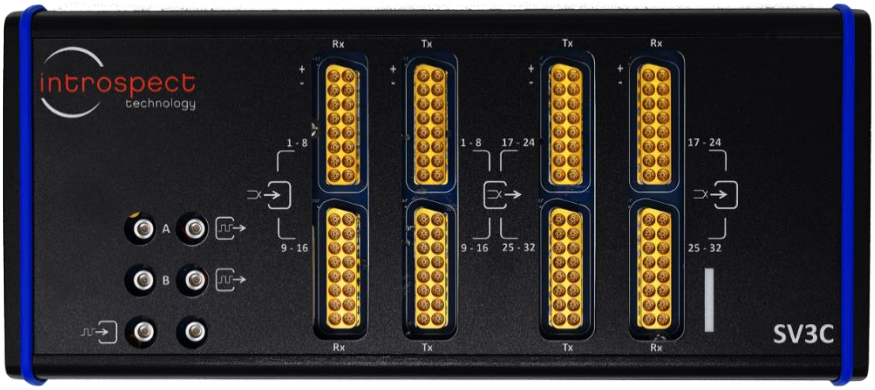
QUICK START GUIDE

SV3C LVDS Generator

SV3C Personalized SerDes Tester

C SERIES



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Introduction

OVERVIEW

This document describes the required steps for getting started with the 16 channel SV3C LVDS Signal Generator. Hardware connection and software installation steps are provided, followed by a simple demonstration of how to set up and start the signal generator.

REQUIREMENTS

- (QTY = 1) SV3C-32 Channel Personalized SerDes Tester
- (QTY = 2) Common Mode Controller Board
- (QTY = 3) 12 V power supply units (manufacturer part number CUI SDI65-12-U-P5)
- (QTY = 2) Huber/Suhner MXP to MXP cable harnesses (manufacturer part number MF53/2x8A_21MXP/21MXP/305_1)
- (QTY = 2) Huber/Suhner MXP to SMA cable harnesses (manufacturer part number MF53/2x8A_21MXP/11SK/305)
- (QTY = 1) Common Mode Controller Interconnect Cable (see Figure 4)
- (QTY = 1) USB2 mini B cable for connection between the SV3C and a personal computer
- (QTY = 1) Personal computer. See the "System Requirements" the "Introspect ESP Software Installation" sections of this document for further details.

Hardware Connection Diagrams

SV3C CONNECTORS AND PINOUTS

The location of the SV3C MXP and Molex connectors is shown in Figure 1, and the complete pinout for MXP signals is provided in Table 1.

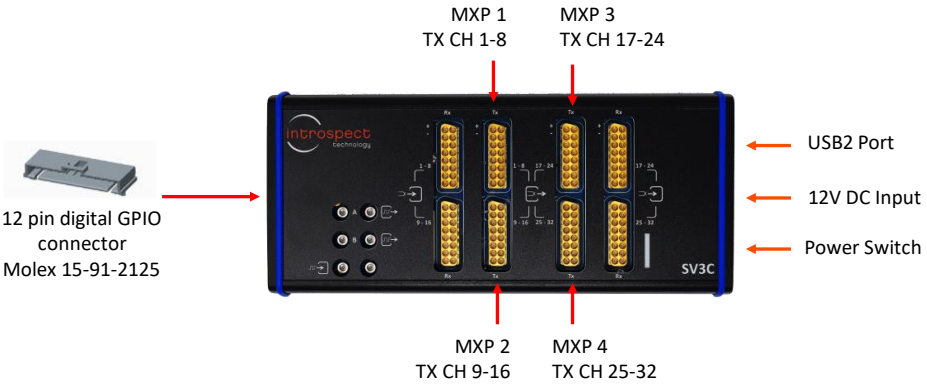


Figure 1: SV3C MXP, Molex, USB and power connector locations

TABLE 1: PINOUT OF THE SV3C TX MXP CONNECTORS

	MXP1 PIN	MXP1 SIGNAL	MXP2 PIN	MXP2 SIGNAL	MXP3 PIN	MXP3 SIGNAL	MXP4 PIN	MXP 4 SIGNAL
MXP Top View 1 16 2 15 3 14 4 13 5 12 6 11 7 10 8 9	1	TX1P	1	TX9P	1	TX17P	1	TX25P
	2	TX1N	2	TX9N	2	TX17N	2	TX25N
	3	TX2P	3	TX10P	3	TX18P	3	TX26P
	4	TX2N	4	TX10N	4	TX18N	4	TX26N
	5	TX3P	5	TX11P	5	TX19P	5	TX27P
	6	TX3N	6	TX11N	6	TX19N	6	TX27N
	7	TX4P	7	TX12P	7	TX20P	7	TX28P
	8	TX4N	8	TX12N	8	TX20N	8	TX28N
	9	TX8N	9	TX16N	9	TX24N	9	TX32N
	10	TX8P	10	TX16P	10	TX24P	10	TX32P
	11	TX7N	11	TX15N	11	TX23N	11	TX31N
	12	TX7P	12	TX15P	12	TX23P	12	TX31P
	13	TX6N	13	TX14N	13	TX22N	13	TX30N
	14	TX6P	14	TX14P	14	TX22P	14	TX30P
	15	TX5N	15	TX13N	15	TX21N	15	TX29N
	16	TX5P	16	TX13P	16	TX21P	16	TX29P

COMMON MODE CONTROLLER BOARD CONNECTORS AND PINOUTS

The setup of the SV3C LVDS Generator requires two Common Mode Controller Boards. Though the Common Mode Control Boards are identical and interchangeable, they are described below in terms of Board # 1, which is used for LVDS output channels 1-8, and Board # 2, which is used for LVDS output channels 9-16. The locations of the MXP connectors and the Auxiliary Control Port SCSI connectors are shown below in Figure 2 and Figure 3. The complete pinouts for MXP signals are provided in Table 2.

