VE2DX Electronics

From Canada (VE) 2 the World (DX)

User Manual for

VE2DX SO2R 2X6 Remote Antenna Switch and 2X6 Interlock Board.

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Version 2.5.0

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Date	Name	Comments	Revision
20 July 2020	VE2DX	Release first version	1.1.0
25 July 2020	VE2DX	Added 2X6 Interlock Board	1.2.0
30 July 2020	VE2DX	Clarified 2X6 Interlock alarms	1.3.0
30 July 2020	VE2DX	Released	1.4.0
25 Sept 2021	VE2DX	Edited to match new version 2 PCBs	2.1.0
26 Sept 2021	VE2DX	Corrections	2.2.0
27 Sept 2021	VE2DX	Released	2.3.0
19 june 2022	VE2DX	Added warnings and variation info	2.5.0

!Warning and Notes!

Please note that some enclosure dimensions in this manual may vary from latest enclosure information.

▲ IMPORTANT ▲

Please read carfully the following warnings.

- This device is switching using 12VDC being applied to the required input.
DO NOT use any other power specs.

- It is **strongly recommended** to keep the coax connector side of the enclosure
ALWAYS facing down if possible to prevent water infiltration.

- **ALWAYS** make certain the enclosure is **properly grounded**.

- Do not climb tower unless you are **properly trainned**
and follow **proper safety protocols.**

- Do not use if **lightning** is possible.

- Always make certain proper **lightning proterections are installed**
on both your **coaxes** and **control lines.**

- Always make certain your coaxes and control connecters
are **properly protected against water infiltration**.

Introduction:

Hello and congratulations on your purchase of the **VE2DX SO2R 2X6 Remote Antenna Switch and/or VE2DX 2X6 Interlock Board.**

This manual is for the Version 2 **VE2DX SO2R 2X6 Remote Antenna Switch and/or VE2DX 2X6 Interlock Board.**

Our SO2R design switch and Interlock board can be used remote from the station installed in a waterproof enclosure at the top of the tower and also in the shack to switch antenna. If used with the Optional VE2DX 2X6 Interlock Board it will prevent a station from accessing an antenna already in use, and can generate 3 alarms; a general alarm and 2 station specific alarms, these optional alarm signals are 12VDC outputs from the 2X6 Interlock Board and can be wired to any 12Vdc triggered devices like leds, ligths, buzzers, etc...

1. VE2DX SO2R 2X6 Remote Antenna Switch
1.1.   Technical information:

The VE2DX SO2R 2X6 Remote Antenna Switch is a dual isolation relay-based antenna switch using a series of RT424012 sealed DPDT relays in groups of 3 for each antenna thus offering dual series isolation of a minimum of 60Db.

It is designed for full legal Power on bands from 1.6Mghz to 60Mghz.

It also offers two 12volts DC ports for optional devices installed in the same enclosure.

The Switch does not require a permanent 12VDC power source, it is triggered using 12VDC signals applied to the selected antenna port via the control cable.

An optional VE2DX 2X6 Interlock Board can be added to the Switch to prevent the operator from setting both radios to the same antenna port. See section 2 for more information

1.2.   Description:

The **VE2DX SO2R 2X6 Remote Antenna Switch** is made of a series of 18 RT424012 sealed DPDT relays in groups of 3 for each of the antenna ports that can be SO2R or N-Type connectors.

You also have two radios ports made of either SO2R or N-Type Connectors offering access to all 6 antennas to each radio.

Antenna selections is done via pins 3 to 8 of the antenna control cable by applying a 12VDC signal to the selected pin. Each control signals are RF filtered.

Optional Lightning arrestors can be added directly to the antenna ports.

When an antenna is NOT selected by either radio, the antenna port is grounded.

1.3. VE2DX SO2R 2X6 Remote Antenna Switch RFI protection.

One very important factor with our design was RFI, Ham radio stations have to deal with RFI often, and we wanted to help with our design, to do so we isolated every port with proper RFI filtering. This will NOT block EVRYTHING, but it should prevent most common issues.

