DRAGOON ITCN

CORVUS

CORVUS-400 Training

SLIDES ONLY

NO SCRIPT PROVIDED

The "Swiss Army Knife" Test Tool for Aircraft Maintainers and System Integrators

CORVUS OVERVIEW

CORVUS-400 is a small, one-man carry, easy-to-use test tool for aircraft avionics and weapon systems.

A combination of hardware and software tools providing a complete MIL-STD-1553 troubleshooting/testing capability for any triax/twisted pair bus network and cable integrity testing.

CORVUS includes four testing and troubleshooting functions and associated cables.

- Bus Monitor
- VNA
- Wiremap
- D-CORVUS

CORVUS-400
NSN: 6625-01-722-8200
GSA Contract# 47QSMS25D0014

The CORVUS-400 System Includes:

CORVUS

- Size: 18” x 11.5” x 5.5”
- Weight: 18 lbs.
- Power: 60 W, 115V AC or 28V

D-CORVUS

- TX generates mimic 1553
- RX receives 1553 & analyzes result
- TX and RX can be configured "*on the fly*" via SW commands on CORVUS mainframe

WiFi built into RX and Mainframe
5 hours battery life between charge

VEGAS

- Size: 5.125" x 4.35" Lx 1.25"
- Weight: 1 lb.
- Power: 5 VDC 0.5 Amps

POWER PACK

- Size: 31.59” x 22.99” x 19.48”
- Weight: 42 lbs.

Min Temp -40° F (-40 ° C)
Max Temp 210° F (99 ° C)

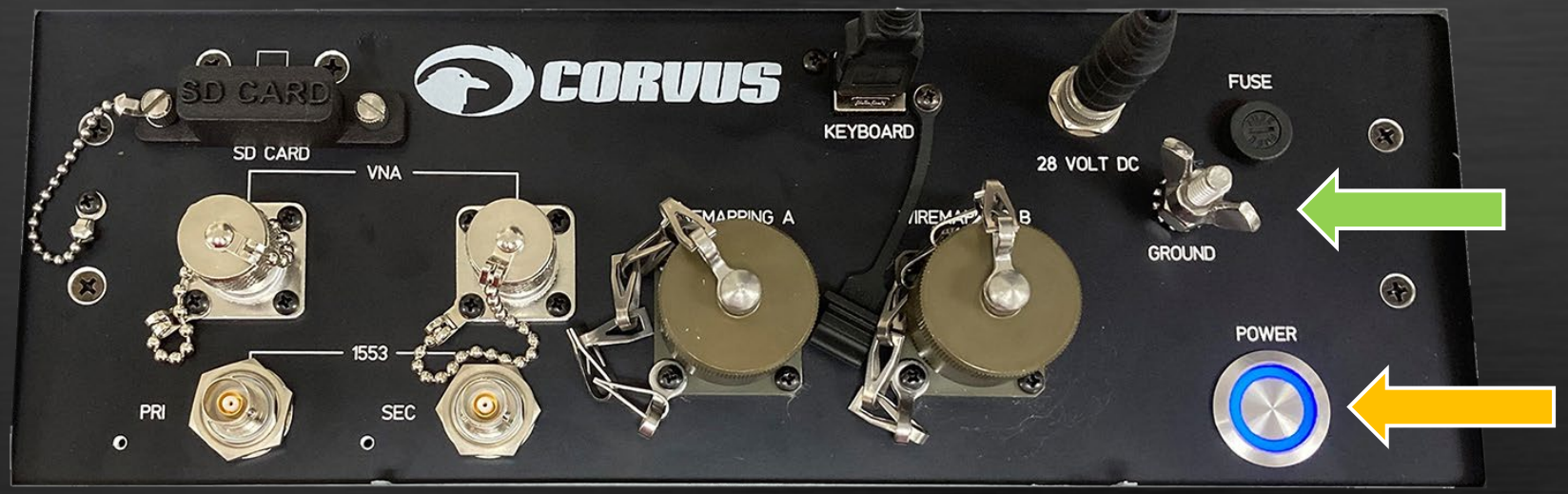
Certifications
IP67 / Def Stan 81-41

5 Hours continuous prime power output

Includes all associated cables, connectors and adapters

TO START:

1. Connect the Grounding Cable to Ground post
2. Plug in the CORVUS - Connect the power cord to a standard 115VAC, 60Hz outlet or the Power Pack
3. Secure the power connection by hand twisting the threaded connector until it is snug.
4. Power on CORVUS by Pushing the illuminated silver Power button on the top panel.

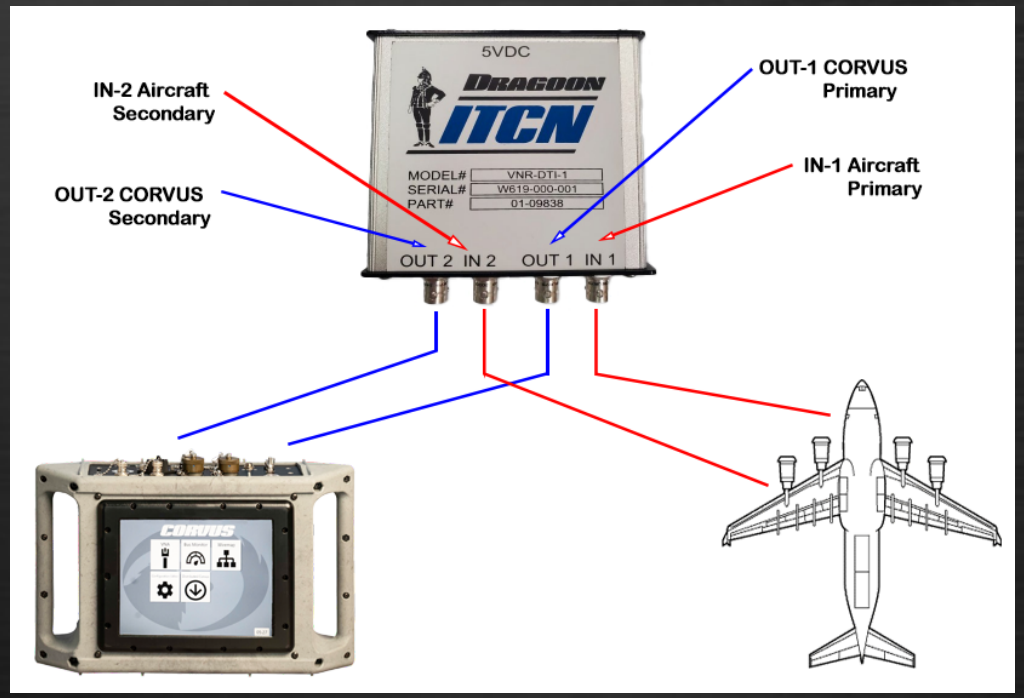


Vegas Diode

The Vegas Diode is used with the Bus Monitor to ensure that CORVUS does not transmit onto the bus.

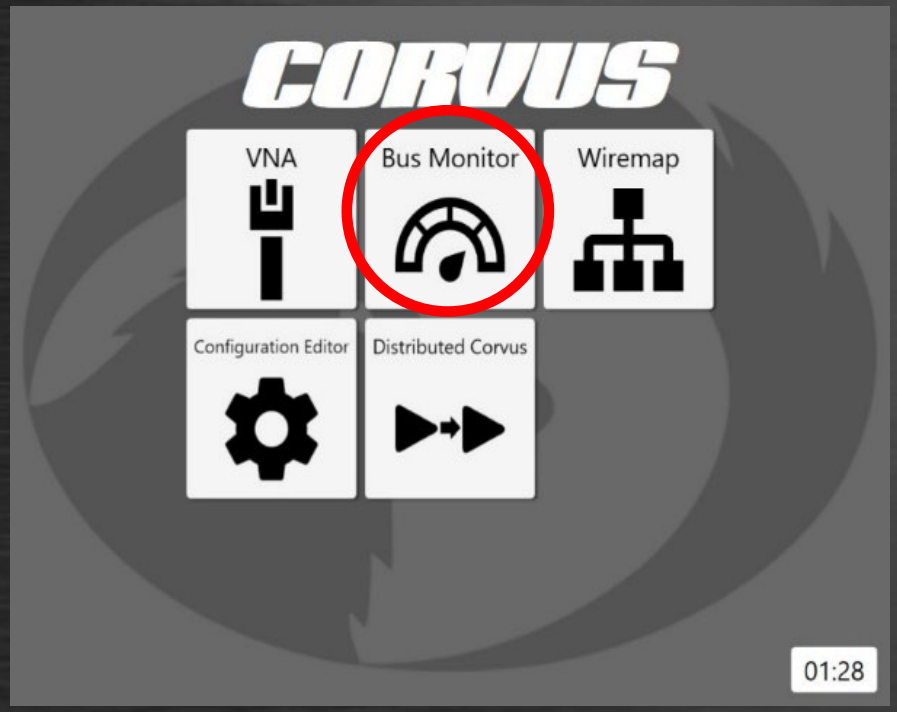
Connect the Vegas Diode to the 5 VDC output on CORVUS top connector panel. Connect the aircraft bus under test to both of the IN ports on Vegas.

CORVUS is then connected to the OUT ports.

