

VDES 1000 Module Quick Start Guide

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1 Introduction

This guide is designed to be used with the following software / firmware versions. If later versions are loaded, check with CML Application Support for updates.

Loader: 1.4
Application: 4.0
engCtrlApp: 1.8.1

2 Hardware Requirements

The following hardware is needed:

1. Power Supply: must provide 24 VDC at 4A
2. Power cable: must mate with the Molex Mini-Fit-Jr on the VDES1000.
3. Digital break-out board (for Ethernet and RS422 connection to host).¹
4. Active GPS antenna. A Siretta Alpha 4A is suggested.
5. RF cables/connectors:
 - a. SMA female for antenna.
 - b. SMP female for GPS.
 - c. RF loads/attenuators to suit test environment.
6. For RS422 Port 0 access:
 - a. 26-way D-sub female to connect to the breakout board.
 - b. RS422 to USB adaptor and cable.

2.1 Digital Breakout Board

The digital breakout board is used to interface with the VDES1000 module to a host via the Ethernet port and the RS422 Port 0. Table 1 shows the pinouts of J6 on the VDES 1000.

J6		RJ45	
Pin	Net Name	Pin	Net
1	GND		
2	/RESET		
3	SPI_CS		
4	SPI_MOSI		
5	SPI_CLK		
6	SPI_MISO		
7	I2C_SCL		
8	I2C_SDA		
9	GND		
10	GND		
11	ETH_TXRXA_P	1	MX1+
12	ETH_TXRXA_N	2	MX1-
13	ETH_TXRXB_P	3	MX2+
14	ETH_TXRXB_N	6	MX2-
15	ETH_TXRXC_P	4	MX3+
16	ETH_TXRXC_N	5	MX3-
17	ETH_TXRXD_P	7	MX4+
18	ETH_TXRXD_N	8	MX4-
19	GND		
20	GND		
21	PIO_TX_A		
22	PIO_TX_B		
23	PIO_RX_A		
24	PIO_RX_B		
25	PI1_TX_A		

J6		RJ45	
Pin	Net Name	Pin	Net
26	PI1_TX_B		
27	PI1_RX_A		
28	PI1_RX_B		
29	PI2_TX_A		
30	PI2_TX_B		
31	PI2_RX_A		
32	PI2_RX_B		
33	PI3_TX_A		
34	PI3_TX_B		
35	PI3_RX_A		
36	PI3_RX_B		
37	PI14_TX_A		
38	PI14_TX_B		
39	PI4_RX_A		
40	PI4_RX_B		
41	PI5_TX_A		
42	PI5_TX_B		
43	PI5_RX_A		
44	PI5_RX_B		
45	ALARM_A		
46	ALARM_B		
47	GND		
48	GND		
49	STATUS_LED_R		
50	STATUS_LED_G		

Table 1 VDES1000 J6 Pinout

A schematic for the digital breakout board is available to download from the CML Technical Portal. This provides pinout data for the RS-422 Ports on a 26-way D-Sub and the Ethernet socket.

¹ Included in the kit.

2.2 RS422 to USB Adaptor

The PI can also be accessed via RS422 Port 0 using the 26-way D-sub connector on the breakout board. This allows NMEA sentences from the PI to be received by a terminal emulator running on the PC. Talker sentences may also be sent from the PC. A suitable adaptor can be constructed as shown in Figure 1.

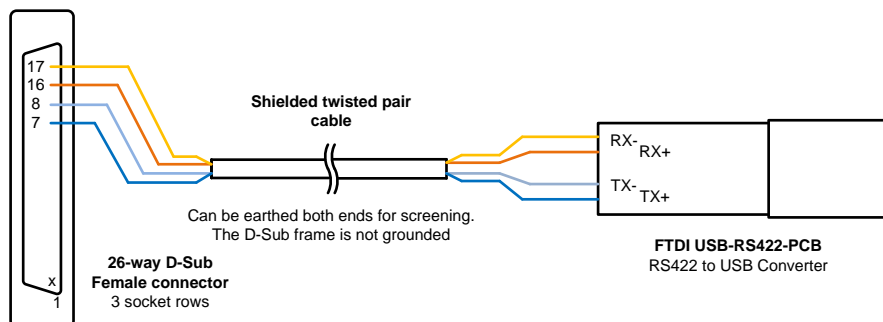


Figure 1 RS422 to USB Adaptor

3 Software Requirements

Although not required, the following software is useful when verifying the VDES1000 module functionality:

1. A network access utility such as Netcat.
2. VDES Engineering Control Application.
3. A terminal emulator such as PuTTY, TeraTerm or RealTerm.

Users should be aware that the 61162-450 protocol specifies IP address and port allocations.

4 Setup

Two configuration options are discussed in the following sections:

- Single Unit Testing
- Two VDES1000 units test - Unit-to-unit File Transfer

Before testing ensure that the latest software and firmware has been downloaded from the CML Technical Portal. Set up the VDES unit as shown in the Single Unit Transmit Test or the Unit-To-Unit File Transfer

There are a number of LEDs that indicate the status of the VDES1000.

