



# AppBox D21 Quick Start Guide



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## 1.0 System Requirements

To operate the Spectrum Digital AppBox D21 your system needs to meet the following requirements:

- Power Supply (+12-24 VDC at 1 amp)
- USB for communications, or
- RS-485 connection for communication
- Atmel-ICE emulator for development (optional)
- Host computer for development system (optional)

## 2.0 What's Included

The Spectrum Digital AppBox D21 product (Part/SKU #: 703910-0001) includes:

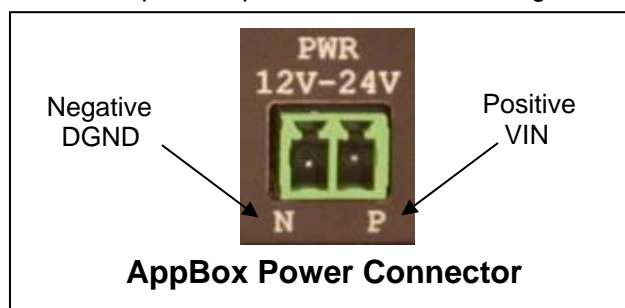
- AppBox D21 in anti-static bag
- Terminal block header for power input
- Product information card

**NOTE: This product does not include any software or drivers. Development tools (Atmel-ICE and Software code generation suite) can be obtained from Microchip/Atmel at:**

<https://www.microchip.com/development-tools/>.

## 3.0 Attaching Power to the AppBox D21

Power can be provided to the AppBox D21 by two different means; the AppBox power supply with cable (Part/SKU #: 703925-0001), or wiring the 2 position terminal block header (included with AppBox D21) that plugs into the D21 CPU Board's power input connector. See the figure below.

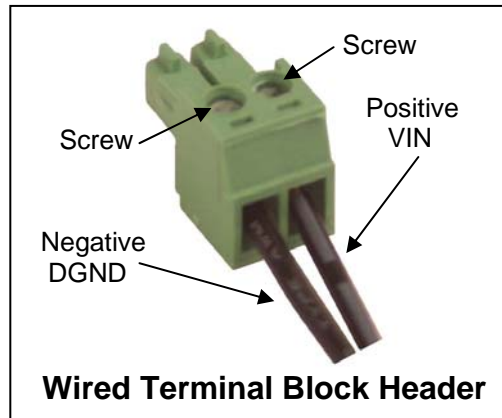


Listed below are the steps to install the terminal block header power connector into the AppBox D21.

1. Cut 2 pieces of wire (preferably 1 red for positive-VIN, 1 black for negative-DGND) to the desired length for your application. This wire should be 22 gauge or heavier
2. Strip ¼ inch (6-7 mm) of insulation from one end of each wire.
3. Position the terminal block header on a flat surface with the key stubs up and away from you. See the figure below.



4. Insert the negative/DGND wire (black) into the left wire hole and tighten the screw.
5. Insert the positive/VIN wire (red or black with strip) into the right wire hole and tighten the screw.
6. The terminal header should look like the figure below.

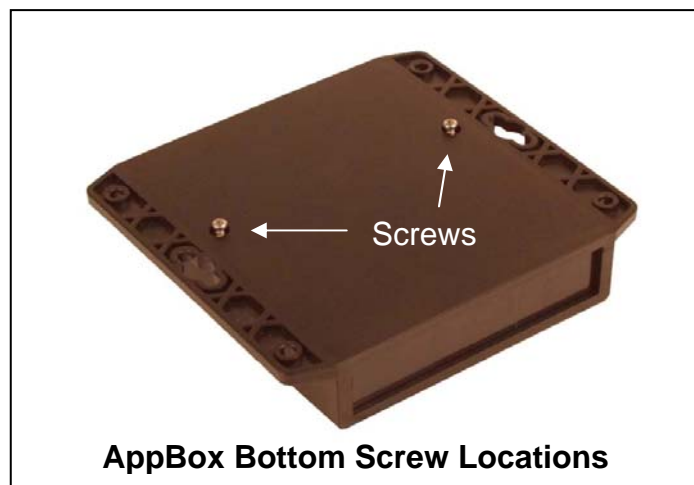


7. Pull/tug on the wires to insure they are secure in the terminal block.
8. Attach the loose end of the wires to a +12 – 24 VDC power source. Be sure of the polarity. This power source should supply at least 1 amp of current. This requirement will vary depending on the current requirements of the C21 CPU Board and the AppIO Modules.
9. Turn on the power source.
10. With a multi-meter or oscilloscope measure the voltage at the terminal block header to verify +12 -24 VDC is present. Place the meter/scope probes on the 2 screws to measure.
11. Turn off the power source
12. Insert the terminal block header into the power input of the AppBox D21.
13. Turn on the power source.