<p style="text-align:center;color:red;">WARNING!</p>

<p style="text-align:center;color:red;">The content of the enclosure is extremely tight we highly recommend that you DO NOT open a preassembled unit.</p>

1.4. VE2DX SO2R 2X6 Remote Antenna Switch enclosures

The **VE2DX SO2R 2X6 Remote Antenna Switch** comes in different formats (PCB, Kit, Assembled) with an optional enclosure choice of Aluminum external weather and RFI proof enclosure or plastic weather proof enclosure.
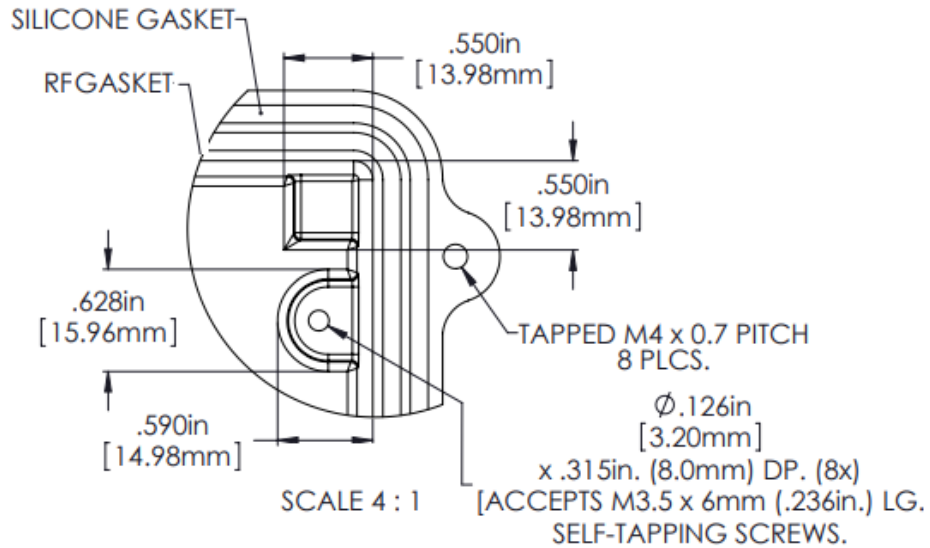
1.4.1. Aluminum External Weather and RFI Proof Enclosure.

Our outdoor Aluminum enclosure is made of very high-quality IP67 Nema Diecast Aluminum Enclosure.

It has a Silicon gasket to prevent any water infiltration and ALL ports or holes made during construction are also sealed with Silicon.

It also has an RF mechanical gasket shield that will make your enclosure RFI protected.

SILICONE GASKET
RF GASKET
.550in [13.98mm]
.550in [13.98mm]
.628in [15.96mm]
.590in [14.98mm]
SCALE 4 : 1
TAPPED M4 x 0.7 PITCH 8 PLCS.
Ø.126in [3.20mm] x .315in. (8.0mm) DP. (8x) [ACCEPTS M3.5 x 6mm (.236in.) LG. SELF-TAPPING SCREWS.

You will find all enclosure specifications in Appendice A.

1.4.2.   Waterproof Dustproof IP65 ABS Plastic Enclosure.

We also offer a Waterproof Dustproof IP65 ABS Plastic enclosure, It also has a Silicon gasket to prevent any water infiltration and ALL ports or holes made during construction are also sealed with Silicon.