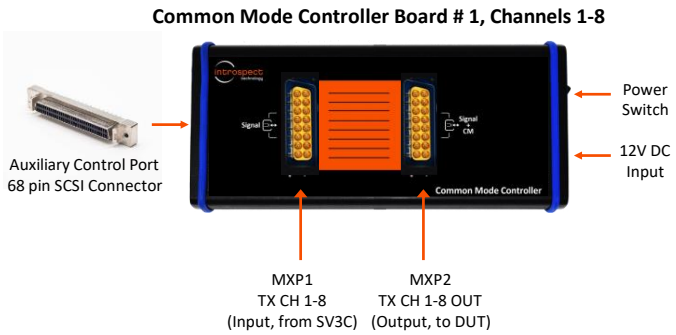


Figure 2: Common Mode Controller Board # 1, MXP, Auxiliary Control Port and power connector locations

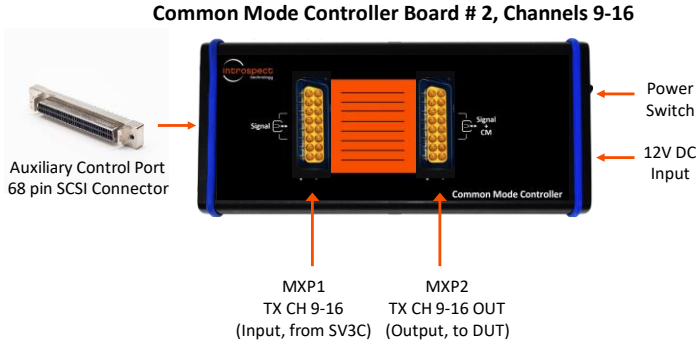
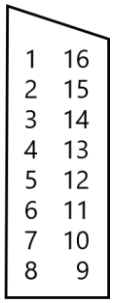


Figure 3: Common Mode Controller Board # 2, MXP, Auxiliary Control Port and power connector locations

TABLE 2: PINOUT OF THE COMMON MODE CONTROLLER MXP CONNECTORS

	COMMON MODE CONTROL BOARD # 1				COMMON MODE CONTROL BOARD # 2			
	FROM SV3C		TO DUT		FROM SV3C		TO DUT	
	MXP1 PIN	MXP1 SIGNAL	MXP2 PIN	MXP2 SIGNAL	MXP1 PIN	MXP1 SIGNAL	MXP2 PIN	MXP2 SIGNAL
MXP Top View 	1	TX1P	1	TX1P OUT	1	TX9P	1	TX9P OUT
	2	TX1N	2	TX1N OUT	2	TX9N	2	TX9N OUT
	3	TX2P	3	TX2P OUT	3	TX10P	3	TX10P OUT
	4	TX2N	4	TX2N OUT	4	TX10N	4	TX10N OUT
	5	TX3P	5	TX3P OUT	5	TX11P	5	TX11P OUT
	6	TX3N	6	TX3N OUT	6	TX11N	6	TX11N OUT
	7	TX4P	7	TX4P OUT	7	TX12P	7	TX12P OUT
	8	TX4N	8	TX4N OUT	8	TX12N	8	TX12N OUT
	9	TX8N	9	TX8N OUT	9	TX16N	9	TX16N OUT
	10	TX8P	10	TX8P OUT	10	TX16P	10	TX16P OUT
	11	TX7N	11	TX7N OUT	11	TX15N	11	TX15N OUT
	12	TX7P	12	TX7P OUT	12	TX15P	12	TX15P OUT
	13	TX6N	13	TX6N OUT	13	TX14N	13	TX14N OUT
	14	TX6P	14	TX6P OUT	14	TX14P	14	TX14P OUT
	15	TX5N	15	TX5N OUT	15	TX13N	15	TX13N OUT
	16	TX5P	16	TX5P OUT	16	TX13P	16	TX13P OUT

COMMON MODE CONTROLLER INTERCONNECT CABLE

The Common Mode Controller interconnect cable is shown below in Figure 4. This cable is used to connect the 12-pin GPIO connector on the SV3C to the SCSI connectors on each of the Common Mode Controller Boards. The SCSI connector for the first Common Mode Controller has a silver stripe on it, as shown in Figure 4. The required connection is shown schematically in Figure 5.

Figure 4: Common Mode Controller Interconnect Cable

SV3C AND COMMON MODE CONTROLLER BOARD CONNECTIONS

The overall connection of the SV3C and the two Common Mode Control Boards is shown in Figure 5. MXP cable harnesses are shown by the red and white solid arrows, and both the Common Mode Controller Interconnect Cable and USB cable are shown by thin red arrows. Power connections are required but not shown.