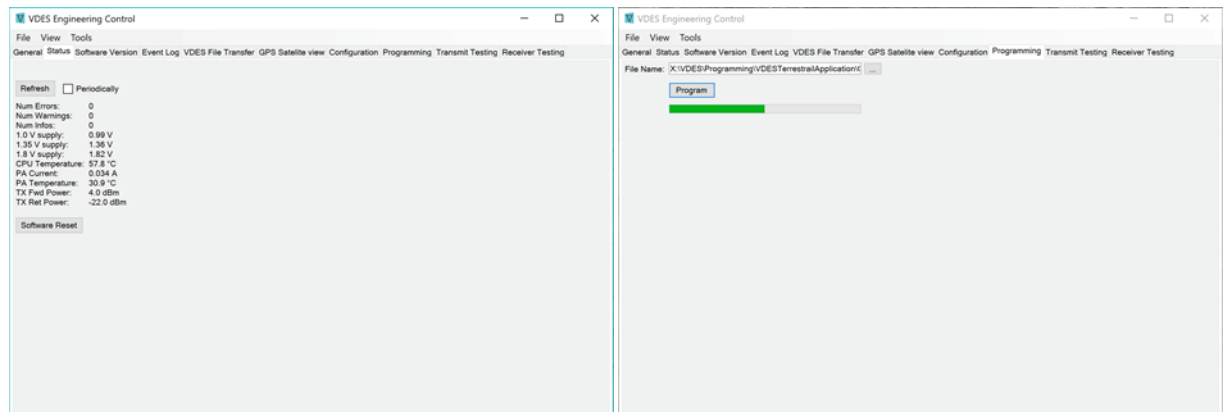
LED ID	Location	Colour	Indication
LED1 POWER	top board, back of unit	Green	Lit while power is applied
LED1 STATUS	bottom board, back of unit	Green/Red/Yellow	Green: No BIIT issue detected. Yellow: Possible error detected. Consult unit event log. Red: Serious error detected. Unit may not be operational and requires repair. Consult unit event log.
LED2	top board, front of unit	Green	Lit when transmitting RF (PA biased).
LED2	bottom board, side of unit)	Green	flashes at approximately 1Hz to show the CPU is operating correctly
LED4	bottom board, side of unit)	Green	flashes at approximately 1Hz to show the FPGA is operating correctly
LED3	bottom board, side of unit)	Red/Green	Red lit – Ethernet port is connected Green lit – Ethernet data transfer active

Note that transmit power is limited to 1W by default. This can be changed using the VDES Engineering Control application.

5 Updating Software

The software on the VDES1000 can be updated using the VDES Engineering Control Application by following the steps below. Always read the release notes before updating software to ensure that valid image combinations are loaded. For example, the latest Loader may be needed before updating the VDES Module Firmware. Ensure that the latest version of the VDES Engineering Control Application is being used.

1. Set up the units as required for a single unit or multi unit test.
2. Power up the PC(s).
3. Power up the VDES1000 unit(s). The two green LEDs on the side of the unit should start flashing at 1Hz which indicates the unit is ready.
4. Open the VDES Engineering Control Application and make sure that you can communicate with the target by going to the status page and clicking **Refresh**.



**Figure 2 The Status tab where a software reset can be done (left)
The Programming tab showing download progress (right)**

5. If an error message is displayed, then use **Tools > Options** and check your IP settings as well as the connection to the target. The current software version can be queried by selecting the **Software Version** tab and clicking **Refresh**.
6. If the Loader version is newer then update this first.
7. If a Golden Application is available and it is a newer version then update this next.
8. If the Module Firmware is a newer version than the Application Version then update this last.
9. The FPGA version and the Customer App Version should be ignored.
10. Select the **Programming** tab.
11. Click on the button next to the **File Name** text box and navigate to the file to program (eg. vdesapp_v2.3.f3b0d426.prog). Click **Open**. The **File Name** text box will show the full path to the selected file.
Click **Program**. Programming of the unit will start. Programming takes approximately 60 seconds. If programming stalls half-way through for longer than 30 seconds, then go to the **Status** tab and perform a software reset. This will flush the image to flash and complete the programming step. In this case a message box will be displayed indicating that programming has failed even though it has been programmed successfully.
12. A message will be displayed once programming has completed. Perform a software reset or cycle power to the board for the download to take effect.
13. If programming fails due to loss of power or other communication failures, then it will revert back to the golden image if a reset is done.
14. If programming fails due to a communication error then it can simply be retried before cycling power.

6 Single Unit Testing

A block diagram of the setup to test a VDES1000 module is shown in Figure 3. This is a simple test setup for RF testing, using a signal generator or spectrum analyser connected to the VDES RF port. This is the female SMA connector. Ensure that any test equipment connected is sufficiently robust or protected to survive the RF power output of the VDES1000 transmissions. The use of a 40dB RF attenuator is recommended during testing.

A PC must be connected to the unit via Ethernet to allow the VDES Engineering Control Application to be used. A bench power supply is used to power the unit.

RS422 Port 0 can also be connected to the PC via a suitable adaptor.