7.0in/177mm
5.6in/141mm
10.1in/256mm
9.3in/237mm
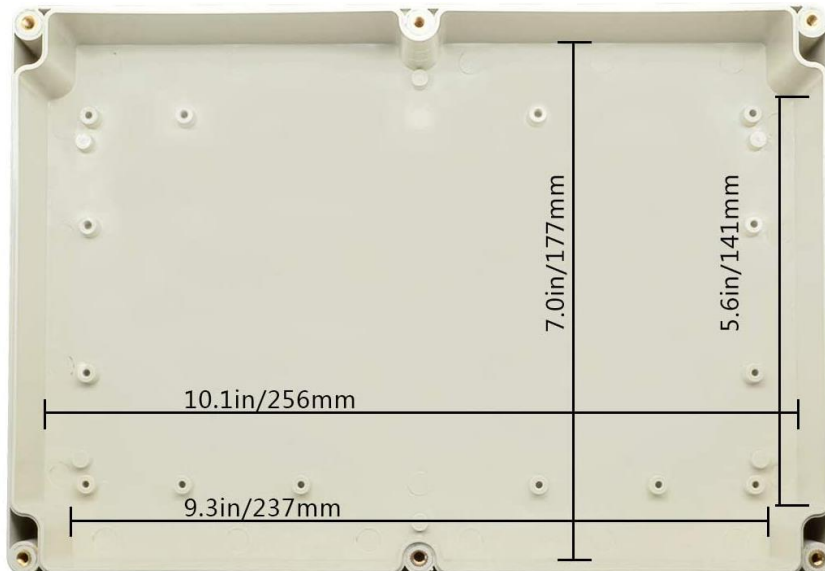
But it is not RF shieled.

It is less expensive than the Aluminum enclosure it is design for outdoor operations and perfect for indoor applications.
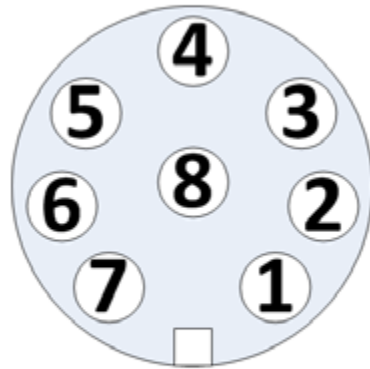
1.5. Connector Pinout

This section will list the connectors used in the **VE2DX SO2R 2X6 Remote Antenna Switch** and their pin assignments.

1.5.1. Aluminum External Weather and RFI Proof Enclosure Control connectors.

The control connectors used are regular 8 pin microphone connectors.

1.5.2.   Optional external connectors pinout.

VE2DX SO2R
Remote Switch
PinOut

① 12VDC
② Gnd
③ Antenna 1
④ Antenna 2
⑤ Antenna 3
⑥ Antenna 4
⑦ Antenna 5
⑧ Antenna 6

1.5.3. SO2R 2X6 Switch PCB Control connectors Pinout.

VE2DX SO2R
Remote Switch
PinOut

1. Gnd
2. 12VDC
3. Antenna 1
4. Antenna 2
5. Antenna 3
6. Antenna 4
7. Antenna 5
8. Antenna 6

1.6. Assembly

The VE2DX SO2R remote antenna switch is fairly simple to assemble, here are the steps to follow;

1.6.1. Tools required

- Soldering iron
- solder
- Small Pliers
- Small cutters

1.6.2. Steps to follow

- Install C1 to C18.
- Install D1 to D18.
- Install RLY1 to RLY18.
- Install RFC1 to RFC16.
- Install 2X 8 pin (Radio1 and Radio2) connectors.
- Install 2X 2 pin 12 vdc.
- Using star washers on each side of the PCB install all 8 SO239 or N-Type Coax connectors. (Note 1)
- Install a short U shaped of solid #14 or #12 copper wire from the tip of the coax connector to the large hole on the PCB next to the connector. (Note 2)

Note 1:

The coax connectors can be installed on the enclosure and then attached to the to main pcb, if so then ensure that the screw used is long enough and the the connector is first bolted to the enclosure the also bolted to the pcb.

If this type of assembly is done, please ensure that you ALWAYS add star washers between screw and connector, between bolt1 and enclosure and finally on each side of the of the pcb, this will ensure proper grounding.

When using this approach if the enclosure is used outdoor proper silicone-based sealant should be used to seal all the openings.