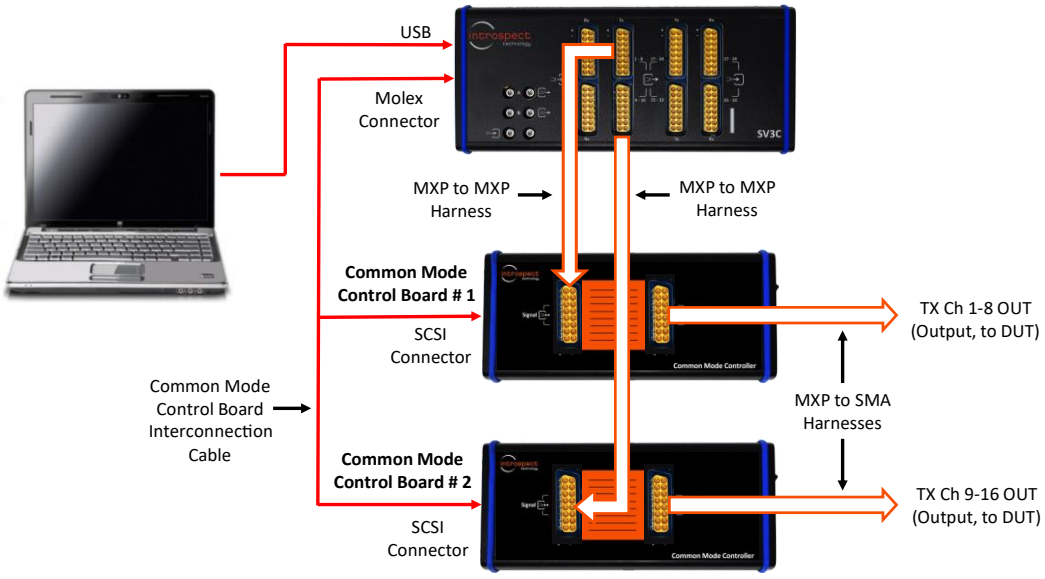


Figure 5: Connection of the PC, SV3C and Common Mode Control Boards

Introspect ESP Software Installation

SYSTEM REQUIREMENTS

The Introspect ESP Software provides an easy-to-use environment for device characterization and test-plan development. To run the software, the following components are required:

- A PC installed with Windows XP, Vista, or Windows 7, 8, 10 or 11.
- The Introspect ESP install executable. Note that to use the 16 channel SV3C LVDS Generator form factor in software, **Introspect ESP version 22.3** or later is required.
- USB device drivers (refer to the driver installation instructions later in this document)

NOTE

A fully functional command line version of the Introspect ESP software is also available for MacOS and Linux. However, this quick start guide will focus on the Windows version.

INTROSPECT ESP SOFTWARE INSTALLATION

1. INSTALLATION PREPARATION

a) Quit any Introspect ESP programs before starting the installation process.

b) If this is your first installation of the Introspect ESP Software, open the “README_Install.txt” file located in the installation files and install any prerequisite components by consulting the “Windows Software Requirements” section.

2. SOFTWARE INSTALLATION

a) From the directory containing the installation files, double-click the "IntrospectESP_Installer.exe" executable and follow the on-screen instructions.

b) When prompted, specify the location where you want to install the Introspect ESP software. The default location is Program Files -> Introspect. The software will be installed into a sub-folder specifying the version number.

NOTE

The selected installation directory must be a new location – it cannot be the same as a previous installation.

c) By the simple press of a button, the Introspect ESP software will install its own embedded version of Python, along with its required 3rd-party modules. This means that any previous Python installations on the host computer will not be affected by the Introspect ESP Software.

3. INSTALL THE LICENSE FILE

a) Towards the end of the installation, you will be asked to provide either an activation key or a license file for the software.
b) If you have a valid activation key, simply select the "Use Activation Key" option and enter your activation key. The installer will then automatically generate the required license files.
c) If you were provided with a license file instead, select the "Use Existing License" option and the installer will help you copy it into the new installation folder.
d) If you do not have any of the above, select the "Get a New License" option and the installer will provide you with information that needs to be sent to Introspect Technology in order to obtain one. Copy and paste that information to request a license via: license_support@introspect.ca.
e) Upon receipt of the valid license files, please place them into the following directory:

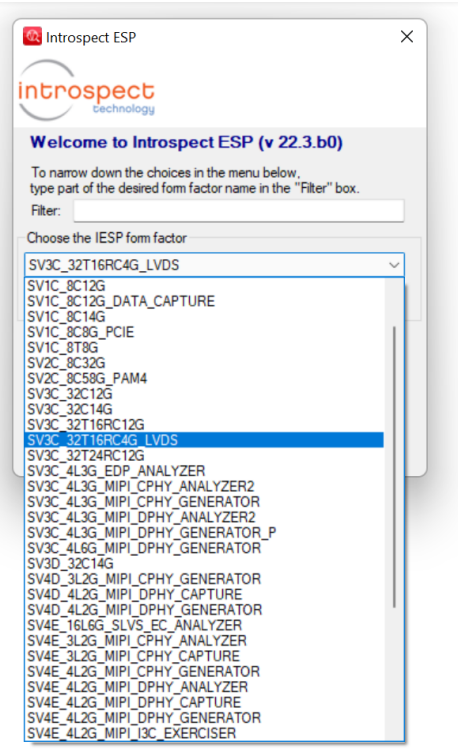
C:\[Your Introspect Installation Folder]\Licenses

