

ETC Reference Guide

F-Drive R12 and W1 Wiring

Introduction

This guide covers wiring considerations for the F-Drive R12 and F-Drive W1 Drivers with optional B-Box4 breakout boxes and a wide variety of load types.

Output wiring requirements and methods vary depending on the load and the chosen wire type. For more information on compatible products, see the resources below.

F-Drive System Design Tool

The [F-Drive System Design Tool](https://etcconnect.com/FDriveSysDesignTool) (etcconnect.com/FDriveSysDesignTool) allows you to design an F-Drive R12 rack unit or F-Drive W1 Driver with different luminaires, breakout boxes, cable lengths, and other system components.

LED Dimming Compatibility Database

The [LED Dimming Compatibility Database](https://etcconnect.com/compatibility) (etcconnect.com/compatibility) is a searchable list of devices that ETC has tested for compatibility with ETC dimming and control systems.

Documentation for Compatible Products

The following documents are available at etcconnect.com/Products/Power-Controls/LED-Drivers/F-Drive/Documentation.aspx:

- *F-Drive B-Box4 Installation Guide*
- *F-Drive Series R12 Installation Manual*
- *F-Drive Series W1 Installation Manual*
- *F-Drive Power Supply Installation Guide*

The following documents are available at etcconnect.com/Products/Architectural-Fixtures:

- *ArcSystem Navis 100 Installation Guide*
- *Source Four Mini LED F-Drive Installation Guide*
- *Irideon WLZ (F-Drive) Installation Guide*
- *Irideon FPZ (F-Drive) Installation Guide*
- *ArcSystem Pro D1 and D2 Series Drivers Installation Guide* for information about ArcSystem Pro One-Cell luminaires
- *ArcLamp System Installation Manual*

ETC Concert software and documentation is available at etcconnect.com/concert.



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Load Types and Configurations

F-Drive R12 has modular output cards and F-Drive W1 Drivers come in different models to drive a variety of loads. This document covers the following load types and configurations:

- [Connect F-Drive-Compatible Luminaires with RJ45 Input on page 2](#)
 - [Daisy-Chain F-Drive-Compatible Luminaires on page 5](#)
 - [Use an FD-BBOX-4R to Connect F-Drive-Compatible Luminaires in Star Topology on page 7](#)
- [Connect ArcSystem Pro One-Cell Luminaires on page 9](#)
 - [Use an FD-BBOX-4M to Connect ArcSystem Pro One-Cell Luminaires on page 10](#)
 - [Connect ArcSystem Pro One-Cell Luminaires without a B-Box on page 11](#)
- [Connect Third-Party Loads on page 13](#)
 - [Use an FD-BBOX-4T to Connect Third-Party Constant Current Loads on page 14](#)
 - [Connect Third-Party Loads without a B-Box on page 15](#)
 - [Connect RGBW LED Tape on page 17](#)
- [Connect ArcSystem ArcLamp Lamps on page 19](#)



CAUTION: Do not coil excess Category-type cable.



Note: Cable bundling limitations apply to F-Drive R12 and W1 Wiring Class 2 output cables. For more information about maximum number of four-pair cables in a bundle, see NFPA 70 2020 National Electrical Code, table 725.144.



Note: F-Drive R12 supports output cards and luminaires up to 1500 W total. To prevent configurations that may exceed system limits, visit the [F-Drive System Design Tool](https://etcconnect.com/FDriveSysDesignTool) (etcconnect.com/FDriveSysDesignTool) for more information about system limits.

Connect F-Drive-Compatible Luminaires with RJ45 Input

ETC provides a variety of luminaires with RJ45 input that can be directly connected to F-Drive Drivers in a daisy chain or connected in star topology with an F-Drive B-Box4 (FD-BBOX-4R).

Driver Options	Luminaire Options
F-Drive R12 with CC-150 Card	<ul style="list-style-type: none">• Navis 100 Fixed White• Irideon FPZ for F-Drive• Irideon WLZ for F-Drive• Source Four Mini LED for F-Drive
F-Drive W1 CC Driver	
F-Drive W1 CC Emergency Driver*	<ul style="list-style-type: none">• Navis 100 Fixed White
F-Drive R12 with FTW-150 Card	<ul style="list-style-type: none">• Navis 100 Fade to Warm
F-Drive W1 Fade to Warm Driver or F-Drive W1 Fade to Warm Emergency Driver*	
F-Drive R12 with Chroma Card	<ul style="list-style-type: none">• Navis 100 RGBW
F-Drive W1 Chroma Driver	

*W1 Emergency Drivers were evaluated for use in emergency systems with Navis Fixed White and Fade to Warm luminaires. Do not use other luminaires with W1 Emergency Drivers in emergency systems.

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CAUTION: Possible damage to equipment. Connect only F-Drive-compatible Fixed White luminaires to a W1 CC Driver. Connect only Navis 100 Fade to Warm luminaires to a W1 Fade to Warm Driver. Connect only Navis 100 RGBW luminaires to a W1 Chroma Driver.



CAUTION: Possible damage to equipment. Connect only the same types of luminaires in a wiring run. DO NOT mix Fixed White, Fade to Warm, and RGBW luminaires in the same wiring run.



Note: Navis RGBW luminaires are not self-terminating. You must terminate the last Navis RGBW luminaire in line with an N4086 RJ45 terminator, included with your W1 Chroma Driver or R12 Chroma Card. To order additional terminators, contact ETC customer service and request part number N4086.

Category-Type Cable Requirements

F-Drive-compatible luminaires typically connect to the F-Drive W1 Driver or F-Drive R12 output card via Category-type cable terminated to RJ45 connectors. If you are installing a B-Box4 between the driver and the luminaire, install Category-type cable between the driver and B-Box4 and between the B-Box4 and the luminaire.

F-Drive-compatible luminaires require:

- 0.25 mm² (23 AWG) or larger conductors in Category-type cable
- 100 m (328 ft) maximum wire run length (including twice the stem length of the pendant accessory if you are installing a pendant)
- 2.4 A maximum per cable



CAUTION: Do not coil excess Category-type cable.

Cable Bundling



Note: Cable bundling limitations apply to F-Drive R12 and W1 Wiring Class 2 output cables. For more information about maximum number of four-pair cables in a bundle, see NFPA 70 2020 National Electrical Code, table 725.144.

The conductors in category-type cable have a maximum current that they can carry before exceeding the temperature rating of the cable. This limit restricts the number of cables that can be bundled together.