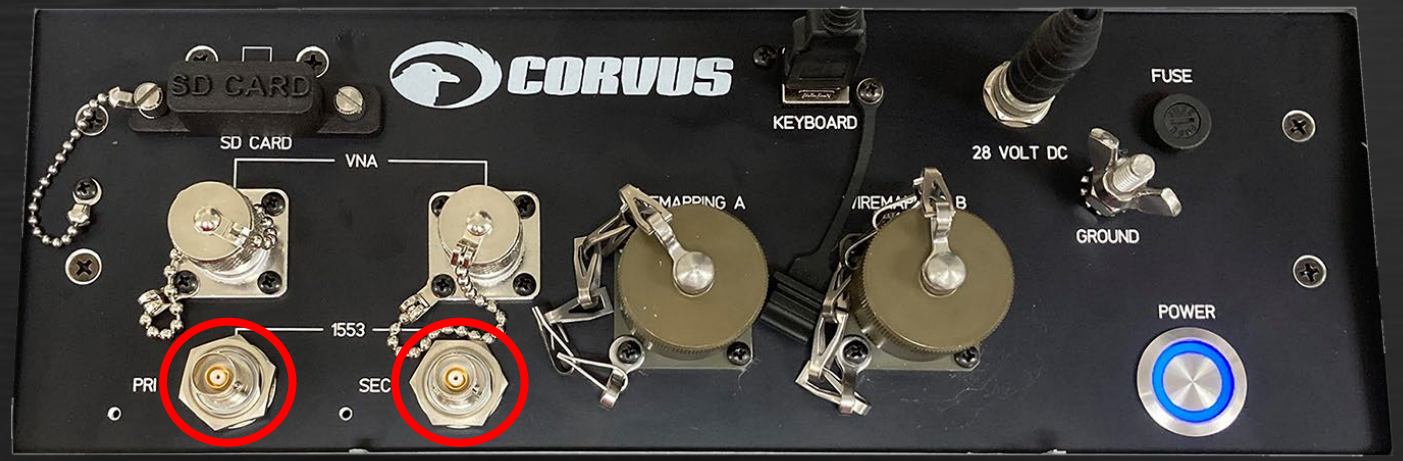


Bus Monitor

Select Bus Monitor from the Splash Screen



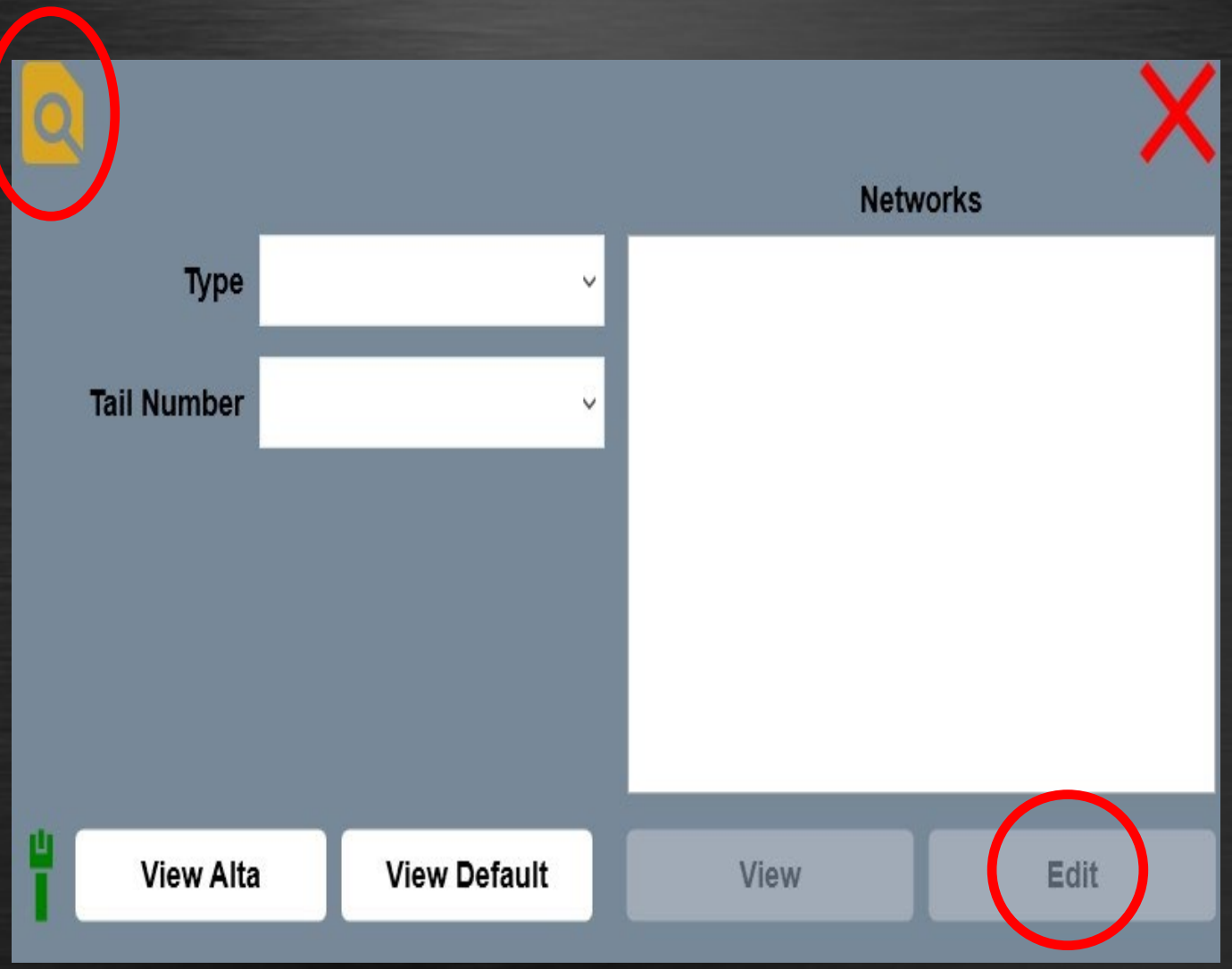
Bus Monitor ports are labeled 1553 “PRI” and “SEC” and are Trumpeter TRB connectors



Bus Monitor 2

You can Create, View, and Edit your busses here

1. Click Yellow File icon and select your Database
2. Select Edit to build your Bus



Bus Monitor 3

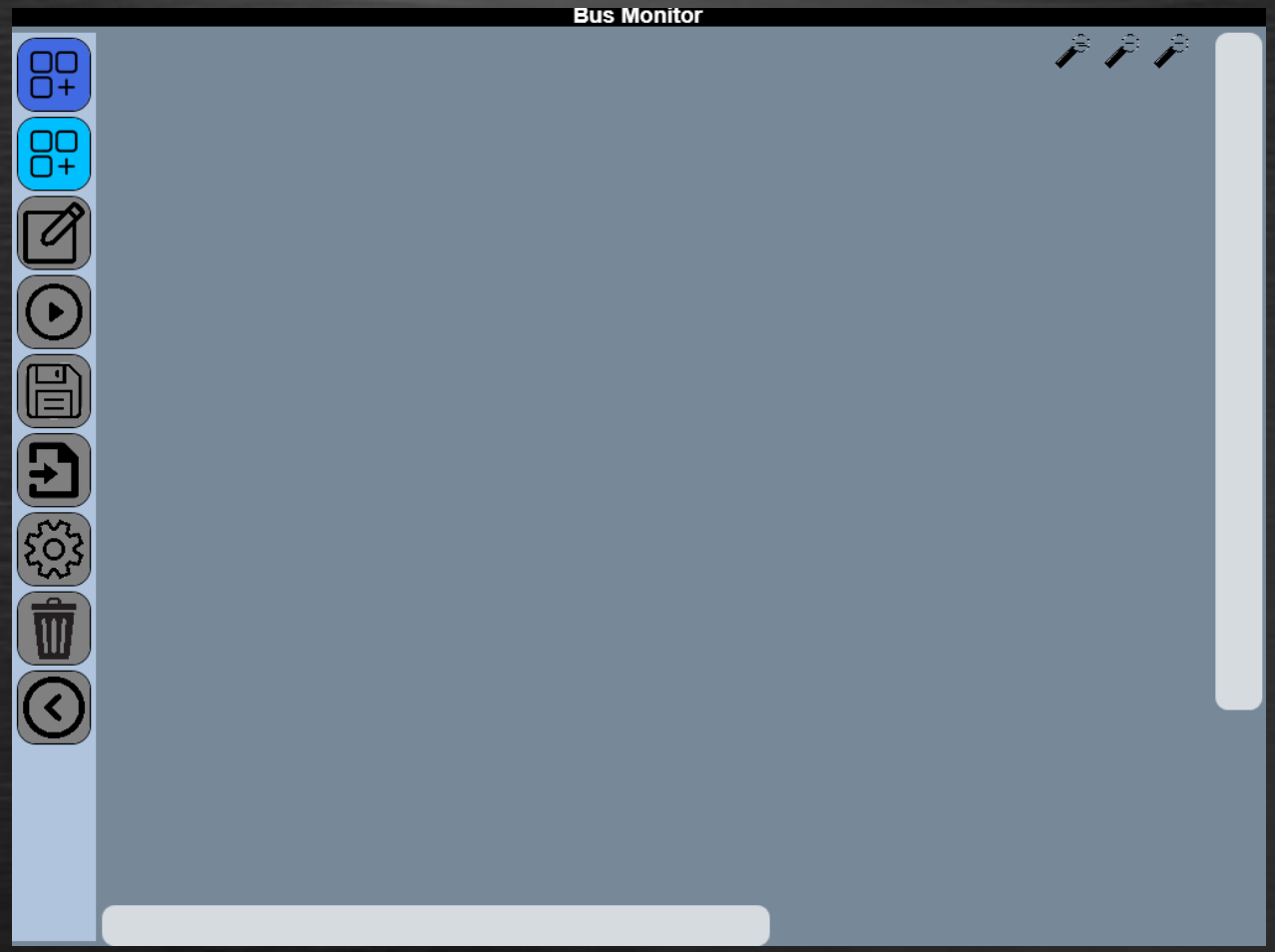
You will get a blank screen that looks like this

Add couplers and RT's by clicking the blue and cyan buttons

Connect RT's and couplers by clicking the stub connector icons on them

Connect couplers to each other by clicking the bus connector icons. Right clicking a bus connector will let you add/remove a terminator

You can set R/T names and addresses once they are added



Bus Monitor 4

This is what your completed Bus will look like with a mix of good and bad data

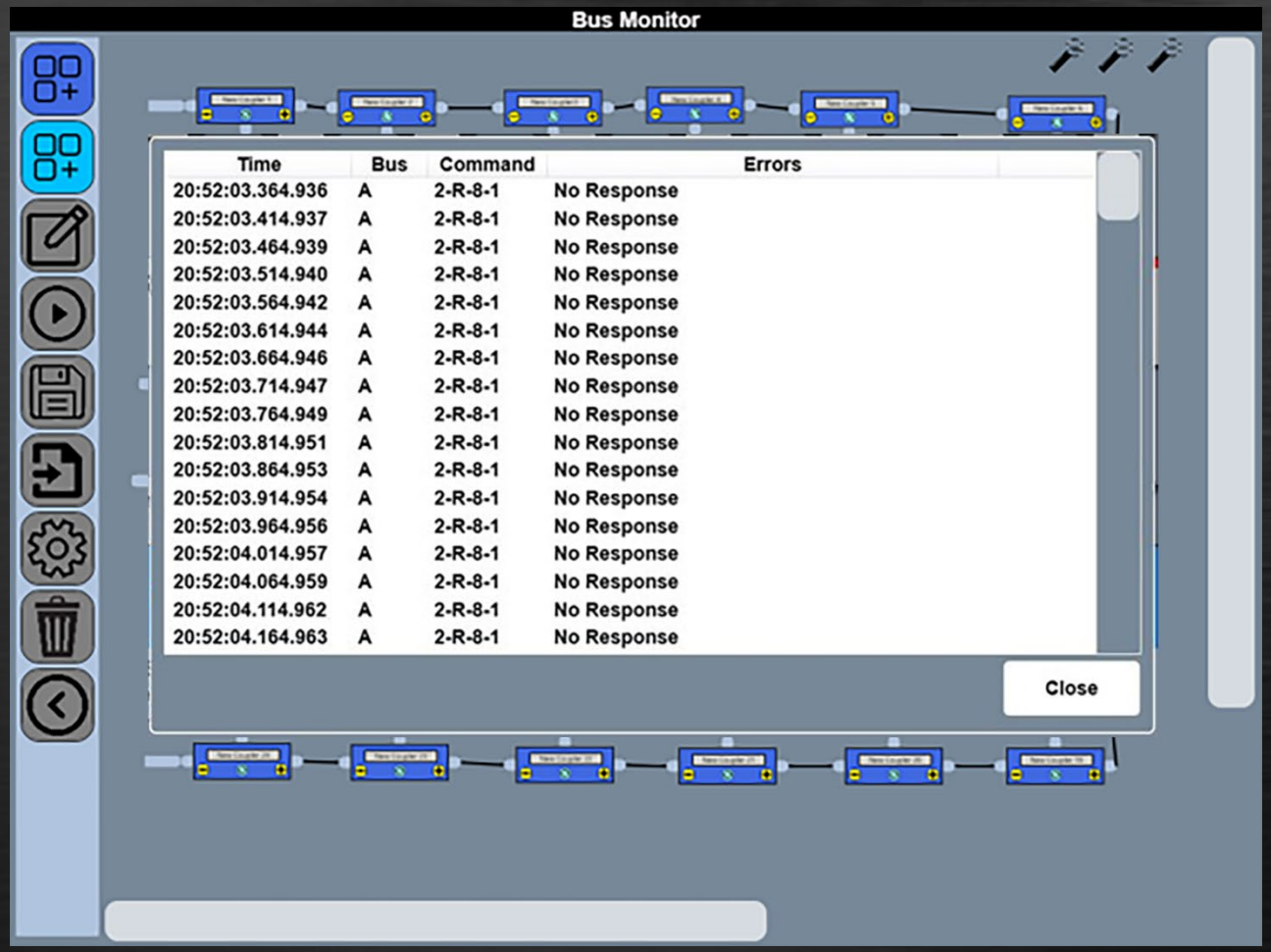
Good Data is shown with a Green highlighted box
Bad Data is shown with a Red highlighted box
No Data is shown with a Yellow highlighted box

