

FFC Display Module (FDM)

Installation Guide

Revision 4.0

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LOGIC RAILTM
TECHNOLOGIES

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TABLE OF CONTENTS

1	PACKAGE CONTENTS	3
2	TECHNICAL OVERVIEW	3
3	POWER SUPPLY REQUIREMENTS.....	3
4	CONNECTION TO THE FFC MASTER CONTROLLER	3
5	SELECTING FDM FEATURES.....	4
6	MAKING YOUR OWN MODULAR CABLES.....	4
7	MULTIPLE FDMS.....	4
8	LOCATING AND MOUNTING THE FDM.....	4
9	QUESTIONS	5
10	LIMITED WARRANTY.....	5

Thank you for purchasing a Logic Rail Technologies product! Please read all instructions prior to installing this board. CAUTION: The FFC master controller contains CMOS circuits that are very sensitive to electrostatic discharge. Store the FFC master controller board in its static protective bag until you are ready to install it. Avoid a build-up of static electricity and handle the board by its edges to minimize potential damage.

1 Package Contents

The following items are included with the FDM display board:

1. Red display filter; pre-drilled and ready for mounting
2. 10 ft. eight conductor cable with modular plugs
3. Mounting hardware (two #4 bolts, two #4 nuts, two #4 spacers)

2 Technical Overview

The FDM receives time information from the FFC master controller using a serial interface. Three signals from the master controller provide all the information for the FDM. The serial interface makes use of differential wiring to allow for extremely long cable runs between the master controller and the FDMs (i.e. provides for very remote displays). Differential wiring means that there are two wires for each of the three serial interface signals. The other two wires in the modular cable carry the power for the FDM.

3 Power Supply Requirements

The FDM has its own on-board rectifier, filter, and voltage regulator. There are two ways that the FDM can get its power. The primary way is from two of the wires in the modular cable. The alternate way is from a plug-in wall transformer (6.3V - 18V AC or DC, 350mA minimum) available from many electronic supply stores (for example, Radio Shack #273-1652). The output plug from the wall transformer should be 2.1mm I.D. and 5.5mm O.D. female. The two ways to power the FDM are illustrated in Figure 1. The choice of which connection to use is dependent upon the capacity of the power source connected to the FFC master controller and the number of loads (master controller + FDM(s) + other accessories) connected to that power source. The master controller draws 85mA and each FDM draws 325mA. For example, a 1200 mA supply can handle the master controller and 3 FDMs ($85\text{mA} + 3 \times 325\text{mA} = 1060\text{mA}$). Don't forget to factor in any other accessories you may be powering from the same power source. If the current requirements exceed the capacity of the master controller power source then you will need to use the alternate power method. In order to utilize the alternate method you must first isolate the power coming from the modular cable. This is simply done by using a pair of diagonal cutters to cut the two wire jumpers on the front side of FDM board (refer to Figure 2). **NOTE: you MUST use the modular cable jack on the righthand side on the FDM to connect back to the master controller (this is shown in Figure 1).** Then simply plug-in the female connector from the wall transformer into the power jack on the back of the FDM board (labeled J3 on the front of the board).

4 Connection to the FFC Master Controller

Nothing could be simpler! Just plug in one end of the modular cable to either of the mating sockets on the back of the FDM board (labeled J4 & J5 on the front of the board). Plug the other end of the modular cable into any one of the mating sockets on the master controller OR another FDM. You should hear distinct click when you plug in each connector. That's it! You're done!!!

5 Selecting FDM Features

The FDM has two selectable features: flashing colon and 12/24 hour mode. Both features are selected using the dipswitch on the backside of the FDM. Switch #1 is for the flashing colon feature and switch #2 is for the 12/24 mode. The following table illustrates the use of these switches.

Position	Switch #1	Switch #2
On	Flashing colon on	Time displayed in 24 hour mode
Off	Flashing colon off	Time displayed in 12 hour mode

6 Making Your Own Modular Cables

You can provide your own modular cable if the one included does not meet the length you need. However, we strongly encourage you to purchase the cable from us (custom lengths available - consult our price sheet or contact us) to insure quality and reliability. In the event you choose to build or purchase cables elsewhere you must insure that the cable is wired "straight through." In other words, the order of the colored wires as seen in the connector should be identical at each end of the cable. Do not reverse the order between ends!