Current Requirements for F-Drive-Compatible Luminaires

Luminaire	Current Required
Navis 100 RGBW	1–4 daisy-chained luminaires require 1 A across 3 wire pairs
Navis 100 Fixed White	1–4 daisy-chained luminaires require 0.7 A per wire pair
Navis 100 Fade to Warm	1–4 daisy-chained luminaires require 0.45 A per wire pair
F-Drive-compatible Source Four Mini LED	
F-Drive-compatible Irideon FPZ	
F-Drive-compatible Irideon WLZ	

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Limits for 75°C Rated Cable

The current requirements of each luminaire type limit the number of four-pair cables per bundle. The limits below are for cable with 0.25 mm² (23 AWG) conductors rated to 75°C.

Luminaire	Four-Pair Cables per Bundle
Navis 100 RGBW	19 four-pair cables per bundle if any cables go to Navis 100 RGBW luminaires
Navis 100 Fixed White	91 four-pair cables per bundle if all cables go to Navis 100 Fixed White or a combination of Navis 100 Fixed White, Navis 100 Fade to Warm, F-Drive-compatible Source Four Mini LED, Irideon FPZ, and Irideon WLZ luminaires
Navis 100 Fade to Warm	
F-Drive-compatible Source Four Mini LED	
F-Drive-compatible Irideon FPZ	
F-Drive-compatible Irideon WLZ	
	192 four-pair cables per bundle if all cables go to Navis 100 Fade to Warm luminaires or F-Drive-compatible Source Four Mini LED, Irideon FPZ, or Irideon WLZ luminaires

Patching Requirements

If you are using a patch panel between the F-Drive W1 Driver or F-Drive R12 output card and F-Drive-compatible luminaires, pins must be rated for more than 1 A.

Configure the Constant Current Driver



CAUTION: *Setting the driver card to output more current than the manufacturer's recommended fixture driver current may reduce the lifetime of the fixtures or cause damage to the fixtures.*

The F-Drive R12 CC-150 Card and the W1 CC Driver can output 200–700 mA. Use ETC Concert to configure the output current for each output channel.

For F-Drive firmware versions v1.1.3 and newer, default output current is 200 mA. For F-Drive firmware versions v1.1.2 and older, default output current was 600 mA.

ETC Luminaire	Driver Output Current Setting
ArcSystem Navis 100 Fixed White	600 mA
ArcSystem Pro One-Cell Micro White or Fade to Warm	200 mA
ArcSystem Pro One-Cell Small White or Fade to Warm	600 mA
ArcSystem Pro One-Cell White or Fade to Warm	600 mA
Irideon FPZ for F-Drive or Irideon WLZ for F-Drive	450 mA
Source Four Mini LED for F-Drive	350 mA

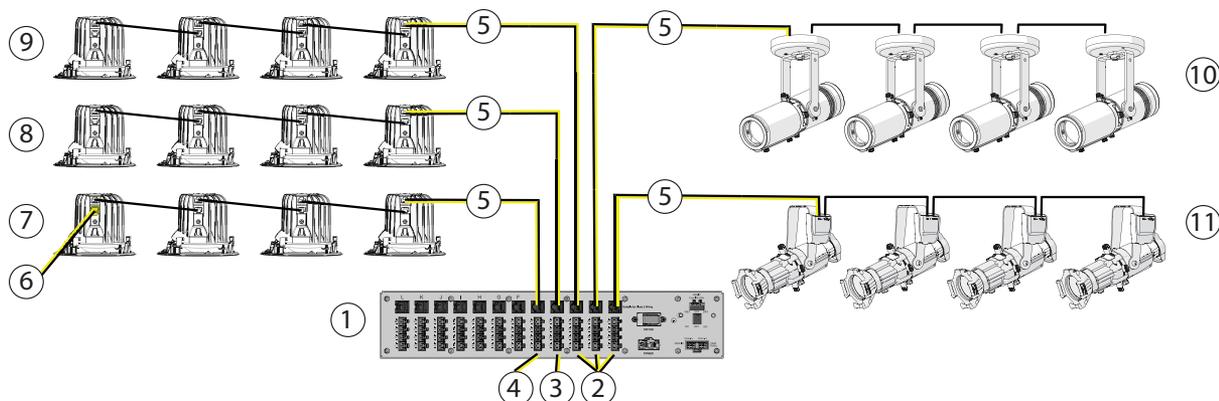
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Daisy-Chain F-Drive-Compatible Luminaires

F-Drive-compatible luminaires can be daisy-chained together using their RJ45 In and Out ports. Consult the installation guide for your luminaires for details. See [Documentation for Compatible Products on page 1](#).

F-Drive R12 with Daisy Chains of F-Drive-Compatible Luminaires



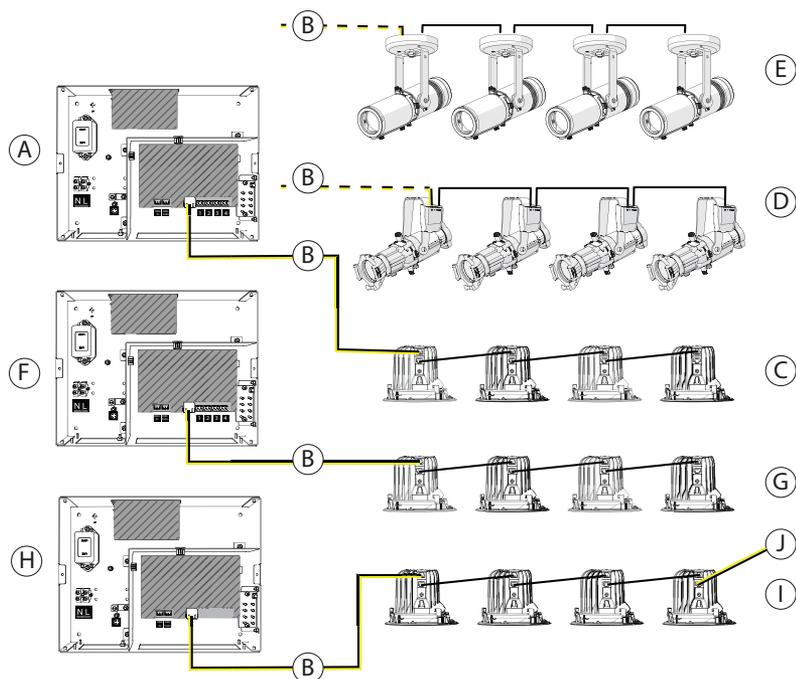
	Description	Notes
1	F-Drive R12	Rear view showing output connections
2	CC-150 Cards installed in card slots of an F-Drive R12	The CC-150 Card outputs constant current, adjustable from 200–700 mA. You must configure the output current to the appropriate setting for your luminaire. See Configure the Constant Current Driver on the previous page .
3	FTW-150 Card installed in a card slot of an F-Drive R12	The FTW-150 Card is compatible with Navis 100 Fade to Warm luminaires.
4	Chroma Card installed in a card slot of an F-Drive R12	The Chroma Card is only compatible with Navis 100 RGBW luminaires.
5	Category-type cable	You must use 0.25 mm ² (23 AWG) or larger conductors in Category-type cable. Not all Cat5 or Cat6 cables meet this gauge requirement.
6	N4086 terminator	Navis 100 RGBW luminaires are not self-terminating. You must terminate the last Navis 100 RGBW luminaire in line with an N4086 RJ45 terminator, included with your F-Drive R12 Chroma Card. To order additional terminators, contact ETC customer service and request part number N4086.
7	Navis 100 RGBW luminaires	Daisy-chain up to four ArcSystem Navis 100 RGBW luminaires per Chroma Card.
8	Navis 100 Fade to Warm luminaires	Daisy-chain up to four ArcSystem Navis 100 Fade to Warm luminaires per FTW-150 Card.
9	Navis 100 Fixed White luminaires	Daisy-chain up to four ArcSystem Navis 100 Fixed White luminaires per CC-150 Card.
10	Irideon for F-Drive luminaires	Daisy-chain up to four Irideon FPZ for F-Drive or Irideon WLZ for F-Drive luminaires per CC-150 Card.
11	Source Four Mini LED for F-Drive luminaires	Daisy-chain up to four Source Four Mini LED for F-Drive luminaires per CC-150 Card.

