and elevator to aileron interactions of a circular type in one of the following two patterns.

Forward elevator causes some right roll.

Right aileron causes some nose up.

Back elevator causes some left roll.

Left aileron causes some nose down.



OR

Forward elevator causes some left roll.
Right aileron causes some nose down.
Back elevator causes some right roll.
Left aileron causes some nose up.

Once this is done replace the head and we are ready to set up the Alien command....

Alien Command set up:

Please note – This is a supplement and you should also read the full Alien Command manual in order to fully understand how to set up the Alien Command component.

Turn the “throw” pot to maximum. Press and hold the button in while connecting the battery (taping the button down will help unless you have three hands).

Once the heli is powered up the swash-plate will twitch three times, this shows the unit is in setup mode. The switches on the AC unit must be set in this mode as the unit will memorise the settings, adjusting the switches outside of this mode will have no effect.

Used a heat source (a cup of hot coffee works well) or put your hand over one of the sensors and check there is movement from the swash-plate, if there is not then check another sensor. The setup mode activates on diagonally opposite pair of sensors. When placing your hand or warm object in front of a sensor it should make the swash plate move in the opposite direction to the heat source. i.e. activating the left rear sensor should make the swash move down & right (diagonally).

Use the switches on the Alien Command unit to achieve the correct movement of the swash plate. Once you have the correct movement on a pair of sensors press the button, this will activate the other pair. Repeat the above until all sensors operate the swash correctly.

For a Trex 450 SE v2 the switch positions are 1 & 2 ON 3 & 4 OFF.

Once this is done power off the heli and the settings will be stored.

DONE.

Setting up the Alien Command (AC) for flying.

Since the AC uses thermal imaging to operate it works best with a wide horizon, open fields etc. Avoid flying close to trees or buildings as it will affect the AC unit's performance.

1. Power up heli and transmitter.
2. Calibrating the AC unit is done by holding the helicopter on its side so the AC sensor has two lenses pointing up and the other two down, try to keep the boom parallel to the ground with the sensor vertical. With the heli in this position press the button for the AC to begin calibration.



3. The swash-plate will pulse (**count them**).
0 to 3 and the AC unit does not have enough sensitivity to work.
3 to 5 pulses will give limited performance.
5 to 10 pulses provide best results. Once the AC has stopped pulsing, the swash-plate will slowly rock, **DO NOT** try to fly this time.
4. Place the Helicopter on the ground and try to get it as level as possible (a bubble level on the tail boom works great). Once it is level, walk away about 5 to 10m to a position behind the helicopter, directly behind it is best then you won't interfere with the sensors.
5. Once happy and ready to fly move the **right stick from left to right a few times**, you will notice the swash-plate will stop rocking and set to it's normal position.
6. The AC unit will still require trimming in flight, to do this hold the heli in a hover and ease off the right stick to see which way the heli wants to drift.

If you find it is drifting to the left then use the trim slider to counter it, move the trim (right horizontal) to the right until the heli no longer wants to drift, the same applies to drifting forward or backwards, use the trims to counter any drift until the heli hovers without you having to adjust with the right stick.

This procedure will have to be done for each flight to ensure maximum benefit from the AC unit. It should also be done if weather conditions change (God help us if the sun comes out while we're ever flying (c;))

If you are not confident in adjusting the trims in flight, remember which way it is drifting, land and then adjust trim, take off and check for drift, repeat until it is trimmed out.

Try not to fly too closely to yourself or others as the body heat signature may affect the AC unit and cause unpredictable flight.

The trimming out of the heli in flight means that it will provide stability even in windy conditions.





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