

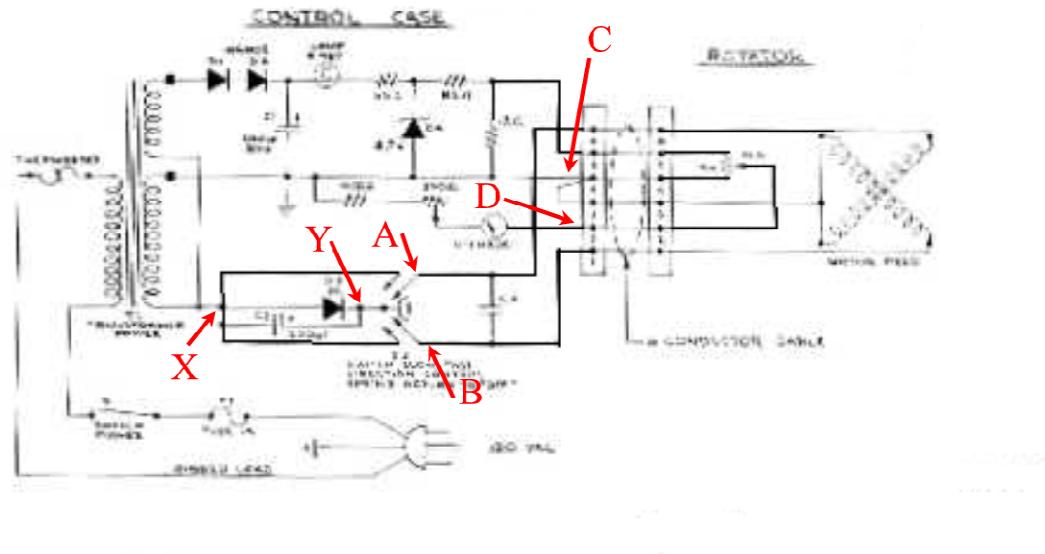
ANTENNA ROTATOR SYSTEM

**Quick Installation
Guide
for
RCI-USB Board**

April/2019

Rev 3.2h

Alliance HD73



This rotor provide a speed control. When "Y" point is connected to "A" or "B" it will turn in slow speed, and meanwhile "X" is connected with "A" or "B" it will turn in High speed mode.

J1 - Relay Connector

J1-1 Unassigned	J1-7: Unassigned	J1-4: to "Y"
J1-2: to "A" (CW)	J1-8: to "B" (CCW)	J1-5: This is the Speed Mode selector
J1-3: to J1-5	J1-9: to J1-5	J1-6: to "X"

J4 - A/D input

J4-3 and J4-4: to "C" or Ground
J4-5: to "D" of rotator voltage feedback

Create RC5x-3P

This computer-compatible antenna rotator provides as standard a computer output for the RCI-USB Board.

You need to switch the setting S3 switch (placed in the rear panel unit at the Create Indicator Control Unit) in lower position, so in this way, every control will be made through J1 connector at the rear panel.

For connecting the CREATE to the RCI-USB unit, you must usage as follows:

J1 - Relay Connector

J1-1: free connection

J1-2: to pin #2 at J1 in the RC5x-3P (CW)

J1-3: to connector case, for grounding at the J1 RC5x-3P

J1-7: free connection

J1-8: to pin #5 at J1 in the RC5x-3P (CCW)

J1-9: to connector case, for grounding at the J1 RC5x-3P

J4 – Azimuth A/D input

J4-4 & J4-3: to connector case, for grounding at the J1 RC5x-3P

J4-5: to pin #1 at J1 in the RC5x-3P (positioning Input pin)

Create RC5-1

Between TB1-6 and TB1-4 there is around 14V. When the Antenna is at CCW limit (Left) this voltage will be at TB1-5 = 0 Volts and when the antenna is located at CW Limit (Right) this voltage will be around 14V. So TB1-5 is the Voltage reference that will be connected to the RCI-USB Board J4-5 (ADC input).

The S2 switch (CW and CCW movements) is a double circuit but only S2A is operational:

Pins **S2-1, S2-2, S2-3**

Those points will be connected to the relays located at the RCI-USB Board.

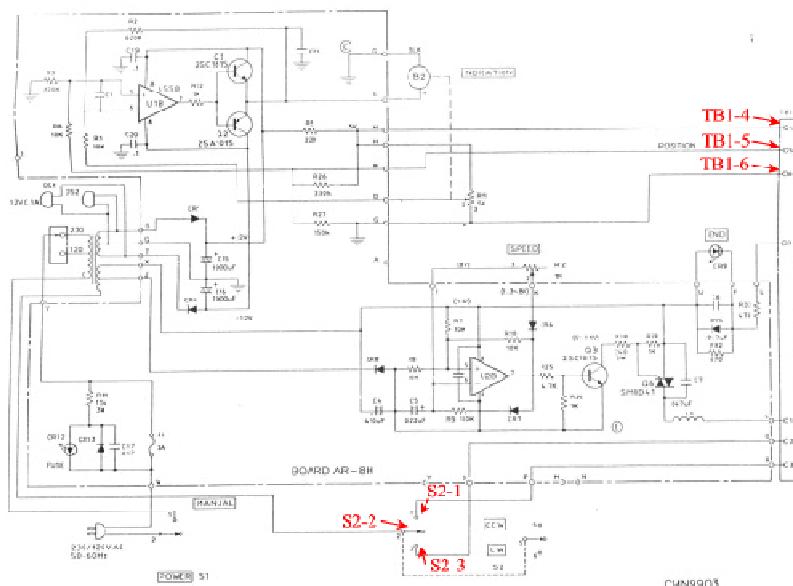


Figure 6-2. RC5-1 Indicator Control, Schematic Diagram

J1 - Relay Connector

J1-1: Unassigned

J1-7: Unassigned

J1-2: switch S2 Pin #2

J1-8: switch S2 Pin #2

J1-3: switch S2 Pin #3 (CW)

J1-9: switch S2 Pin #1 (CCW)

J4 – Azimuth A/D input

J4-3 & J4-4: TB1-6

J4-5: TB1-5

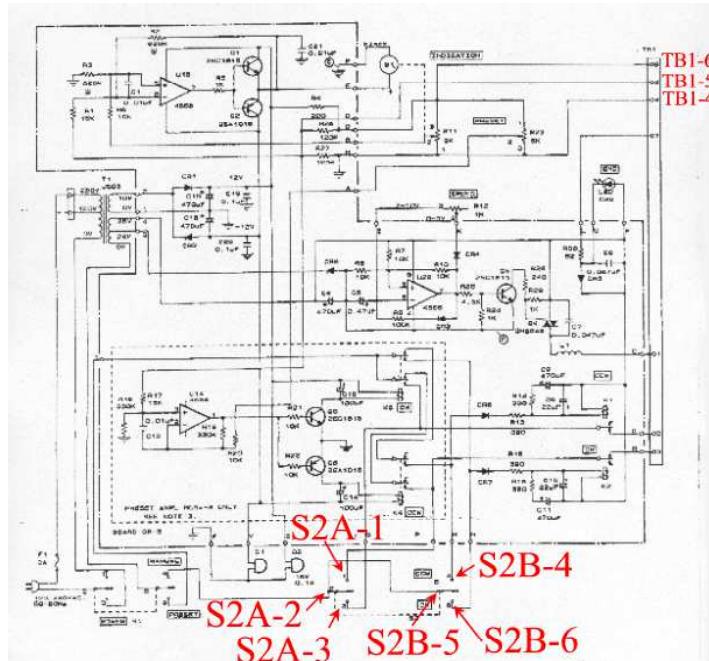
Create RC5-x series

Between TB1-6 and TB1-4 there is around 9.8V. When the Antenna is at CCW limit (Left) this voltage will be at TB1-5 = 0 Volts and when the antenna is located at CW Limit (Right) this voltage will be around 9.8V. So TB1-5 is the Voltage reference that will be connected to the RCI-USB Board J4-5 (ADC input). By means of the Pot1 Potentiometer located at the RCI-USB you must adjust until the ADC = 254 or 255 (using the Software Calibration setup) or by means of a Voltmeter located at IC2 pin 2 or X2 Point (ADC input). TB1-4 is the ground reference so it will be connected to J4-3 & J4-4.

The S2 switch (CW and CCW movements) is a double circuit:

Pins **S2A-1, S2A-2, S2A-3** and **S2B-4, S2B-5, S2B-6**

Those points will be connected to the relays located at the RCI-USB Board.



J1 - Relay Connector

- | | |
|------------------|------------------|
| J1-1: Unassigned | J1-7: Unassigned |
| J1-2: S2B-5 | J1-8: S2B-5 |
| J1-3: S2B-6 | J1-9: S2B-4 |

B-C & H-I Terminals

- | | |
|---------------|---------------|
| G: Unassigned | A: Unassigned |
| H: S2A-2 | B: S2A-2 |
| I: S2A-1 | C: S2A-3 |

J4 – Azimuth A/D input

- | | |
|--------------|-------|
| J4-3 & J4-4: | TB1-6 |
| J4-5: | TB1-5 |

Create ERC-51

This computer-compatible antenna rotator provides as standard a computer output for the RCI-USB Board.

You need to switch the setting S3 switch (placed in the rear panel unit at the Create Indicator Control Unit) in lower position, so in this way, every control will be made through J1 connector at the rear panel. In other words, Remote Control will be enabled.

For connecting the CREATE to the RCI-USB unit, you must usage as follows:

J2 – Elevation Relay Connector

J2-1: free connection

J2-2: to pin #2 at J1 of ERC51 (CCW or UP)

J2-3: to connector case, for grounding at J1 of ERC-51

J2-4: free connection

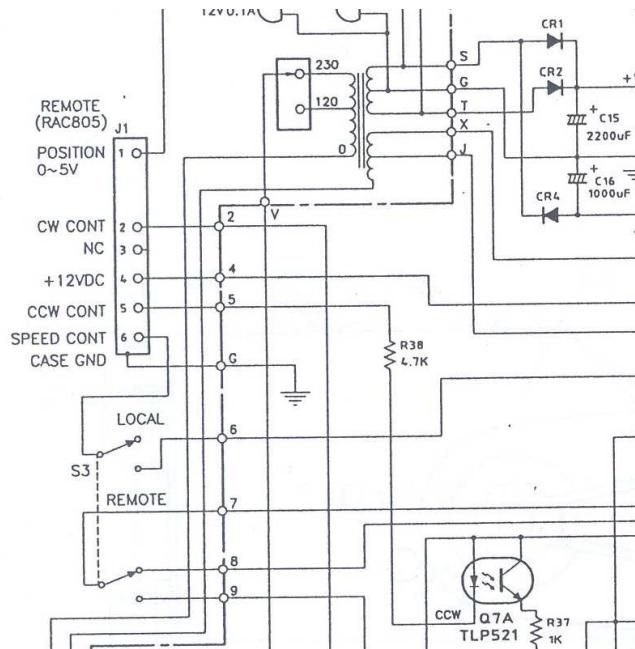
J2-5: to pin #2 at J1 of ERC51 (CW or DWN)

J2-6: to connector case, for grounding at J1 of ERC-51

J4 – Azimuth A/D input

J4-1 & J4-3: to connector case, for grounding at J1 of ERC-51

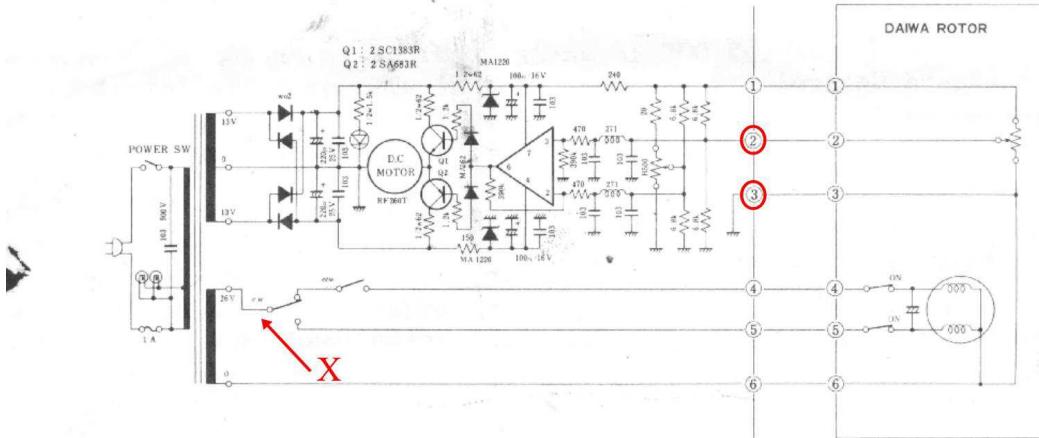
J4-2: to pin #1 at J1 of ERC-51 (positioning Input pin)



Daiwa DR7500R/X & DR7600R/X

Both rotors have a similar wiring and connection.

DC-7011



From the point marked as **X**, you will get the 24-26V provided by the transformer to pass them through the terminals J1-3 and J1-9. This voltage will be applied to the rotator when you want to turn the antenna from the ARS.

Because the voltage at point 2 (see in the diagram above that this point belongs to the cursor of the potentiometer) is slightly greater than the 5V needed by the RCI-USB to work properly, attenuate the input signal by means of Pot1 until you get 5Vat pin 2 @ IC2 or X2 Point.