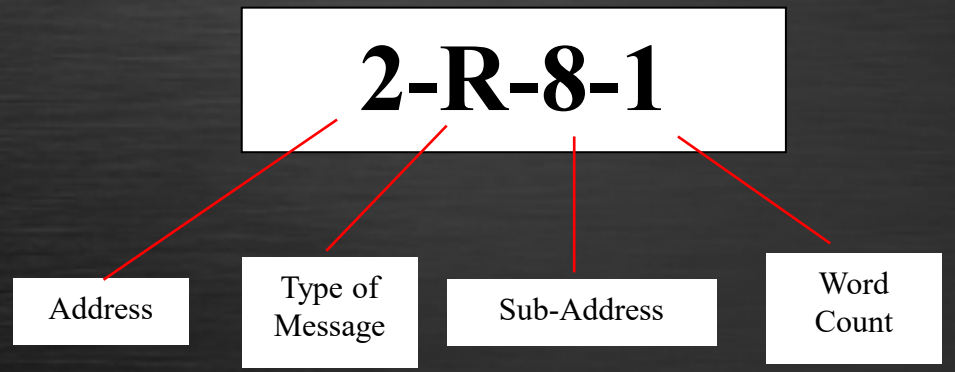
The error/message count is shown on the terminal for both primary (top) and secondary (bottom) buses

You can view errors by clicking the red highlight on the R/T and select filters by clicking the filter button next to it.

Bus Monitor Error/Filter

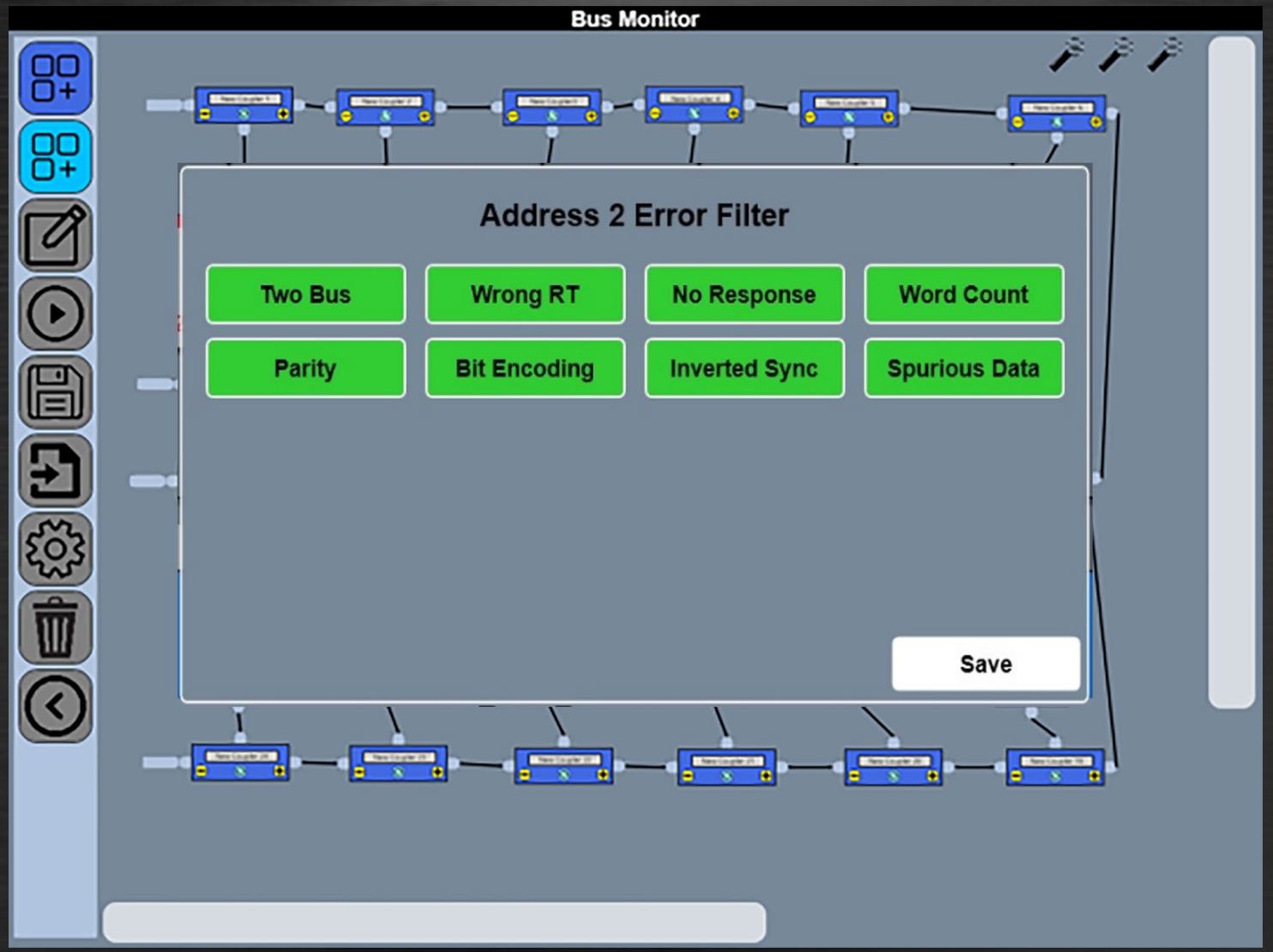
Here you can view each error that occurred and the breakdown of each command that caused the error





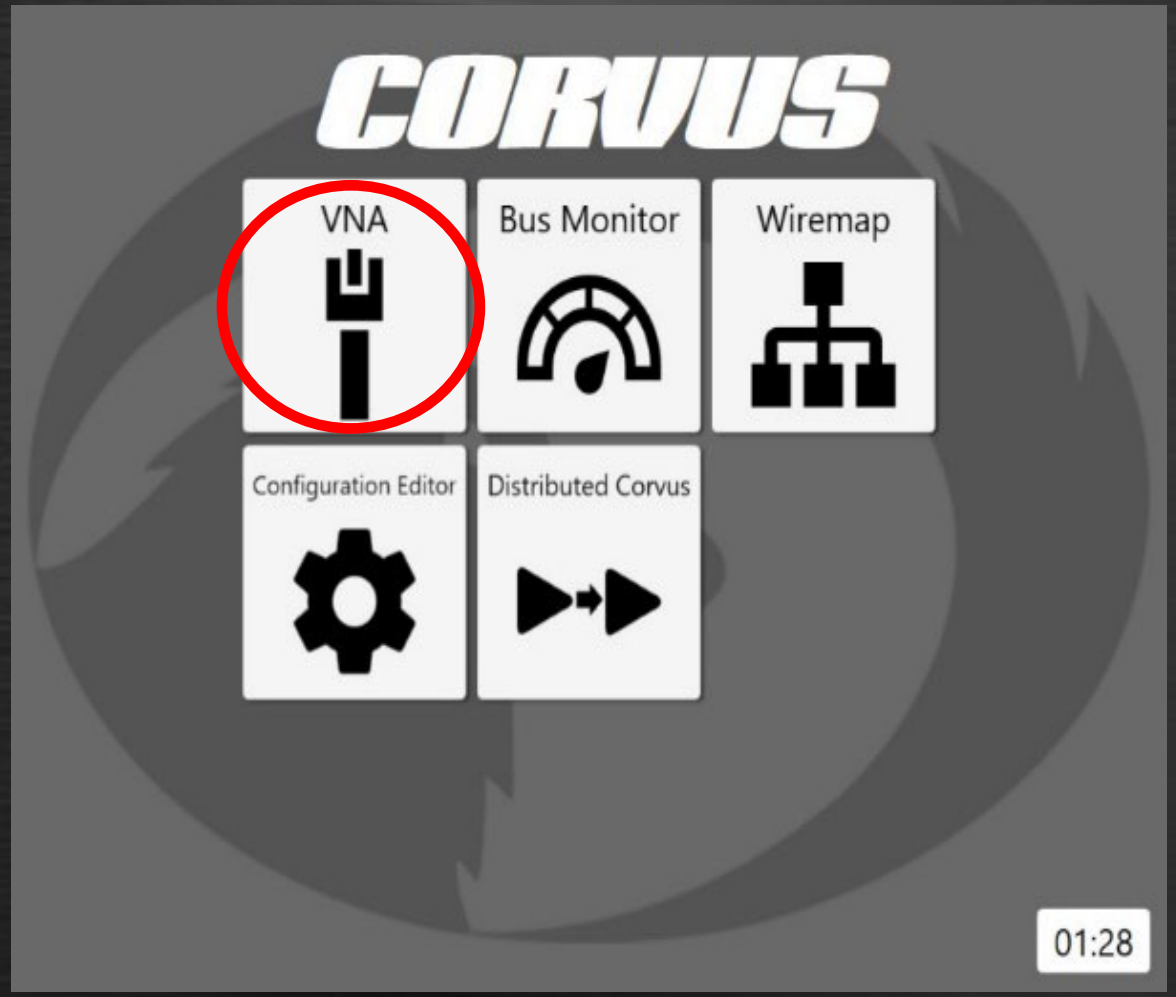
Bus Monitor Error/Filter

You can also filter errors you do not want to appear



Vector Network Analyzer

Select VNA from the Splash Screen



Vector Network Analyzer

CORVUS utilizes a one port VNA that operates in the range of 1 MHz – 6 GHz

There are four tests that can be performed-

- Insertion Loss
- Return Loss
- SWR
- Distance to Fault

Insertion Loss

1. **Set** Start and Stop frequencies by selecting Stimulus
2. **Connect** lead cable and follow Calibration steps
3. **Connect** DUT
4. **Select** Trace and change format to cable loss
5. **Connect** load to opposite end of DUT
6. **Save** trace data in memory by clicking Trace then Memorize Trace
7. **Remove** Load from the end of the cable
8. **Click** Trace > Data Math > Data – Mem
9. **Click** Marker and add the marker to see dB loss

Return Loss

1. **Set** Start and Stop frequencies by selecting Stimulus
2. **Connect** lead cable and follow Calibration steps
3. **Connect** DUT
4. **Select** Trace and change format to Log Magnitude
5. **Click** Marker and add marker to see dB loss