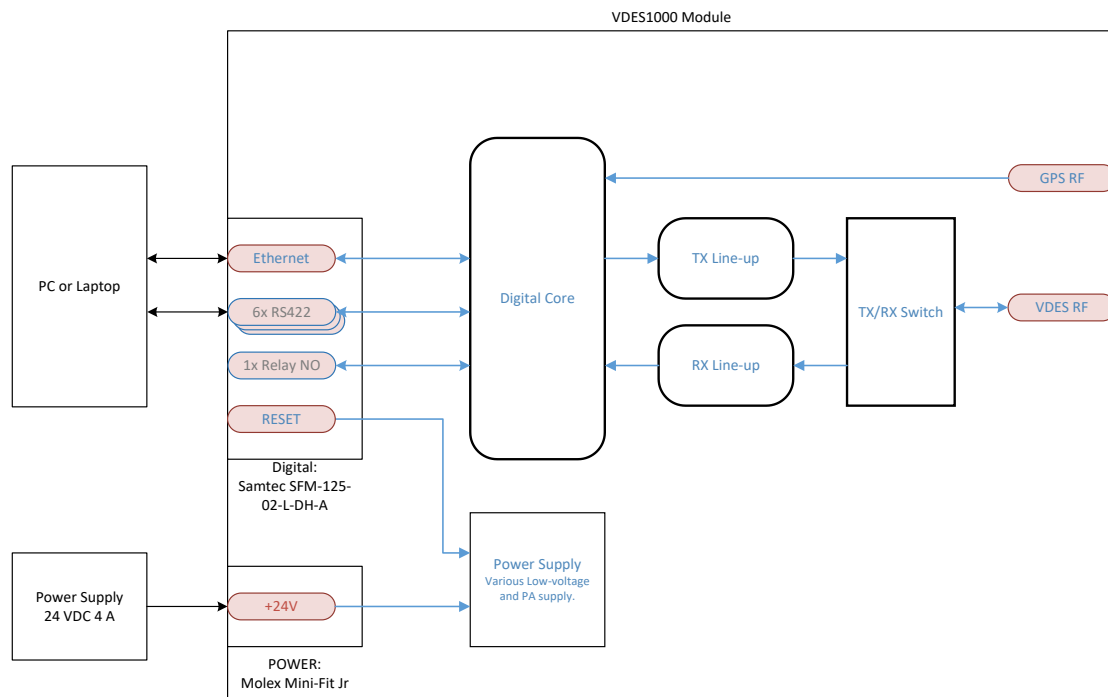


Figure 3 VDES1000 Module Test Setup

1. Connect the VDES1000 module as shown in Figure 3.
2. Run the vdesEngCtrl.exe application. It will show the **General** tab.
3. Switch on power to the module. It will draw 260mA @ 24V when first powered up. The board will perform a self-test and then draw roughly 390mA @ 24V after 3 seconds when the application is running. Both the CPU and FPGA LEDs will flash at 1Hz.

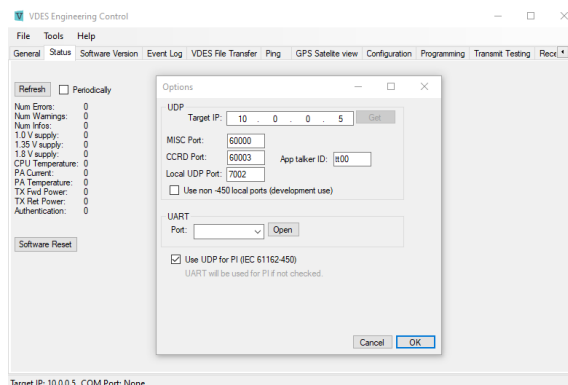


Figure 4 Setting up the UDP ports for single VDES1000 units connected to a PC

4. Click on **Tools** in the menu and select **Options**.
5. In the **Options** dialogue set the VDES1000 IP address and check the **Use UDP for PI** option.
6. Click OK, accept the configuration and close the **Options** dialogue.
7. Select the **Status** tab and then click **Refresh**. The display should update with the current status values, including the internal power supply levels and temperatures.
8. Click on the **Receiver Testing** tab and then click **Update**. The fields should populate with the default receiver configurations.
9. Check **Monitor RF Rx Traffic**. This will allow the receivers to receive information that is transmitted on their configured RF channels and display the relevant data and status in the console to the right.
10. After a few minutes the unit will begin transmitting AIS traffic. Each message will coincide with the Transmitting LED, LED2 on the top of the unit, flashing green briefly.

11. If the RS422 port 0 is connected to the PC, a terminal emulator such as PuTTY, TeraTerm or RealTerm can be assigned to the port to display receiver activity. The port should be configured to 38400 baud 8 data bits, no parity, 1 stop bit and no flow control.
12. The transmit power is limited to 1W by default. This can be changed by selecting the Configuration tab in the VDES Engineering Control application. Select **Installer -> TxOutputPowerdBm** and select the desired option. Only 1W and 12.5W can be selected.
13. When testing it may be necessary to disable the autonomous AIS transmissions from the VDES1000. This can be done by selecting the Configuration tab in the VDES Engineering Control Application. Select **User -> Feature Mask** and change the value to 6. Select the **Receiver Testing** tab and check the Enabled checkboxes for the AIS receive channels then click **Update**. The AIS channels will now receive but not transmit autonomously.

CAUTION: If an AIS transmit message is sent over the PI then this will override the configuration setting and the AIS messages will be transmitted. To restore normal operation, select **User -> Feature Mask** and change the value back to the default value 7.

7 Operating more than one VDES1000 unit from a single PC

It is possible to operate multiple VDES1000 units on one PC using a single Ethernet port with an Ethernet switch or hub. Each VDES1000 unit must have its own IP address and these must be in the range of the subnet mask for the PC Ethernet port. The units must not be configured to use IEC 61162-450 broadcasting.

1. Connect and create the configuration for one VDES1000 unit as described in Single Unit Testing.
2. On the Configuration tab in the VDES Engineering Control application. Select **User -> BroadCastIP** and set it to **0.0.0.0**. This disables IEC 61162-450 broadcasting. The **Use UDP for PI (IEC61162-450)** in **Tools -> Options** setting will be ignored.
3. In the **Options** dialogue set the VDES1000 IP address and check the **Use non -450 local ports (development use)** option.