7 Multiple FDMs

Up to 9 FDMs are supported by the FFC master controller. FDMs can either be connected to any one of the three modular sockets on the master controller or daisy-chained with other FDMs using the two modular sockets on the FDMs (Figure 3). **NOTE: if you are using the alternate power method for an FDM you can power "downstream" FDMs from that same separate wall transformer. This is illustrated in Figure 3 where FDM 7 uses a separate wall transformer (with jumpers cut per Figure 2) and also powers FDM 8 & 9 (which do NOT have their jumpers cut!).** FDMs can be located up to 500 feet from the master controller. This means you can have two FDMs 1000 feet apart if they use separate master controller modular sockets.

8 Locating and Mounting the FDM

The FDM board is predrilled for mounting; do NOT enlarge the holes since damage to the board can result. Figure 4 shows a head-on view of how the FDM is mounted on your panel. An area 1.25" x 4.1" should be cut out from the panel. If you carefully cut out the dotted box in Figure 4 you can use Figure 4 as a mounting template. Carefully mark the two mounting holes on the front of the panel. Use Figure 4 as a template or use the holes in the color filter; make sure the holes are lined up properly. Carefully drill the two holes in your panel using a 5/32" drill bit that's compatible with the panel material. Refer to Figure 5 while following these mounting procedures:

1. Insert the #4 bolts through the front of the panel; the bolt heads may be painted prior to installing if desired
2. Install the color filter onto the #4 bolts from the rear of the panel
3. Insert a #4 spacer over each of the #4 bolts against the back of the color filter
4. Install the FDM board over the #4 bolts
5. Fasten the complete FDM assembly with the #4 nuts; tighten the nuts as necessary to secure the FDM assembly
6. Power up the FFC master controller and start keeping those trains running on time!!!

9 QUESTIONS

Please direct any questions about the use of this product in writing or email to Logic Rail Technologies. Include as much detail as possible about your usage (e.g. power supply voltage and current rating, number of FDMs, length of modular cables). Comments and suggestions are always welcome.

10 LIMITED WARRANTY

This product is warranted to be free from defects in materials or workmanship for a period of one year from the date of purchase. Logic Rail Technologies reserves the right to repair or replace a defective product. The product must be returned to Logic Rail Technologies in satisfactory condition. This warranty covers all defects incurred during normal use of this product. This warranty is void under the following conditions:

1. If damage to the product results from mishandling or abuse.
2. If the product has been altered in any way (e.g. soldering).
3. If the current or voltage limitations of the product have been exceeded.

Requests for warranty service must include a dated proof of purchase, a written description of the problem, and return shipping and handling (\$6.00 inside U.S./\$10.00 outside U.S. - U.S. funds only). Except as written above, no other warranty or guarantee, either expressed or implied by any other person, firm or corporation, applies to this product.