The complete wiring is as follows :

J1 - Relay Connector

- J1-1: Unassigned
- J1-2: to the point 5-5'
- J1-3: to the point **X**

J1-7: Unassigned

J1-8: to the point 4-4'

J1-9: to the point **X**

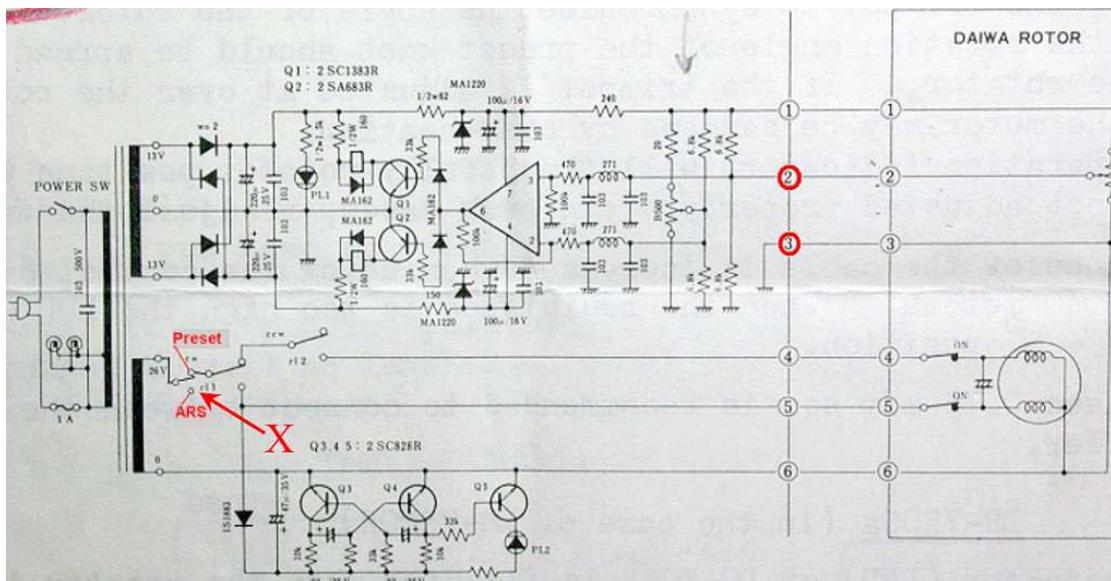
J4 – Azimuth A/D input

- J4-3 & J4-4: to the point 3
- J4-5: to the point 2

Daiwa DR7500R/X & DR7600R/X - Preset 7055 Control Unit

This unit includes a preset and no manual operation is allowed, so it's necessary to add a switch that will permit to use it as:

- Normal or Preset mode (as it was designed)
- ARS Mode



So the 24-26V from the transformer will be wired into the switch (common point). When it's in "preset" mode, it will work as without the modification. However when it's in "ARS" mode, the 24-26V will be applied at point "X" and this point will be passed through the terminals J1-3 and J1-9. This voltage will be applied to the rotator when you want to turn the antenna from the ARS.

Because the voltage at point 2 (see in the diagram above that this point belongs to the cursor of the potentiometer) is slightly greater than the 5V needed by the RCI-USB to work properly, attenuate the input signal by means of Pot1 until you get 5V at pin 2 @ IC2 or X2 Point.

The complete wiring is as follows :

J1 - Relay Connector

- | | |
|-------------------------|-------------------------|
| J1-1: Unassigned | J1-7: Unassigned |
| J1-2: to the point 5-5' | J1-8: to the point 4-4' |
| J1-3: to the point X | J1-9: to the point X |

J4 – Azimuth A/D input

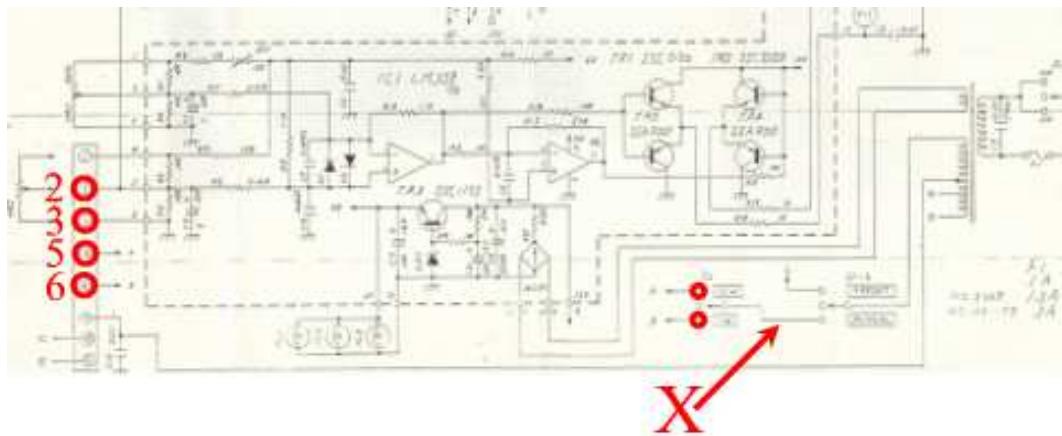
- J4-3 & J4-4: to the point 3
J4-5: to the point 2

Daiwa MR750/MR300

Those units include a preset and manual operation switch, so for a computer control based on the ARS Product, this switch (S2-1) must be configured for Manual Operation.

When 24V is applied at the point 5 (red color label at the bellow schematic), the rotator will turn in CCW direction meanwhile if 24V is applied to point 6, it will turn in CW direction.

This 24V can be got from the point X, common point at the CW/CCW switch and will be routed to the RCI-USB Board relays.



The antenna position is detected from the point 2 and point 3 (ground)

The complete wiring is as follows:

J1 - Relay Connector

J1-1: Unassigned
J1-2: to the point 6 (CW)
J1-3: to the point X

J1-7: Unassigned
J1-8: to the point 5 (CCW)
J1-9: to the point X

J4 – Azimuth A/D input

J4-3 & J4-4: to the point 3
J4-5: to the point 2

Emotator 1200 FXX

This unit includes a DIN-5 socket connector that provides all features for being connected into the RCI-USB Board.

Pin#1 is a Data output. Output is made by changing direction degree to a voltage. This pin will be wired into the RCI-USB Azimuth Input: J4-5.

Pin#2 is the Right Control. When this pin is connected to ground, the rotator will turn towards Right direction (CW).

Pin#5 is the Left Control. When this pin is connected to ground, the rotator will turn towards Left direction (CCW).

External Shield of this connector is the Ground Reference. This point will be named in this guide as “**Gnd**”

Note: Pin#4 is a +8Vcc, 0,35A. This is not a good power supply for the RCI-USB Board. The RCI-USB Board must be powered by +12V.

J1 - Relay Connector

J1-1: Unassigned	J1-7: Unassigned
J1-2: Gnd	J1-8: Gnd
J1-3: Pin#2	J1-9: Pin#5

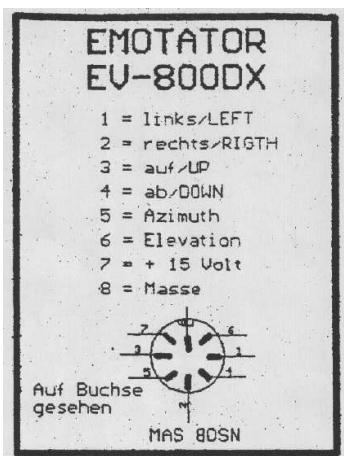
J4 – Azimuth A/D input

J4-3 & J4-4: Gnd
J4-5: Pin#1

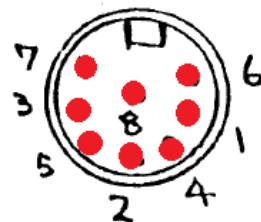
Emotator EV-700 & EV-800DX

Those Azimuth & Elevation models have a DIN-8 connector in the back panel, that it will allow interfacing to the RCI-USB Board.

The DIN-8 connector has the following pin assignment and their connection to the RCI-USB board is as follows:



EV700D5X
View from the front



Pin Nr:	Function/meaning	RCI/RCI-EL connection
6	Elevation position detector	J4-2 (V+ Elev.)
5	Azimuth position detector	J4-5 (V+ Azim.)
1	Left turn control	J1-9
2	Right turn control	J1-3
3	Up turn control	J2-3
4	Down turn control	J2-6
8	Ground	J1-8 & J1-2 & J2-2 & J2-5 + J4-1 & J4-4 & J4-3
7	This pin has between 15V. It's not used by the RCI-USB Board.	

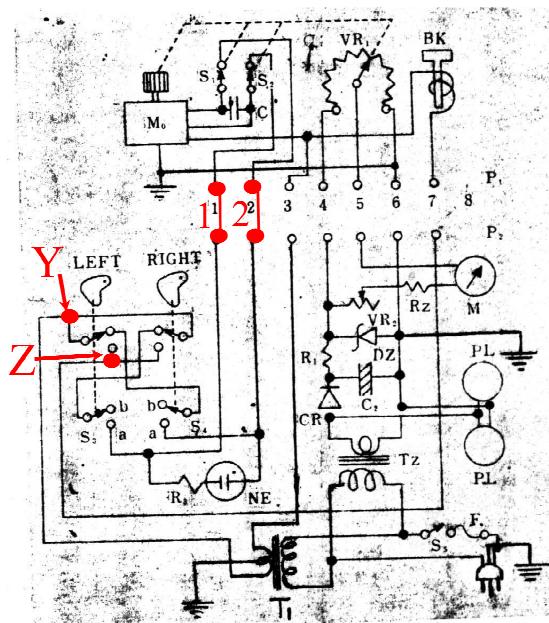
The pin 8 at DIN-8 connector is the ground reference. So this pin will be connected to the ADC ground input (J4-1 & J4-3 & J4-4 at the RCI-USB Board) and to the J1-8, J1-2, J2-2 & J2-5. So you must connect all those points.

Emotator 1102

When the CW or CCW switch are pressed, 2 circuits are activated. The first one is used for activating the solenoid, so a Voltage is applied at Pin #7, and the second circuit is used for applying the voltage for the rotor movement (present at Pin#2 or Pin#1).

The solenoid control will be activated by means of the AUX relay @ RCI-USB Board, so when this relay is activated, “Y” and “Z” points will be closed. In this way, when the AUX relay is activated, there will be a Voltage from the T1 at “Z”. When the Right or Left relay @ RCI-USB Board is activated, the voltage at “Z” will be used for activating the rotor.

The Voltage present at pin#5 (Antenna Position feedback) will depend on the antenna heading. This Voltage (pin#5) is connected into the J4-5 so the RCI-USB can READ the antenna position.



J1 - Relay Connector

Right/CW Relay	Left/CCW	Aux Relay
J1-1: Unassigned	J1-7: Unassigned	J1-4:
J1-2: Z point	J1-8: Z point	J1-5: Y point
J1-3: Pin#2	J1-9: Pin#1	J1-6: Z point

J4 – Azimuth A/D input

J4-3 & J4-4: **Pin#6 (Gnd)**
J4-5: **Pin#5**

Emotator 1105 MSAX

This unit includes a DIN-5 socket connector that provides all features for being connected into the RCI-USB Board.

Pin#1 is a Data output. Output is made by changing direction degree to a voltage. This pin will be wired into the RCI-USB Azimuth Input: J4-5.

Pin#2 is the Right Control. When this pin is connected to ground, the rotator will turn towards Right direction (CW).

Pin#5 is the Left Control. When this pin is connected to ground, the rotator will turn towards Left direction (CCW).

External Shield of this connector is the Ground Reference. This point will be named in this guide as “**Gnd**”

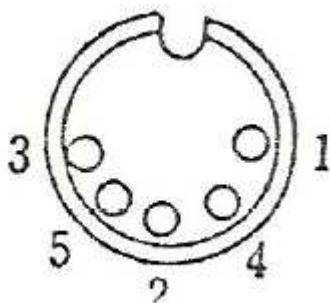
Note: Pin#4 is a +8Vcc, 0,35A. This is not a good power supply for the RCI-USB Board. The RCI-USB Board must be powered by +12V.

J1 - Relay Connector

J1-1: Unassigned	J1-7: Unassigned
J1-2: Gnd	J1-8: Gnd
J1-3: Pin#2	J1-9: Pin#5

J4 – Azimuth A/D input

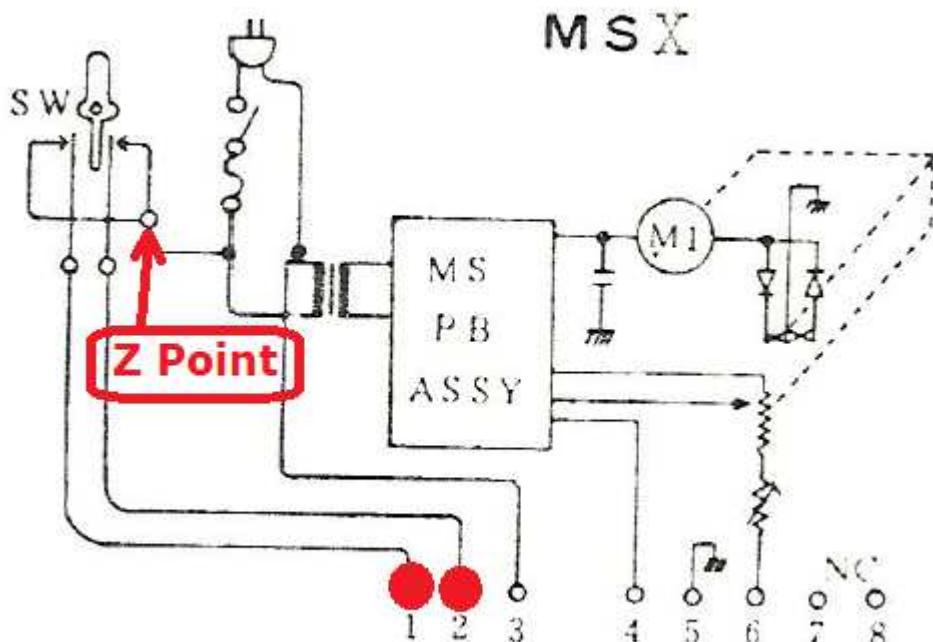
J4-3 & J4-4: Gnd
J4-5: Pin#1



DIN-5 connector

Emotator 1105 MSX and MX

When the SW (CCW/CW) Lever is activated the rotor will be energized (Z Point voltage is applied to the motor on pins #1 or #2). The position feedback is read via the potentiometer, pins #4 and #5.