SWR

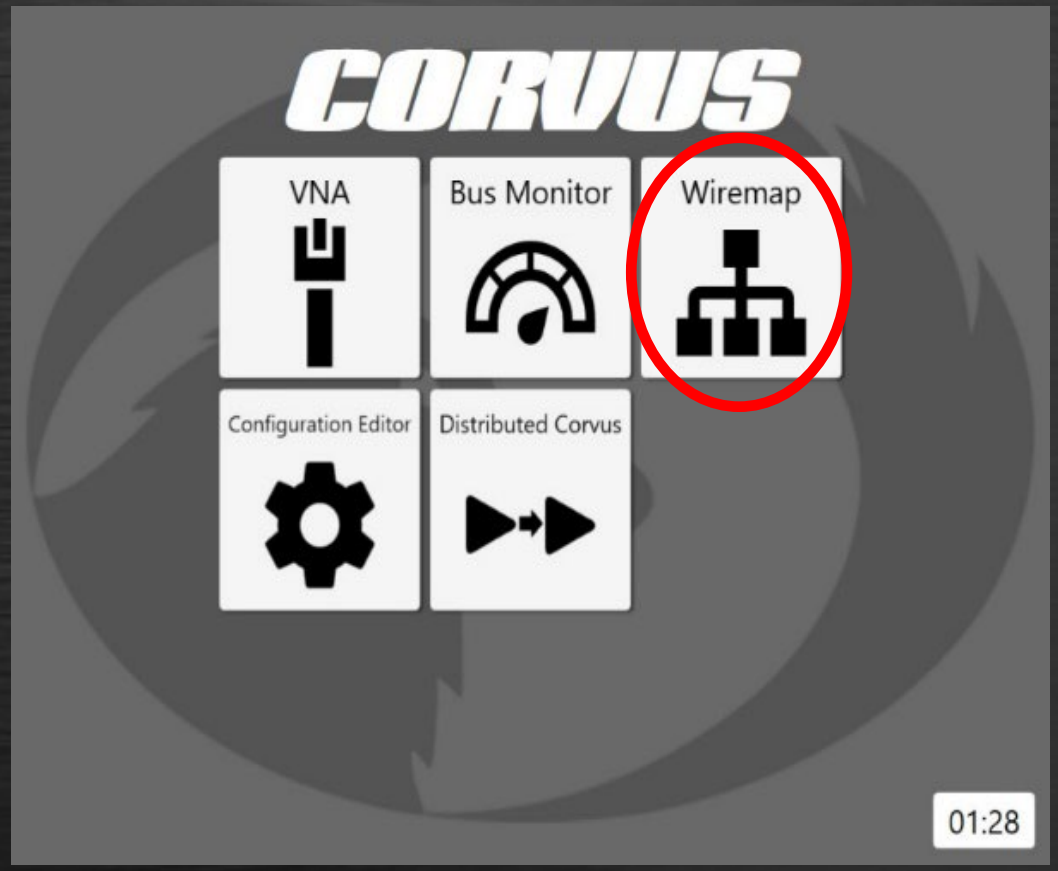
1. **Set** Start and Stop frequencies by selecting Stimulus
2. **Connect** lead cable and follow Calibration steps
3. **Connect** DUT
4. **Select** Trace and change format to SWR
5. **Click** Marker and add marker to see dB loss

Distance to Fault

1. **Set** Start and Stop frequencies by selecting Stimulus
2. **Set** number of points to 2001
3. **Connect** lead cable and follow Calibration steps
4. **Connect** DUT
5. **Ensure** trace format is set to Log Mag
6. **Select** Analysis > Time Domain and change settings to
   - Unit- Imperial Ft
   - Reflection Type- One way
   - Response- Lowpass Impulse
   - Velocity Factor- VoP of the DUT
7. **Click** set frequency low pass
8. Turn time domain on and click Ok
9. **Click** Marker and add marker to see Ft measurement

Wiremap

Select Wiremap from the Splash Screen

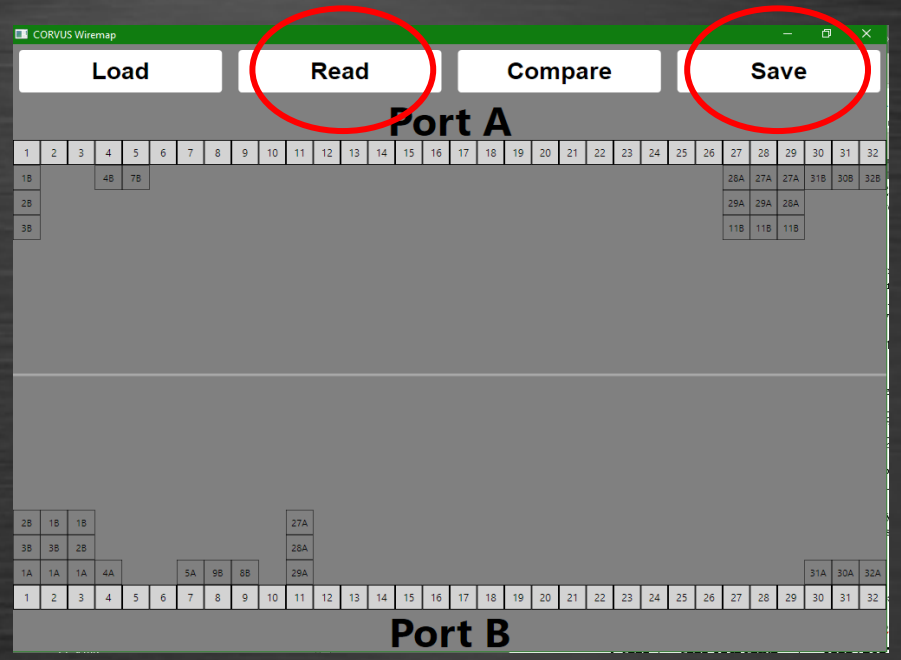


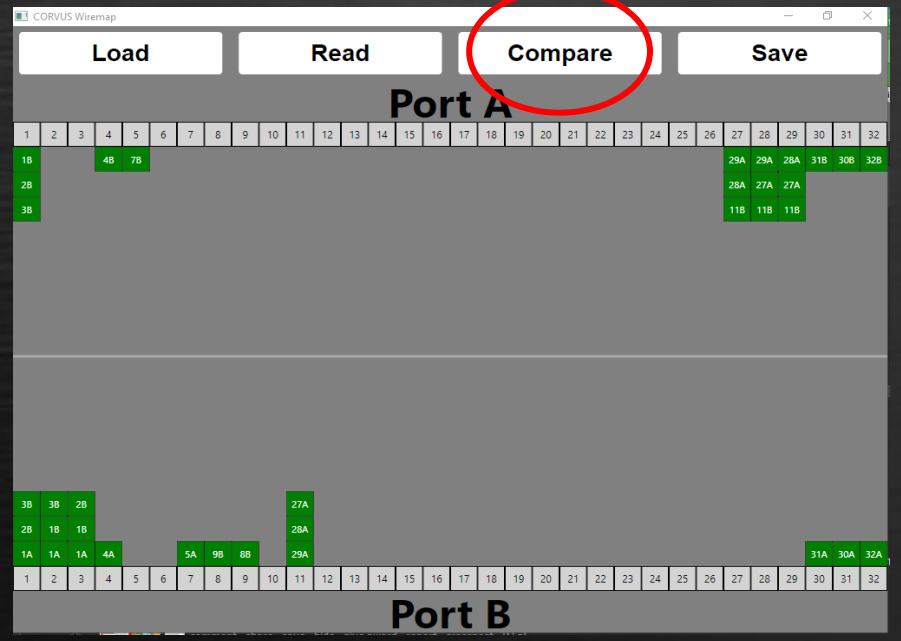
Wiremap

You will need adapter cables to utilize Wiremap

1. Connect the cable you want to test to both ports on the connector panel
2. Select Read, You will get something similar to the screenshot on the top right
3. Select Save to save this as the “golden cable”
4. You can now connect another cable and Select Compare to compare it to the original

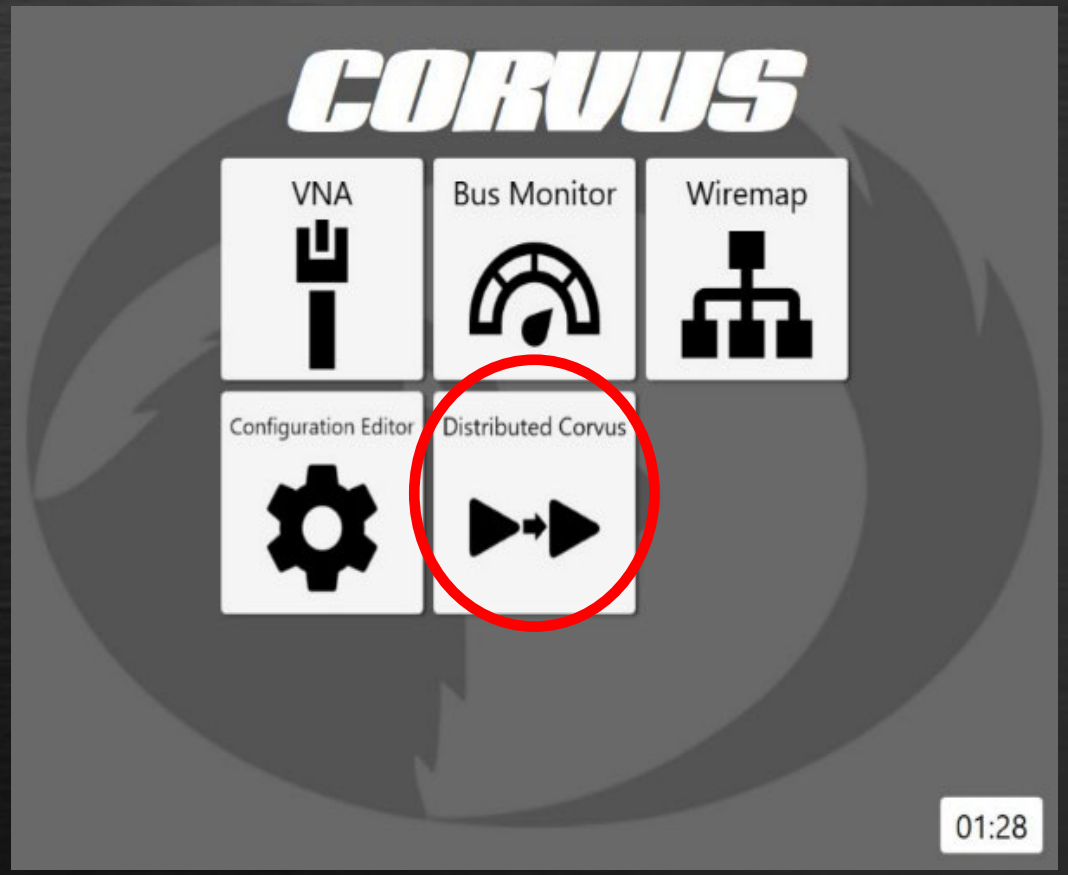
If all connections are the same it'll show all Green