Note: The illustration is not drawn to scale. Loads are not shown on all outputs for clarity.

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F-Drive W1 with Daisy Chain of F-Drive-Compatible Luminaires



	Description	Notes
A	W1 CC Driver or W1 CC Emergency Driver*	The W1 CC Driver outputs constant current, adjustable from 200–700 mA. You must configure the output current to the appropriate setting for your luminaire. See Configure the Constant Current Driver on page 4 . This illustration shows a W1 CC Driver.
B	Category-type cable	You must use 0.25 mm ² (23 AWG) or larger conductors in Category-type cable. Not all Cat5 or Cat6 cables meet this requirement.
C	Navis 100 Fixed White luminaires	Daisy-chain up to four ArcSystem Navis Fixed White luminaires.
D	Alternative: Source Four Mini LED for F-Drive luminaires	Daisy-chain up to four Source Four Mini LED for F-Drive luminaires (non-emergency installations only).
E	Alternative: Irideon for F-Drive luminaires	Daisy-chain up to four Irideon FPZ for F-Drive or Irideon WLZ for F-Drive luminaires (non-emergency installations only).
F	W1 Fade to Warm Driver or W1 Fade to Warm Emergency Driver*	The W1 Fade to Warm Driver is compatible with Navis 100 Fade to Warm luminaires. The illustration shows a W1 Fade to Warm Driver.
G	Navis 100 Fade to Warm luminaires	Daisy-chain up to four ArcSystem Navis Fade to Warm luminaires.
H	W1 Chroma Driver	The W1 Chroma Driver outputs power and data that is compatible with Navis 100 RGBW luminaires.
I	Navis 100 RGBW luminaires	Daisy-chain up to four ArcSystem Navis RGBW luminaires.
J	N4086 120 Ω terminator	Navis 100 RGBW luminaires are not self-terminating. You must terminate the last Navis 100 RGBW luminaire in line with an N4086 RJ45 terminator, included with your W1 Chroma Driver. To order additional terminators, contact ETC customer service and request part number N4086.
*W1 Emergency Drivers were evaluated for use in emergency systems with Navis Fixed White and Fade to Warm luminaires. Do not use other luminaires with W1 Emergency Drivers in emergency systems.		
Note: The illustration is not drawn to scale.		

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Use an FD-BBOX-4R to Connect F-Drive-Compatible Luminaires in Star Topology

Drive up to four F-Drive-Compatible Fixed White or Fade to Warm luminaires in star topology from one F-Drive W1 or one R12 output card with an FD-BBOX-4R.

Refer to the *F-Drive B-Box4 Installation Guide* and visit the [F-Drive System Design Tool](https://etcconnect.com/FDriveSysDesignTool) at etcconnect.com/FDriveSysDesignTool to learn more.



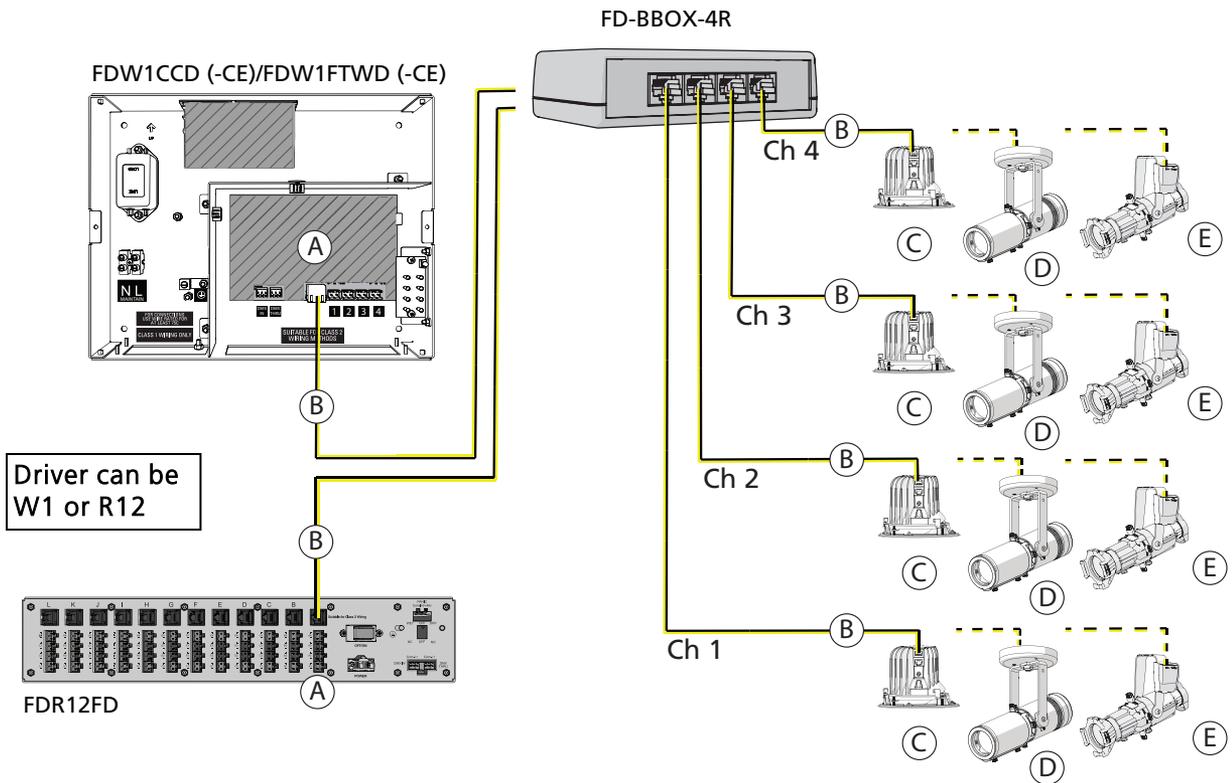
Note: *Navis RGBW luminaires are not compatible with B-Box4.*