NOTE

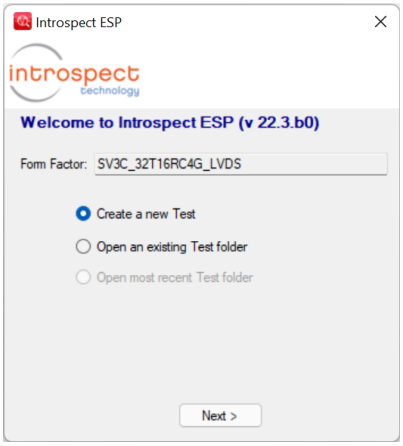
The installer creates a folder called "Introspect" under the "My Documents" folder of your account. This folder is where Test Procedures are usually saved.

4. RUNING THE INTROSPECT ESP SOFTWARE

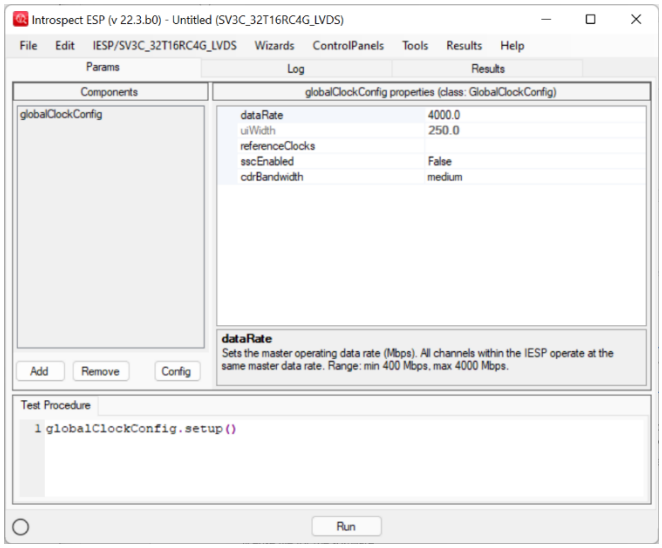
a) Double-click on the "IntrospectESP" shortcut on your Desktop and you should see the first "welcome" window of the GUI. Please specify the hardware (the form factor) as "SV3C_32T16RC4G_LVDS" and Press "Next" to continue.



b) Select the option "Create a new Test" and click the "Next" button.



c) With a valid license in the "Licenses" directory, the following GUI screen should come up, which indicates that the Introspect ESP Software has been successfully installed.



5. FURTHER DOCUMENTATION

The "[IntrospectESP_install_dir]\Doc" folder contains the following information on the software:

- "IntrospectESP_UserManual.pdf" is the user manual for the Introspect ESP Software and is recommended reading for all users.
- "svt.html" and "iesp.html" provide documentation on the Python component classes and lower-level functions specific to the selected form factor. Both files can be found in "C:\[IntrospectESP_install_dir]\Doc\FormFactors\SV3C_32T16RC4G_LVDS. These are intended for intermediate and advanced users.

NOTE

Both the user manual and the above html files are also conveniently available from the "Help" pull down menu located on the top right of the main Introspect ESP window.

"Application Notes" can be found in the "C:\[IntrospectESP_install_dir]\Doc\" sub-folder and have more advanced features, often in the form of tutorials.

USB Driver Installation

The following procedure will allow for automated FTDI driver installation.

1. HARDWARE SETUP

For this procedure, connect the SV3C to the PC using the USB2.0 mini B cable, as shown in Figure 6 below, and power on the module. To allow for driver installation, the PC should be connected to the internet as well.

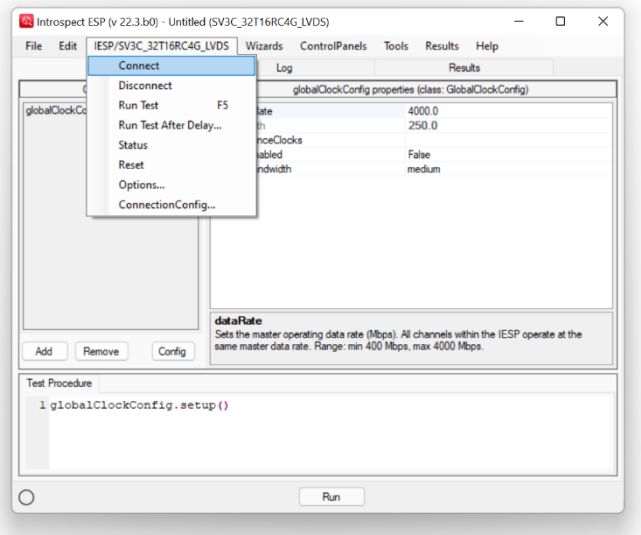
Figure 6: USB cable connection for USB driver installation

