Application Note

75-0045-210205

D4000 Quick Start Guide and Integration Information

This document provides the guideline for how to integrate the ThinkRF D4000 Downconverter into user's system. It outlines how to use the downconverter and what equipment users would need for integration.

thinkRF

monitor. detect. analyze

Requirements and Obligations

The following items are included in the D4000 package.

- D4000 RF Downconverter/Tuner
- Power supply – with barrel connector
- Power cord – Country specific by Type
- Ethernet cable

Users shall supply following items to work with D4000.

- Antenna
- RF cables
- Spectrum Analyzer with an IF input range at least covers the IF frequency of 1.536GHz and 500MHz real-time bandwidth.

ThinkRF will provide necessary support for D4000 users to guide them in setting up the D4000 to work with their existing spectrum analyzer. ThinkRF provide detailed instruction and programming information, found in the D4000 User Guide and D4000 Programmer's Guide, please contact support@thinkrf.com for assistance or document requests.

Currently only SCPI commands are available to control the D4000, there is no API available. Users are required to develop their own interface software, with the assistance of ThinkRF, using SCPI commands to control the D4000 with their existing Spectrum analyser.

Connecting the Ethernet and Cables

Follow the schematic below to connect the D4000 to the Spectrum Analyzer.
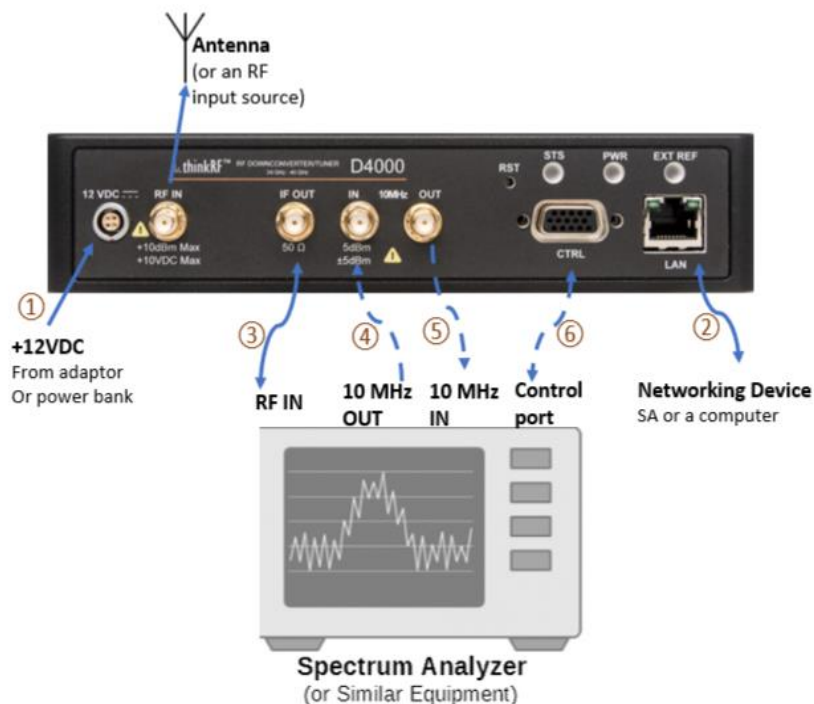
1. Connect the power supply source to D4000's LEMO power connector.

2. Connect one end of the Ethernet cable to the D4000's Ethernet port and the other end to an Ethernet port on the SA or a computer.

Caution: For the following RF connectors, see **Error! Reference source not found.** section in the D4000 User Guide for important cautions and torque suggestion.

3. Connect the Antenna or an RF input source to the D4000's RF IN port.

4. Connect the SMA connector end of the cable coming from D4000's 10 MHz OUT port to the SA's External IN port.

5. Connect the SMA connector end of the cable coming from SA's RF IN port to the D4000's IF OUT SMA port.

6. Connecting to D4000's 10 MHz IN port is optional or on per needed basis for clock synchronization. See D4000 User Guide for more information and important cautions.

7. Connect the auxiliary GPIO to SA's control port for controlling (Future feature)

Controlling D4000

- The D4000's default factory configuration at the first power-up or after a factory reset is set to STATIC type with IP 192.168.1.2. Users are required to set their PC or network to accommodate the D4000 IP settings. More information can be found in D4000 User Guide.

- Users need to use port 5025 to send SCPI to D4000 for controlling, there is currently no API available for D4000. SCPI command is the only way to control D4000 currently. Terminal software PuTTY can be used for simple tasks.

- D4000's IF output frequency is 1.536GHz. Users are required to supply their own spectrum analyzer. Minimum bandwidth of 500MHz is needed to accommodate D4000's 500MHz real-time bandwidth. User's spectrum analyzer must have the capability to reach 1.536GHz.

- Sample code of TCP/IP connection and SCPI control can be found under Appendix A of the D4000 Programmer's Guide.

Note: D4000 IF output frequency is fixed and cannot be changed.
Gain/loss shall be applied after getting the amplitude readings from IF output, D4000 IF output is not calibrated, each D4000 comes with its own gain table, contact support@thinkrf.com to obtain the gain table.

SCPI Example

In order to see the signal coming out of D4000, users may leave everything at default settings, and just tune the center frequency by using "[:SENSe]:FREQuency:CENTer" on page 29 of D4000 PG Programmer's Guide. For example, for tuning the RF input at 27.5GHz, sending SCPI ":FREQ:CENTER 27.5 GHZ"

For a better signal quality, changing settings of "[:SENSe]:ATTenuator" on page 28, to 0dB. For example, send SCPI ":SENSE:ATTENUATOR 0"

Document Revision History

This section summarizes document revision history.

Document Version	Release Date	Revisions and Notes
v1.0	Feb 01, 2021	First release.

Contact us for more information

ThinkRF Support website provides online documents for resolving technical issues with ThinkRF products at http://www.thinkrf.com/resources.

For all customers who hold a valid end-user license, ThinkRF provides technical assistance 9 AM to 5 PM Eastern Time, Monday to Friday. Contact us at https://www.thinkrf.com/support/ or by calling **+1.613.369.5104**.