Note: *If you install a B-Box within an Emergency Lighting Circuit, follow NEC marking requirements or local jurisdiction requirements.*

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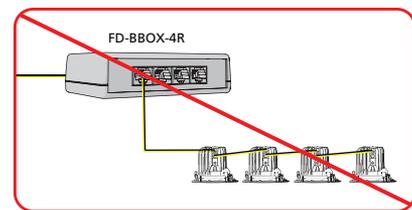
Description	Notes
A CC-150 Card or FTW-150 Card installed in a card slot of an F-Drive R12	The CC-150 Card and W1 CC Driver output constant current, adjustable from 200–700 mA. You must configure each channel of the driver to provide the correct current for the connected luminaire. See Configure the Constant Current Driver on page 4 .
W1 CC Driver or W1 Fade to Warm Driver	The FTW-150 Card and W1 Fade to Warm Driver are compatible with Navis 100 Fade to Warm luminaires.
B Category-type cable	You must use 0.25 mm ² (23 AWG) or larger conductors in Category-type cable. Not all Cat5 or Cat6 cables meet this gauge requirement.
C ArcSystem Navis luminaires	Fixed White or Fade to Warm depending on the W1 Driver or R12 output card
D Alternative: Irideon for F-Drive luminaires*	Irideon FPZ for F-Drive or Irideon WLZ for F-Drive luminaires
E Alternative: Source Four Mini LED for F-Drive luminaires*	

*Irideon FPZ for F-Drive, Irideon WLZ for F-Drive, and Source Four Mini LED for F-Drive luminaires require an F-Drive R12 CC-150 Card or W1 CC Driver (non-emergency installations only).

Note: The illustration is not drawn to scale. Loads are not shown on all outputs of the F-Drive R12 for clarity.



Note: F-Drive-Compatible luminaires will not function if they are daisy-chained from the output of the B-Box.



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Connect ArcSystem Pro One-Cell Luminaires

Several luminaires from the ArcSystem Pro One-Cell family can be connected to the RJ45 outputs of F-Drive Drivers using the FD-BBOX-4M. Alternatively, you can connect ArcSystem Pro One-Cell luminaires to the terminal block outputs.



CAUTION: *To avoid damage to equipment, use FD-BBOX-4M to connect ArcSystem Pro One-Cell luminaires to your F-Drive Driver.*

If you do not use FD-BBOX-4M, you must use the proper pinouts for each model of ArcSystem Pro One-Cell luminaire. See [Connect ArcSystem Pro One-Cell Luminaires without a B-Box on page 11](#).

ArcSystem Pro One-Cell Luminaires with F-Drive Drivers

Driver Options	Luminaire Options
F-Drive R12 with CC-150 Card	<ul style="list-style-type: none">ArcSystem Pro One-Cell Standard White or Fade to WarmArcSystem Pro One-Cell Small White or Fade to WarmArcSystem Pro One-Cell Micro White or Fade to Warm
F-Drive W1 CC Driver	

Note: See [Configure the Constant Current Driver on page 4](#).

Extension Cables

ETC supplies extension cables for ArcSystem Pro One-Cell luminaires. Visit etcconnect.com/Products/Architectural-Fixtures/Pro-One-Cell/Documentation.aspx and view the datasheet for your luminaire for details.



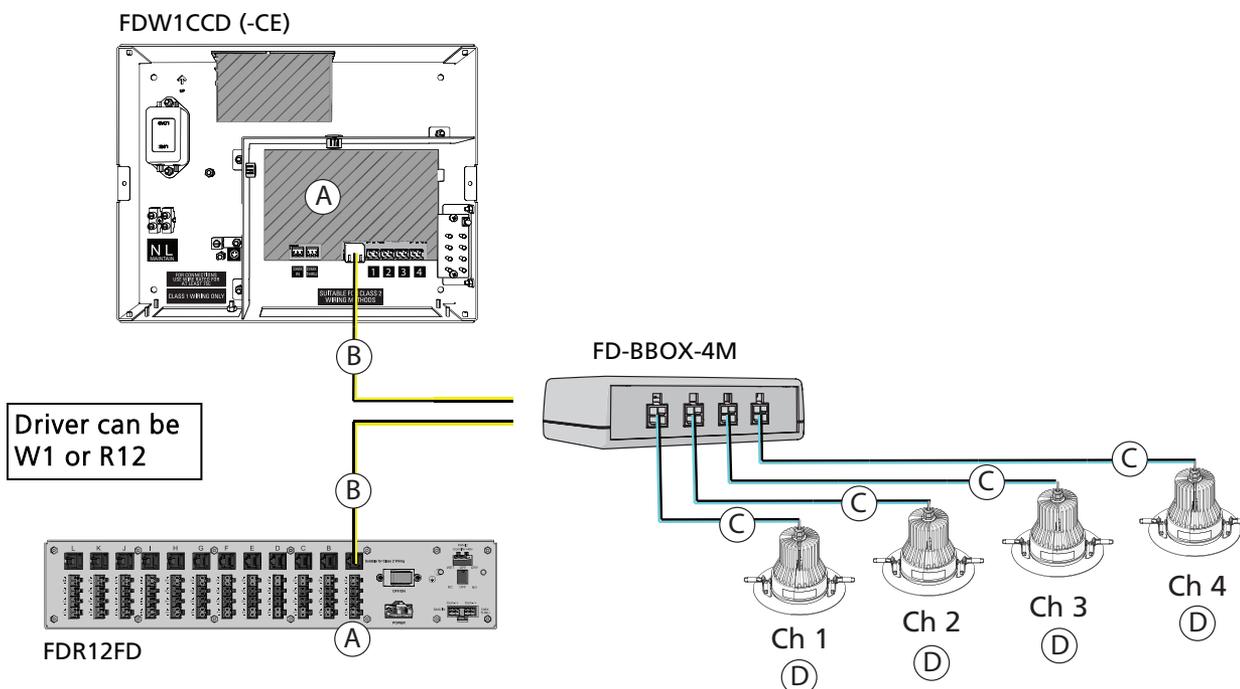
Note: *Maximum supported wire length between ArcSystem Pro One-Cell Standard, Small, and Micro luminaires and F-Drive R12 or W1 is 100 m (328 ft).*

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F-Drive R12 and W1 Wiring

Use an FD-BBOX-4M to Connect ArcSystem Pro One-Cell Luminaires

The most convenient way to connect ArcSystem Pro One-Cell luminaires to an F-Drive R12 CC-150 Card or W1 CC Driver is with an F-Drive FD-BBOX-4M. FD-BBOX-4M takes a single four-channel RJ45 output from an F-Drive R12 CC-150 Card or W1 CC Driver and provides four separated Molex outputs. Refer to the *F-Drive B-Box4 Installation Guide* and visit the [F-Drive System Design Tool](http://etconnect.com/FDriveSysDesignTool) at etconnect.com/FDriveSysDesignTool.