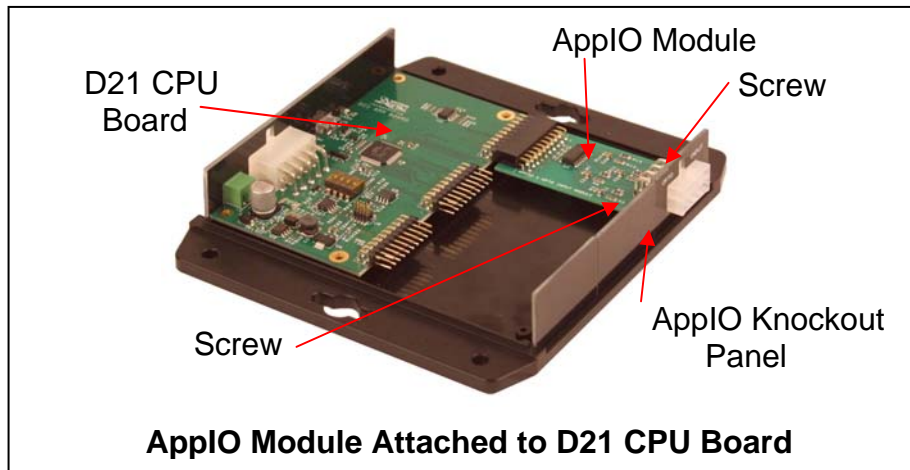
#### 4.0 Installation of AppIO Modules

Listed below are the steps to install AppIO Modules in the AppBox D21:

1. Remove **ALL** power to the AppBox enclosure
2. Remove all interface connections attached to the installed AppIO Modules
3. Remove the USB/RS-485 connections to the D21 processor board
4. Turn the AppBox over and remove the 2 screws from the bottom of the enclosure as shown below



5. Turn the AppBox back over (label showing) and lift the top off the enclosure being careful not to lose the knockout panels
6. If necessary remove one or more existing AppIO Modules and associated knockout panels by unscrewing the 2 screws
7. Plug the new AppIO Module(s) into EXT1, EXT2, or EXT3 on the D21 CPU Board



8. Insert the included knock out panel associated with this AppIO Module
9. Insert and tighten the 2 screws for the AppIO Module
10. Insert the knock out panels in any unused positions
11. Place the cover back over the D21 processor board and AppIO Modules
12. Insert the 2 screws back in and tighten until snug, do not over tighten/strip the screws

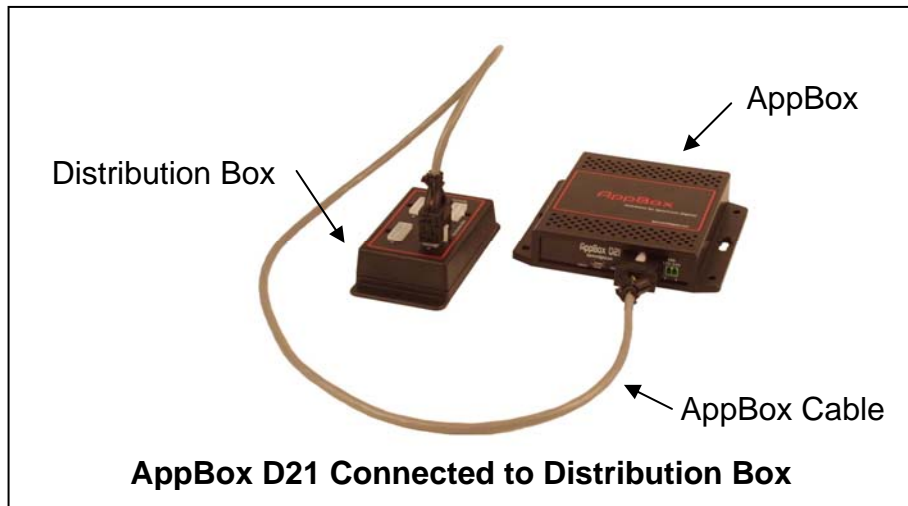


13. Re-attach the USB/RS-485 connections to the processor board
14. Re-attach all interface connections to the AppIO Modules
15. Apply power to the AppBox D21

## 5.0 Attachment of Distribution Box to the AppBox D21

Listed below are the steps to attach the Distribution Box (Part/SKU #: 703924-0001) to the AppBox D21:

1. Remove **ALL** power to the AppBox D21 enclosure
2. Remove any communication cables from the J2 connector on the AppBox D21
3. Plug one end of the AppBox cable (Part/SKU #: 703923-0001) into the J2 connector on the AppBox D21
4. Plug the other end of the AppBox cable into one of the connectors on the Distribution Box

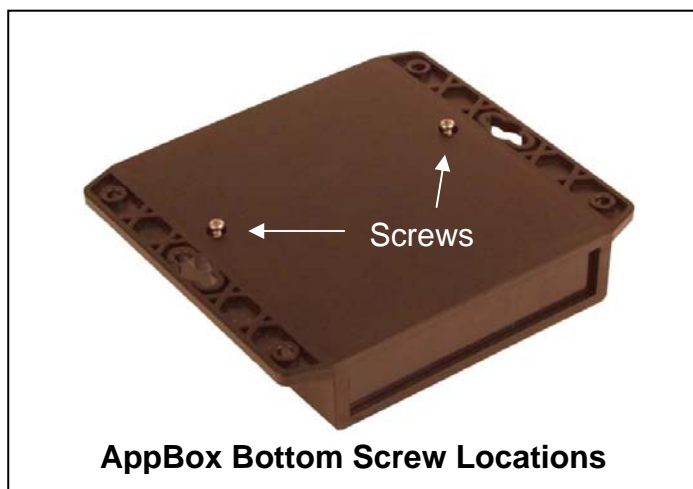


5. Plug the desired communication cables into the Distribution Box
6. Make all other connections before powering
7. Apply power to the AppBox D21

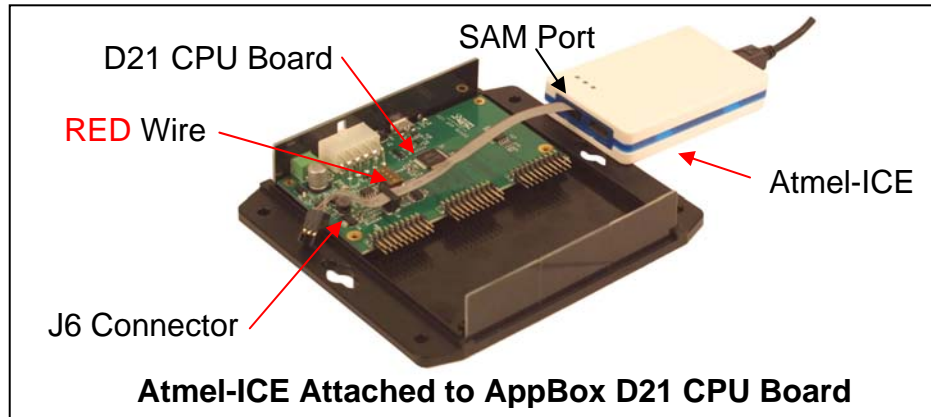
## 6.0 Installation of Atmel-ICE emulator

Listed below are the steps to install Atmel-ICE emulator:

1. Remove **ALL** power to the AppBox D21 enclosure
2. Remove all interface connections attached to the AppIO Modules
3. Remove the USB/RS-485 connections to the processor Module
4. Turn the AppBox over and remove the 2 screws from the bottom of the enclosure as shown below



5. Turn the AppBox back over (label showing) and lift the top off the enclosure being careful not to lose the knockout panels
6. Plug the emulator end of the ribbon cable into the "SAM" Port on the emulator
7. Plug in the Atmel-ICE debug into connector J6 on the AppBox D21 CPU board. Visually inspect the connection to insure all the board pins are in the female cable connector.



8. Re-attach the USB/RS-485 connections to the processor board
9. Re-attach all interface connections to the AppIO Modules
10. Apply power to the AppBox D21
11. Start debug session on the host computer

## 7.0 Support Resources

Listed below are the steps to install Atmel-ICE emulator:

1. If you have problems or need additional information regarding the AppBox D21 please refer to the AppBox D21 support page. The URL for this page is:

<http://www.spectrumdigital.com/appbox>

2. Support questions can be addressed via email to the following email address:

[support@spectrumdigital.com](mailto:support@spectrumdigital.com)

3. Sales questions can be addressed via email to the following email address:

[sales@spectrumdigital.com](mailto:sales@spectrumdigital.com)

4. Mailing address:

PO Box 1559  
Sugar Land, TX. 77487-1559

5. Web site is:

[www.spectrumdigital.com](http://www.spectrumdigital.com)

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The warranty and return policy are described on the SDI web site.

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