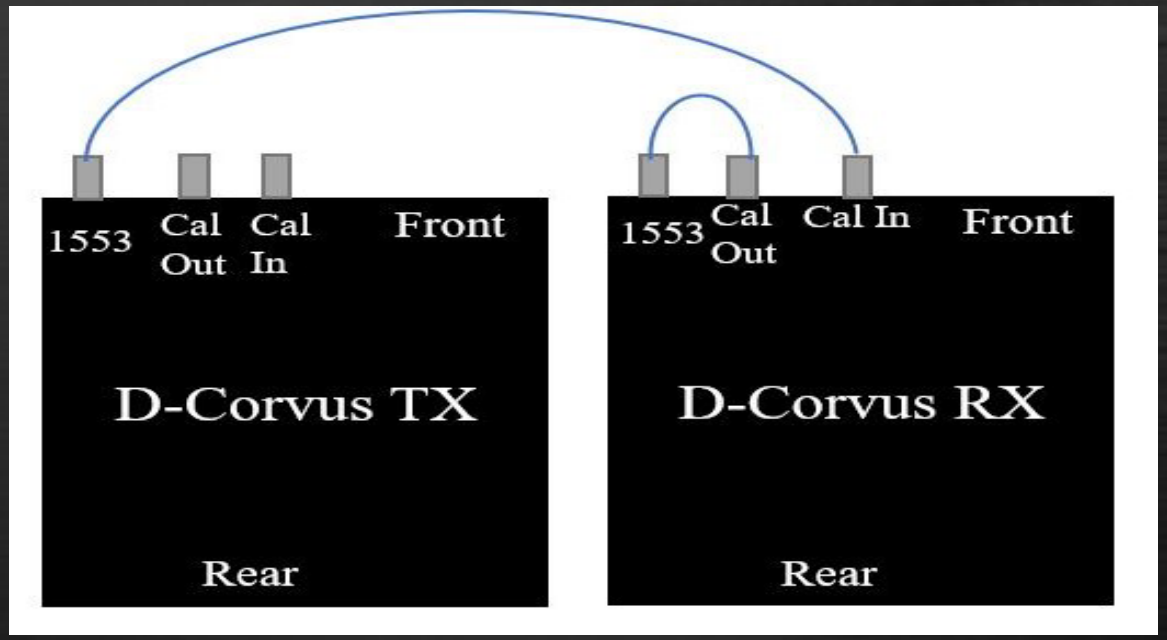
D-CORVUS

Select Distributed CORVUS from the Splash Screen



D-CORVUS

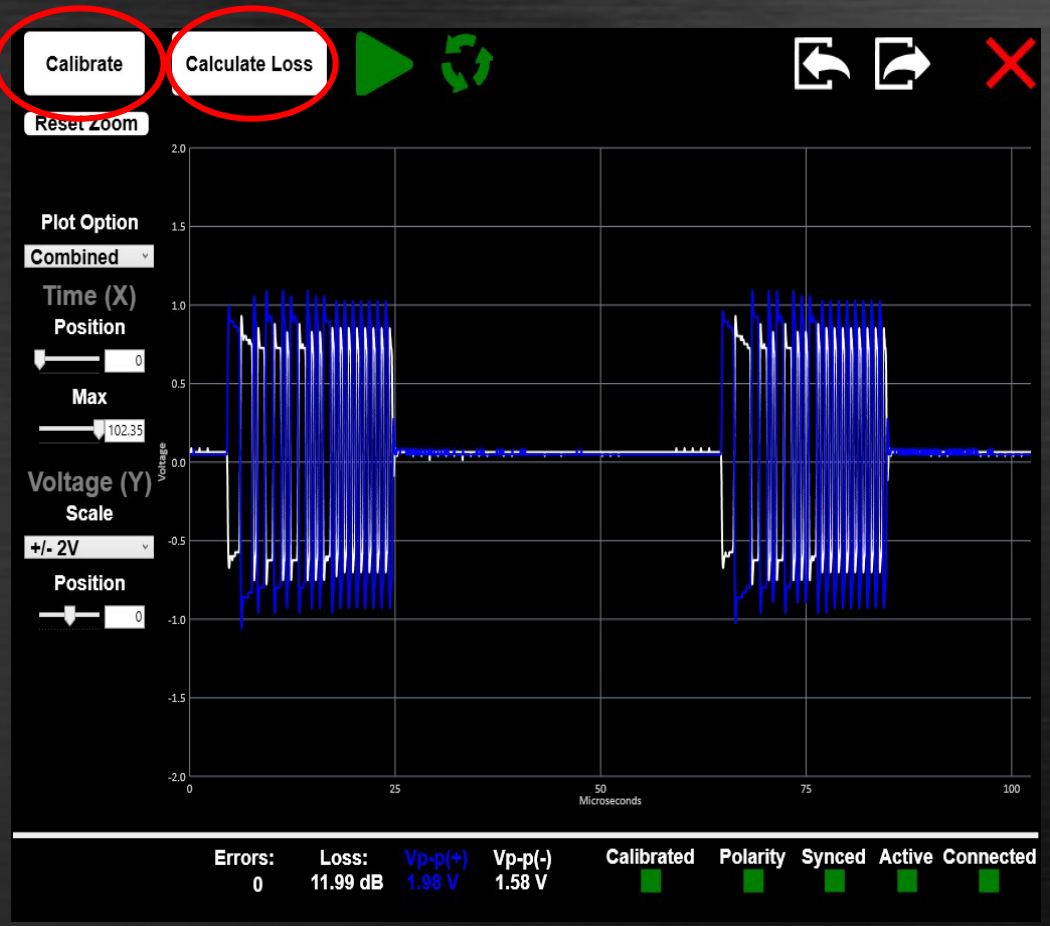
Before connecting the D-CORVUS system to the Aircraft bus make sure the bus is in a powered down state. This requires the bus controller and all remote terminals be in the powered down state.



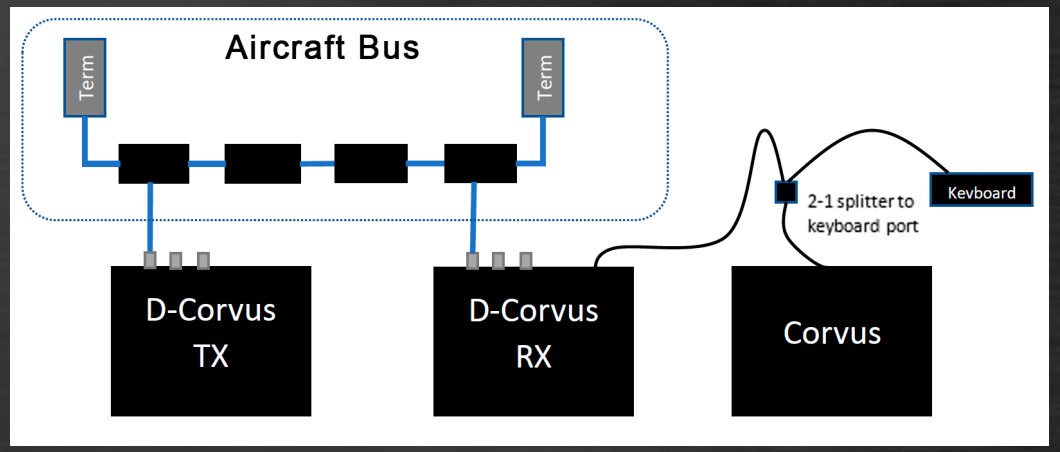
1. **Connect** the Triax cable from Tx Module (MIL 1553 port) to the Rx Module (Cal In port).
2. **Connect** Triax cable to Rx Module ports MIL1553 and Cal Out.
3. **Connect** D-CORVUS RX Module and keyboard to CORVUS via USB Splitter provided

D-CORVUS Cont.

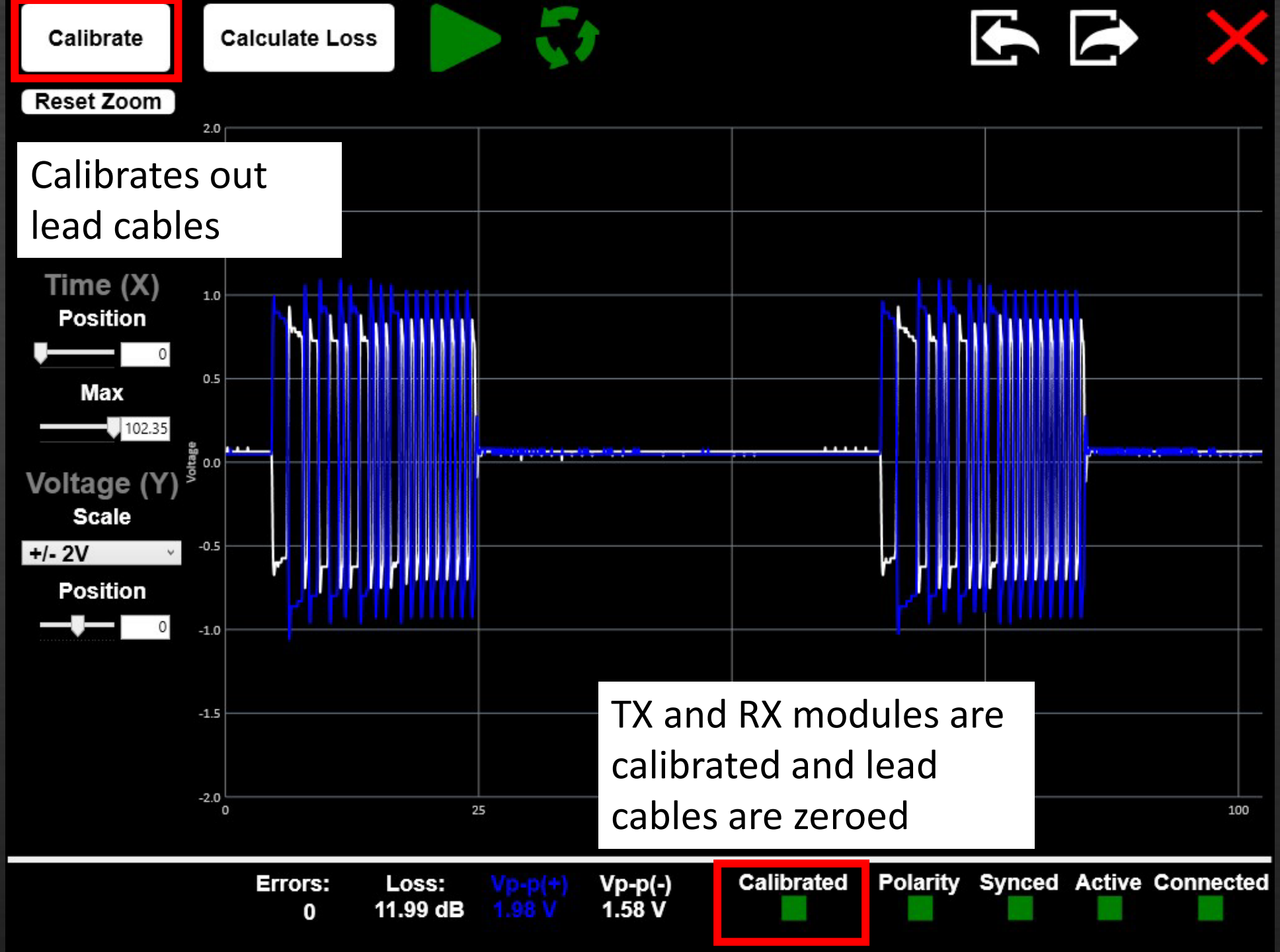
1. Connect TX and RX modules to aircraft stubs
2. **Select** Calibrate in top left corner
3. **Select** Calculate Loss and dB loss should be 12dB ± 1dB



D-CORVUS Aircraft connection



D-CORVUS


Calibrate
Calculate Loss
Reset Zoom
Calibrates out lead cables
Time (X)
Position
0
Max
102.35
Voltage (Y)
Scale
+/- 2V
Position
0
2.0
1.0
0.5
0.0
-0.5
-1.0
-1.5
-2.0
Voltage
0
25
100
TX and RX modules are calibrated and lead cables are zeroed
Errors:
0
Loss:
11.99 dB
Vp-p(+)
1.98 V
Vp-p(-)
1.58 V
Calibrated
Polarity
Synced
Active
Connected


D-CORVUS
Calibrate
Calculate Loss
Reset Zoom
Plot Option
Split
Time (X)
Position
0
Max
102.35
Voltage (Y)
Scale
+/- 5V
Position
0
Device:
Nav
Device Count: 2
Device Manager
Stress Test
Fast Rendering
Voltage Ch1
Voltage Ch2
5.0
3.0
1.0
-1.0
-3.0
-5.0
0
25
50
75
100
Microseconds
Version 2.0.0.0
Error Menu
Errors: 0
Loss:
Vp-p(+) 3.91 V
Vp-p(-) 4.92 V
Calibrated
Polarity
Synced
Active
Connected
Plotting options
Channel 1 Voltage
Channel 2 Voltage
Wi-Fi Device Controls
APP Version #
Status Indicators