Notre 2:

The antenna connection is located on the left-hand side of the Radio 1 and Radio 2 connectors. For antenna 1 to Right-Hand of the connectors.

1.7. Testing

The VE2DX SO2R remote antenna switch is fairly simple to assemble, here are the steps to follow;

1.7.1. Tools required

- DVM or Multimeter
- 2 X 12 inch wire of different colors
- 12 VDC power source

1.7.2. Steps to follow

- Attach wire1 to ground connector of the power supply.
- Attach wire2 to 12VDC connector of the power supply.
- Attach Wire1 one to Pin 1 of the Radio1 connector.
- Attach Wire2 to Pin 3 of the Radio1 connector, you should have heard Relay 16 engage.
- Measure using Ohm scale the resistance between Radio1 coax center connection and antenna 1 coax center connector you should have a short.
- Repeat for all six connectors.
- The move to radio2 connector doing the same procedure, note that in this case TWO relays will engage thus RLY17 and RLY18 for antenna 1.
- Verify when no power is applied that all antenna connectors (1 to 6) are ground.

Note 3: the 12VDC connectors do not have any power on them unsless 12VDC is applied to Pin2, these are only there for options.

Note 4: refer to 1.5.2 for connector pinout, Pin 1 is always on the Right-Hand side of the Radio 1 and 2 connectors.

2. VE2DX SO2R 2X6 Interlock Board
2.1.   Technical information:

The **VE2DX SO2R 2X6 Interlock Board** is using sealed DPDT relays that are interlock to prevent relay to engage if his counterpart is already engaged.

It is added to a 12VDC SO2R 2X6 switch to prevent during SO2R operations a both radios to attach to the same antenna.

It is designed for full legal Power on bands from 1.6Mghz to 60Mghz.

It also offers two 12volts DC ports for optional devices installed in the same enclosure.

The Switch **does** require a permanent 12VDC power source, it is triggered using 12VDC signals applied to the selected antenna port via the control cable.

It can be piggyback to a **VE2DX SO2R 2X6 Remote Antenna Switch** thanks to optional supports 3D printed by WWW.VE2DX.COM.

2.2.   2.2 Description:

The **VE2DX SO2R 2X6 Interlock Board** is made of a series of 12 sealed DPDT relays in groups of 2 for each of the antenna ports.

You have two 8 pins input ports, two 8 pins output ports, an optional 12VDC output, an Alarm (ALL) 12VDC output, an Alarm (Radio1) 12VDC output and an Alarm (Radio2) 12VDC output.

Antenna selections is done via pins 3 to 8 of the antenna control cable by applying a 12VDC signal to the selected pin. Each control signals are RF filtered on the input and output.

To operate both INPUT connectors must have 12VDC applied to Pin2.

Pin 1 is used for ground

It is highly recommended that the 12VDC on both output connectors (Pin2) and Ground (Pin1) be attached to the proper assigned pins on the **VE2DX SO2R 2X6 Remote Antenna Switch.**