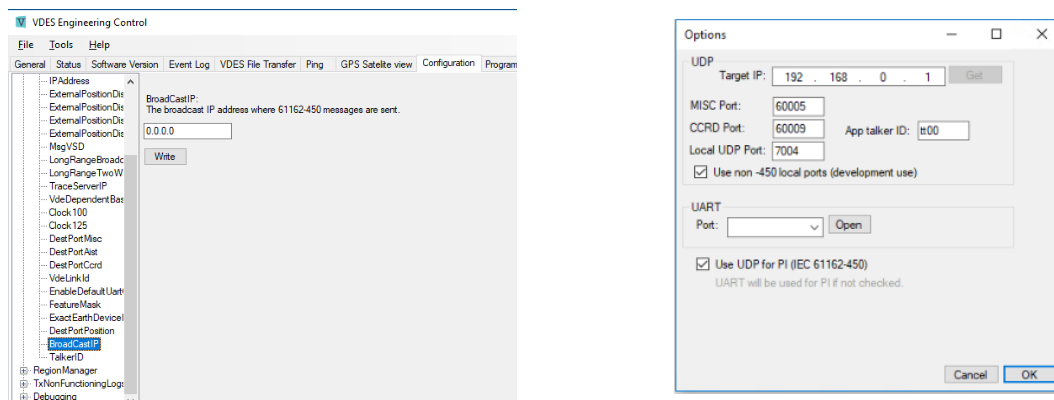


Figure 5 Setting the broadcast IP (left) and the UDP ports for development use

4. Disconnect the VDES1000 unit from the PC.
5. Create a new folder for the second VDES1000 unit. This can be anywhere within the users space on the PC.
6. Copy the following items from the existing VDES1000 folder:
 - vdesEngCtrl.exe
 - vdesEngCtrl.exe.manifest
 - Application.settings
 - Data folder with contents
7. Open the new folder for the second VDES1000 unit in Windows Explorer.
8. Connect and power up the second VDES1000 unit as described in Single Unit Testing.
9. Start the VDES Engineering Control Application and set the IP address of the second VDES unit as described in Changing the IP Address.
10. Click on **Tools** in the VDES Engineering Control Application menu bar.
11. In the **Options** dialogue, set the **Target IP** to match that of the second VDES1000 unit.
12. Change the **Local UDP Port** to be outside the range of the first VDES1000 unit, for example if unit 1 is set to 7002 set it to 7020. (Application uses **Local UDP Port +1,2,3,4**).
13. Check **Use UDP for PI (IEC 61162-450)**.
14. Repeat steps 2 and 3 on this second unit.

15. Click **OK**. The second VDES1000 unit and the second VDES Engineering Control Application are now configured to talk to each other.
16. Power down and disconnect the second VDES1000 unit.
17. Repeat steps 5 for 16 of any additional units.
18. Connect the PC Ethernet port to a switch or hub. Connect the VDES1000 units to ports on the switch or hub.

The VDES1000 units can now be controlled independently from the unique instances of the VDES Engineering Control Application.

8 Unit-to-unit File Transfer

This section describes the setup and procedure necessary to perform a basic file transfer between two PCs using a VDES1000 connected to each PC. For testing with two VDES1000 units connected to one PC configure the PC following section 7 - Operating more than one VDES1000 unit from a single PC.

The following step-by-step guide will guide you through the process of transferring a file between two units. See section 2 and section 3 for the required hardware and software.

Figure 6 shows the test configuration for two VDES1000 units. Each VDES1000 is connected to a PC for control purposes and the antenna ports are connected together. The GPS antenna is optional for this test but required for further testing. The RS2422 connection to the PC is optional for this test but is required for further testing.

Note the IP address and MMSI for the units. These can be changed as required by the user. The following steps will describe how to reproduce the setup shown in Figure 6.

WARNING: External attenuators must always be connected to the VDES1000 antenna port to prevent damage to test equipment.

The default MMSI on a new unit is 0 (disabled).

The default IP address on a new unit is 10.0.0.5.

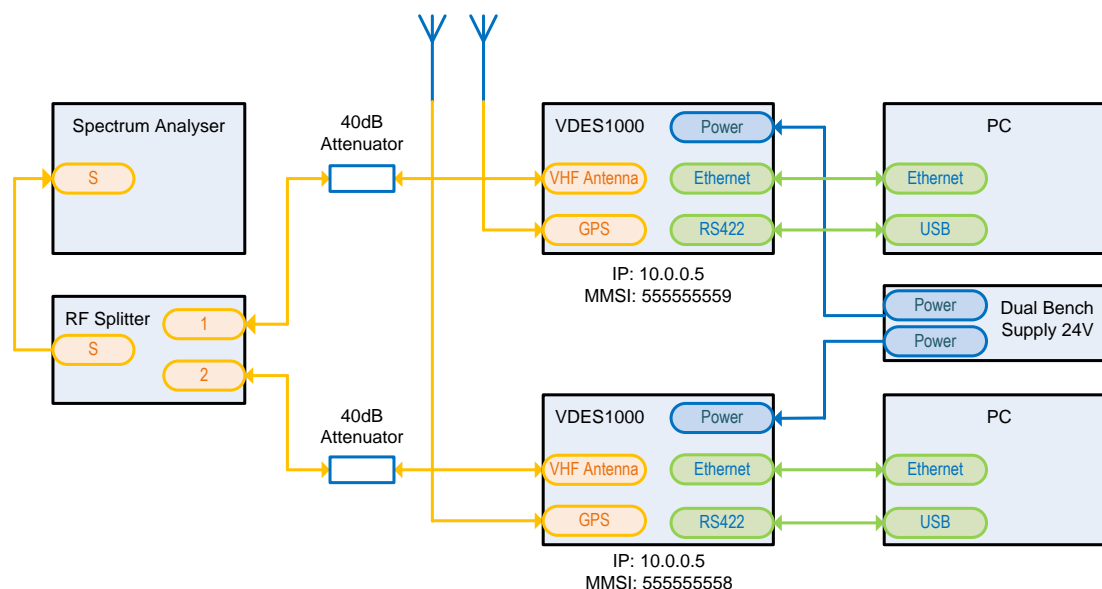


Figure 6 Unit-to-unit File Transfer

1. Connect the two VDES1000 module antenna ports together and connect the PCs as shown in Figure 6.
2. Power up the units with a 24V supply. Ideally each unit should have its own bench supply, or use a supply with two outputs. Each unit will draw a static current of 430mA when running and up to 2.5A when transmitting. Note the two LEDs on the side of the unit should be flashing at 1Hz indicating that the units are ready.
3. Configure the PC to be on the same IP subnet as the VDES1000 (e.g. IP 10.0.0.4). It should be possible to ping the unit at 10.0.0.5 from the PC.
4. The steps below (5 to 9) must be performed on both transmit and receive PCs.