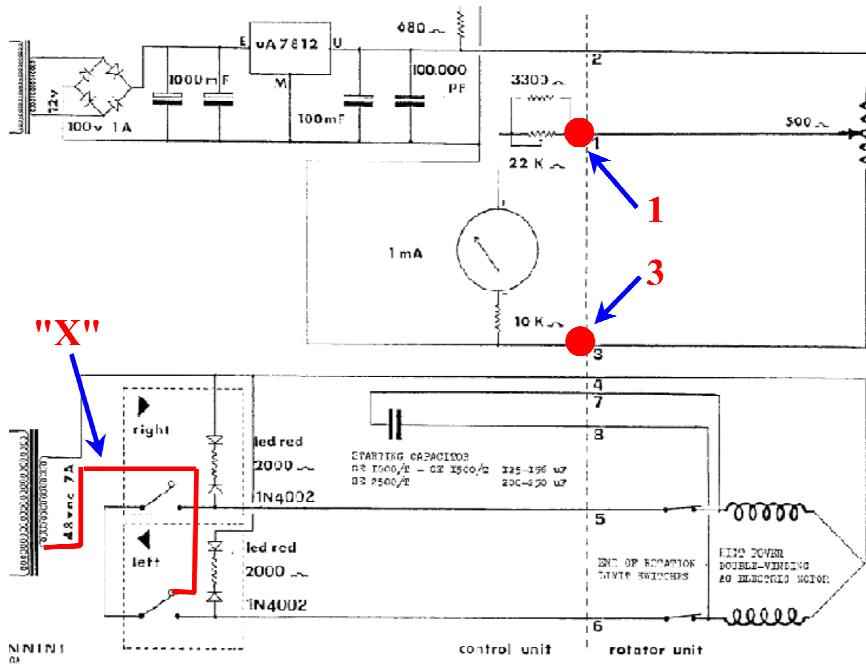
J1 - Relay Connector

Right/CW Relay	Left/CCW
J1-1: Unassigned	J1-7: Unassigned
J1-2: Z point	J1-8: Z point
J1-3: Pin#2	J1-9: Pin#1

J4 – Azimuth A/D input

J4-3 & J4-4: **Pin#5 (Gnd)**
J4-5: **Pin#4**

Giovannini GE 1000/T, GE 1500/T & GE 2500/T



From the point marked as "**X**", you will get the 48Vac provided by the transformer. This voltage will be applied to the rotator when you want to turn the antenna from the ARS.

Because the voltage at point 1 (see in the diagram above that this point belongs to the cursor of the potentiometer) is slightly greater than the 5V needed by the RCI-USB to work properly, attenuate the input signal by means of Pot1 until you get 5V at pin 2 @ U2 or X2 point.

The complete wiring is as follows :

J1 - Relay Connector

- J1-1: Unassigned
- J1-2: to the point 5-5'
- J1-3: to the point **X**

J1-7: Unassigned

J1-8: to the point 4-4'

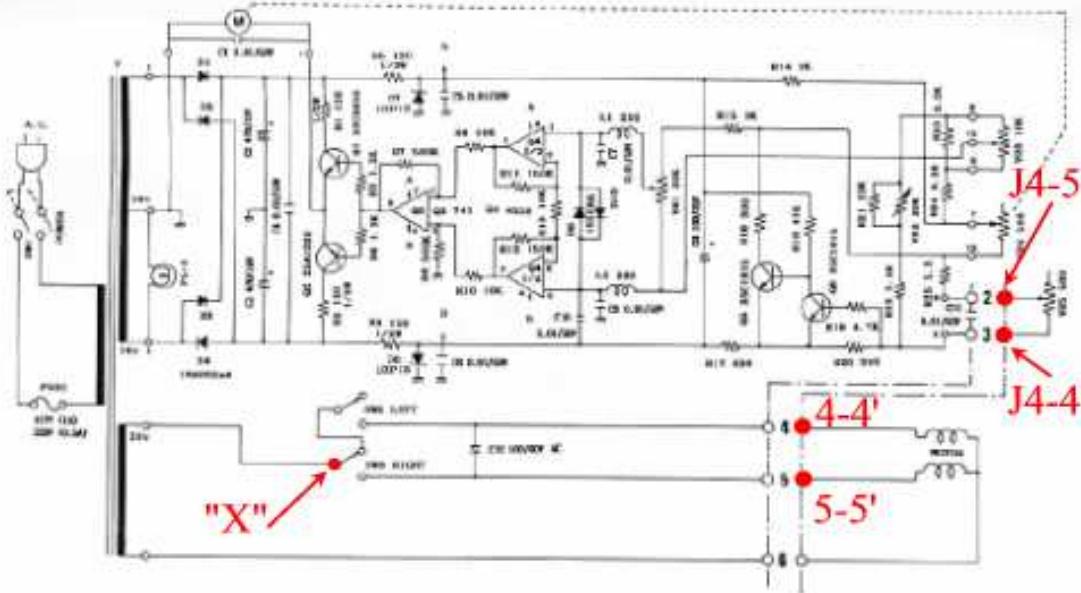
J1-9: to the point **X**

J4 – Azimuth A/D input

- J4-3 & J4-4: to the point 3
- J4-5: to the point 1

Kenpro KR-400RC

G-400RC SCHEMATIC DIAGRAM



The complete wiring is as follows :

J1 - Relay Connector

- J1-1: Unassigned
- J1-2: to the point 5-5'
- J1-3: to the point 'X'

J1-7: Unassigned

- J1-8: to the point 4-4'
- J1-9: to the point 'X'

J4 – Azimuth A/D input

- J4-3 & J4-4: to the point 3
- J4-5: to the point 2

Kenpro KR-450XL & KR-650XL

Those units will be wired exactly as the KR-400RC Units.

The complete wiring is as follows :

J1 - Relay Connector

J1-1: Unassigned
J1-2: to the point 5-5'
J1-3: to the point **X**

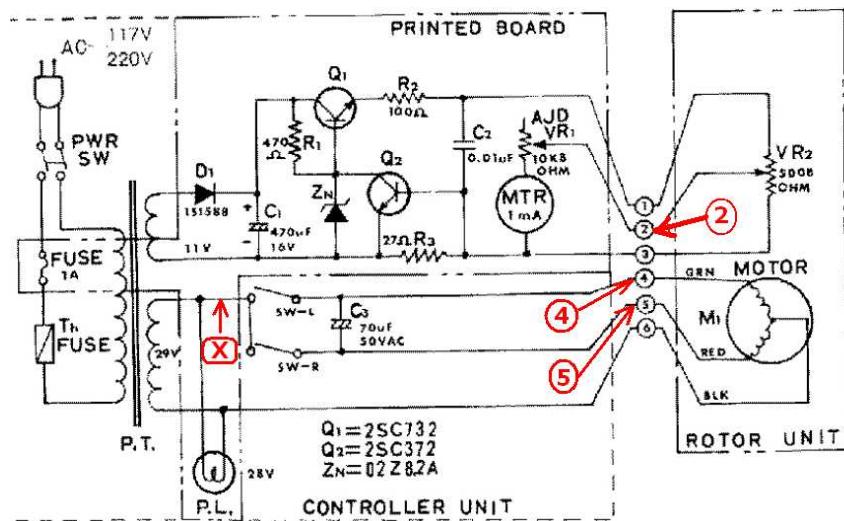
J1-7: Unassigned
J1-8: to the point 4-4'
J1-9: to the point **X**

J4 – Azimuth A/D input

J4-3 & J4-4: to the point 3
J4-5: to the point 2

Kenpro KR-500

This Elevation rotator is similar than Yaesu G500



From the point marked as **X**, you will get the 24-26V provided by the transformer to pass them through the terminals J2-2 and J2-5 at RCI-USB. This voltage will be applied to the rotator when you want to turn Up/Down the antenna from the ARS.

The position is gotten by means of the Voltage that is read from Pin-2. This voltage is applied to the J4 terminal Pin-2. By means of the P2 you will be able to adaptive this input to the ADC.

The complete wiring is as follows:

J2 – Elevation Relay Connector

J2-1: Unassigned

J2-2: to the point 5-5' (or Point 5)

J2-3: to the point **X**

J2-4: Unassigned

J2-5: to the point 4-4' (or Point 4)

J2-6: to the point **X**

J4 – Elevation A/D input

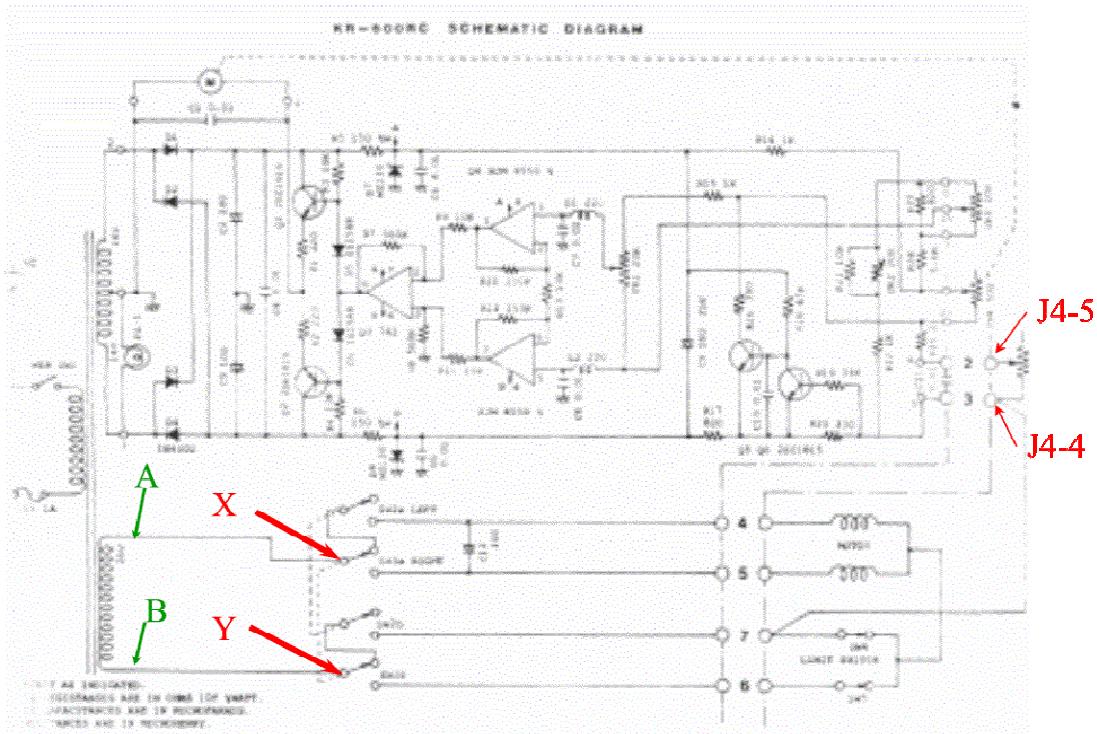
J4-1: to the point 3 (V-)

J4-2: to the point 2 (V+)

J4-3: connected to J4-1 (Ground reference to the system)

Kenpro KR-600RC

This rotator provides -3.6V at its 360° position and apart from switching 24V for turning to right or to left, it also switches the ground, as shown in the following diagram :



When a direction switch is pressed, it switches two circuits : the +24V circuit (**X switch**) and the rotator ground (**Y switch**).

The complete wiring between J1, J4 and the control unit, numbered from 2 to 7, has to be made in the following way :

The points 2, 3, 4, 5, 6 and 7 belong to the control unit terminals and the points 2', 3', 4', 5', 6' and 7' belong to the cable attached to the rotator. The **point X** is the 24V transformer positive terminal and the **point Y** is the negative terminal.

J1 - Relay Connector

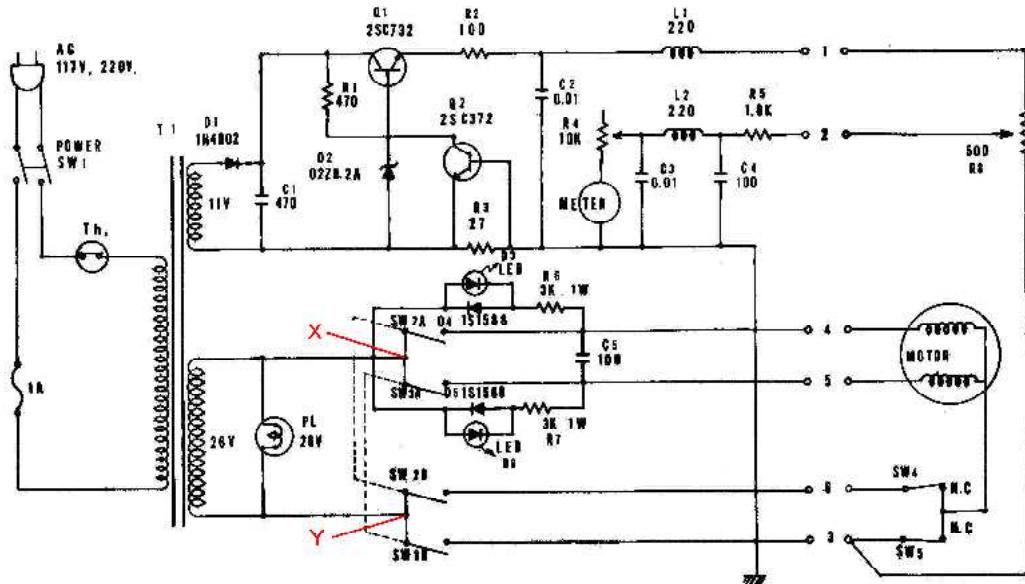
J1-1: unassigned	G: unassigned
J1-2: to the point 5-5'	H: to the point 7-7'
J1-3: to the point X	I: to the point Y
J1-7: unassigned	A: unassigned
J1-8: to the point 4-4'	B: to the point 6-6'
J1-9: to the point X	C: to the point Y

J4 – Azimuth A/D input

- J4-3: to the point 3-3'
- J4-5: to the point 2-2'

Kenpro KR-600S

This rotator provides 6V at its 360° position and apart from switching 24V for turning to right or to left, it also switches the ground, as shown in the following diagram :



When the direction switch is pressed, it switches two circuits : the +26V circuit and the rotator ground.