	Description	Notes
A	CC-150 Card installed in a card slot of an F-Drive R12	The CC-150 Card and W1 CC Driver output constant current, adjustable from 200–700 mA. You must configure each channel of the driver to provide the correct current for the connected luminaire.
	W1 CC Driver	See Configure the Constant Current Driver on page 4 .
B	Category-type cable	The cable from the RJ45 output of the driver to the input of the FD-BBOX-4M. You must use 0.25 mm ² (23 AWG) or larger conductors in Category-type cable. Not all Cat5 or Cat6 cables meet this requirement.
C	Use the cable attached to the ArcSystem Pro One-Cell luminaire	Extension cables are available. See the datasheets for ArcSystem Pro One-Cell luminaires at etconnect.com/Products/Architectural-Fixtures/Pro-One-Cell/Documentation.aspx .
D	ArcSystem Pro One-Cell luminaire	ArcSystem Pro One-Cell (ARCP1), Pro One-Cell Small (ARCP1S), or Pro One-Cell Micro (ARCP1M); White or Fade to Warm.

Note: The illustration is not drawn to scale. Loads are not shown on all outputs of the F-Drive R12 for clarity.

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Connect ArcSystem Pro One-Cell Luminaires without a B-Box



CAUTION: To avoid damage to equipment, use *FD-BBOX-4M* to connect ArcSystem Pro One-Cell luminaires to your F-Drive Driver.

If you do not use *FD-BBOX-4M*, you must use the proper pinouts for each model of ArcSystem Pro One-Cell luminaire. ArcSystem Pro One-Cell luminaires have different wire color conventions on their input cables. See the table below.

Luminaire	Wire Color and Polarity	
	Red	Black
ArcSystem Pro One-Cell Standard	negative (-)	positive (+)
ArcSystem Pro One-Cell Small	negative (-)	positive (+)
ArcSystem Pro One-Cell Micro	positive (+)	negative (-)

See the *F-Drive Series R12 Installation Manual* or *F-Drive Series W1 Installation Manual Appendix A*, section "Connect ArcSystem Pro One-Cell Luminaires to the Terminal Block Output" for the pinouts of the terminals on the R12 or W1.

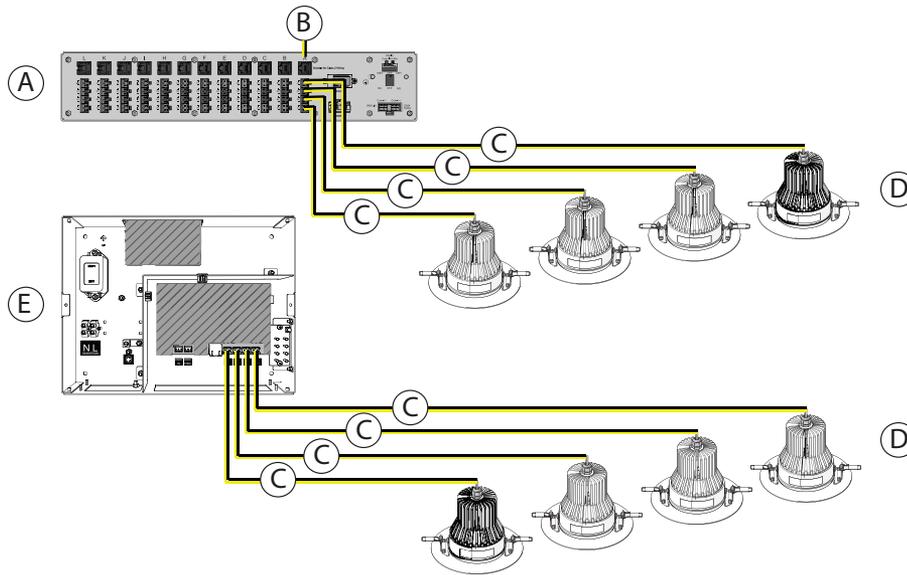
ArcSystem Pro One-Cell Fixed White and Fade to Warm luminaires can be wired to the F-Drive W1 CC Driver or R12 CC-150 Card using the terminal block outputs on the driver or output card. W1 Drivers ship with four two-pin screw-terminal plugs and R12 ships with 12 eight-pin screw terminal plugs (R12 output termination kit, ETC part number 7148K1016). Each channel of control requires two pins. See the *F-Drive Series W1 Installation Manual* or *F-Drive Series R12 Installation Manual* for more details.



Note: You must configure each channel of the driver to provide the correct current for the connected luminaire. See [Configure the Constant Current Driver on page 4](#).

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	Description	Notes
A	F-Drive R12	Back view
B	CC-150 Card	The CC-150 Card outputs constant current, adjustable from 200–700 mA. You must configure the output current to the appropriate setting for your luminaire. See Configure the Constant Current Driver on page 4 .
C	Use the cable attached to the ArcSystem Pro One-Cell luminaire	Extension cables are available. See the datasheets for ArcSystem Pro One-Cell luminaires at etconnect.com/Products/Architectural-Fixtures/Pro-One-Cell/Documentation.aspx .
D	ArcSystem Pro One-Cell luminaire	ArcSystem Pro One-Cell Standard (ARCP1), Pro One-Cell Small (ARCP1S), or Pro One-Cell Micro (ARCP1M); White or Fade to Warm.
E	W1 CC Driver	The W1 CC Driver outputs constant current, adjustable from 200–700 mA. You must configure the output current to the appropriate setting for your luminaire. See Configure the Constant Current Driver on page 4 .

Note: The illustration is not drawn to scale. Loads are not shown on all outputs of the F-Drive R12 for clarity.

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Connect Third-Party Loads

Determining compatibility between third-party loads and the W1 driver or R12 output card is an important step toward ensuring the success of a project. Search the [LED Dimming Compatibility Database](#) at etcconnect.com/compatibility to see if your load is compatible. If your load is not in the compatibility database, follow the instructions at the link above to contact the ETC Applications Engineering department to arrange for compatibility testing.