D-CORVUS


Calibrate
Calculate Loss
Reset Zoom
Plot Option
Split
Time (X)
Position
0
Max
102.35
Voltage (Y)
Scale
+/- 5V
Position
0
Device:
Nav
Device Count: 2
Device Manager
Stress Test
Fast Rendering
Device Manager
Device Name
Device ID
Code Version
Receiver
TX
2cfe8b4bb6f6
1.0.0.0<Debug>
Nav
2cfe8b4bb736
1.0.0.0<Debug>
Customizable Device Name
Unchangeable Device ID
MCU Code Version
TX/RX Control
Back
Selected Device: Nav
Latency: -
Device Mode: RX
Delete
Save
Version 2.0.0.0
Error Menu
Errors: 0
Loss:
Vp-p(+) 3.91 V
Vp-p(-) 4.92 V
Calibrated
Polarity
Synced
Active
Connected

D-CORVUS

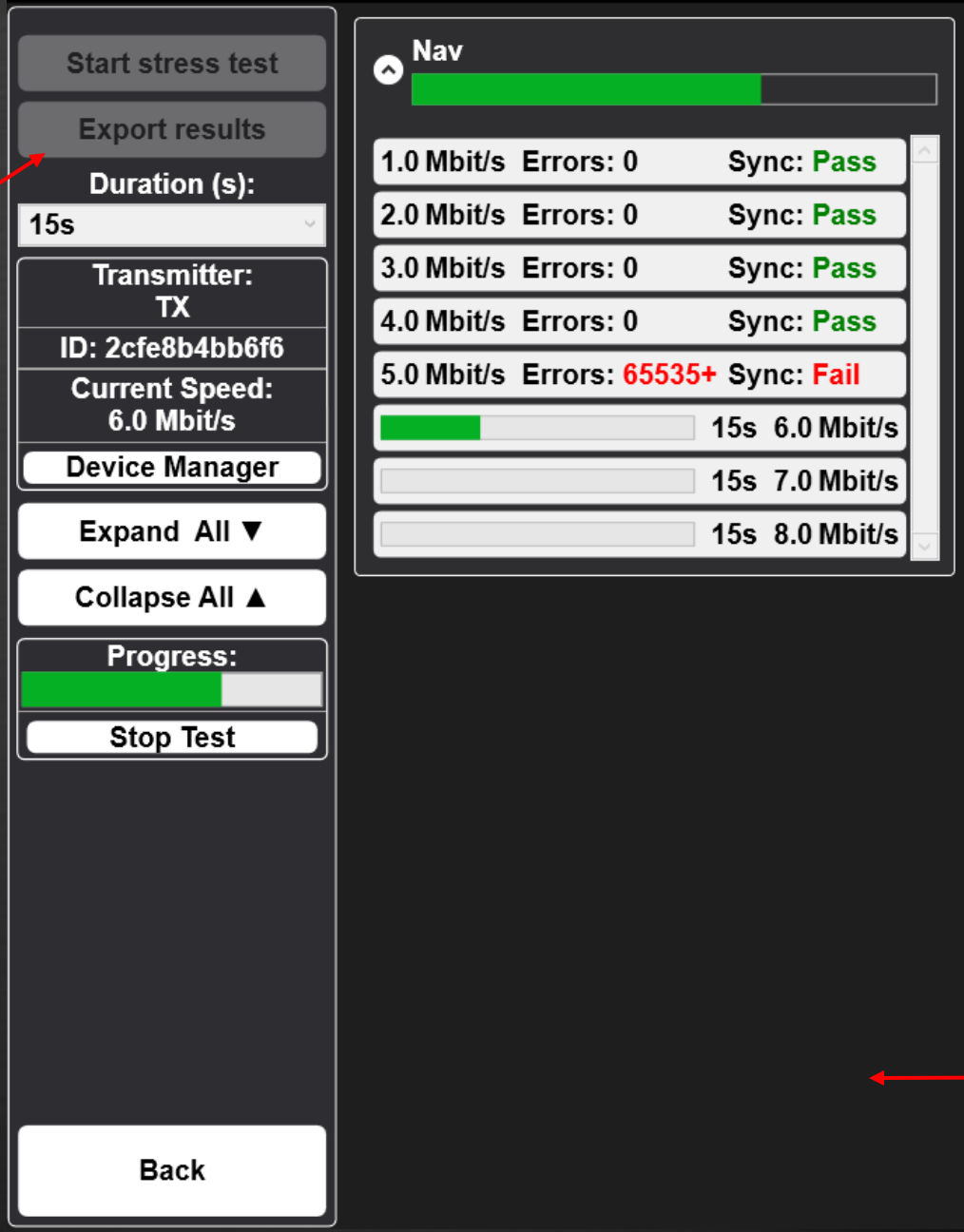
Stress Test

Stress test controls

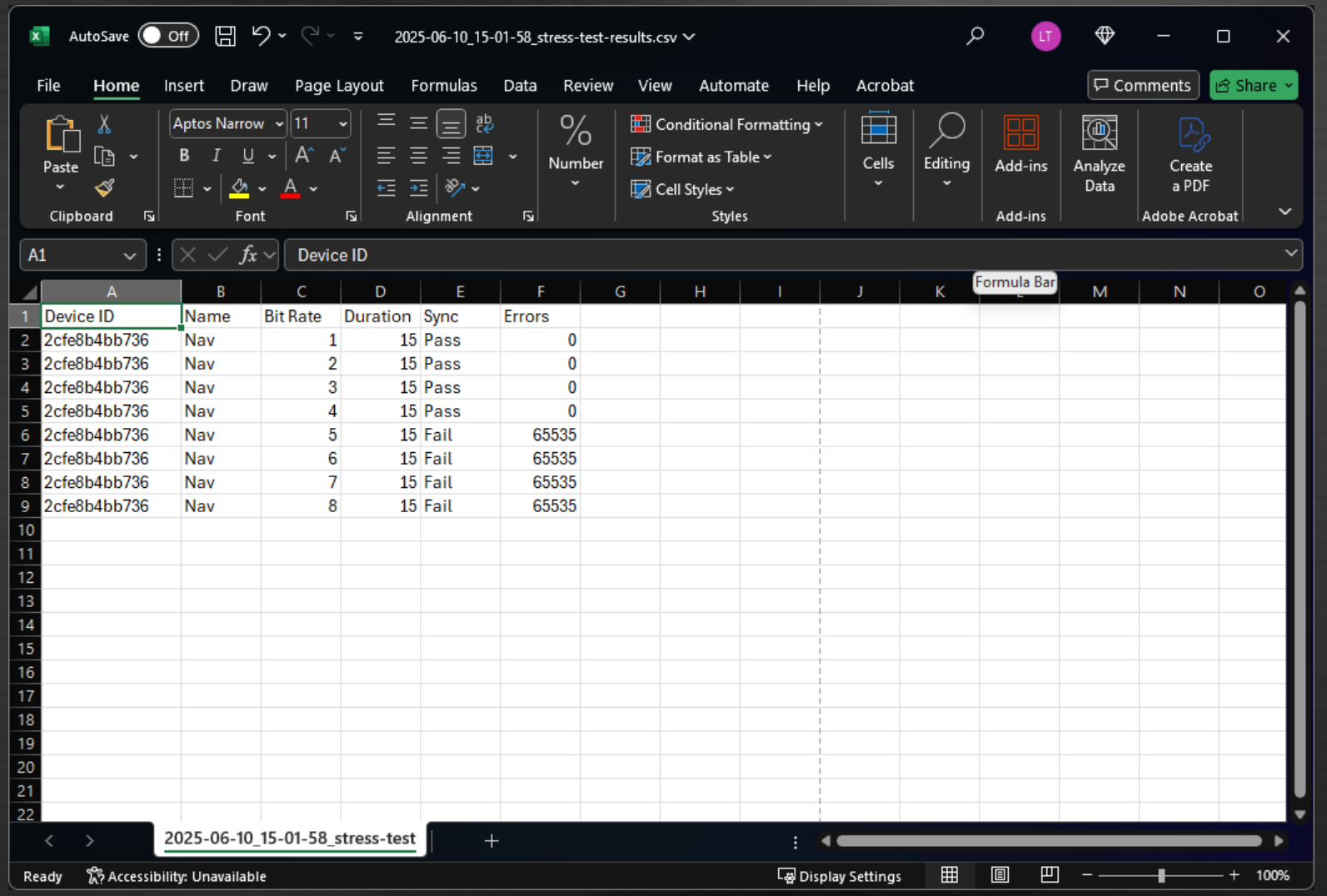
Export to .CSV button

Running Stress Test for device “Nav”

Additional stress tests will show up here as devices connect



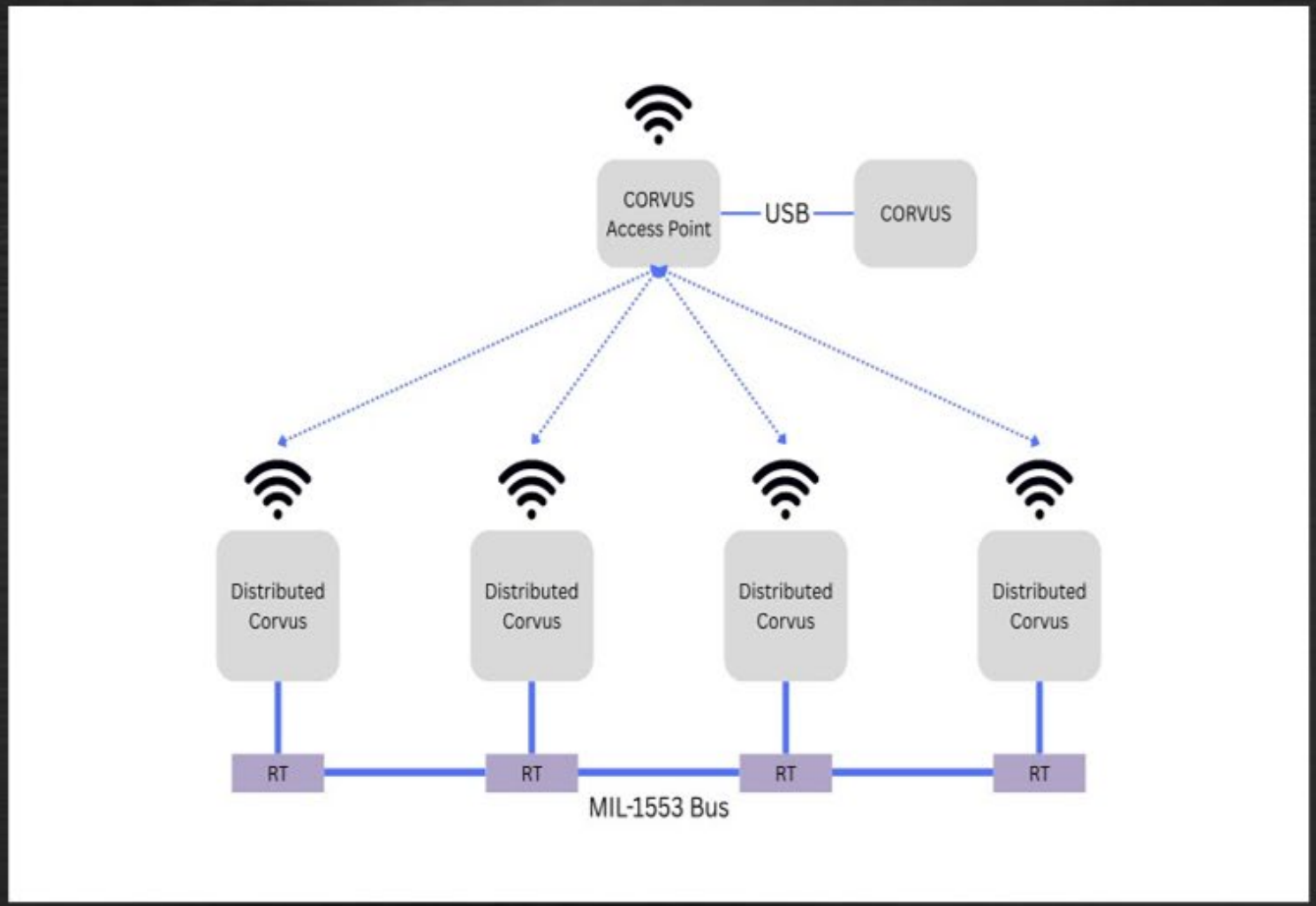
Stress Test Export



Device ID	Name	Bit Rate	Duration	Sync	Errors
2cfe8b4bb736	Nav	1	15	Pass	0
2cfe8b4bb736	Nav	2	15	Pass	0
2cfe8b4bb736	Nav	3	15	Pass	0
2cfe8b4bb736	Nav	4	15	Pass	0
2cfe8b4bb736	Nav	5	15	Fail	65535
2cfe8b4bb736	Nav	6	15	Fail	65535
2cfe8b4bb736	Nav	7	15	Fail	65535
2cfe8b4bb736	Nav	8	15	Fail	65535