The complete wiring between J1 (relays), J4 (antenna position) and the control unit, numbered from 1 to 6, has to be made in the following way :

The points 1, 2, 3, 4, 5 and 6 belong to the control unit terminals and the points 1', 2', 3', 4', 5' and 6' belong to the cable attached to the rotator. The point X is the 24V transformer positive terminal and the point Y is the negative terminal.

J1 - Relay Connector

- | | |
|-------------------------------|----------------------|
| J1-1: unassigned | A: unassigned |
| J1-2: to the point 5-5' (CW) | B: to the point 3-3' |
| J1-3: to the point X | C: to the point Y |
| J1-7: unassigned | G: unassigned |
| J1-8: to the point 4-4' (CCW) | H: to the point 6-6' |
| J1-9: to the point X | I: to the point Y |

J4 – Azimuth A/D input

- J4-4 & J4-3: to the point 3-3'
 J4-5: to the point 2-2'

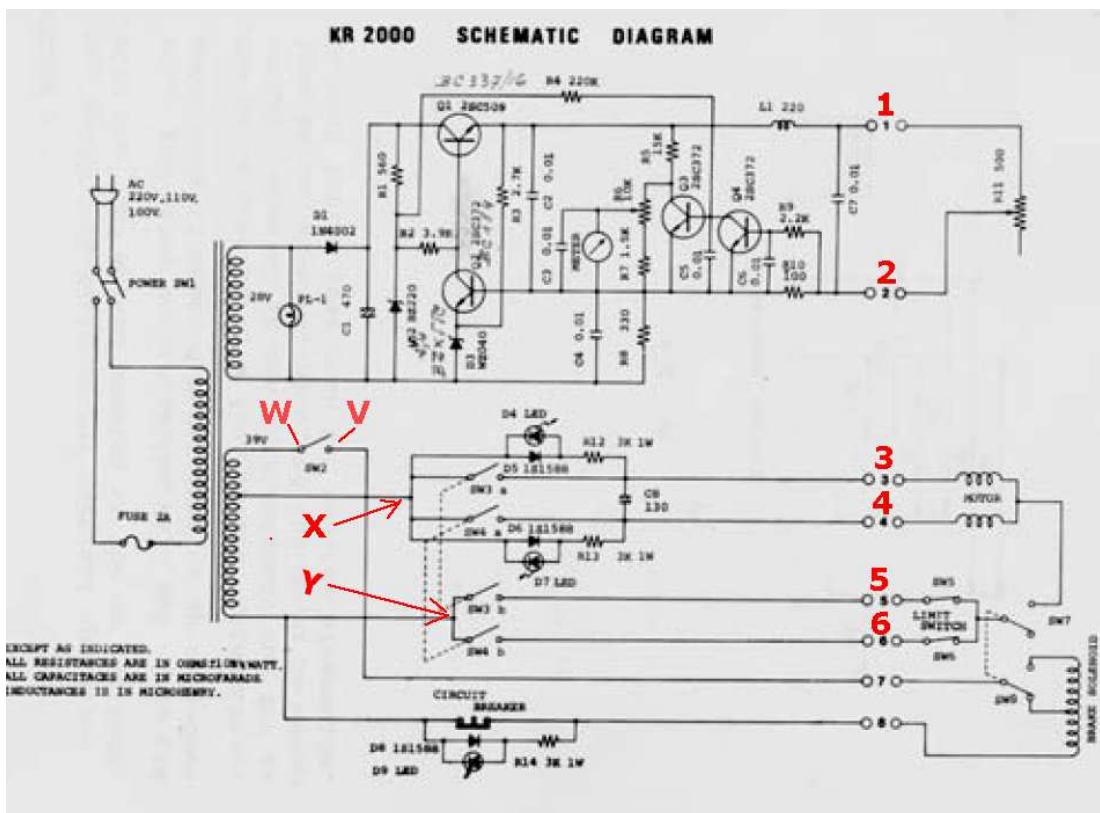
Kenpro KR-800 & KR-1000

Those models are similar than the Yaesu G-800S & G-1000S. So read that section and proceed as it's described.

Kenpro KR-2000

This is a special unit because the switch uses 2 circuits and also the controller incorporates a solenoid which is used as mechanical brake. First you must extend the wires from the brake switch (SW2) until the ARS-USB Aux. relay and connect them into J1-5 and J1-6. The direction switches SW3 (a-b) and SW4(a-b) are a two circuit type, therefore you will use both terminal circuits of the ARS-USB; Primary: J1-1, J1-2, J1-3; J1-7, J1-8, J1-9 and Secondary: A, B, C and G, H, I.

Note: The secondary circuit available on the ARS-USB PCB is described on the ARS-USB_EN.pdf manual, section 2.1 page 9.



The complete wiring is:

J1 - Relay Connector

J1-1: Unassigned	J1-7: Unassigned	J1-4: Unassigned
J1-2: to 4	J1-8: 3	J1-5: to W (SW2 brake switch)
J1-3: to X	J1-9: X	J1-6: to V (SW2 brake switch)

G: Unassigned	A: Unassigned
H: to 5	B: to 6
G: to Y	C: to Y

J4 – Azimuth A/D Input

J4-5: to **1**
J4-3 & J4-4: to **2**

Kenpro HR-2700SDX

This model includes an external control terminal that will be used for the wiring with the RCI-USB Board. The external control terminal (XHP-8) can be found in the inside of the control box when a cover of the control box is removed.

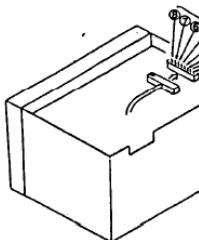
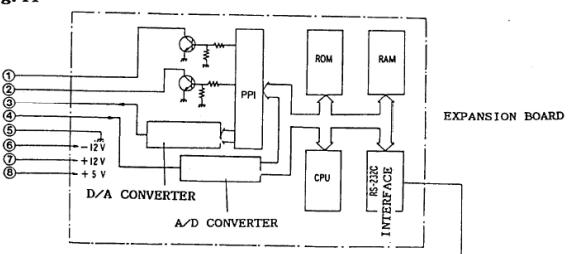


Fig. 11

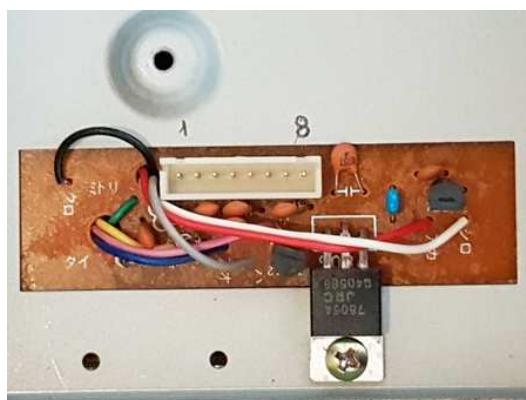


This model includes a XHP-8 connector with the following connection:

XHP-8	Meaning
Pin #1:	Right movement (CW)
Pin #2:	Left movement (CCW)
Pin #3:	Speed Control
Pin #4:	A/D or Potentiometer feedback
Pin #5:	Earth or Ground
Pin #6:	-12V
Pin #7:	+12V
Pin #8:	+5V

The connection is as follows:

DXA serie	RCI-USB Board
Pin 1	J1-2 (right movement)
Pin 2	J1-8 (left movement)
Pin 5	J1-3 (ground)
Pin 5	J1-9 (ground)
Pin 4	J4-5 (Position Potentiometer)
Pin 5	J4-3 & J4-4 (ground)



Kenpro KR-5400 & KR-5600

Those models are similar than the Yaesu G-5400 & G-5600. So read that section and proceed as it's described.

Pro.Sis.Tel Control Unit “B” models

All Pro.Sis.Tel with control unit “B” models can be connected in the same way. This control box includes a DB-9 connector with all signals necessary to read the Pot feedback and the movement activations.

The complete wiring is as follows:

J1 - Relay Connector

J1-1: unassigned
J1-2: to pin 8 in the DB9 Connector (CW)
J1-3: to pin 6 in the DB9 Connector (Ground)

J1-7: unassigned
J1-8: to pin 9 in the DB9 Connector (CCW)
J1-9: to pin 6 in the DB9 Connector (Ground)

J4 – Azimuth A/D input

J4-3 & J4-4: to pin 6 in the DB9 Connector (Ground)
J4-5: to pin 7 in the DB9 Connector

Pro.Sis.Tel Control Unit “D” models

Pro.Sis.Tel “D” control unit includes a RS232 interface, but this connection is useless for the ARS Product. So, you must open the control unit, and locate some wires at the PCB. The voltage feedback from the external rotator is present at the TP2 point. TP2 is located at a corner close to a blue multi-turn potentiometer. This TP2 will provide 0 (CCW Limit) to 5V (CW Limit). The ground point is located at TP4. For activating the motion via RCI-USB you must connect in parallel 2 wires from each relay at the RCI-USB (Left and Right) to the switch’s located at the control unit. So when any of the relays of the RCI-USB are energized, they will close their circuit at the control unit. Exactly as a user has pressed any of the

The complete wiring is as follows:

J1 - Relay Connector

J1-1: unassigned

J1-2: to CW switch (one of the legs)

J1-3: to CW switch (the other leg, it doesn't care the order selected)

J1-7: unassigned

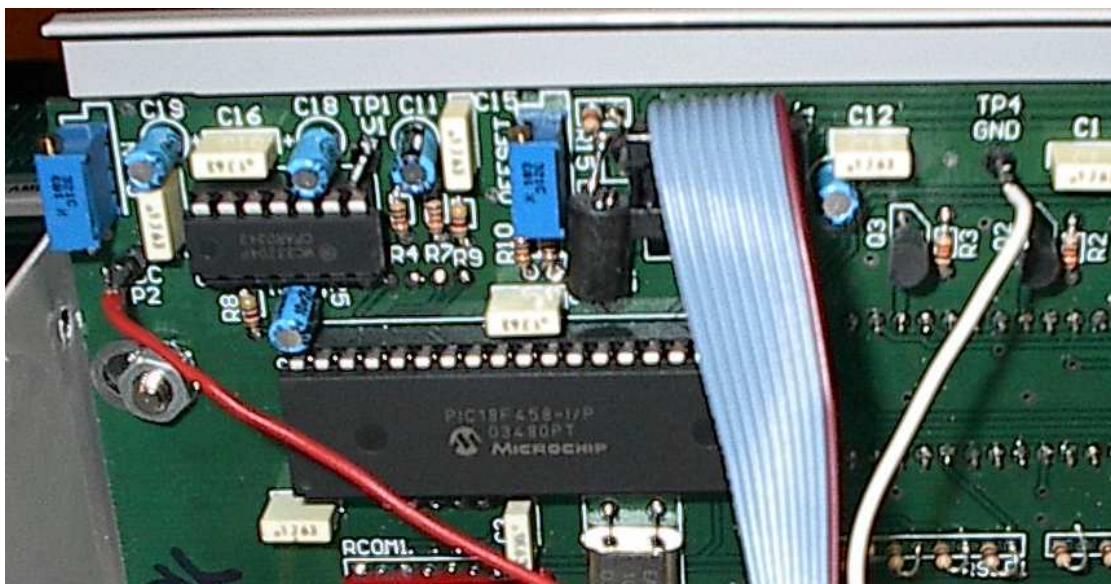
J1-8: to CCW switch (one of the legs)

J1-9: to CCW switch (the other leg, it doesn't care the order selected)

J4 – Azimuth A/D input

J4-3 & J4-4: to TP4 point (Ground)

J4-5: to TP2 point (Voltage feedback)

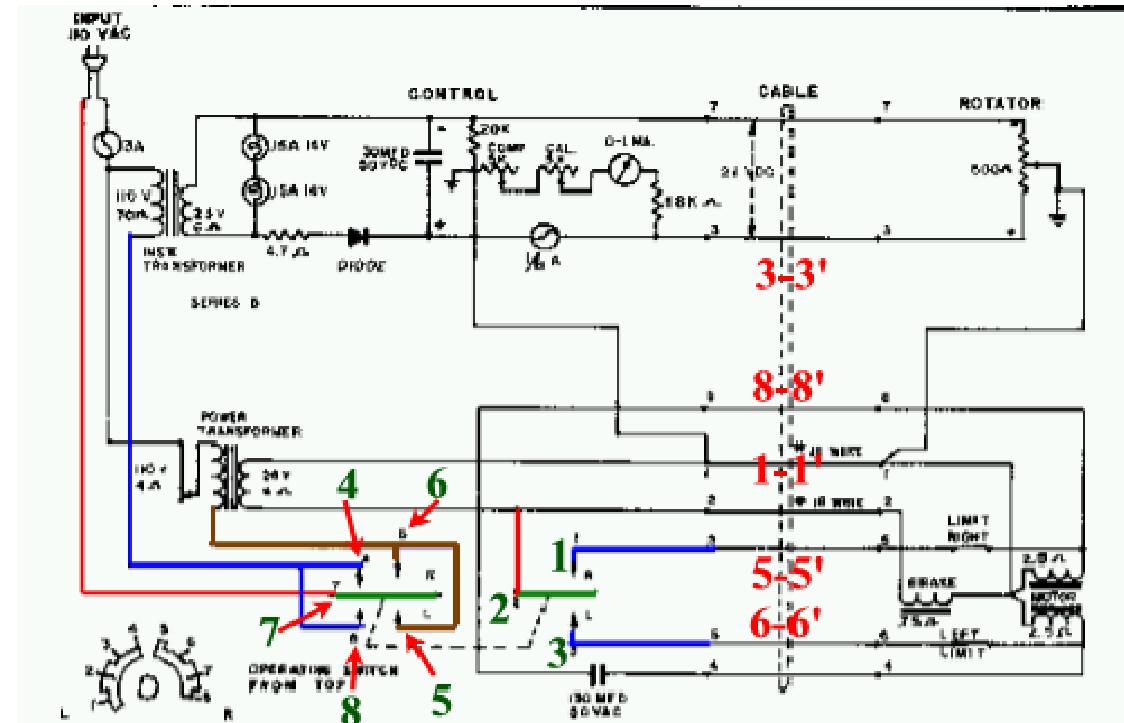


(TP2 is connected via a red wire, and TP4 has a white wire)

Telex/Hy-Gain HAM II

The HAMII rotator is equipped with lever. This lever actives 3 circuits:

- Instrument Transformer; power on the meter and provide a voltage feedback. Points 7-4-8 (Red to Blue)
- Power Transformer, power the brake solenoid and provides 24Vac for the rotation movement. Points 7-6-5 (Red to Brown)
- Provide the CCW or CW movement. Points 2-1-3 (Red to Blue), applying 24Vac at point 5 or 6.