W1 Driver and R12 Output Card Limits



CAUTION: *Setting the F-Drive CC-150 Card or W1 CC Driver to output more current than the manufacturer recommends for the loads may reduce the lifetime or cause damage to the load.*



CAUTION: *Do not exceed any Class 2 limits stated by the manufacturer of the third-party load.*

The F-Drive R12 Driver with CC-150 Card and F-Drive W1 CC Driver provide up to 48 VDC and 200–700 mA to third-party constant current loads. See [Configure the Constant Current Driver on page 4](#).

The F-Drive R12 Driver with CV-150 Card and F-Drive W1 CV Driver are capable of driving third-party constant voltage loads up to 24 VDC and 50 W per channel. See [Voltage Drop below](#).



Note: *Do not bus/bridge channels to attempt to exceed the individual channel limits.*

For guidance on load limits for channels, output cards, and systems, visit the [F-Drive System Design Tool](#) at etcconnect.com/FDriveSysDesignTool.

Voltage Drop

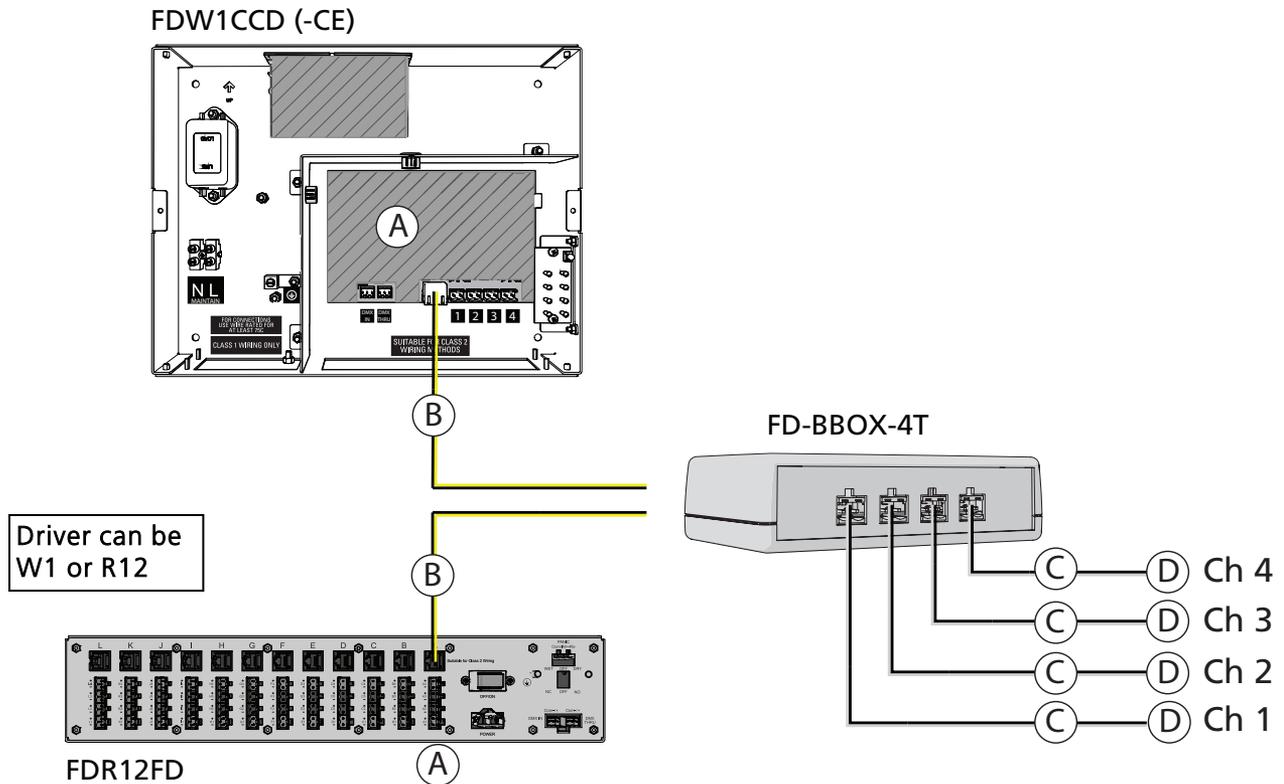
Voltage drop along load wiring is a consideration for constant voltage loads. Voltage drop calculations vary by project and are based on the type, length, and gauge of wire. The CV-150 Card and the ArcLamp 150 Card have an adjustable dial on the front of the output card to set the 24–28 VDC (+/-5%) output. Measure the voltage at the load and adjust the dial to achieve 24 VDC at the load. Contact a qualified electrician, visit the [F-Drive System Design Tool](#) at etcconnect.com/FDriveSysDesignTool, and see the *F-Drive Series R12 Installation Manual* for additional information.

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Use an FD-BBOX-4T to Connect Third-Party Constant Current Loads

FD-BBOX-4T takes a single four-channel RJ45 output from an F-Drive R12 CC-150 Card or W1 CC Driver and provides four two-pin output terminals. FD-BBOX-4T can be installed close to the location of fixtures, simplifying cable management between the driver and the fixtures. Refer to the *F-Drive B-Box4 Installation Guide* and visit the [F-Drive System Design Tool](http://etcconnect.com/FDriveSysDesignTool) at etcconnect.com/FDriveSysDesignTool.



Description	Notes
A CC-150 Card installed in one card slot of an F-Drive R12 W1 CC Driver	The CC-150 Card and W1 CC Driver output constant current, adjustable from 200–700 mA. You must configure each channel of the driver to provide the correct current for the connected load. See Configure the Constant Current Driver on page 4 .
B Category-type cable	The cable from the output of the CC-150 Card to the input of the FD-BBOX-4T. You must use 0.25 mm ² (23 AWG) or larger conductors in Category-type cable.
C 0.2–1.5 mm ² (26–14 AWG) Class 2 wire pair	
D Third-party constant current loads	

Note: The illustration is not drawn to scale. Loads are not shown on all outputs of the F-Drive R12 for clarity.