Distributed CORVUS Wi-Fi Network

- Multiple D-CORVUS devices may be connected at once.
- Each D-CORVUS device will automatically connect to the access point.
- The access point will be controlled by CORVUS to send commands to each device.
- Specific devices can be selected to plot data at that location.

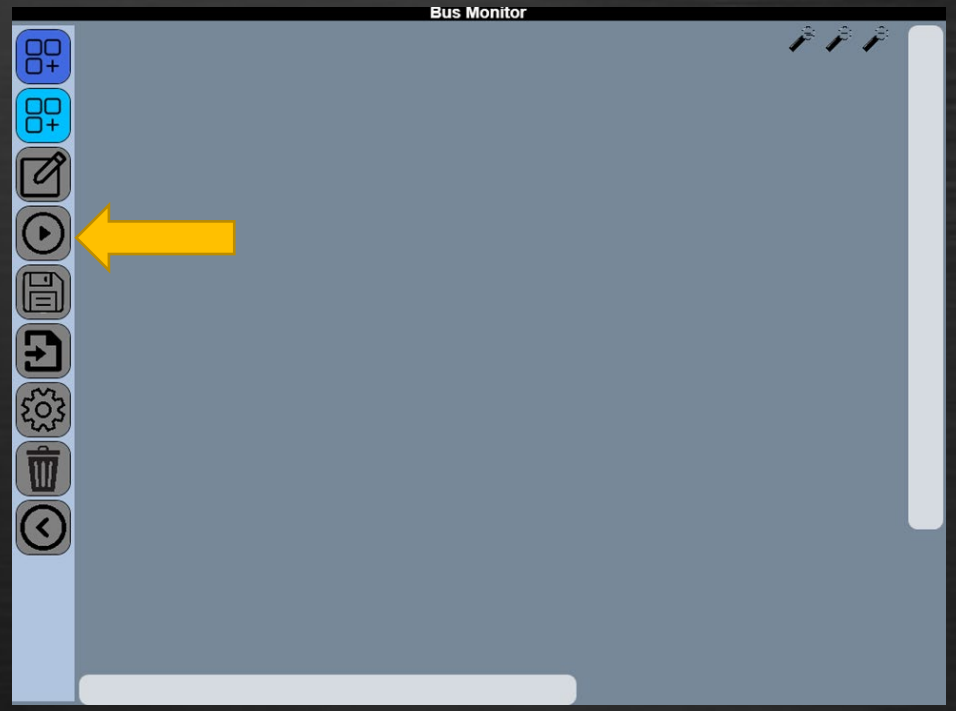


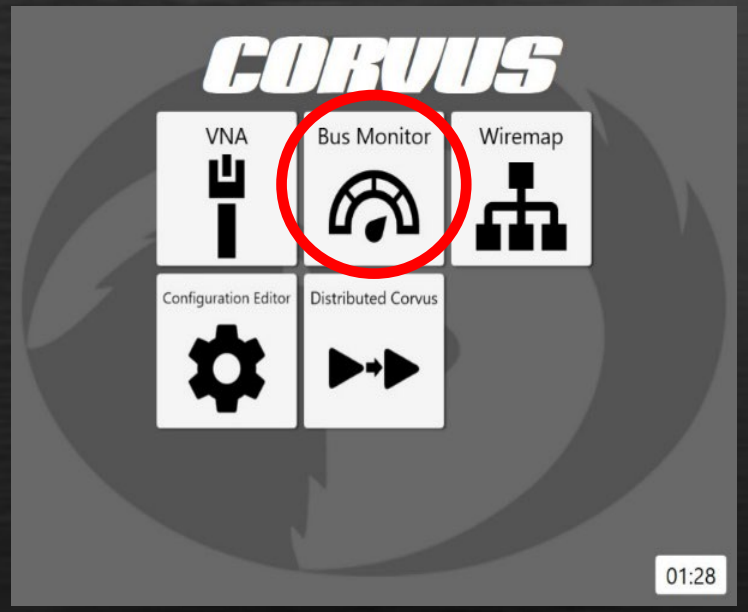
Use Cases

ISSUE	FUNCTION	APPROACH
1553 Bus Errors	Bus Monitor	Detect and capture R/T indicating RED
Reverse Polarity	D CORVUS	RX Polarity indicates RED
Cable Open and Shorts	D CORVUS VNA	Use TX and RX with D CORVUS to ensure signal path is complete. Both open and short conditions will be apparent. Use VNA in Distance to fault mode for determining distance on cable assembly.
Coupler Fault	D CORVUS	Use TX and RX on Stubs, run D CORVUS to measure insertion loss
Pushed Pins	Wiremap	Use function to determine which pin is disconnected in cable
Antenna Mismatch	VNA	

1553 Bus Monitor Use Case

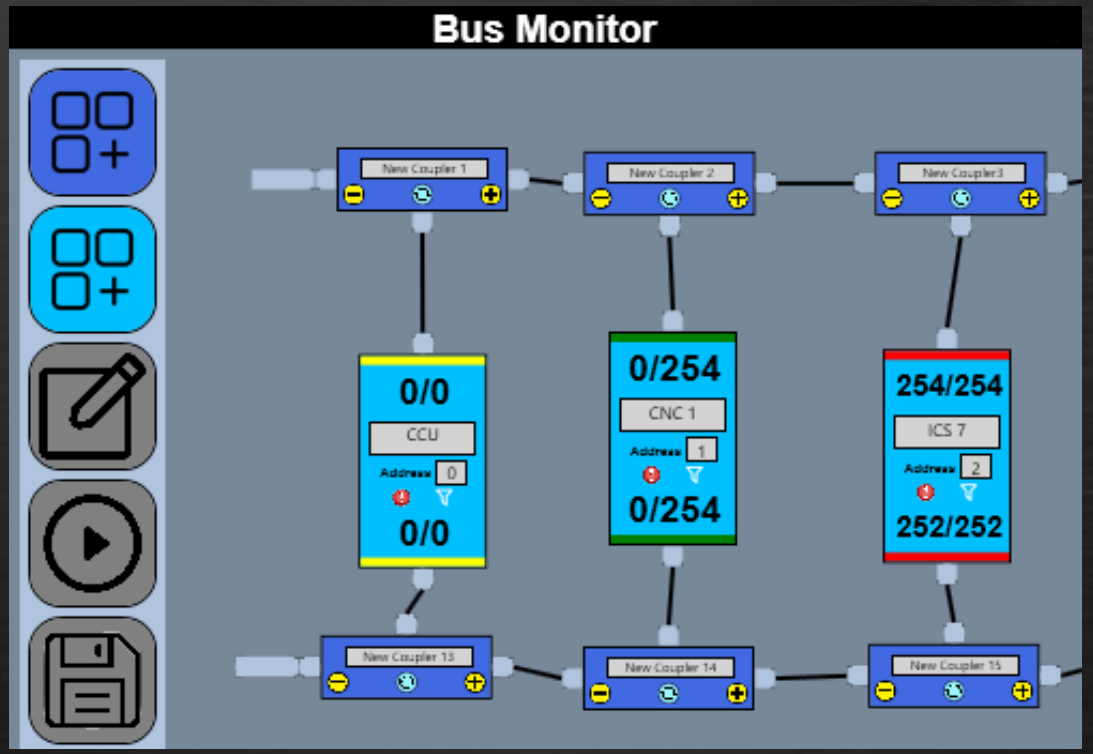
1. Locate 1553 Bus PRI and SEC ports on A/C
2. Attach adaptor cable to CORVUS 1553 PRI / SEC
3. Start Bus Monitor with Icon shown by Yellow Arrow
4. Run CORVUS Bus Monitor from the Splash Screen and Load proper Bus Configuration file

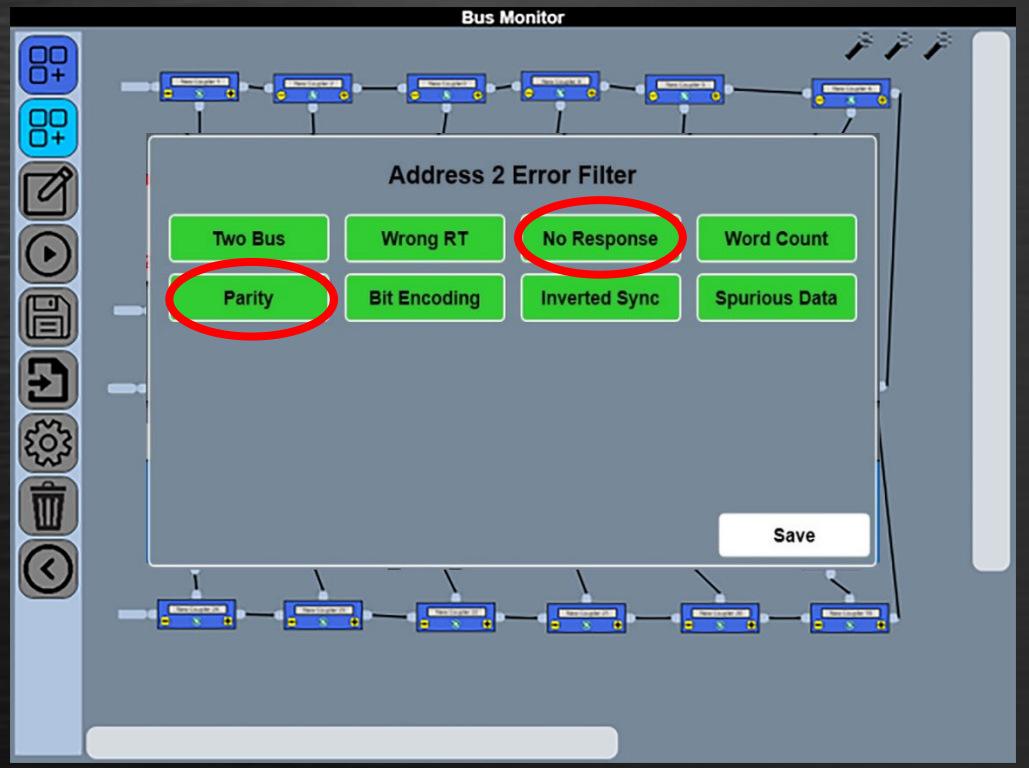




1553 Bus Monitor Use Case

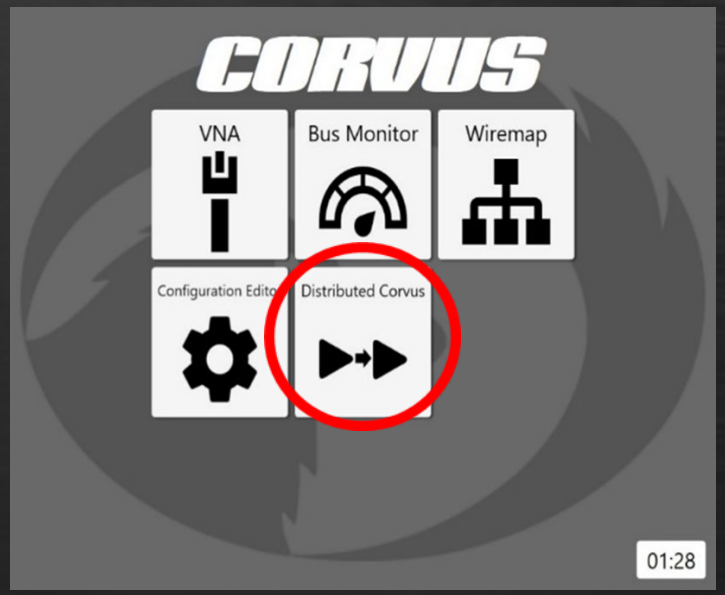
5. Monitor R/T for errors (red) and view the error by selecting the R/T with red indicators.
6. Typical errors are “No Response” or Parity Error
7. Replace or repair as needed.