5. Start up the VDES Engineering Control Application.
6. Select **Tools -> Options** and ensure that the IP address is set to that of the unit connected to the PC (default should be 10.0.0.5). See Figure 5.
7. Make sure that **Use UDP for PI (IEC 61162-450)** is checked. This will use Ethernet for the Presentation Interface.
8. If the Configured Ports for IEC 61162-450 MISC(60000) and CCRD(60003) have been changed from defaults in the VDES1000, make sure they match the settings in **Tools -> Options**.
9. Press **OK**.
10. Select the **Status** tab and click **Refresh** to populate the parameter list from the VDES unit. If an error message is displayed, then check the IP settings, connections, and that the units are running with both green LEDs on the side flashing at 1Hz.

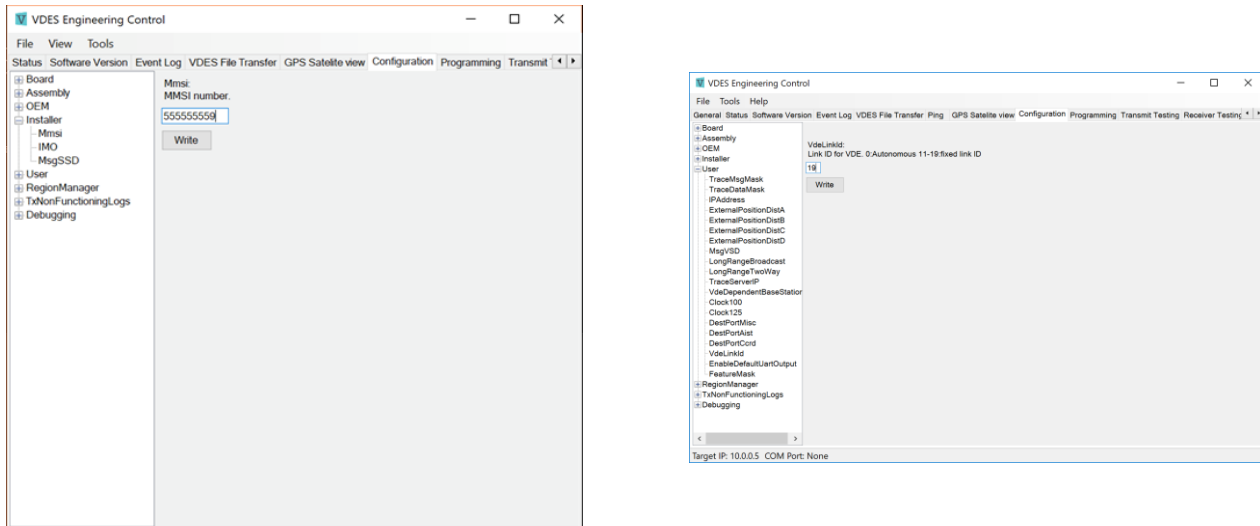


Figure 7 Setting the MMSI (left) and the Link_ID (right) for file transfers

11. The two units need different valid MMSI values. To configure on a unit:
 - a. Select the **Configuration** tab.
 - b. In the left-hand tree view, select **Installer -> MMSI**. Type in the desired MMSI in the edit box on the right-hand side and click **Write**. "Data written successfully" should be displayed. See Figure 7
12. Perform steps a and b on both units and ensure each has a unique MMSI. For the purpose of this document, the MMSI values shown in Figure 6 have been used.
13. VDE can operate in 25kHz, 50kHz or 100kHz channels. There are two modulation schemes (Pi/4 QPSK and 16 QAM) that can be used in each channel bandwidth.
The two units must be configured to operate in the same bandwidth. On the transmit side, this is done by configuring the link ID used, and on the receiver side by configuring the Rx channel parameters. The following steps configure a unit for maximum throughput using 100kHz, 16 QAM.
14. On both units open the **Configuration** tab and select **User -> vdeLinkId** – see the Notes below. Type 19 in the text box and click **Write**. See Figure 7
15. All non-volatile memory changes are cached and may not be stored immediately. A software reset is required to force a flush of cached data to non-volatile memory to ensure that all changes remain persistent.
To perform a software reset, select the **Status** tab and press **Software Reset**. Note that the unit's current consumption will briefly drop to 220mA while it is starting up and the side LEDs will stop flashing.
Steps 14 and 15 are only required once. These changes will be permanent. Configuration can be viewed and changed at a later stage if required.
16. On the PC that will receive, select the **VDES File Transfer** tab Figure 8

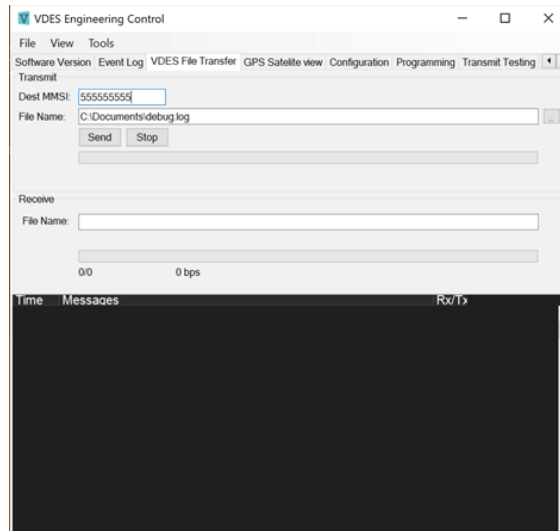


Figure 8 The destination MMSI and file to be transmitted have been configured.