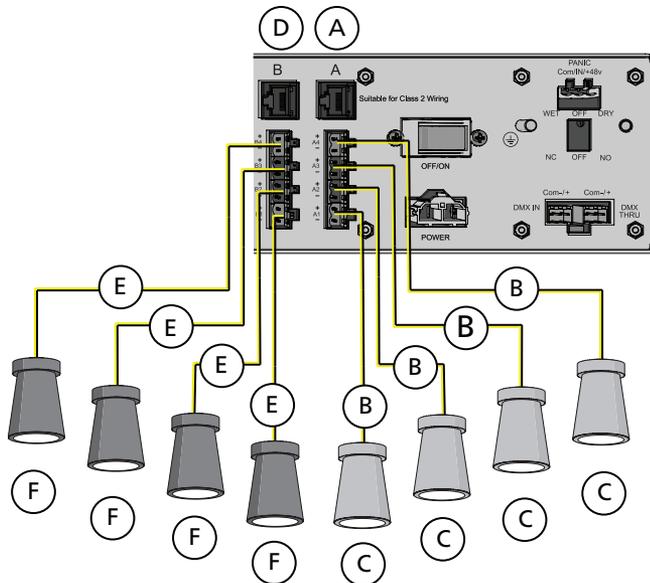
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Connect Third-Party Loads without a B-Box

Connect third-party luminaires or loads to the terminal outputs of the W1 CC Driver, W1 CV Driver, R12 CC-150 Card, or R12 CV-150 Card. W1 Drivers ship with four two-pin screw-terminal plugs and R12 ships with 12 eight-pin screw terminal plugs (R12 output termination kit, ETC part number 7148K1016). Each channel of control requires two pins. See the *F-Drive Series W1 Installation Manual* or *F-Drive Series R12 Installation Manual* for more details.

F-Drive R12 with Third-Party Loads



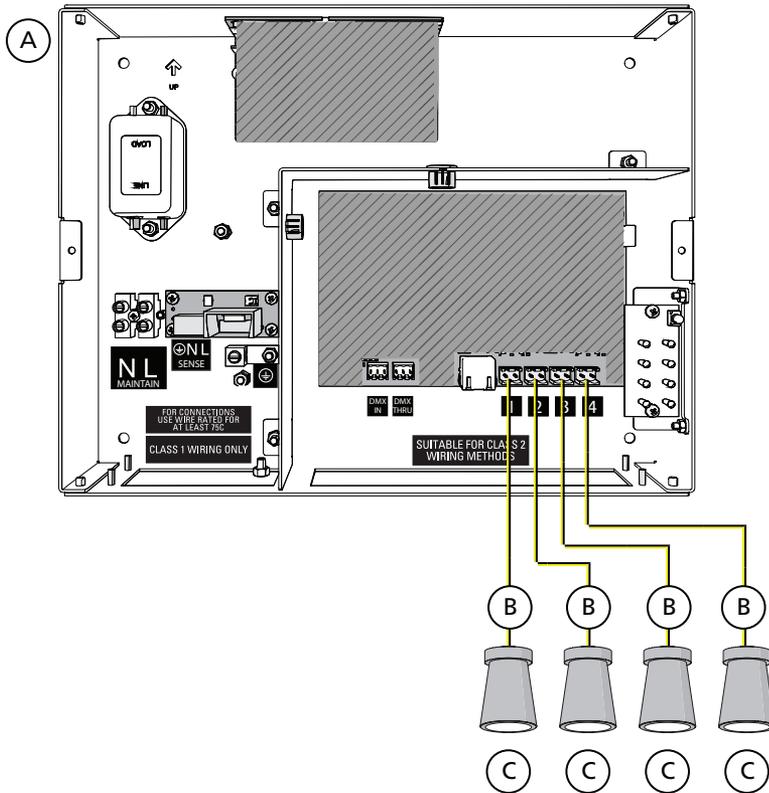
	Description	Notes
A	CC-150 Card installed in one slot of an F-Drive R12	Back view, partial. The CC-150 Card outputs constant current, adjustable from 200–700 mA. You must configure the output current to the appropriate setting for your luminaire. See Configure the Constant Current Driver on page 4 .
B	0.2–1.5 mm ² (26–14 AWG)	
C	200–700 mA constant current fixtures	
D	CV-150 Card installed in one slot of an F-Drive R12	Back view, partial
E	1.5 mm ² (14 AWG) recommended	See Voltage Drop on page 13 and visit the F-Drive System Design Tool at etcconnect.com/FDriveSysDesignTool for more information.
F	24 VDC constant voltage fixtures	

Note: The illustration is not drawn to scale. The F-Drive R12 is only partially shown and loads are not shown on all outputs for clarity.

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W1 Driver with Third-Party Loads



	Description		Notes
A	W1 CC Driver, W1 CC Emergency Driver, W1 CV Driver, or W1 CV Emergency Driver		W1 CC Emergency Driver shown.
B	W1 CC Driver or W1 CC Emergency Driver	0.2–1.5 mm ² (26–14 AWG)	
	W1 CV Driver or W1 CV Emergency Driver	1.5 mm ² (14 AWG) recommended	See Voltage Drop on page 13 and visit the etcconnect.com/FDriveSysDesignTool for more information.
C	W1 CC Driver or W1 CC Emergency Driver	200–700 mA constant current fixtures	The W1 CC Driver outputs constant current, adjustable from 200–700 mA. You must configure the output current to the appropriate setting for your luminaire. See Configure the Constant Current Driver on page 4 .
	W1 CV Driver or W1 CV Emergency Driver	24 VDC constant voltage fixtures	

Note: The illustration is not drawn to scale.

ETC Reference Guide

F-Drive R12 and W1 Wiring

Connect RGBW LED Tape

You can use the four output channels of a CV-150 Card or W1 CV Driver to control the four channels of RGBW LED tape. However, there are additional wiring considerations.



CAUTION: *In order to meet Class 2 LVLE requirements, follow the instructions below when using the four channels of an output card or W1 Driver to control a single load:*

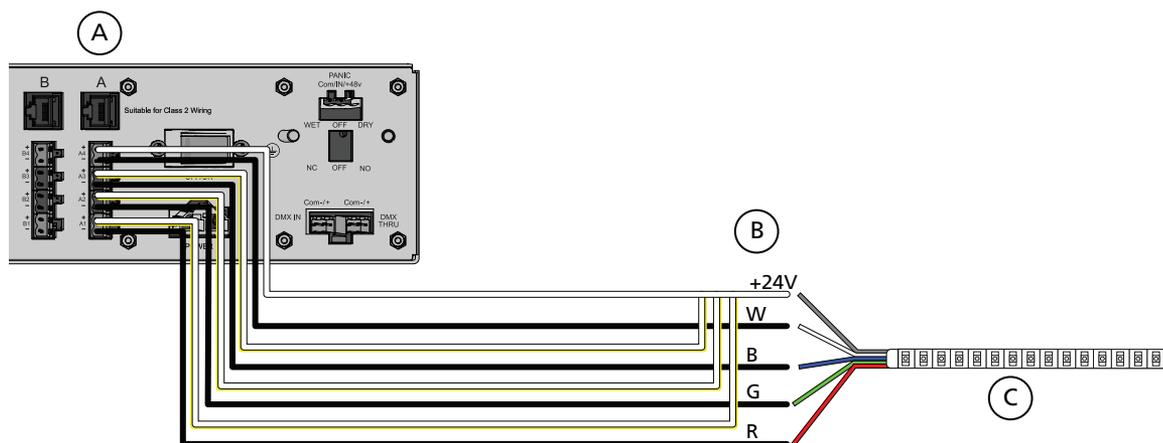
- *Do not bus together +24 V outputs at the R12 output card or W1 Driver.*
- *Do not exceed 50 W per wire pair or per output channel.*
- *Do not exceed 150 W total load per R12 output card or W1 Driver.*



CAUTION: *Do not exceed any Class 2 limits stated by the manufacturer of the third-party load.*

If you are wiring a product that requires more than 50 W on the common, bus the common outputs of the CV-150 or W1 CV Driver together at the load as illustrated below. Visit the [F-Drive System Design Tool \(etcconnect.com/FDriveSysDesignTool\)](http://etcconnect.com/FDriveSysDesignTool) for assistance with power consumption and length limit calculations.