2. WAIT FOR NEW HARDWARE DETECTION

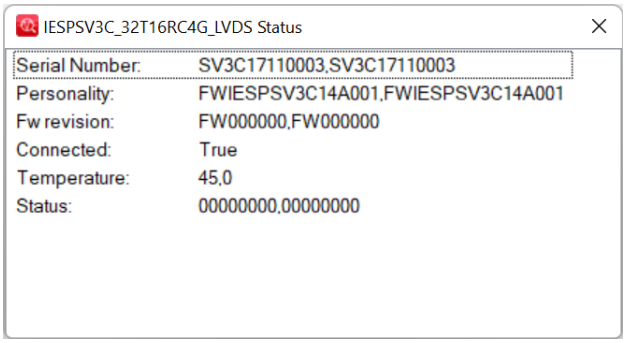
The PC should display the message "New drivers successfully installed" once the installation process is complete. If this does not occur, see the troubleshooting notes at the end of this section.

3. VERIFY DRIVER INSTALLATION

a) If it is not already open, launch the Introspect ESP Software and select the "SV3C_32T16RC4G_LVDS" form factor. From the main GUI window, click the "IESP/SV3C_32T16RC4G_LVDS" drop down menu and click "Connect", as shown here. Establishing the connection should take a couple of seconds.



b) To verify the connection, select the "IESP/SV3C_32T16RC4G_LVDS" drop down menu and click "Status". A dialog window should confirm that the SV3C module is connected, as shown in the example here. Also, the status indicator in the bottom left corner of the main GUI window should be solid green, indicating that the SV3C unit is connected and ready.



4. TROUBLESHOOTING

If the connection cannot be established, or if the drivers cannot be found or automatically installed, please refer to the "FTDI Driver Manual Installation" Appendix to install the required drivers.

SV3C LVDS Generator Demonstration

STEP-BY-STEP GUIDE

The following step-by-step guide will allow the user to set up the SV3C LVDS Generator to transmit data on one or more channels. The following section is intended to provide an overview of how to use the Introspect ESP GUI and highlight several of the GUI's key features.

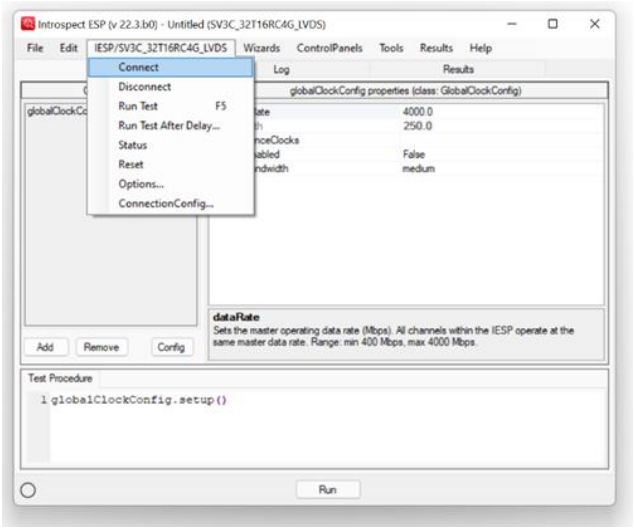
1. CONNECT THE HARDWARE COMPONENTS

For this procedure, please attach the hardware components as shown previously in Figure 5. Also connect the generator to a device under test (or to an oscilloscope) as required.

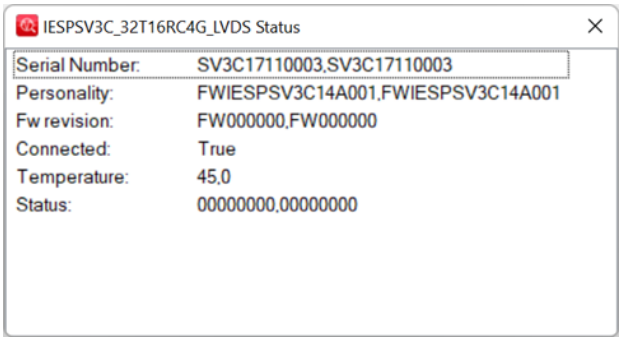
2. GETTING TO KNOW THE INTROSPECT ESP GUI

a) If you have not done so previously during the USB driver installation procedure, launch the Introspect ESP Software, select the "SV3C_32T16RC4G_LVDS" form factor and create a new Test Procedure.