17. On the PC that will transmit, select the **VDES File Transfer** tab and perform the following steps.
 - a. Enter the MMSI number of the destination device. Ensure that this is not the MMSI of the source device (i.e. the MMSI must not be the same as that shown when reading the MMSI in the **Configuration** tab of the current unit).
 - b. Click on the file open button ("...") and select a file to transfer. It is best to start with a file in the 2kb range to first test the setup. The file name will be shown in the text box and can also be manually edited if required.
 - c. Press **Send**.
18. The black log window should show the sentences over the PI - See Figure 9 below. If an error message is displayed, then check the COM port settings. The progress, including sentences over the PI, should also be visible on the receiving PC. Note the Success dialog in Figure 9 is from the receiving unit.

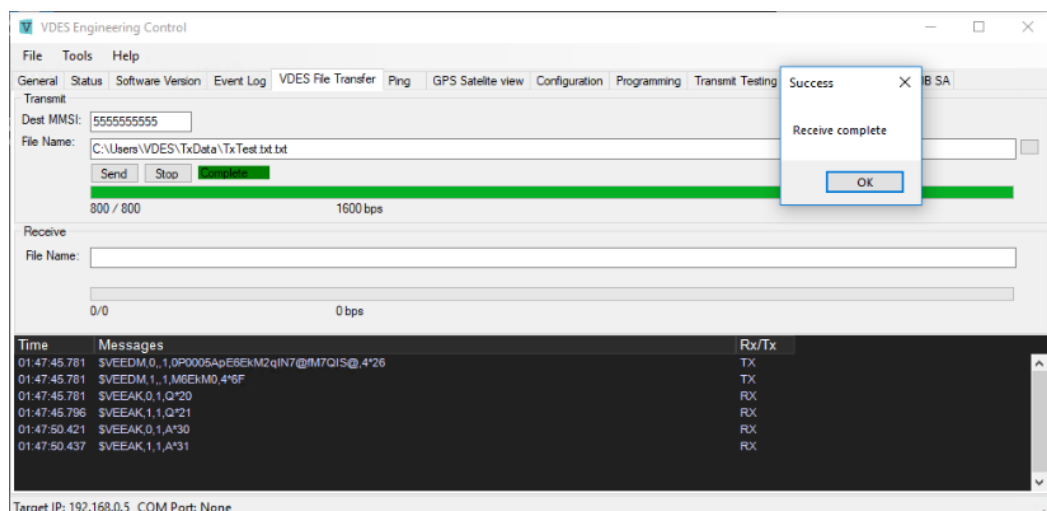


Figure 9 The VDES File Transfer tab showing a message has been transmitted successfully.

Notes:

1. The steps above can be used to configure the units to operate in 25kHz, 50kHz or 100kHz bands, using any one of the 3 available modulation schemes. The VDES specification can be consulted for the meaning of the different link IDs. Alternatively, the **Ping** tab can be used to see a description for the different valid link IDs.
2. It is possible to configure the operational frequency for a file transfer. This is a temporary feature that will be removed in a future software release when there is more certainty in the specification on how the operational frequencies will be configured. To change the operational frequency used for file transfer, open the **Configuration** tab and select **Debug -> VDEChannel0Freq**. Change the frequency to the required value and press **Write**. This will be the center frequency used

- and can be done in 12.5kHz steps. Note that the value entered is in Hz, so 161837500 must be used to operate at 161.8375MHz. This change must be done on both the transmitter and receiver side when doing a file transfer.
3. The TX/RX switch LED on top of the VDES1000 unit showing that it is transmitting. If a file transfer fails, then the unit may continue for a while attempting to send the data. This is not visible from the PC but can be seen by looking at the TX/RX switch LED showing that a VDES packet transfer may still be in progress. This is a normal part of the VDES link layer.
 4. The File Transfer Protocol between the PC and VDES1000 is a proprietary protocol that uses the VDES Sentences as defined in the VDES specification. This File Transfer Protocol is a simplistic implementation and should be used for demonstration purposes only. It is assumed that a customer will design their own software that uses the VDE Sentences to transfer data between two units.
 5. GPS time is sometimes used by a unit instead of UTC time. This condition may persist for as long as 15 minutes after the GPS unit has found a fix. When this happens, then a VDES file transfer will fail because the unit transmits in the wrong timeslot.
 6. If the traffic loading is high the RS422 data buffer may be overflowed by a VDES file transfer and some data loss may occur. It is expected that the VDES data transfers will be handled via Ethernet as the standard matures, relieving the load on the RS422 data buffer.

9 Ping Test

This section describes the setup and procedure necessary to run a ping test between two VDES units. The ping test was specifically developed to test VDE performance in a controlled environment, such as a lab or field trial. It should never be used in an environment where VDES is operational since it does not adhere to the VDES Link Layer specifications and will transmit in random time slots that could interfere with other VDES systems.

The ping test uses a PC connected to a requesting device to send request messages to a responding device. The responding device does not need a connection to a PC. This is very useful in cases where the responding device can be installed at a remote location, for example a ship, and can then be monitored from a convenient fixed location.

The setup for running a ping test between two units is the same as that for doing a file transfer. Please read section 8 Unit-to-unit File Transfer before continuing and ensure that the units are configured as described.

1. Follow the steps in section 8 to configure the hardware and software.
2. On the requesting side, start the VDES engineering control application.