J1 - Relay Connector

J1-1: Unassigned	J1-7: Unassigned	J1-4: Unassigned
J1-2: to the point 2	J1-8: to the point 2	J1-5: to the point 7
J1-3: to the point 1	J1-9: to the point 3	J1-6: to the point 4

Second circuit @ AUX Relay

E to the point 7
F to the point 6

J4 – Azimuth A/D input

J4-3 & J4-4: to the point 1-1' (Control Unit output)
J4-5: to the point 3-3' (Control Unit output)

Note:

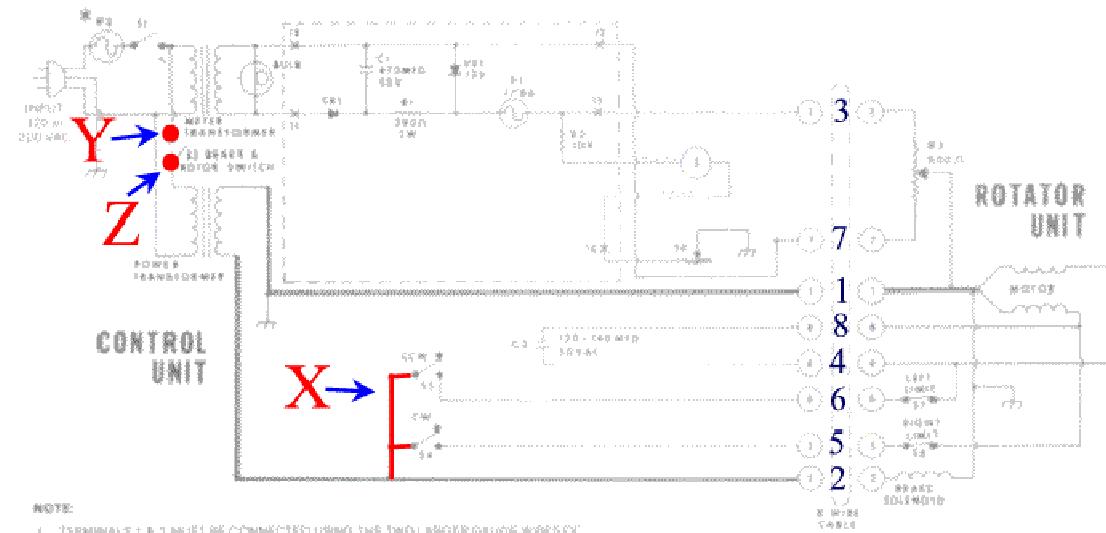
The Aux relay will activate 2 circuits, one will connect the primary instrument transformer (Red line with Blue line) and the second the primary power transformer (Red line with Brown line).

The movement activation is done using the left and right relay, so it will connect the point 2 at the lever with the point 1 (right activation) or to point 3 (left activation)

Telex/Hy-Gain HAM IV

The HAMIV rotator is equipped with a mechanical brake, switched by means of a solenoid when the brake switch is pressed. The 24V that allows the turn to right or to left, they only appear at the direction switches when the brake switch is pressed (points Y-Z). In fact, the brake switch closes the primary circuit of the transformer, providing then the 24V not only used to make the brake relay active but to provide voltage to the direction switches (point X).

To get the antenna position, the HAMIV has a voltmeter that read 13V when the antenna is fully turned clockwise. The voltmeter is calibrated in degrees in order to make easy the reading on it. Adjust the potentiometer Pot1 till the voltage present at X2 was 5V for the CCW limit.



J1 - Relay Connector

J1-1: Unassigned J1-7 Unassigned

J1-2: to the point 5-5 J1-8: to the point 6-6'

J1-3: to the point X J1-9: to the point X

J1-4: Unassigned

J1-5: to the point Y

J1-6: to the point Z

J4 – Azimuth A/D input

J4-3 & J4-4: to the point 1-1'

J4-5: to the point 3-3'

Telex/Hy-Gain T²X

The T²X has the same circuit and control unit like the HAMIV. This means, the wiring will be made in the same way. The diagram below shows the T²X circuit diagram.

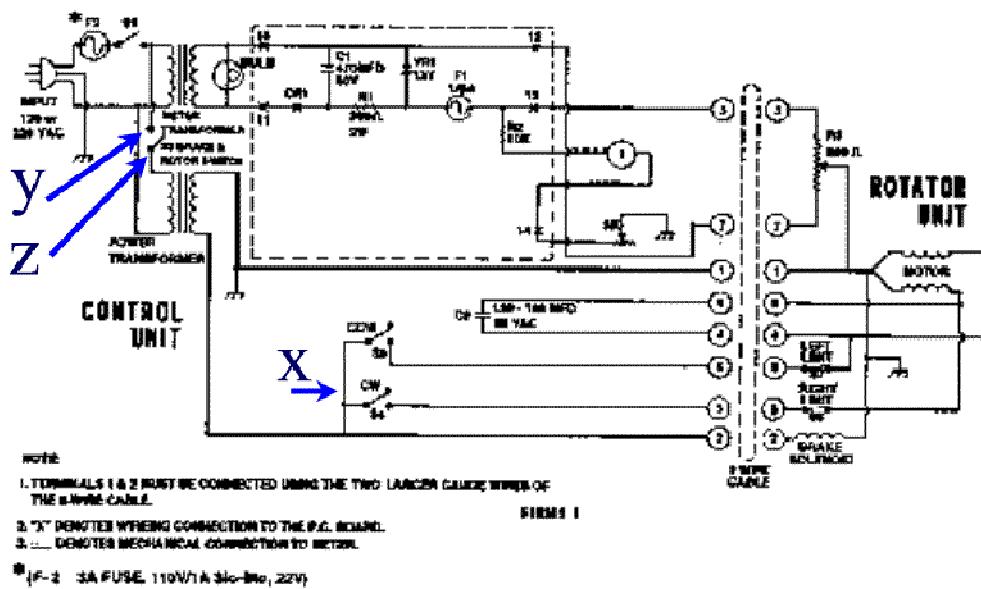


Figure 9
Wiring Schematic

J1 - Relay Connector

- J1-1: Unassigned J1-7: Unassigned J1-4: Unassigned
J1-2: to the point 5-5' J1-8: to the point 6-6' J1-5: to the point Y
J1-3: to the point X J1-9: to the point X J1-6: to the point Z

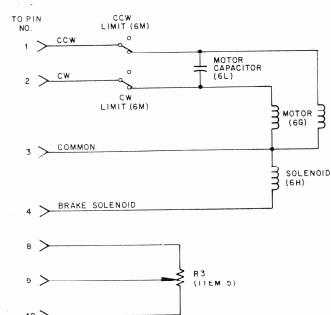
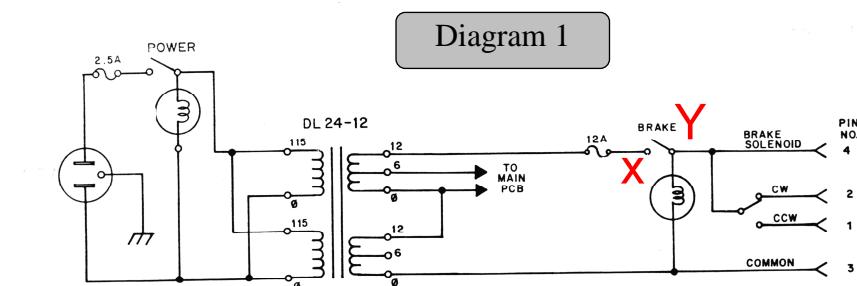
J4 – Azimuth A/D input

- J4-3 & J4-4: to the point 1-1'
J4-5: to the point 3-3'

The points marked as Y and Z are taken from the brake switch. In case of doubt, see the HAMIV circuit diagram.

Telex/Hy-gain HDR-300

This high performance rotator is equipped with a mechanical brake. When the brake switch is pressed, 24V appears at the terminal 4, which is attached to the solenoid. You have to take out two wires from inside the control unit, taken from the points marked as X and Y, so that the RCI-USB could make the same operation. Both wires will be attached to the Auxiliary relay on the RCI-USB through J1-5 and J1-6. Order is not important. In this way, when the ARS orders to make a turn, it will make two operations: it will make the solenoid active and it will get 24V. at terminal 4, which will be used to turn to right or to left by means of the two provided relays.



Because this rotator has an internal A/D converter, at the potentiometer ends already exists the 5V needed by the RCI-USB, therefore you do not need to attenuate or amplify the signal located at terminal 9 on the control unit. Adjust Pot1 till you get 5V at X2 point, for CW Limit.

J1 - Relay Connector

J1-1 Unassigned

J1-7: Unassigned

J1-4: Unassigned

J1-2: to the Pin-2 (CW)

J1-8: to the Pin-1 (CCW)

J1-5: to the point X

J1-3: to the point Y or Pin-4

J1-9: to the point Y or Pin-4

J1-6: to the point **Y**

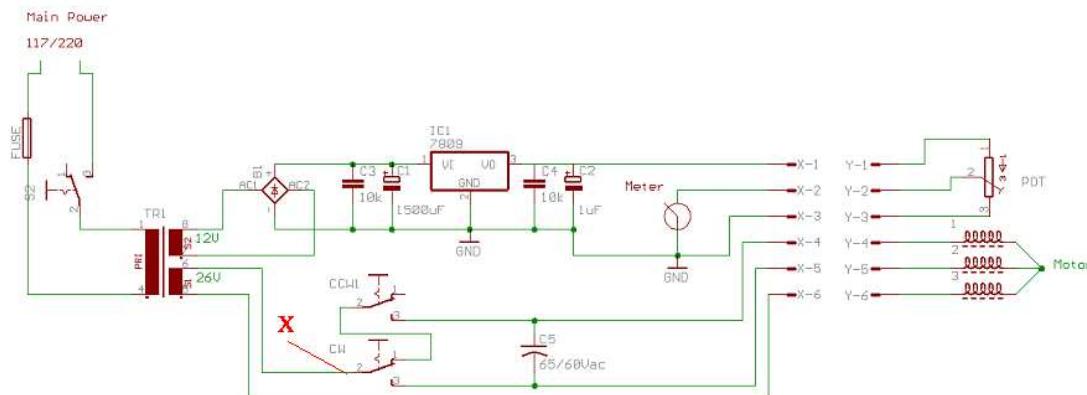
J4 – Azimuth A/D input

J4-3 & J4-4: to the point 10 (in parallel with the factory wires)
J4-5: to the point 9 (in parallel with the factory wires)

Yaesu G-250

This rotor is not supported, however if you replace the original rotor with the schematic below, it will be supported 100%.

You can use some pieces as the transformer, C5 Capacitor, etc. from your original control unit, when you design your new control unit.



Design notes:

IC1 provides 9Vcc into the external POT, located at the rotor. If you place a 12 Volt-Meter, it will indicate the antenna position.

From the point marked as **X**, you will get the 24-26V provided by the transformer to pass them through the terminals J1-3 and J1-9. This voltage will be applied to the rotator when you want to turn the antenna from the ARS.

Because the voltage at point 2 (see in the diagram above that this point belongs to the cursor of the potentiometer) is slightly greater than the 5V needed by the RCI-USB to work properly, attenuate the input signal by means of Pot1 until you get 5Vat pin 2 @ IC2 or X2 point.

The complete wiring is as follows :

J1 - Relay Connector

J1-1: Unassigned

J1-2: to the point 5-5'

J1-3: to the point X

J1-7: Unassigned

J1-8: to the point 4-4'

J1-9: to the point X

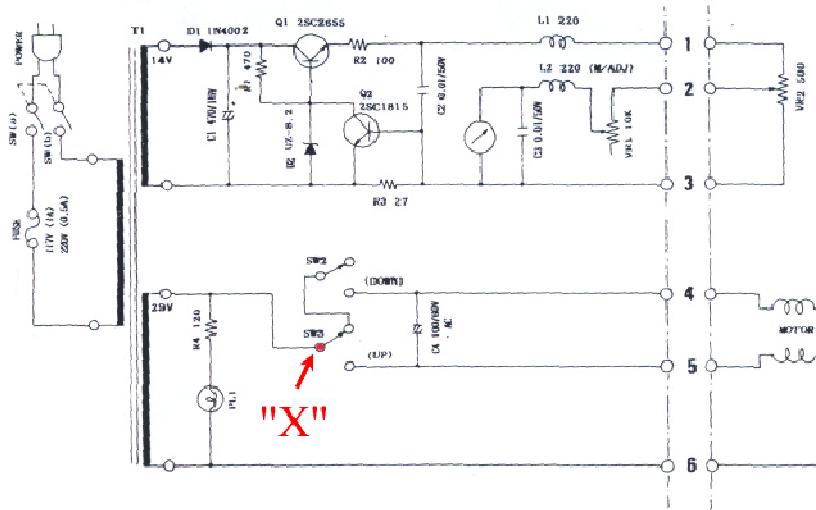
J4 – Azimuth A/D input

J4-4: to the point 3

J4-5: to the point 2

Yaesu G-400

This model approximately works with a voltage of 6.3V at the ends of the potentiometer (between the points 1 and 3 in accordance with the diagram below). Then at the cursor of the potentiometer you will get respectively 0 and 6.3V, for the counter clockwise and clockwise position. Because there is no brake, the Aux. relay is not used.