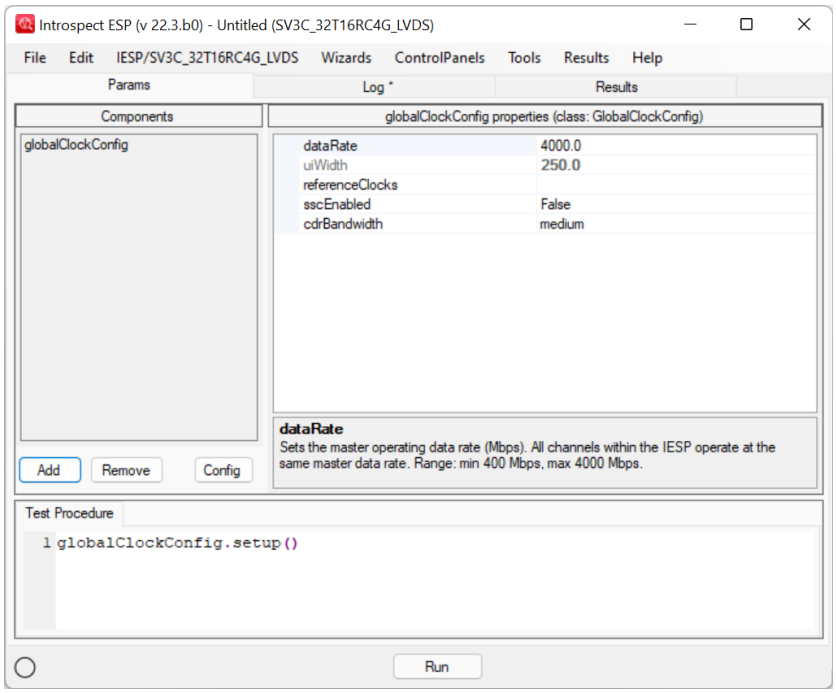
b) In the top left corner of the main GUI window, select the "IESP/ "SV3C_32T16RC4G_LVDS" drop down menu and click the "Connect" option. Establishing connection should take a couple of seconds.



c) To verify the connection between the PC and the SV3C module, select the "IESP/SV3C_32T16RC4G_LVDS" drop down menu and click the "Status" option. A dialog window should confirm that the SV3C module is connected, as shown here, and will list the detected personality / firmware version.

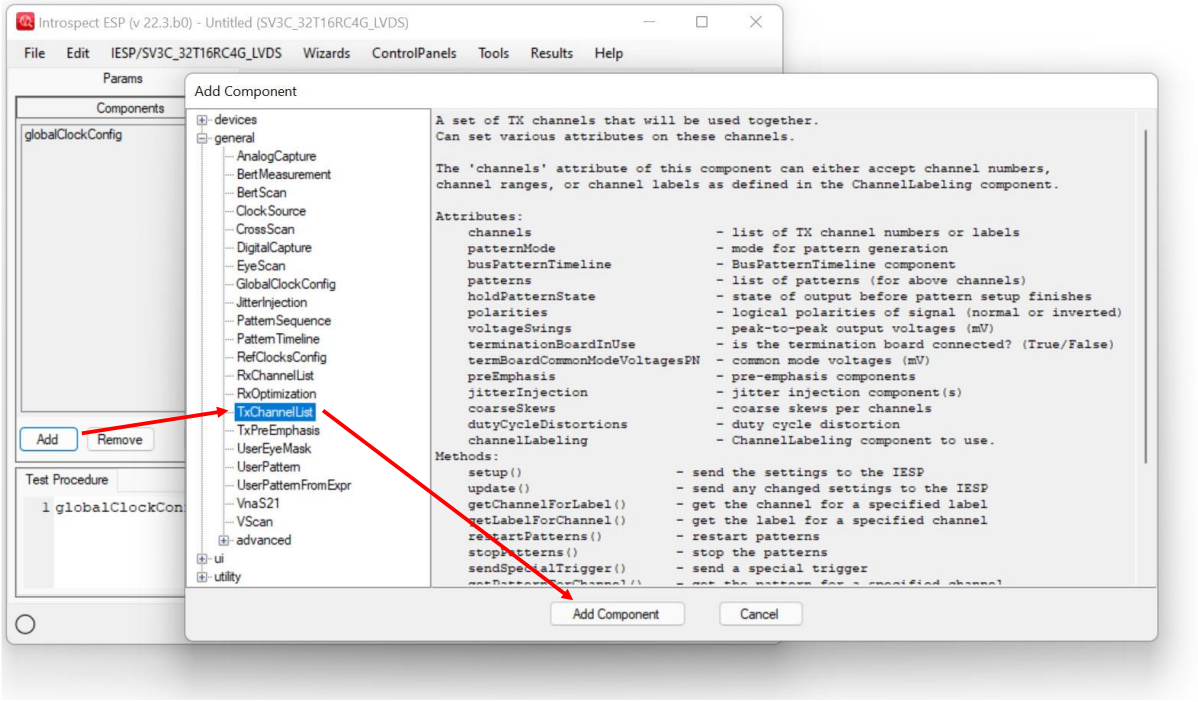


d) By default, when started in the "SV3C_32T16RC4G_LVDS" form factor, the GUI contains a single line of code in the "Test Procedure" tab and a single component in the "Components" section, as shown below. The globalClockConfig1 component is used to specify the data rate of the SV3C module. The default data rate is 4000 Mbps as shown.