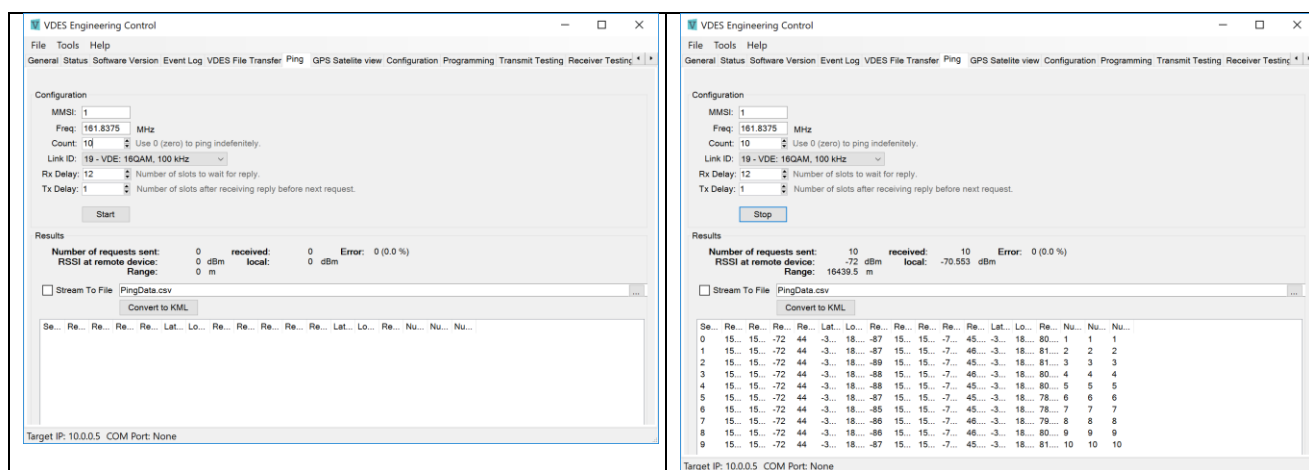


Figure 10 Configuring the Transmitter Ping test (left) and received ping data (right)

3. Open the **Ping** tab. Ensure that the **MMSI**, **Freq** and **Link ID** is configured correctly for the receiving device. The **MMSI** must be that of the responding device. The **Freq** must be that of the responding device, as reported in its **Receiver Testing** tab and the **Link ID** must correspond with the channel bandwidth of the responding device. For example, if the responding device is configured for 100kHz channel Bandwidth, then link IDs 17, 18 or 19 can be used, corresponding with Pi/4 QPSK and 16 QAM respectively. See Figure 10 (left).
4. Change the **Count** field to the number of ping requests to send, or set to zero to ping indefinitely or until the **Start/Stop** button is pressed to stop.

5. Use the **Tx Delay** field to configure the rate of the ping. This is the number of slots that the requesting device will wait before sending.
6. Setting **Rx Delay** below 10 may result in a timeout since two slots are allowed to modulate a transmit message, and three slots are allowed to decode a message (from VDE specification).
7. Press the **Start/Stop** button to start the ping test. The result from response messages are shown in the table view below. See Figure 10 (right)
8. Note that the **Stop** button must be pressed even if **Count** was set to a non-zero value, and that number of requests has been sent.
9. **Save To File** may be selected prior to starting the ping test to stream the response results to a .csv file so that the data may be processed at a later stage.
10. **Convert to KML** is an experimental feature that can be used to convert the saved .csv file to KML so that the result of the ping test can be viewed in a KML viewer.

Notes:

Use the ping test to easily evaluate the performance of all VDE link IDs, from 11 to 19. The test can be run over a long period (days or weeks) to record meaningful track/performance data.

10 Useful Information

10.1 Using the RS422 Port

The RS422 port 0 reflects activity in the PI via NMEA formatted sentences at 38400 baud with no handshaking. The port can be connected to the PC via a suitable adaptor as shown in Figure 1. The port activity can be viewed on a simple Terminal Emulator such as RealTerm. Talker sentences may be sent to the VDES1000 for configuration and transmission using the Terminal Emulator. Currently undefined and proprietary sentences are given in the VDES1000 Datasheet.

To change the MMSI of the VDES1000 from 223456789 to 200000001 using the RS422 port send the following talker sentences from the PC terminal emulator:

```
$AISPW,VDM,223456789,2,Admin PassWord123*43 // Enter admin mode
$PCML,MMSI,200000001*3B // Set new MMSI
$AIRST,,1,1,C*1E // Do a software reset to update nv-storage
```

The responses from the PI will appear as each line is processed.

```
$AITXT,01,01,54,Admin access granted*75
```

Note that a carriage return and line feed must be appended to each sentence. The terminal emulator may be configured to do this automatically or will not do it at all. Many simple text editors will add these two control characters if <RETURN> is pressed at the end of the text.

10.2 Changing the IP Address

The IP address of the VDES1000 can be changed using the VDES Engineering Control Application. Select the **Configuration** tab, click **User** then select **IP Address**. Enter the required IP address and click **Update**. Ensure that the unit responds with an acknowledgement and then perform a software reset by selecting the **Status** tab and clicking **Software Reset**.

Ensure that the PC in use is also using an appropriate IP setting for the new IP address of the unit.

In the VDES Engineering Control Application, select the **Tools** tab and then click **Options** to set the new target IP address. If the **MISC** and **CCRD** ports on the unit has been configured to non-default values then ensure that these values match the ports in the VDES Engineering Control Application.

Note that by default PI sentences make use of IEC 61162-450 with broadcasting and assumes a default **BroadCastIP** of 10.0.0.255. Care should be taken when changing the **IPAddress** to also change the **User -> BroadCastIP** accordingly. (For more information on configuring broadcast address, see https://en.wikipedia.org/wiki/Broadcast_address).