From the point marked as **X**, you will get the 24-26V provided by the transformer to pass them through the terminals J1-3 and J1-9. This voltage will be applied to the rotator when you want to turn the antenna from the ARS.

Because the voltage at point 2 (see in the diagram above that this point belongs to the cursor of the potentiometer) is slightly greater than the 5V needed by the RCI-USB to work properly, attenuate the input signal by means of Pot1 until you get 5Vat pin 2 @ IC2 or X2 point.

The complete wiring is as follows :

J1 - Relay Connector

J1-1: Unassigned

J1-2: to the point 5-5'

J1-3: to the point X

J1-7: Unassigned

J1-8: to the point 4-4'

J1-9: to the point X

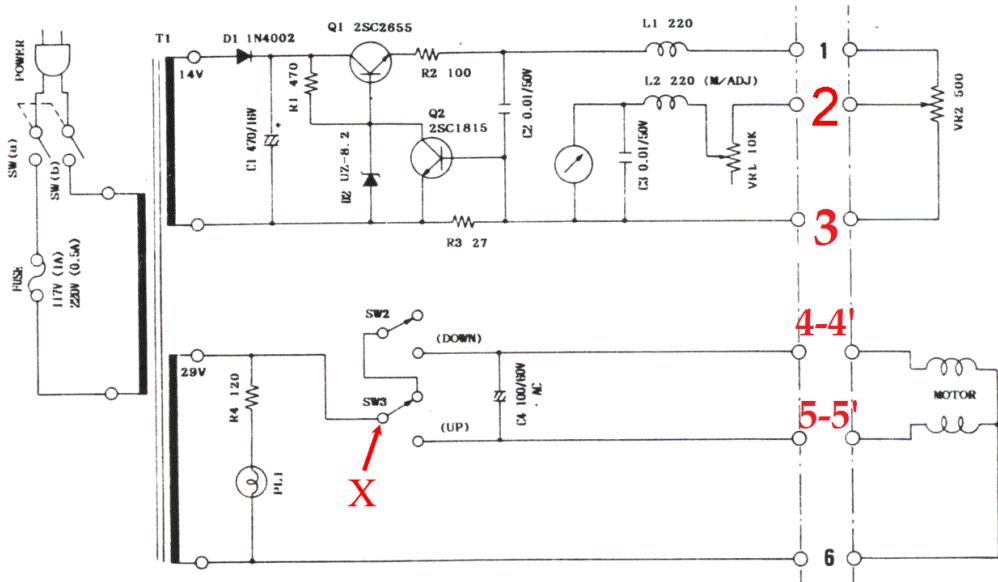
J4 – Azimuth A/D input

J4-4: to the point 3

J4-5: to the point 2

Yaesu G-500 & G-500A

This Elevation rotator works similar than the G400, however the relays connectors will be connected to J2 terminals (elevation)



From the point marked as **X**, you will get the 24-26V provided by the transformer to pass them through the terminals J2-2 and J2-5 at RCI-USB. This voltage will be applied to the rotator when you want to turn Up/Down the antenna from the ARS.

The position is gotten by means of the Voltage that is read from Pin-2. This voltage is applied to the J4 terminal Pin-2. By means of the P2 you will be able to adaptive this input to the ADC.

The complete wiring is as follows:

J2 – Elevation Relay Connector

- J2-1: Unassigned
- J2-2: to the point **5-5'**
- J2-3: to the point **X**

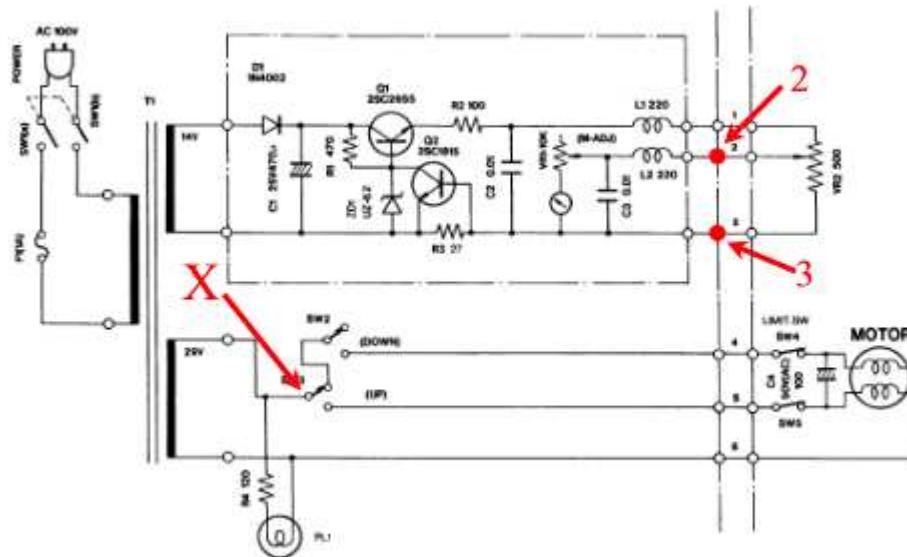
- J2-4: Unassigned
- J2-5: to the point **4-4'**
- J2-6: to the point **X**

J4 – Elevation A/D input

- J4-1: to the point **3** (V-)
- J4-2: to the point **2** (V+)
- J4-3: to J4-1 (Ground reference to the system)

Yaesu G-550

This Elevation rotator has the same wiring than the G500 & G500A



The complete wiring is as follows:

J2 – Elevation Relay Connector

- J2-1: Unassigned
- J2-2: to the point 5-5'
- J2-3: to the point X

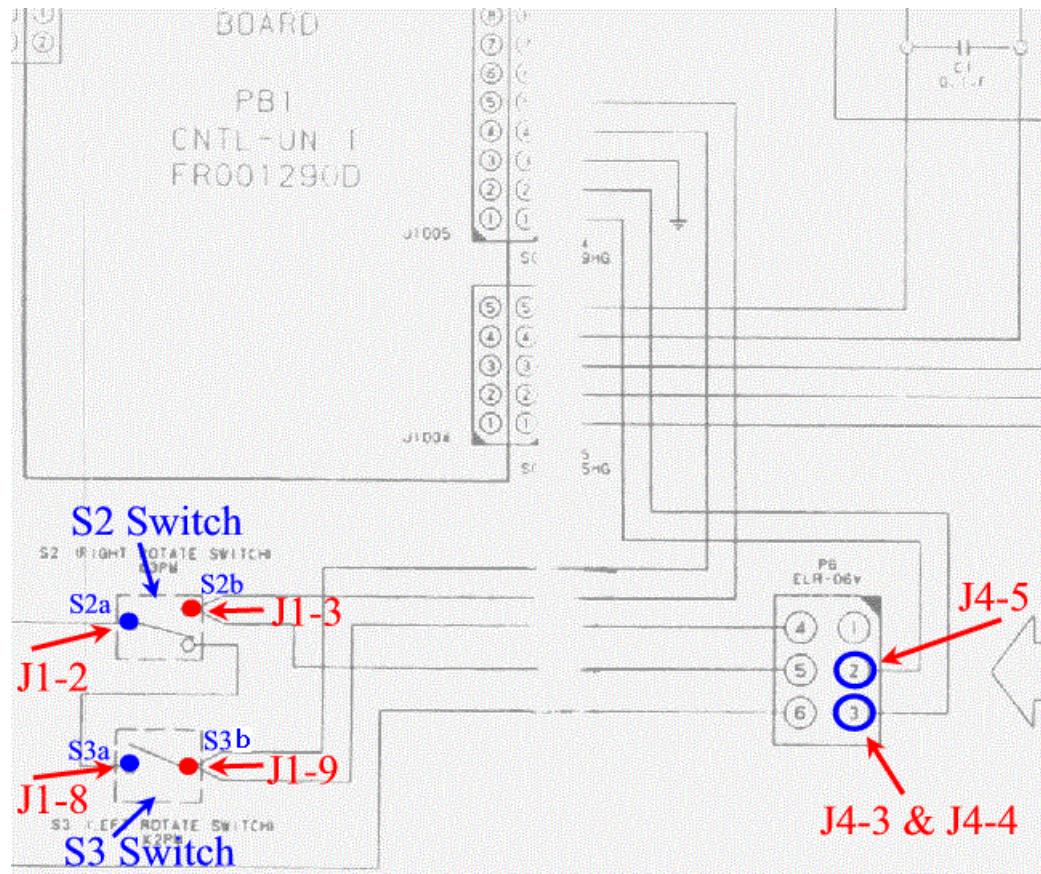
- J2-4: Unassigned
- J2-5: to the point 4-4'
- J2-6: to the point X

J4 – Elevation A/D input

- J4-1: to the point 3 (V-)
- J4-2: to the point 2 (V+)
- J4-3: to J4-1 (Ground reference to the system)

Yaesu G-450A-C/650A-C

You must wire as follows:



J1 - Relay Connector

J1-1: Free J1-7: Free
J1-2: to S2a J1-8: to S3a
J1-3: to S2b J1-9: to S3b

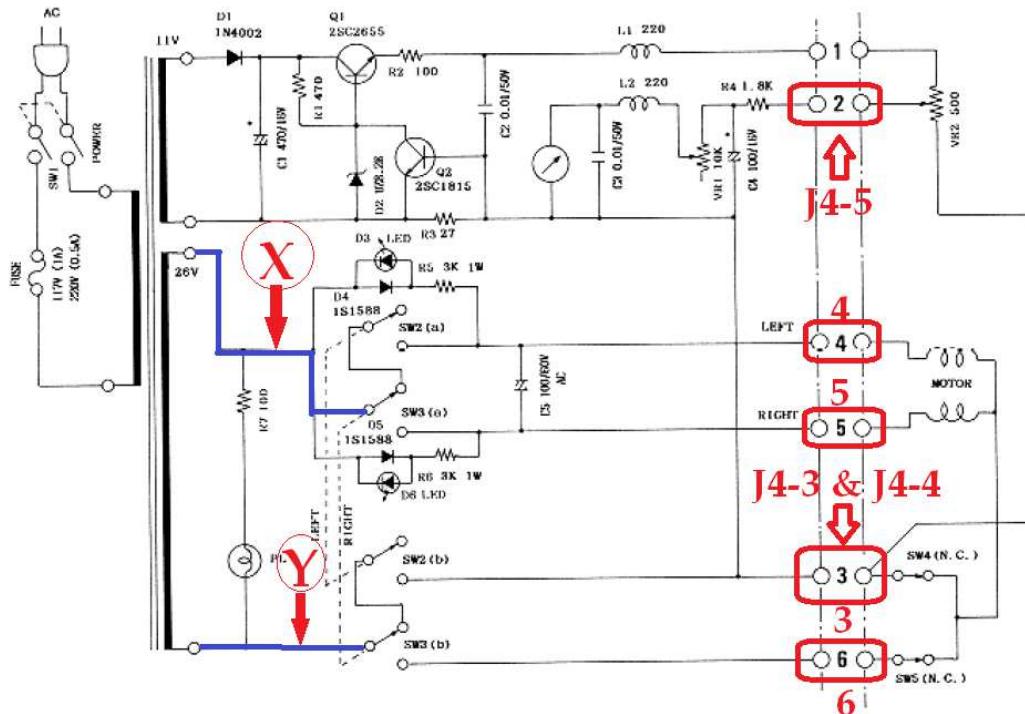
J4 – Azimuth A/D input

J4-3 & J4-4: to the point **3 @ P6 connector**
J4-5: to the point **2 @ P6 connector**

Yaesu G-600

This rotator provides 5,9V at its 360° position (CW limit) and it uses 2 circuits per switch. When the CCW or CW keys are pressed, 2 circuits are activated. So the 26Vac of the transformer are applied via X and Y to each circuit.

G-600 SCHEMATIC DIAGRAM



J1 - Relay Connector

- | | | |
|-----------------------------|----|-----------------------|
| J1-1: unassigned | A: | unassigned |
| J1-2: to the point 5 | B: | to the point 6 |
| J1-3: to the point X | C: | to the point Y |
| J1-7: unassigned | G: | unassigned |
| J1-8: to the point 4 | H: | to the point 3 |
| J1-9: to the point X | I: | to the point Y |

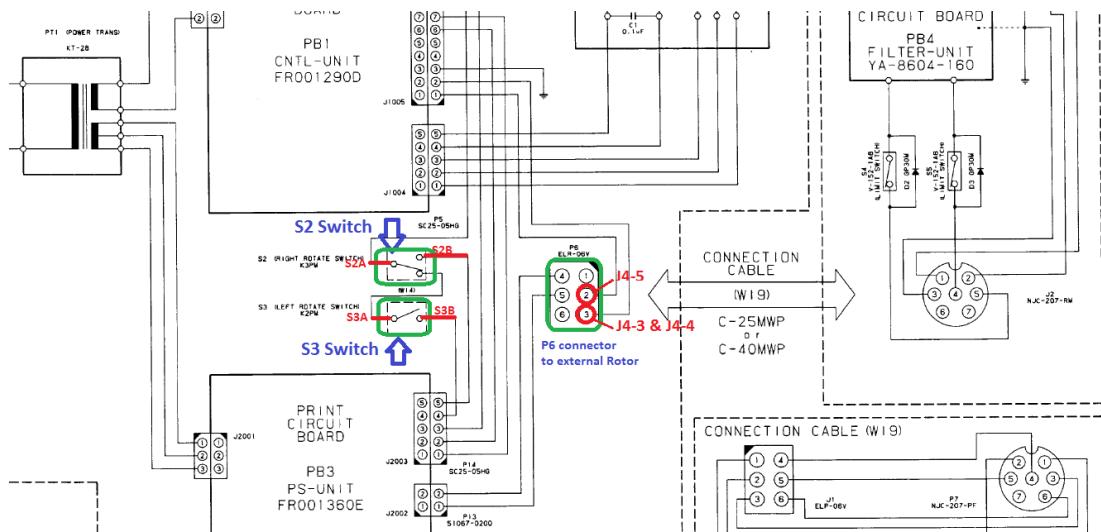
J4 – Azimuth A/D input

J4-3 & J4-4: to the point 3

J4-5: to the point **2**

Yaesu G-800SA & G-1000SA

You must wire as follows:



