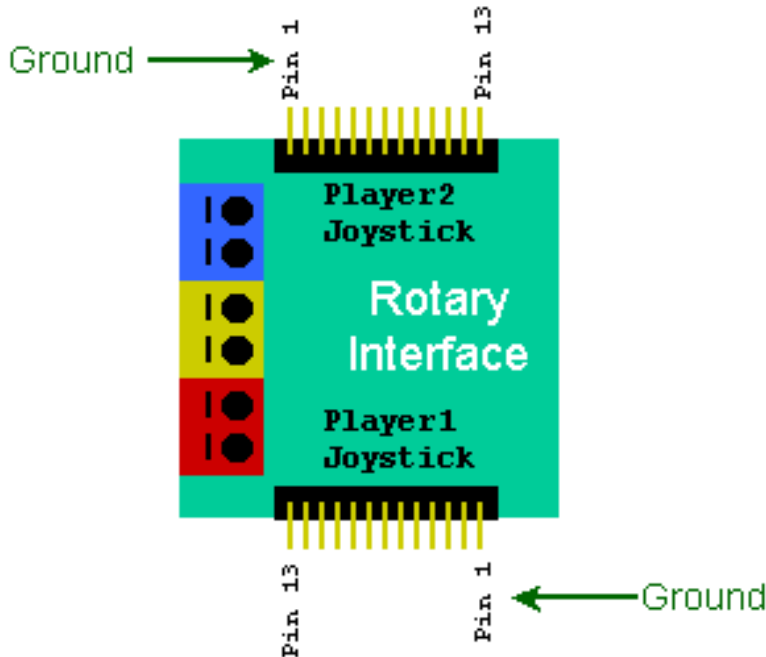# Rotary Interface Instructions

<u>Connecting to rotary joysticks</u>

There are two 13-pin right angle male headers on the rotary interface to connect 2 rotary joysticks.

WARNING: The rotary interface will only work with 12 position rotary joysticks such as the LS-30.

WARNING: Be very careful when plugging and unplugging the ribbon cables to the joystick and interface. The pins and connectors can be easily damaged.

WARNING: The chips on the rotary interface can be damaged by static electricity. Always ground yourself before handling.

The 13-pin connectors are designed to work with LS-30 13-pin ribbon cables. Please note that LS-30 ribbon cables are not <u>straight</u> connections. One side of the cable only works with the joystick and the other side only works with the interface. The rotary joystick switch has 12 positions and a ground. The ground needs to be connected to Pin 1 on the rotary interface. The LS-30 ribbon cables usually have a small "R" on one of the connectors. The R-side plugs into the LS-30 joystick.

Recommendation: I have found that it is important to have the LS-30 joysticks grounded to an earth ground to prevent static electricity interference. I use a 12 gauge solid wire with 1 end connected to the LS-30 steel frame and the other to an earth ground.

Recommendation: When purchasing rotary joysticks you need to beware of sticks that have substantial use because the rotary switches may have worn brushes that will not function reliably with the rotary interface. Bent joystick shafts can also interfere with the rotary switch.

Connecting to keyboard encoder

There are 6 wires that go from the interface to the keyboard encoder.   For demonstration purpose I have provided an illustration using an IPAC VE. The same principles hold true for other encoders.
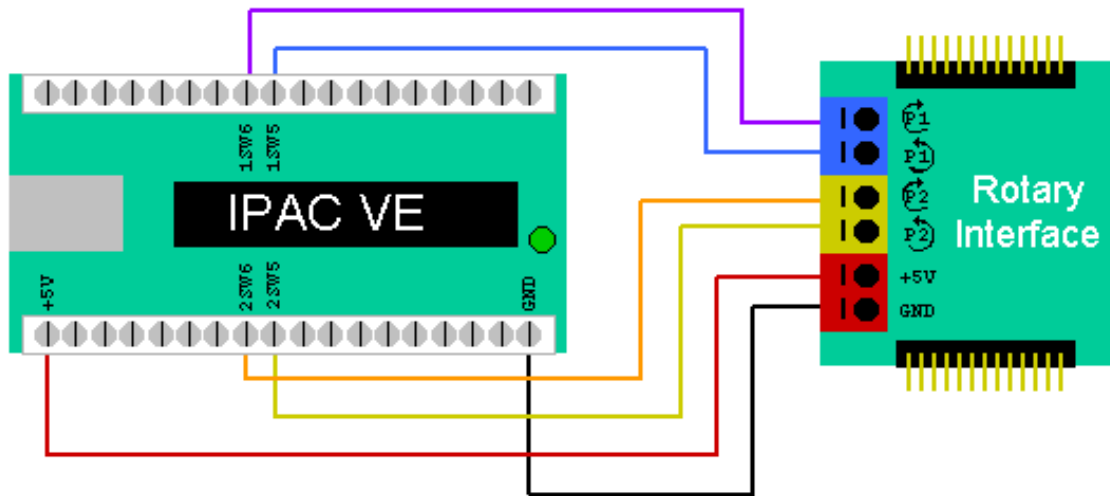
WARNING: Do NOT reverse the +5V and GND because it can damage the interface.