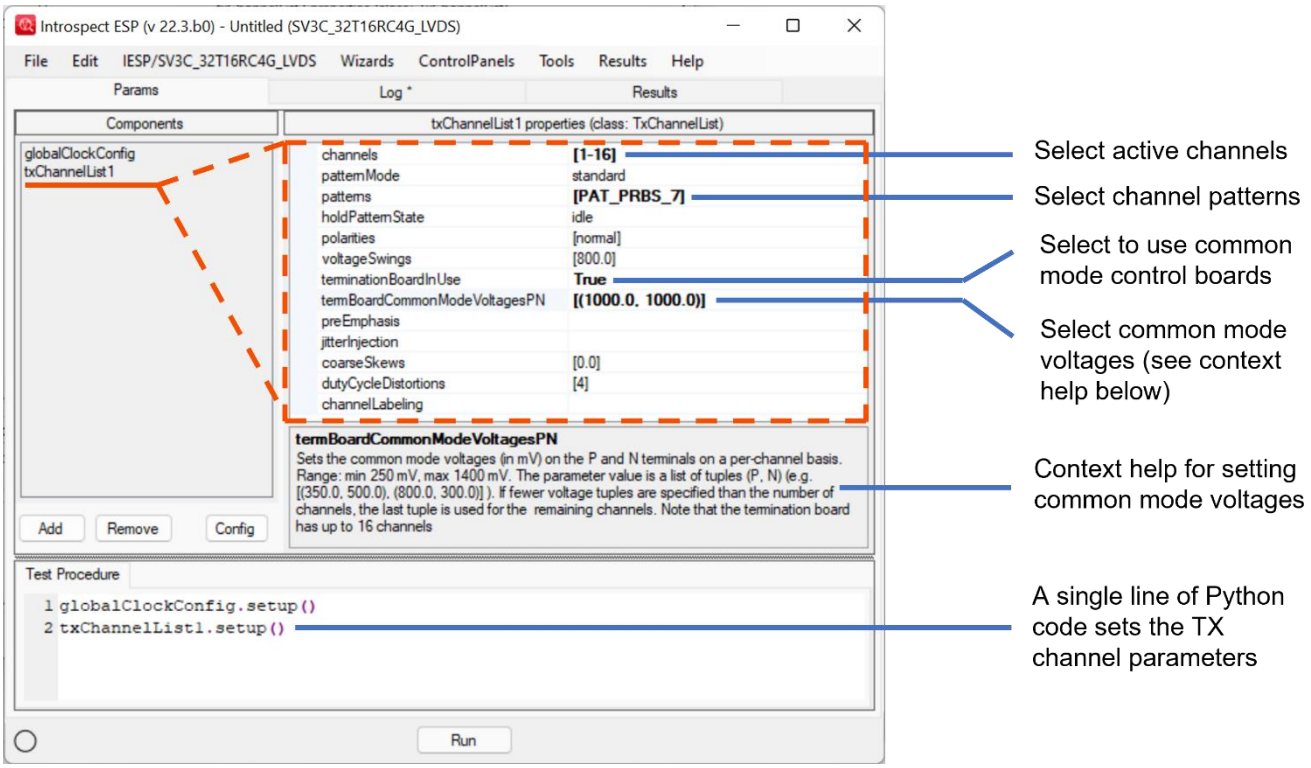


3. ADDING TEST COMPONENTS

a) The SV3C LVDS Generator output is set by the "txChannelList" component. To add this component to the test procedure, first click the "Add" button as shown below. Next, in the "Add Component" window, select the "txChannelList" component, and finally click the "Add Component" button, as shown below.



b) A new "txChannelList" component will be added in the "Components" window on the left side of the GUI, and a single line of code will be added automatically to the end of the "Test Procedure" window at the bottom of the GUI. All of this is shown in the figure on the following page.



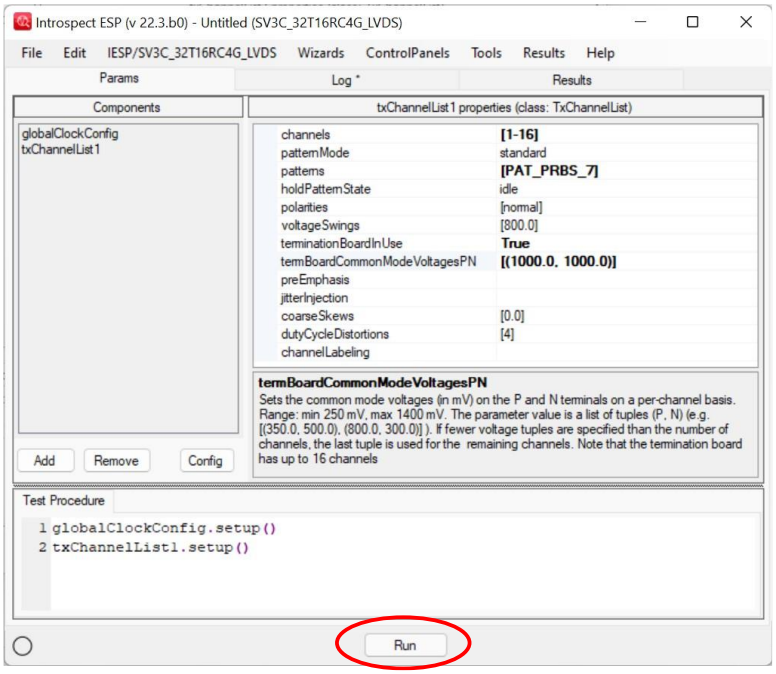
c) To modify the TX channel list properties, click on "txChannelList1" in the "Components" window on the left side of the GUI, as shown above.