J1 - Relay Connector

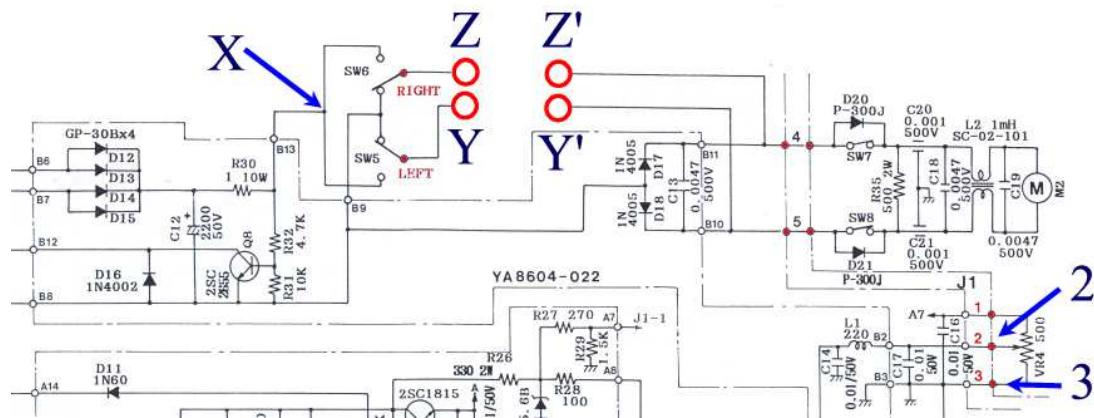
- | | |
|--------------|--------------|
| J1-1: Free | J1-7: Free |
| J1-2: to S2A | J1-8: to S3A |
| J1-3: to S2B | J1-9: to S3B |

J4 – Azimuth A/D input

- J4-3 & J4-4: to the point **3 @ P6 connector**
 J4-5: to the point **2 @ P6 connector**

Yaesu G-800S & G-1000S

These two rotators have the same circuit and the same wiring. The Pot feedback voltage between the points 1 and 3 (potentiometer's terminals) is approximately 3.6V



J1 - Relay Connector

- J1-1: to **Z** J1-7: to **Y**
J1-2: to **Z'** J1-8: to **Y'**
J1-3: to **X** J1-9: to **X**

J4 – Azimuth A/D input

- J4-3 & J4-4: to the point 3
J4-5: to the point 2

You must unsolder each direction wire and then attach J1-2 and J1-8 respectively to each wire you removed. Then solder J1-1 and J1-7 into the place you removed the controller wires respectively. Finally you must provide the +Vdc (**X** point) to J1-3 and J1-9.

For reading the antenna position, 2 wires will be connected to the point 2 (+V) and to 3 (Gnd), located at the back panel at the Control Unit.

Yaesu G-800SDX & G-1000SDX

Those two models have the advantage that are not necessary to be open the Control Unit. At the back panel they have a special connector with 8 pins.

The connection is as follows:

SDX serie RCI-USB Board

- Pin 1 J1-2 (right movement)
- Pin 2 J1-8 (left movement)
- Pin 5 J1-3 (ground)
- Pin 5 J1-9 (ground)
- Pin 4 J4-5 (Position Potentiometer)
- Pin 5 J4-4 & J4-3 (ground)
- Pin 8 +5V

NOTE 1:

The original Control Unit presents at Pin 8 -> 5V. I suggest to remove this 7805 and put in their place a 7812, so the RCI-USB Board can be powered directly from this terminal.

NOTE 2:

Kenpro **SDX** Series has a similar connector called XHP-8. This instruction is also valid for this series.

NOTE 3:

Some users have detected that their SDX units must be wired backwards.

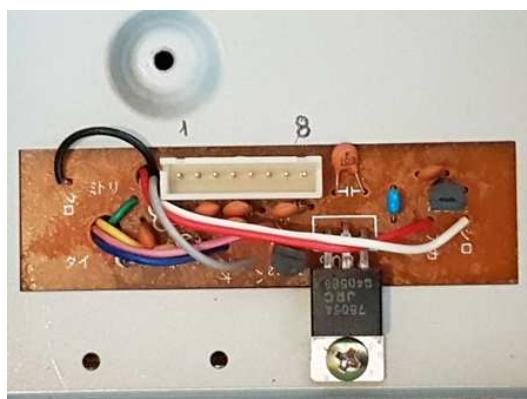
Instead:

- Pin1 => J1-2
- Pin2 => J1-8

It should be:

- Pin1 => J1-8
- Pin2 => J1-2

Yaesu G-2800SDX includes the same connector so it share the same wiring as those models.



Yaesu G-800DXA, G-1000DXA & G-2800DXA

Those models include a mini-Din connector with the following connection:

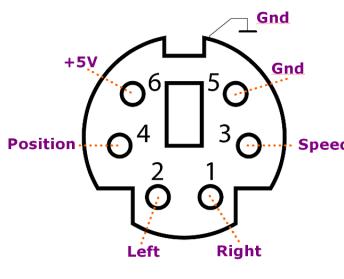
<u>Mini-Din</u>	<u>Meaning</u>
Pin #1:	Right movement (CW)
Pin #2:	Left movement (CCW)
Pin #3:	Speed Control
Pin #4:	A/D or Potentiometer feedback
Pin #5:	Earth or Ground
Pin #6:	Vd
Pin #7:	Earth or Ground

The connection is as follows:

<u>DXA serie</u>	<u>RCI-USB Board</u>
Pin 1	J1-2 (right movement)
Pin 2	J1-8 (left movement)
Pin 5	J1-3 (see note)
Pin 5	J1-9 (see note)
Pin 4	J4-5 (Position Potentiometer)
Pin 5	J4-3 & J4-4 (ground)

Important Note: Mike OE3MZC has reported that when the mini-DIN connector is wired as explained above, the rotator will move too slowly. It can be fixed for an automatic speed control motion, doing the following change:

<u>DXA serie</u>	<u>RCI-USB Board</u>
Pin 1	J1-2 (right movement)
Pin 2	J1-8 (left movement)
Pin 5	J1-3 (ground)
Pin 5	J1-9 (ground)
Pin 3	J1-5 (Aux Speed Relay)
Pin 6	J1-6 (5V+)
Pin 4	J4-5 (Position Potentiometer)
Pin 5	J4-3 & J4-4 (ground)



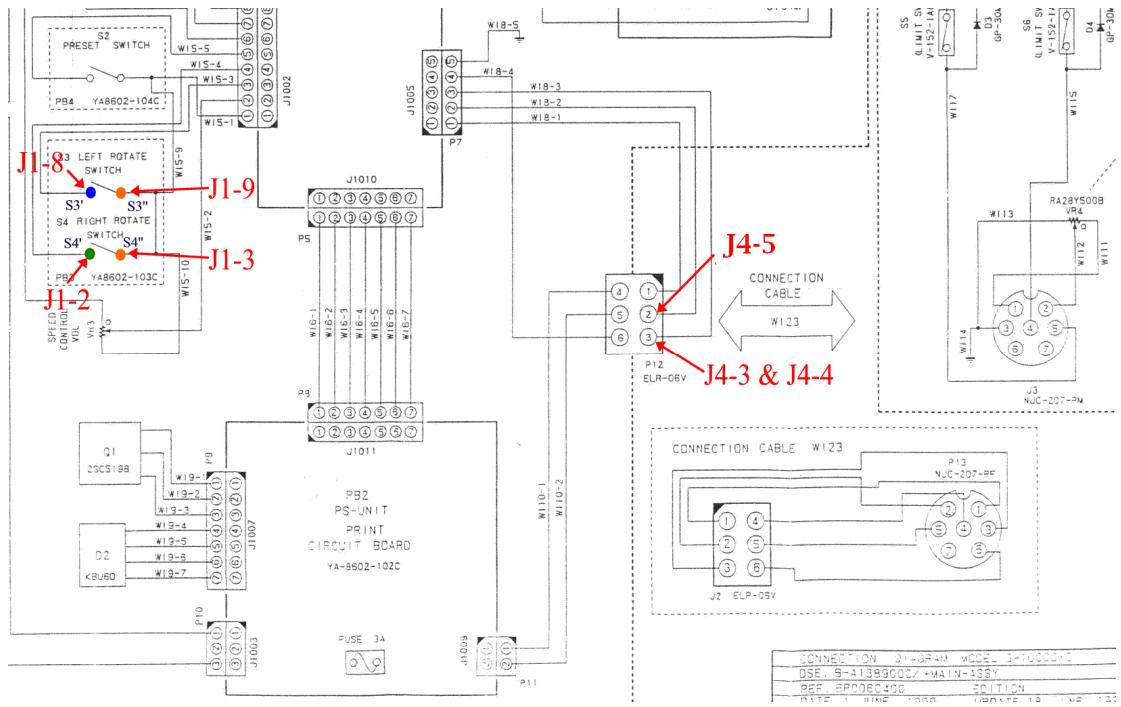
Mini-Din connector

Remember that Pin 5 on the Yaesu connector must be wired to several parts at the ARS-USB Unit that must be connected to ground (J1-3, J1-9, J4-3 and J4-4)

Additionally you must enable on the ARS-USB device to control the speed via Aux relay. You will do this with the **ARSConf program**.

Yaesu G-1000DXC

You must wire as follows:



J1 - Relay Connector

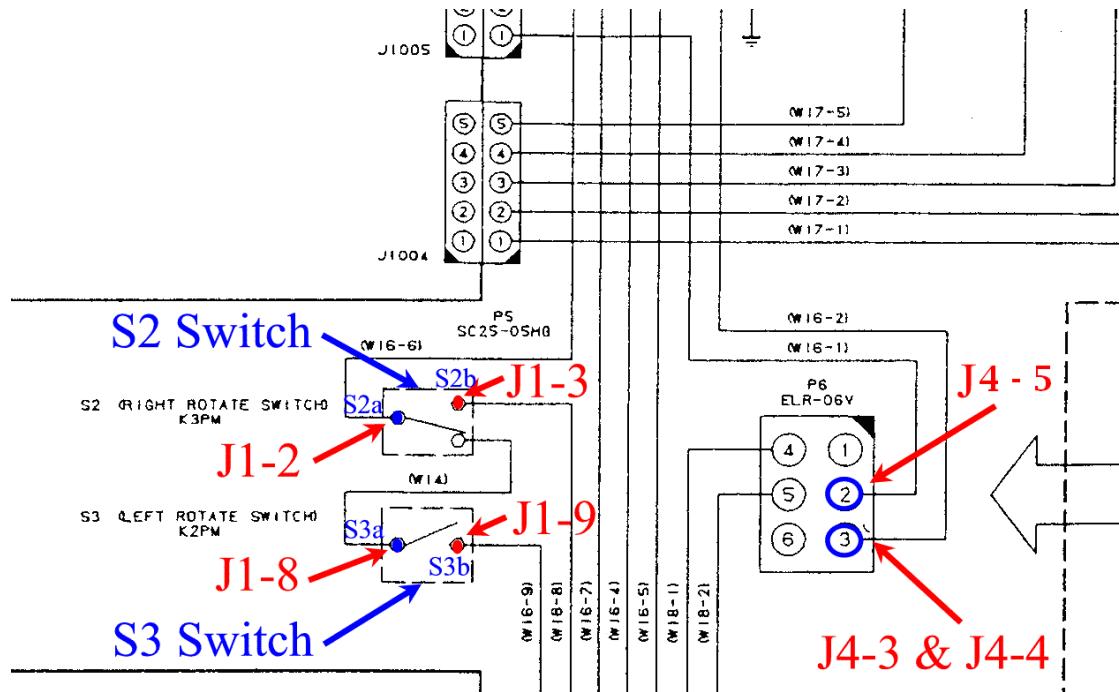
- | | |
|--------------|--------------|
| J1-1: Free | J1-7: Free |
| J1-2: to S4' | J1-8: to S3' |
| J1-3: to S4" | J1-9: to S3" |

J4 – Azimuth A/D input

- J4-3 & J4-4: to the point **3 @ P12 connector**
J4-5: to the point **2 @ P12 connector**

Yaesu G-1000C

You must wire as follows:



J1 - Relay Connector

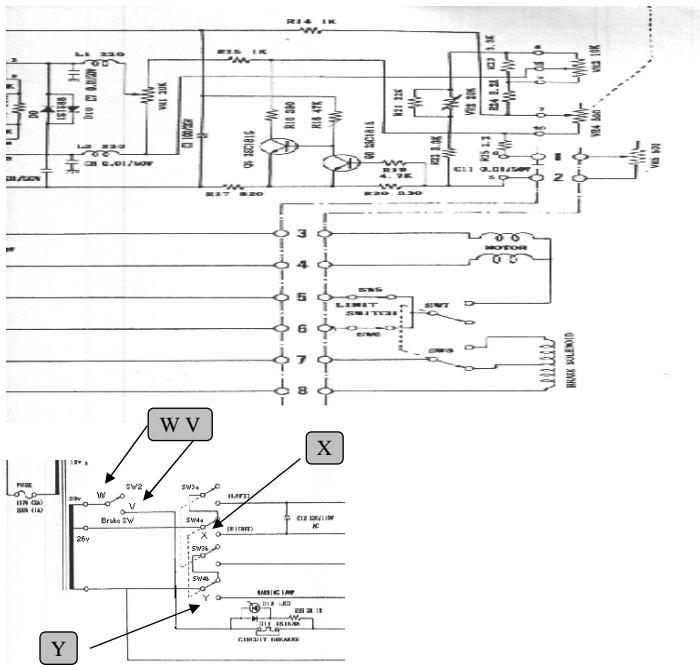
- | | |
|--------------|--------------|
| J1-1: Free | J1-7: Free |
| J1-2: to S2a | J1-8: to S3a |
| J1-3: to S2b | J1-9: to S3b |

J4 – Azimuth A/D input

- J4-3 & J4-4: to the point **3 @ P6 connector**
 J4-5: to the point **2 @ P6 connector**

Yaesu G-2000RC

The G-2000 provides -3.24V negative voltage between the terminals 1 and 2 of the control unit when the antenna is fully turned clockwise. This means, on the one hand it is necessary to invert this voltage exchanging V- and V+. On the other, because this voltage is minor than 5V, adjust Pot1, until you get 5V at pin 2 of IC2 or X2 point. This rotator also incorporates a solenoid, which is used as mechanical brake, so you have to extend the wires from the brake switch (SW2) until the Auxiliary relay and passing them through J1-5 and J1-6. The direction switches SW3 (a-b) and SW4 (a-b) are a two circuit type, therefore the main circuit (J1-1, J1-2, J1-3; J1-7, J1-8, J1-9) and the auxiliary circuit (A, B, C and G, H, I) of the RC relays will be used.