WARNING: The rotary interface should only be powered from the keyboard encoder. Do NOT try to power the interface from a wall transformer.

WARNING: Disconnect power to the keyboard encoder before connecting the rotary interface.

The red/yellow/blue screwless wire connectors work best with 18 – 22 gauge solid wire. Simply strip about a ¼" off the end of a wire and press it firmly into the round hole on the connector until it locks. The wire can be released by inserting a small screwdriver (or a paperclip) firmly into the adjacent rectangular hole. The connectors allow wires to be inserted in either the side or top holes. Please note that the top wire release will not release the side connector, it will only release the top connector and vice versa.   Wires can be plugged into both top and side connectors in case you want to power other devices or share inputs. If you need to use a stranded wire or a thinner gauge than it will be necessary to insert a small screwdriver into the adjacent rectangular hole while inserting the wire. Otherwise the wire will probably bend and not lock properly. Crimp on pin connectors (Radio Shack part# 64-3095) can also be used with thinner or stranded wire, but due to their thickness the connectors won't lock.

Before connecting the +5V and ground (GND) wires from the keyboard encoder to the rotary interface, the polarity should be double-checked. This can be performed easily with a multi-meter. Set the meter to DC Volts. Then connect the red meter probe to the +5V wire coming from the keyboard encoder. Then connect the black probe to the ground. The meter should read approximately 5 volts. If it reads negative 5 volts than the wires are reversed. If it reads anything else than something is not connected properly.

I prefer to connect the rotation key outputs to Player1 & 2 SW5 & SW6 on the keyboard encoder. You can share these inputs with pushbuttons to save 4 inputs. It is convenient for testing purposes to have pushbuttons sharing inputs with the rotary joysticks. This allows you to test if MAME is configured properly. If the pushbuttons rotate the player correctly, but the rotary sticks do not than the interface is not set up correctly. Please note that any inputs on the encoder can be used. I used SW5 & SW6 because they work best with my CP.

Adjusting keyboard pulse jumpers

There are 3 jumpers (JP1-JP3) that can be used to configure the keyboard pulse sensitivity.
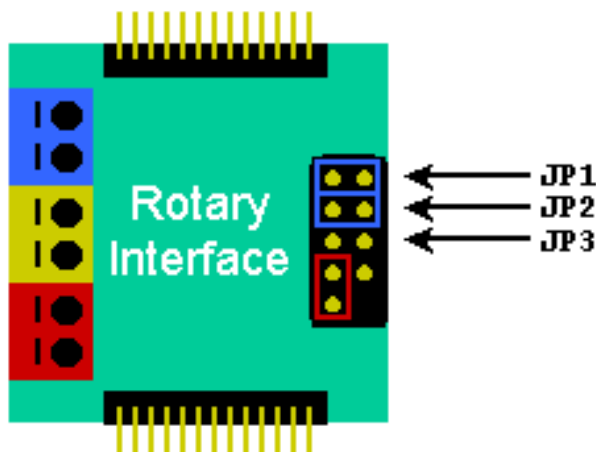
WARNING: The red jumper on the bottom left pins in the figure above should never be removed. It is for programming purposes. The interface may not function properly if removed or repositioned.

WARNING: Never change the jumpers while the rotary interface has power. Before changing jumpers, unplug the keyboard encoder to insure no power is going to the interface.

The follow table shows the 8 possible jumper settings:

Setting	JP1	JP2	JP3	
0	ON	ON	ON	Responsive (Missed Clicks)
1	OFF	ON	ON	
2	ON	OFF	ON	
3	OFF	OFF	ON	
4	ON	ON	OFF	Default Setting
5	OFF	ON	OFF	
6	ON	OFF	OFF	
7	OFF	OFF	OFF	Reliable (Control Lag)

The jumpers allow the user to tweak the rotary interface keyboard pulse durations. Shorter pulses provide more responsive play, but may cause MAME to miss rotation clicks. Longer pulses will insure a more reliable interaction with MAME, but may cause control lag. The default setting is 4. Try to use the lowest setting that does not cause missed clicks. The default setting is very conservative. I find that setting 1 works the best on my computer.

Recommendation: At the current time the interface works best with MAME Analog+ version 83.2 which can be downloaded at http://urebelscum.speedhost.com.

I have found that regular MAME and later versions of MAME Analog+ will often miss rotation clicks or move twice for a single click. The best way to test rotary joystick games is to get the keyboard working first for rotation. Once you get the keyboard working than try the rotary joysticks. The following table shows the basic input settings for MAME Analog+ v.83.2 assuming that you are using IPAC SW5 & SW6. These are the only settings necessary and the dial inputs should be ignored.

P1	Button 4	Z
P1	Button 5	X
P2	Button 4	I
P2	Button 5	K