2.3.   VE2DX SO2R 2X6 Interlock Board RFI protection.

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2.4.   Connector Pinout

This section will list the connectors used in the **VE2DX SO2R 2X6 Interlock Board** and their pin assignments.
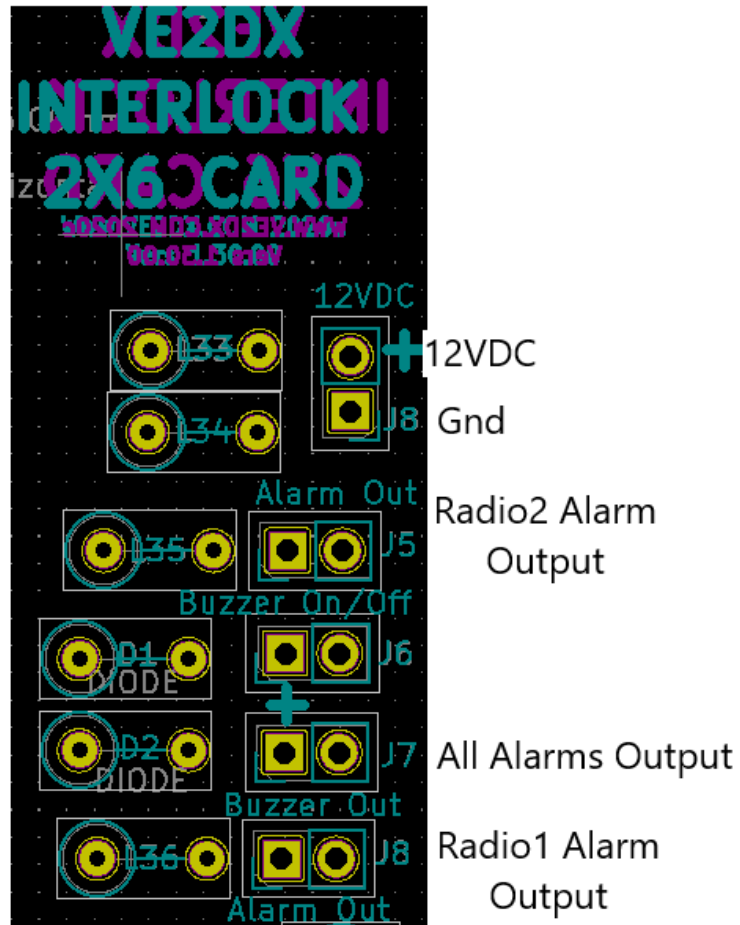
2.4.1. Input Connectors for Radio 1 and 2.