The complete wiring will be as follows :

J1 - Relay Connector (*)

J1-1: to the point 4 J1-7: to the point 3
 J1-2: to the point 4' J1-8: to the point 3'
 J1-3: to the point X J1-9: to the point X

G: to the point 5 A: to the point 6
 H: to the point 5' B: to the point 6'
 G: to the point Y C: to the point Y

J1-4: Free
 J1-5: to W (a SW2 terminal)
 J1-6: to V (the other SW2 terminal)

J4 – Azimuth A/D Input

J4-5: to the point 3-3'
 J4-4: to the point 2-2'

*** NOTE:** The points marked as 3, 4, 5 and 6 belong to the control unit terminals and the points marked with the apostrophe symbol (' (e.g. 3', 4') belong to the cable attached to the rotator.

Yaesu G-2800DXC

This models include a mini-Din connector with the following connection:

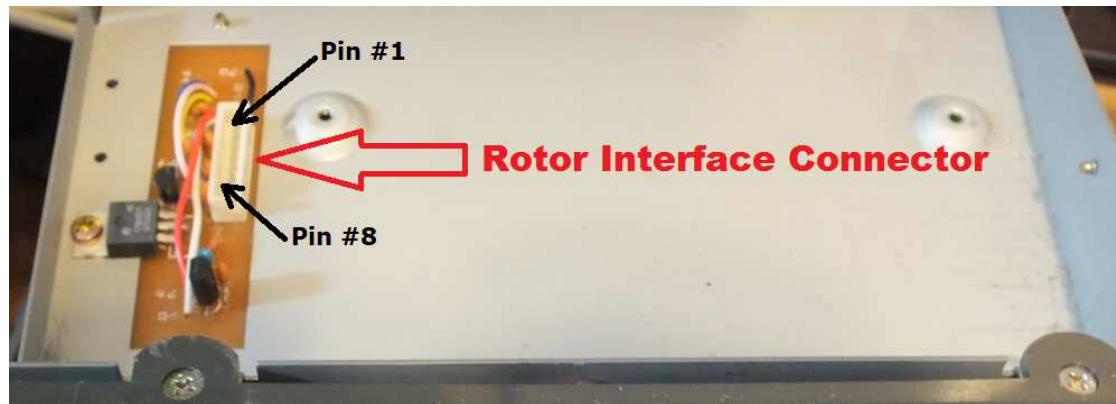
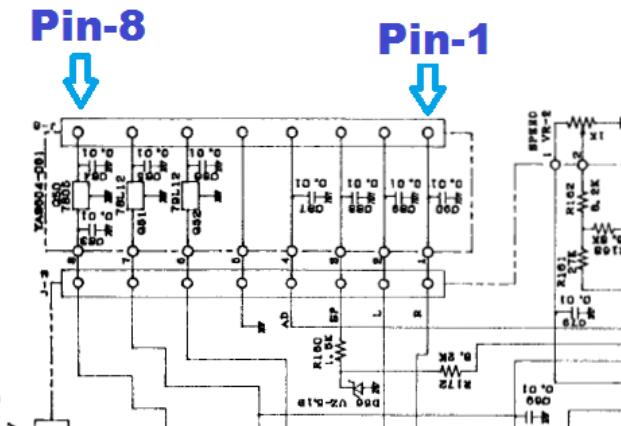
<u>Mini-Din</u>	<u>Meaning</u>
Pin #1:	Right movement (CW)
Pin #2:	Left movement (CCW)
Pin #3:	Speed Control
Pin #4:	A/D or Potentiometer feedback
Pin #5:	Earth or Ground
Pin #6:	Vd
Pin #7:	Earth or Ground

This model has the same wiring than Yaesu G-2800DXA, so read that section and proceed as it's described.

Yaesu G-2800SDX

This models include a 8 pins connector so you must open the controller top cover and route those wires from the rotor interface controller to the ARS-USB.

Connector on Top Panel



J1 - Relay Connector (*)

- | | |
|-------------------------------|------------------------------|
| J1-1: Free | J1-7: Free |
| J1-2: to Pin-1 (Right) | J1-8: to Pin-2 (Left) |
| J1-3: to Pin-5 (Gnd) | J1-9: to Pin-5 (Gnd) |

J4 – Azimuth A/D Input

- | | |
|--------------|-----------------------|
| J4-5: | to Pin-4 (AD) |
| J4-4 & J4-3: | to Pin-5 (Gnd) |

Yaesu G-5400 & G-5600

Both models, included the G-5500 or the Kenpro variant, have a DIN-8 connector in the back panel, that will allow to interface it to the RCI-USB Board.

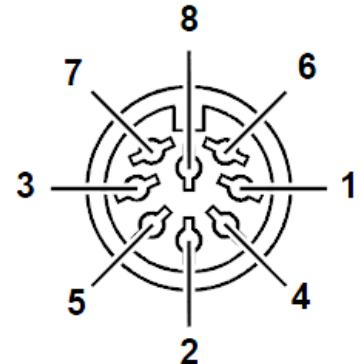
The DIN-8 connector, has the following pin assignment and their connection to the RCI-USB board is as follows:

Pin Nr:	Function/Meaning	RCI-USB connection
1	Elevation position detector	J4-2 (V+ Elev.)
6	Azimuth position detector	J4-5 (V+ Azim.)
4	Left turn control	J1-9
2	Right turn control	J1-3
3	Up turn control	J2-3
5	Down turn control	J2-6
8	Ground	J1-8 & J1-2 & J2-2 & J2-5 + J4-1 & J4-3 & J4-4
7	This pin has between 13-6V (not regulated) with a maximum current of 100mA. It's not used by the RCI-USB Board.	

The pin #8 @ DIN-8 connector is the ground reference. So this pin will be connected to the ADC ground input: J4-1 & J4-3 & J4-4 and also to the relays output: J1-8, J1-2, J2-2 & J2-5.

Note: You must connect the ground (Pin #8) to all those points indicated with a wire. So connect J4-1, J4-3, J4-4, J1-8, J1-2, J2-2 and J2-5 all together to pin #8 of the DIN8 Yaesu connector.

Pin	Function
6	Provides 2 to 4.5VDC corresponding to 0 to 450°
1	Provides 2 to 4.5VDC corresponding to 0 to 180°
4	Connect to Pin 8 to rotate left (counterclockwise)
2	Connect to Pin 8 to rotate right (clockwise)
5	Connect to Pin 8 to rotate DOWN
3	Connect to Pin 8 to rotate UP
7	Provides DC13V to 6V at up to 200mA
8	Common ground



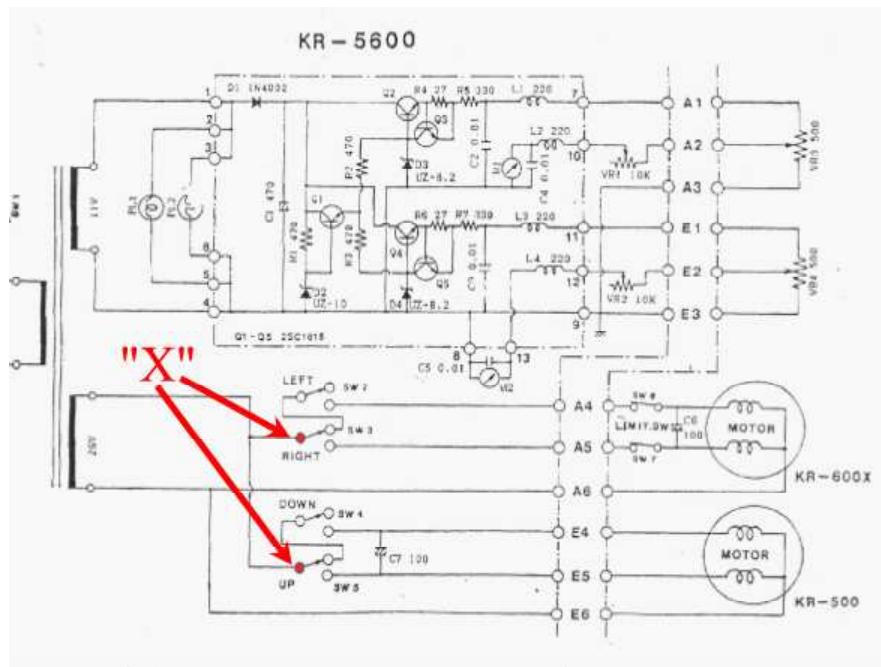
Din connector and Pin Assignment

Yaesu G-5400 & G-5600 w/o DIN connector

The Yaesu or Kenpro 5400/5600 without the DIN connector at the back panel of the Control Unit are wired similar than the G400 and G500. So it's necessary to read the guide for those models.

Note that the Control Unit has A1, A2 ... A6, and E1, E2, ..E6.

"A" means Azimuth and "E" means Elevation rotor



J1 - Relay Connector (Azimuth)

J1-1: Unassigned

J1-2: to the point A5

J1-3: to the point X

J1-7: Unassigned

J1-8: to the point A4

J1-9: to the point X

J4 – Azimuth A/D input

J4-4 & J4-3: to the point A3

J4-5: to the point A2

J2 - Relay Connector (Elevation)

J2-1: Unassigned

J2-2: to the point E5

J2-3: to the point X

J2-4: Unassigned

J2-5: to the point E4

J2-6: to the point X

J4 – Elevation A/D input

J4-1 & J4-3: to the point E3

J4-2: to the point E2

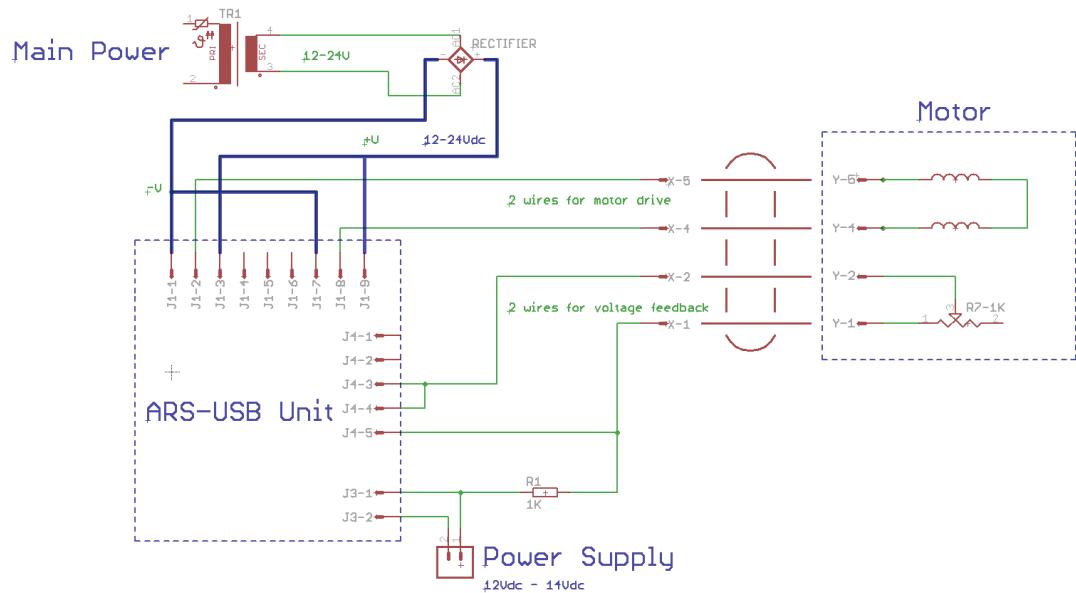
Yaesu G-5500

This model has the same wiring and connection that the Yaesu G5400 or G5600. So read that section and proceed as it's described.

TVRO actuator with POT (2 wires)

The ARS-USB can control a TVRO Actuator with a Potentiometer (2 or 3 wires). Most models use a 36Vdc, but it's possible that they can work with a PS from 12-24Vdc.

The schematic is as follows:



- A 1K Ohms can be used as R1.
- A Power Supply (12-24Vdc) will work OK for a 36Vdc actuator. A transformer and bridge rectifier can be used for this part.

Specifications

J1: AZIMUTH RELAY CONNECTOR

3 x Relay: 2 circuits, 5A at 220V.

J2: ELEVATION RELAY CONNECTOR

2 x Relay: 2 circuits, 5A at 220V.

J3: POWER CONNECTOR

Input voltage: 12-14V

Power consumption
(Standby): <60mA.

Power consumption
with relays switched on : <150mA.

J4 AZIMUTH & ELEVATION ADC INPUTS

J4-5 & J4-4 are the azimuth rotor feedback input. It is adjusted by means of Pot1 (Gain).

J4-2 & J4-1 are the elevation rotor feedback input. It is adjusted by means of Pot2 (Gain).

Input signals between +/-3 to +/-24V can be regulated by means of Pot1 or Pot2.

CIRCUIT DIMENSIONS

12 cm x 12 cm x 2 cm (Deep, Wide, High)

4.7inch x 4.7inch x .8inch (Deep, Wide, High)

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