To disable broadcasting set **BroadCastIP** to **0.0.0.0**. In this mode the unit will only respond once a PI sentence has been received by the unit on each port (**MISC**, **AIST**, **CCRD**).

10.3 VDES Engineering Control Application

A brief description of each tab in the VDES Engineering Control Application follows.

General

Click **Refresh** to read user-defined fields and basic VDES1000 status information.
If any user-defined fields are updated, click Set to write them.

Status

Click **Refresh** to get an update of the VDES1000 status.
Check the **Periodically** box to enable the VDES Engineering Control Application to update the status automatically.
Click **Software Reset** to write any settings to non-volatile memory in the VDES1000.
Click **Software Reset** to commit firmware updates to the VDES1000. Any modified settings or firmware will be used when the VDES1000 restarts.

Software Version

Click **Refresh** to load the current version details from the VDES1000.
The *Customer App version* will normally read as zeros.

Event Log

The VDES unit keeps a detailed event log from power on. This can be helpful when debugging issues with the VDES1000.
Click **Read** to copy the Event Log to the console.
Click **Erase** to clear the Event Log and start a new log session. This can be useful before upgrading firmware and when starting a new evaluation session.
Click **Save** to copy the Event Log to a file. A dialogue will allow you to name the file and save it to a useful location.

VDES File Transfer

See section 8 for a detailed description.

Ping

See section 9 for a detailed description on how to use this facility.

GPS Satellite View

Click GSV Sentence enabled and then click Update to see a polar map and tabulated information of acquired satellites. The GSV sentences from the GPS unit will be echoed from the PI to the RS422 port 0.

Configuration

The configuration information for the VDES1000 can be viewed and non-fixed data can be set. The main ones of interest for evaluation are:

Group	Key	Description
Installer	Mmsi	The MMSI can be configured here.
	IMO	The IMO can be configured here.
	TxOutputPowerdBm	Sets the RF output level. 1W is the default. 12.5W is optional.
User	VdeLinkID	Sets the LinkID used for VDE data transfer. See Unit-to-unit File Transfer.
	EnableDefaultUartOutput	Enables the PI over the RS422 port 0. Default is 1 (enabled). 0 = disable where the PI will only be available over the Ethernet (UDP) port.
	FeatureMask	Enables and disables ASM, VDE data transfer and AIS channels selectively. The value is 3-bit binary coded, where a 1 enables the channels and 0 disables them; b2 = ASM, b1 = VDE and b0 = AIS. The default is 7 (Enable all). See section 6 for a description on using this feature to enable reception only.
	IPAddress	The unit's IP address
	DestPortMisc	Destination IEC 61162-450 UDP port for miscellaneous sentences
	DestPortAist	Destination IEC 61162-450 UDP port for AIS target data sentences
	DestPortCcrd	Destination IEC 61162-450 UDP port for command and command response sentences
	BroadCastIP	The broadcast IP address where IEC 61162-450 messages are sent.

Programming

See section 5 for a detailed description on updating the VDES1000.

Transmit Testing

Click **Refresh** to populate the fields with the current VDES1000 configuration.

Click **Update** to write any settings back to the VDES1000. Check Update automatically to write changes as they occur.

Select **Test Signal**

- **Type** - We currently recommend that only PRBS N Bursts is selected. *Damage to the unit may result from incorrect use of other items.*

Sends N bursts of data at the selected frequency, using the selected link ID. Data is framed correctly and all ramp-up and ramp-down phases are controlled. The PA is switched on at the start of each burst and switched off at the end of the burst so that the full TX mask performance can be tested. Each packet that is sent has a new random payload, i.e. it does not conform to any message structure. The number of bursts, as well as the spacing between bursts can be adjusted (currently there is a 2-slot spacing limit between bursts, but this will be removed in the future).

The PRBS sequence will always be the maximum allowed for the given link ID. In the case of LinkID 0 (AIS - GMSK) the maximum AIS payload length is used. For the other LinkIDs, except those for ASM (which is treated as AIS), the payload size is fixed based on the Forward Error Correction (FEC) that is used. LinkID 4 to 10 are not currently defined.

- **Frequency** - The frequency can be set to any value and will round to the nearest 12.5kHz.

- **LinkID, Repeat and Slot Interval** should be set as required for the PRBS N Bursts test. LinkID 4 to 10 are not currently defined.

- **CMX998 Control** – **DO NOT USE. Damage to the unit may result from incorrect use**

- **Adjust IQ DC Offsets** – **DO NOT USE. Damage to the unit may result from incorrect use**

- **PA Control** – **DO NOT USE. Damage to the unit may result from incorrect use**

Receiver Testing

Click **Refresh** to populate the fields with the current VDES1000 configuration.

Any receiver channels can be enabled or disabled by checking or unchecking the respective **Enabled** checkbox.

The received traffic for all enabled receivers can be monitored in the console by checking the **Monitor RF Rx traffic**.

The operating **Frequency** for each receiver channel can be set the respective edit box and will be rounded to the nearest 25kHz.

The **Channel Type** can be selected from the respective drop down menu.

Click **Update** to write back the new settings.

N9000B SA

This tab is for internal use only. **DO NOT USE.**

10.4 Hardware

1. Ground loops may degrade the performance of the 24V input SMPS. This manifests itself in low levels of audible noise emanating from the unit. In excessive cases this may also cause errors in biasing of the PA, resulting in a raised noise floor when transmitting, or lower output power levels.
If this occurs, ensure that all the equipment is grounded properly. The input PSU is isolated. The RF GND is also the chassis GND and the cause is often equipment that shares the same GND, resulting in a short between chassis GND and the 24V return.
2. The USB port is deprecated for use from software version 1.6.x onward.

10.5 Software

1. The DSC channel is not enabled.

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