- The "channels" property sets the number of active channels and may include any set of channels numbered between 1 and 16.
- The "patterns" property sets the pattern or patterns on a per-channel basis.
- To use the common mode controller boards in the setup, the "terminationBoardInUse" property must be set to "True" as shown.
- The "termBoardCommonModeVoltagesPN" property sets the common mode voltage for all channels listed in the "channels" property mentioned above. Common mode voltage for the P and N terminals for each channel are specified separately for each channel.
- There is context help available in the GUI for setting each txChannelList property. The context help for the "termBoardCommonModeVoltagesPN" property is shown in the figure above.

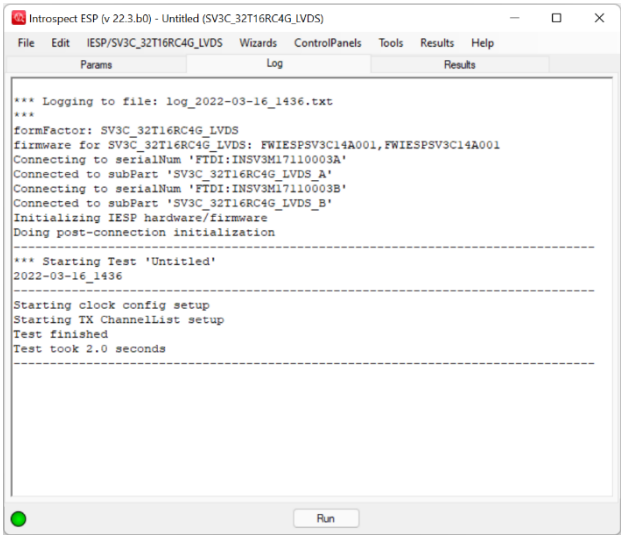
d) Additional help and further on-line documentation for components is available from the pull-down menu Help -> Component Classes. Other on-line resources are available through the same pull-down menu.

4. EXECUTING THE TEST PROCEDURE

a) Click the "Run" button at the bottom of the main GUI window as shown below, or use the F5 shortcut key, to start the test.

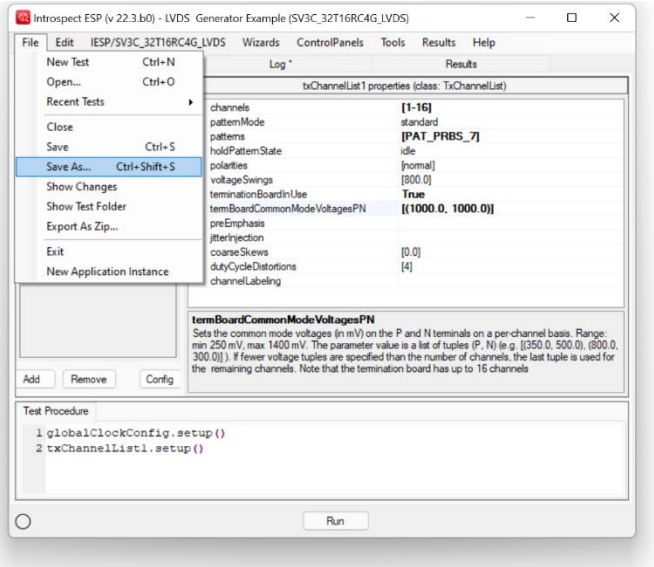


b) After clicking the "Run" button, the GUI will automatically change from the "Params" tab to the "Log" tab where you can find information about the currently executing procedure. Any errors occurring during the test run will be reported here. An example set of log messages is shown in the figure on the following page. Check the DUT or oscilloscope to verify output of the SV3C LVDS Generator at this point, following the test execution. The generator output continues to run after the test procedure has completed.



5. SAVING THE TEST PROCEDURE

a) From the pull-down menu, select “File -> Save” or “File -> Save As…” to save the contents of the test folder. The name of a saved folder will appear at the top of the test folder window, such as “LVDS Generator Example” as shown here. This concludes this SV3C LVDS Generator software demonstration.



ADDITIONAL DOCUMENTATION

SV3C Personalized SerDes Tester Data Sheet

- MK-D011E-E-18143 - SV3C Data Sheet

SV1C Common Mode Controller Data Sheet

- EN-D029E-E-21129 - SV1C Common Mode Controller Data Sheet

Appendix

FTDI DRIVER MANUAL INSTALLATION

The Introspect ESP Software communicates with the SPI Controller via an FTDI device (connected via USB). If you don't already have required FTDI drivers installed on your Windows computer, or if the automated driver detection presented earlier in this document was unsuccessful, you will need to download them from the FTDI web site. To do this, follow the instructions found at

http://www.ftdichip.com/Documents/InstallGuides.htm

The latest drivers can be found at

http://www.ftdichip.com/Drivers/D2XX.htm

Note that the driver version used in our product development is 2.12.

You may wish to use the "usbview" utility program linked to on the following FTDI page:

http://www.ftdichip.com/Resources/Utilities.htm

This program will allow you to check that your computer can "see" the FTDI device over USB.

Revision Number	History	Date
1.0	Document release	July 17, 2020
1.1	Changes in Figure 1, updates to Table 5.	July 27, 2020
1.2	Changes to the common mode controller boards and interconnect cable descriptions. Also added software section.	April 11, 2022

The information in this document is subject to change without notice and should not be construed as a commitment by Introspect Technology. While reasonable precautions have been taken, Introspect Technology assumes no responsibility for any errors that may appear in this document.

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