(1) Gnd

(2) 12VDC

(3) Antenna 1

(4) Antenna 2

(5) Antenna 3

(6) Antenna 4

(7) Antenna 5

(8) Antenna 6

2.4.2. Output Connectors for Radio 1 and 2.

(1) Gnd

(2) 12VDC

(3) Antenna 1

(4) Antenna 2

(5) Antenna 3

(6) Antenna 4

(7) Antenna 5

(8) Antenna 6
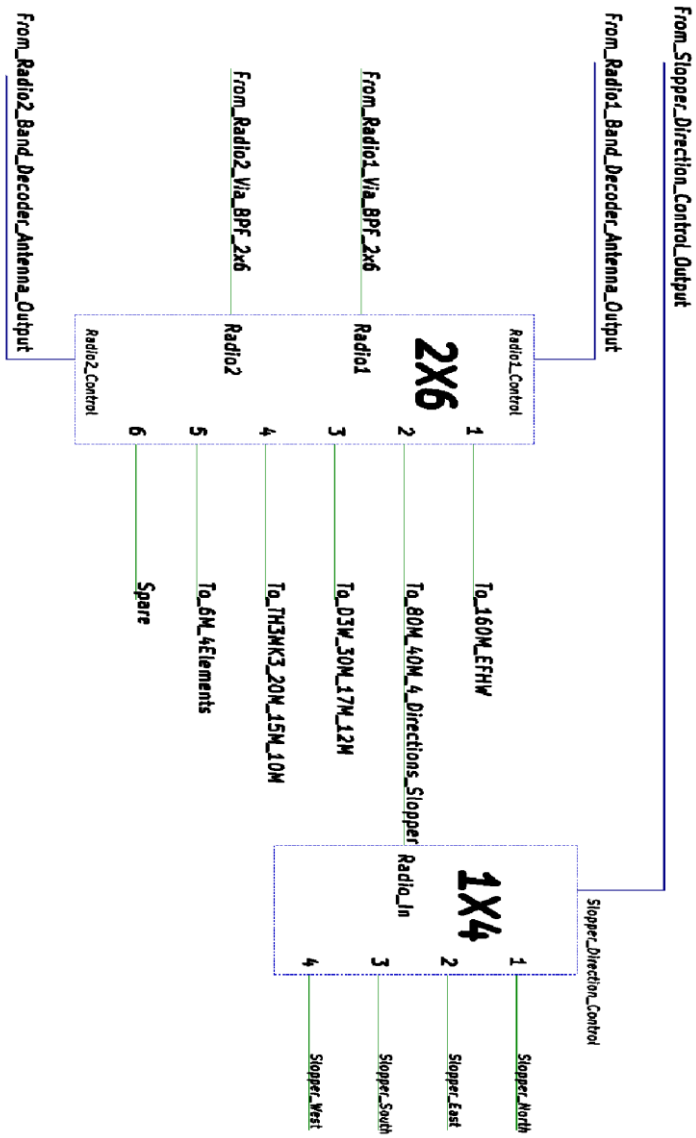
2.4.3. Alarm Output

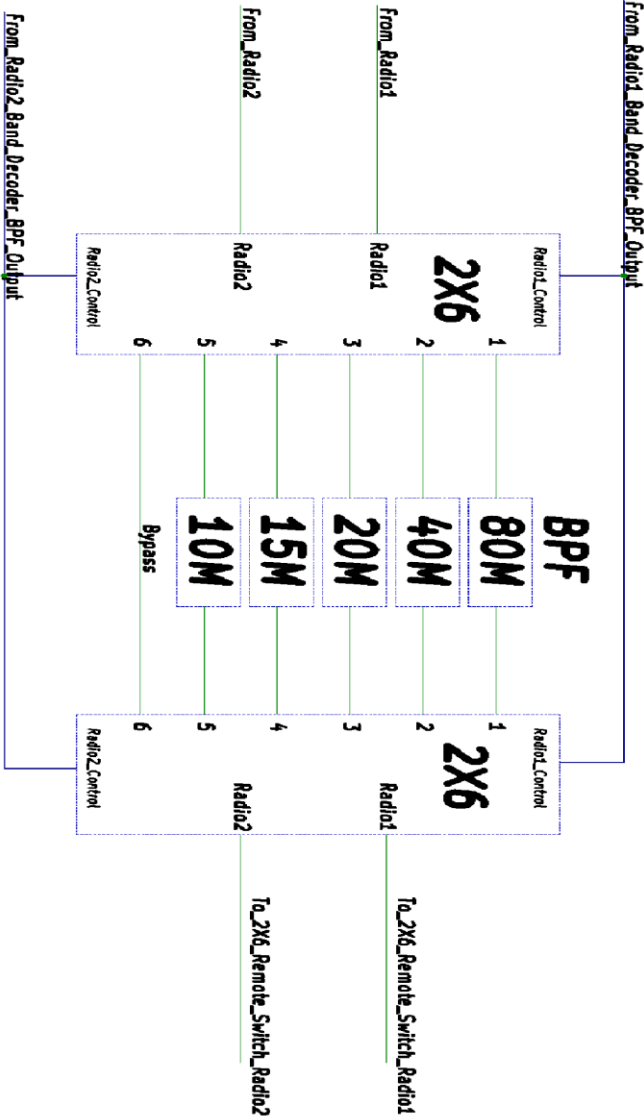**You are done you can now exit the SETUP Menu and start having fun!**

A.IP67 Nema Diecast Aluminum Enclosure Specifications.

B. Application Example1

2X6

- Radio1_Control
- Radio1
- Radio2
- Radio2_Control
- 1 — To_160M_EFHW
- 2 — To_80M_40M_4_Directions_Slopper
- 3 — To_D3W_30M_17M_12M
- 4 — To_TH3MK3_20M_15M_10M
- 5 — To_6M_4Elements
- 6 — Spare

From_Slopper_Direction_Control_Output
From_Radio1_Band_Decoder_Antenna_Output
From_Radio1_Via_BPF_2x6
From_Radio2_Via_BPF_2x6
From_Radio2_Band_Decoder_Antenna_Output

1X4

- Radio_In
- 1 — Slopper_North
- 2 — Slopper_East
- 3 — Slopper_South
- 4 — Slopper_West

Slopper_Direction_Control

C.Application Example2

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73 De Richard VE2DX 😋