

Fast Electrical Linking of dual 2-axis stations using CL SPU + BLDRV2 Cards and the CL XOver Link card

Setup Steps

1. Firstly setup and check each station (pilot and co-pilot) as standalone systems to confirm normal operation. Use separate FTDI cables for this to set up separate COM ports for each station. A single USB joystick card can be used for trim inputs, hot buttons etc for both stations however.

Check both normal loaded operation and A/P following behaviour for each station.

2. Connect the CL_XOver Link card to the CL_SPU's on each station using the supplied I2C leads.

(See Appendix 2 of the CL_SPU data sheet for more details of connections)

3. Configure the CL Software for electrical linking. In Config Mngr go to Tab 6, then set:

Item 1: COM port for Pilot Station FTDI cable.

Item 15: COM port for Co_Pilot station.

Item 16: Set same as Item 7 (Pilot station joystick card number).

Item 17: Master/Slave toggle buttons on pilot station joystick card.

4. Note Item 18: Slave movement invert. If your slave station position follows in opposite direction then this can be used to reverse the movement. Set as required on testing.

5. Go to Tab 4 - A/P Following.

Check the PID settings (Items 16 – 21) are not all zero. This would disable the position following movement.

For initial setup purposes it is sensible to set Items 13 & 14 = 127. This will raise the displacement induced auto-switch over triggers to such an extent that they will become inactive. This will help with initial PID value setting because control will remain with the Master station until a toggle button is pressed.

Once good PID settings are determined then the trigger displacements can be reduced to working levels.

6. Save the settings.
7. Start the sim software with your aircraft stationary on the ground and the software unpaused. This will make initial checking of the position following easier if there is no loading and you don't need to fly the aircraft whilst making settings.

Start the CL software, and power up and calibrate the controls as normal.

8. Check the CL_X_Over Link card LED's. The LED on the Slave side should be blinking to indicate that position data from the master is being received and is available.

Pressing a Master/Slave toggle switch should swap control between stations and cause the green LED on the other side (the new slave) to blink.

9. Position both sets of controls near their mid-positions. Engage the loading on the CL Software.

The slave station should follow the master station.

10. The smoothness of the position following depends on several factors. These include the smoothness of the mechanical system, the PID settings used and the cap level applied to the maximum torque available by the cards.

The system cannot compensate for rough or sticky mechanical builds.

PID settings can be altered in Tab 4. Normal procedure is to raise the P (proportional) term until the position following response to a sharp movement starts to show signs of overshoot. Then to raise the D setting to dampen down the oscillation.

Usually the I terms are not required.

Note that the PID settings are used for both the Master/Slave position following and for A/P position following. So check both modes of operation with your settings.

By default the available position following torque is capped by the cards at 50% of maximum. This is usually sufficient for position following duty. The cap level is set using the PID_Cap parameters in the BLDRV2.ini EEPROM settings file in the Config Mngr folder. To change this the Update_EEPROM facility of the Driver Test App must be used.

PID_Cap=2 for 50% of max, =3 for 33%, =4 for 25%, =5 for 20% etc.

11. For details of additional control swap switch or grip sensor connections to the CL_XOver card see Appendix 2 of the CL_SPU card data sheet.

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