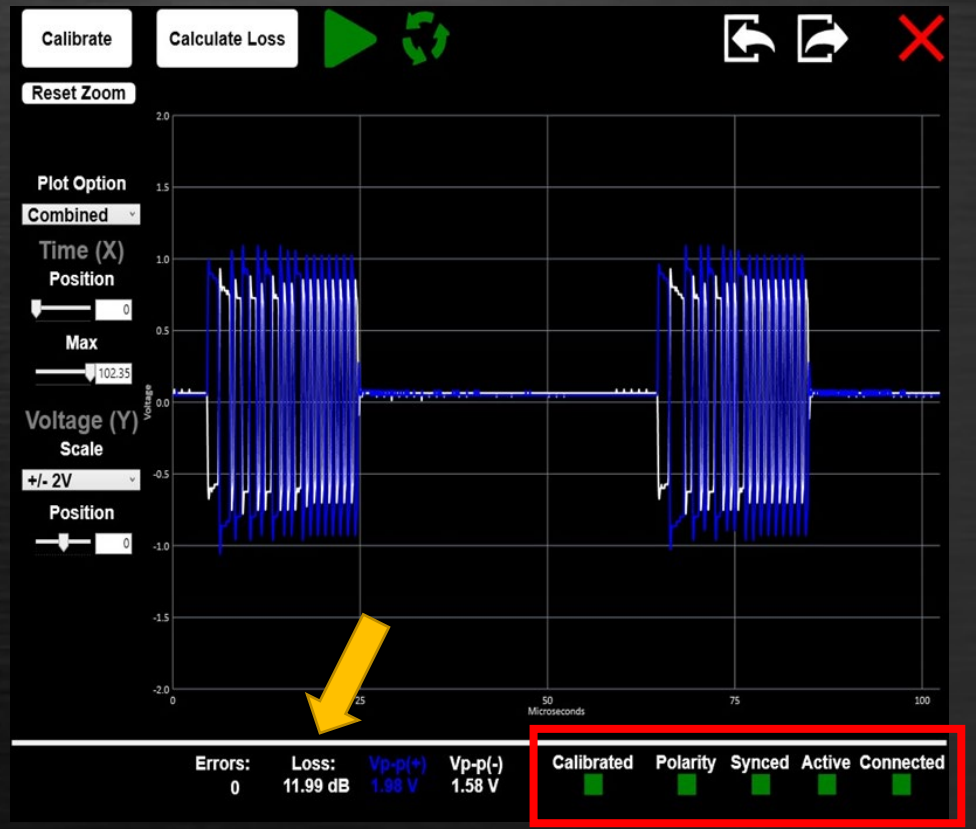




1553 Stub Coupler Use Case

1. Locate 1553 Bus STUB PRI and SEC ports on inactive A/C. Disconnect R/T if no test port.
2. Connect TX to A/C, repeat for RX on same bus (stub)
3. Using WiFi or cable (USB-Keyboard) from CORVUS to RX, ensure all modules are on and Green. (LEDs)
4. Start D CORVUS application from CORVUS Splash Screen
5. Observe mimic 1553 Test Pattern as seen in RX trace.
6. Compare to TX and prior traces (if available)
7. Coupler insertion loss is displayed as shown.

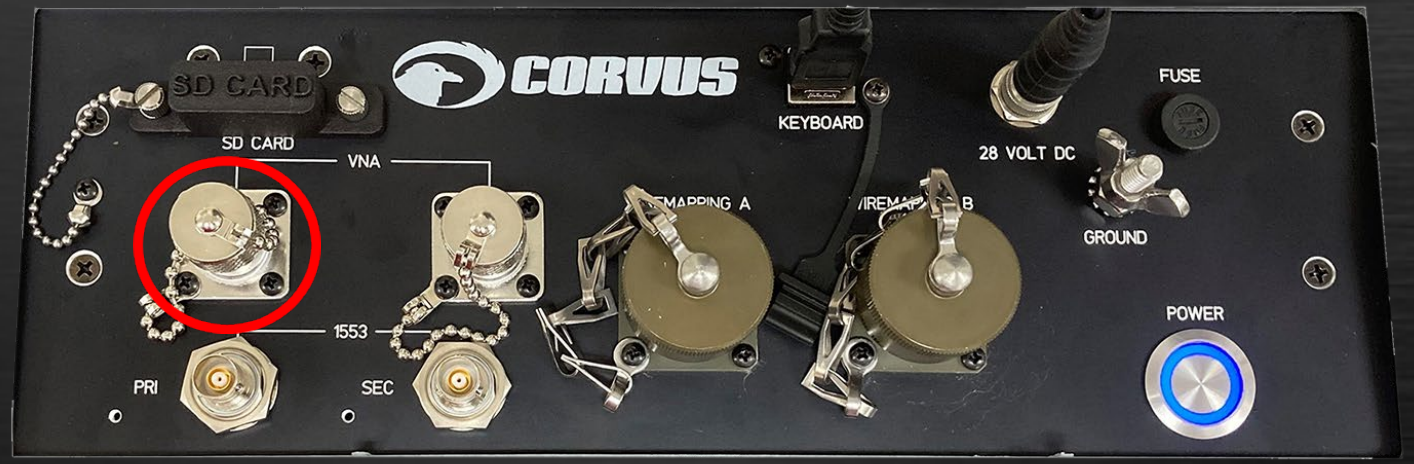




VSWR USE CASE – WHIP ANTENNA

Whip antenna operational range
225 MHz – 450 MHz

Lead Cable attaches to VNA Port



VSWR Use Case 1

1. **Select** S_{11}
2. **Select** Trace & Format
3. **Set** Start and Stop frequencies by selecting start & stop and entering desired frequencies
4. Follow Calibration steps (next)

VSWR Use Case 2

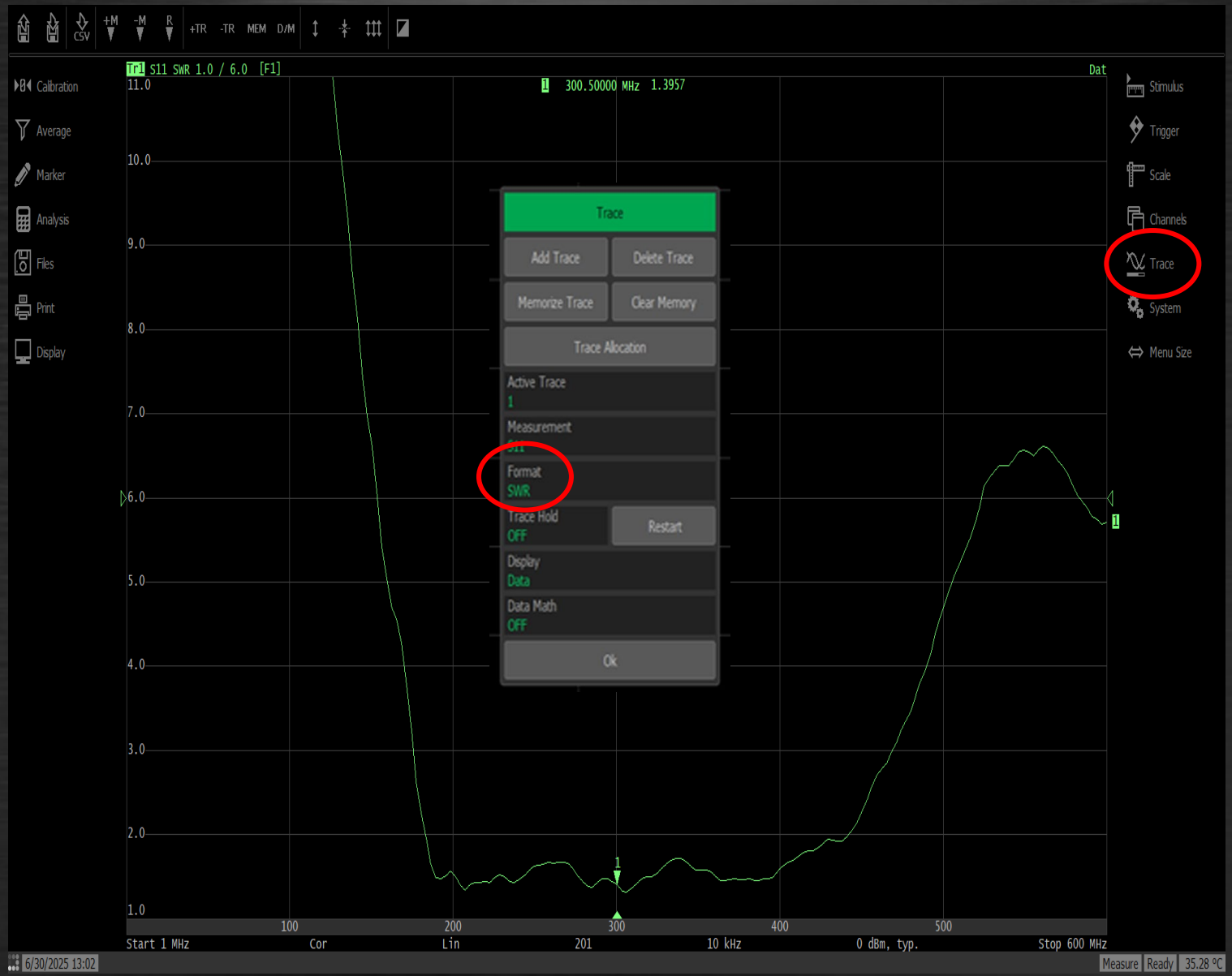
Calibration Steps

1. Connect N611 open select open F
2. Connect N611 short select short F
3. Connect N611 load select load

4. Select Apply
5. Lead cable is calibrated out

VSWR Use Case 3

1. **Connect** the end of the lead cable to the whip antenna being tested
2. **Select** Trace and ensure format is SWR
3. **SWR should be** below 2:1 in 225 – 450 MHz range for PASS



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