F-Drive R12 with LED Tape



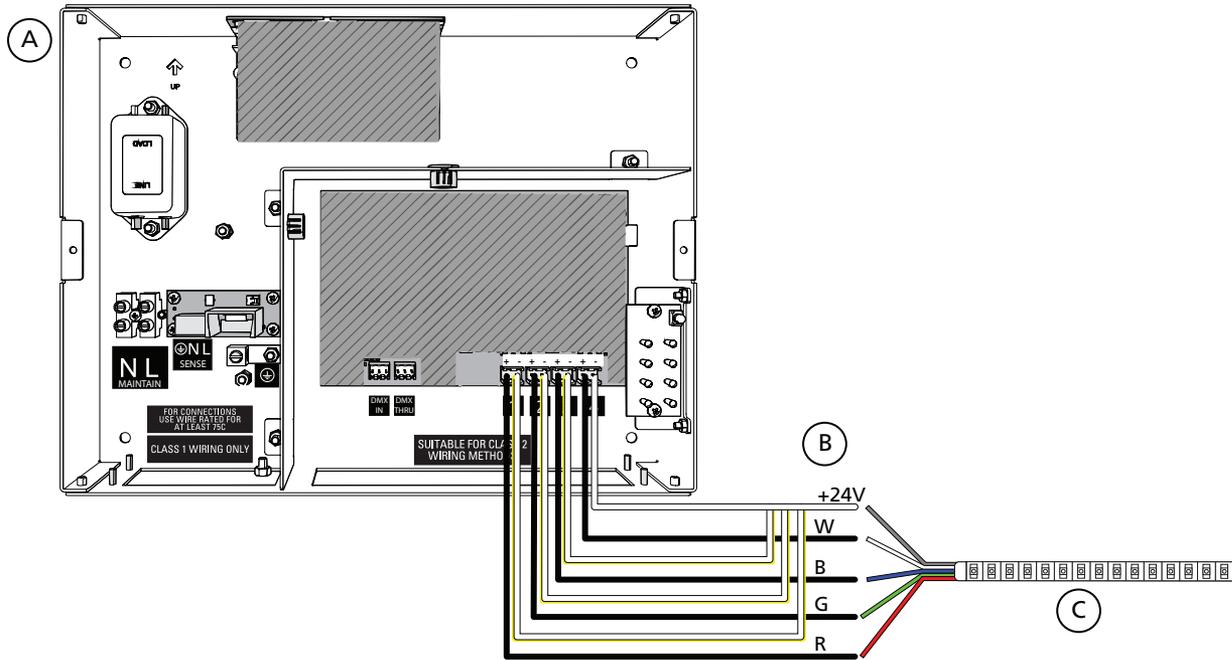
Description	Notes
A CV-150 Card installed in one slot of an F-Drive R12	Back view, partial
B 1.5 mm ² (14 AWG) recommended	See Voltage Drop on page 13 and visit the F-Drive System Design Tool at etcconnect.com/FDriveSysDesignTool for more information.
C 24 VDC RGBW LED tape	

Note: The illustration is not drawn to scale. The F-Drive R12 is partially shown and loads are not shown on all outputs for clarity.

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F-Drive R12 and W1 Wiring

W1 Driver with RGBW LED Tape



	Description	Notes
A	W1 CV Driver	
B	1.5 mm ² (14 AWG) recommended	See Voltage Drop on page 13 and visit the F-Drive System Design Tool at etcconnect.com/FDriveSysDesignTool for more information.
C	24 VDC RGBW LED tape	

Note: The illustration is not drawn to scale.

ETC Reference Guide

F-Drive R12 and W1 Wiring

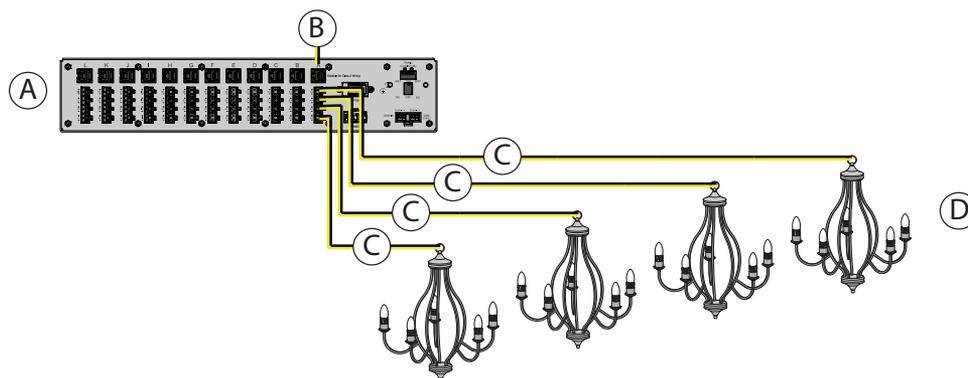
Connect ArcSystem ArcLamp Lamps

The F-Drive R12 with ArcLamp 150 Card has four output channels. Each output channel can support up to 8 ArcLamp lamps with a total of up to 32 ArcLamp lamps per card. Fixtures with ArcLamp lamps can be wired to the eight-pin terminal output of the ArcLamp 150 Card.

For more information, visit the [F-Drive System Design Tool](http://etcconnect.com/FDriveSysDesignTool) at etcconnect.com/FDriveSysDesignTool.



Note: *B-Box4 is not compatible with the F-Drive R12 ArcLamp 150 Card.*



	Description	Notes
A	F-Drive R12	Back view
B	ArcLamp 150 Card installed in one slot of the F-Drive R12	
C	One 1.5 mm ² (14 AWG) wire pair per channel	R12 ships with one eight-pin screw-terminal plug per output card (R12 output termination kit, ETC part number 7148K1016). Each channel requires two pins from one eight-pin plug.
D	ArcLamp lamps	Up to 8 ArcLamp lamps per channel, up to 32 ArcLamp lamps per ArcLamp 150 Card

Note: The illustration is not drawn to scale. Loads are not shown on all outputs for clarity.