FDM Installation Illustrations

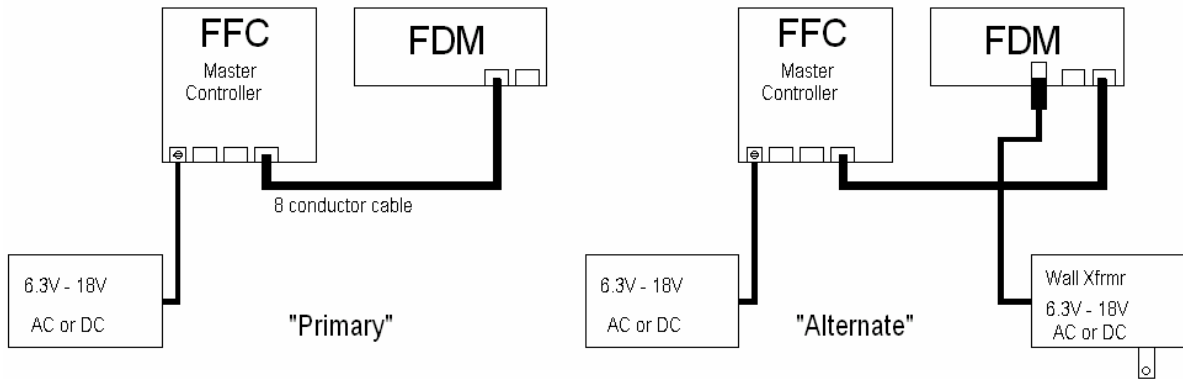


Figure 1: Power Connections

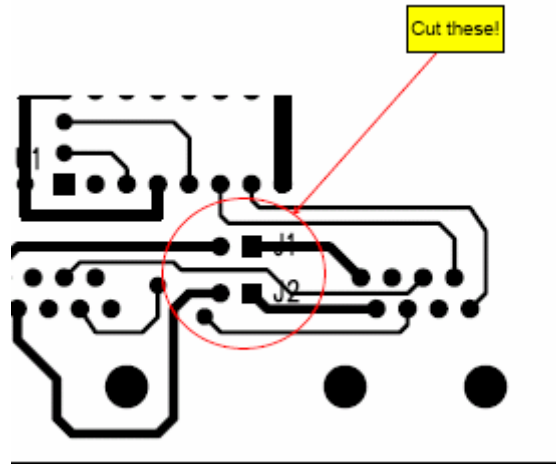


Figure 2: Location of Jumpers (cut for alternate power)

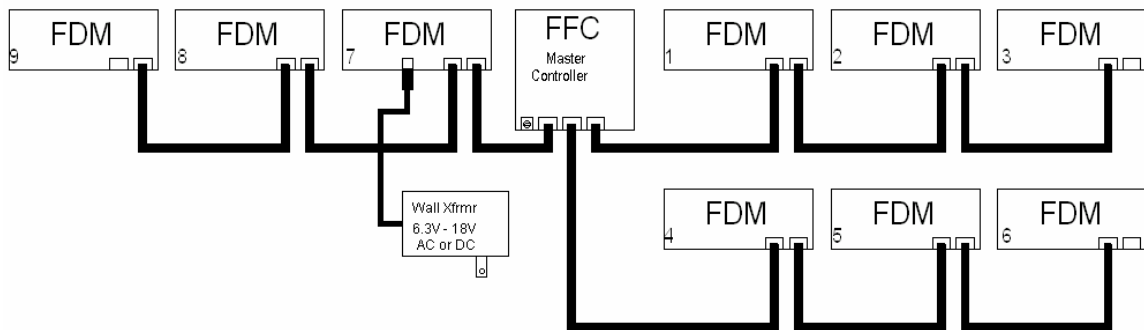


Figure 3: Multiple FDMs

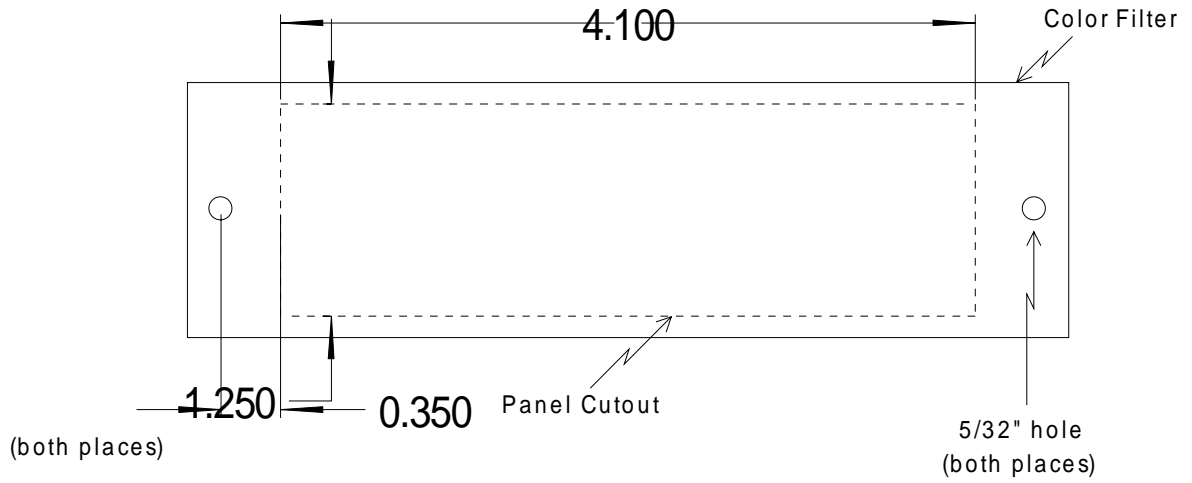


Figure 4: Front View (Scale 1:1)

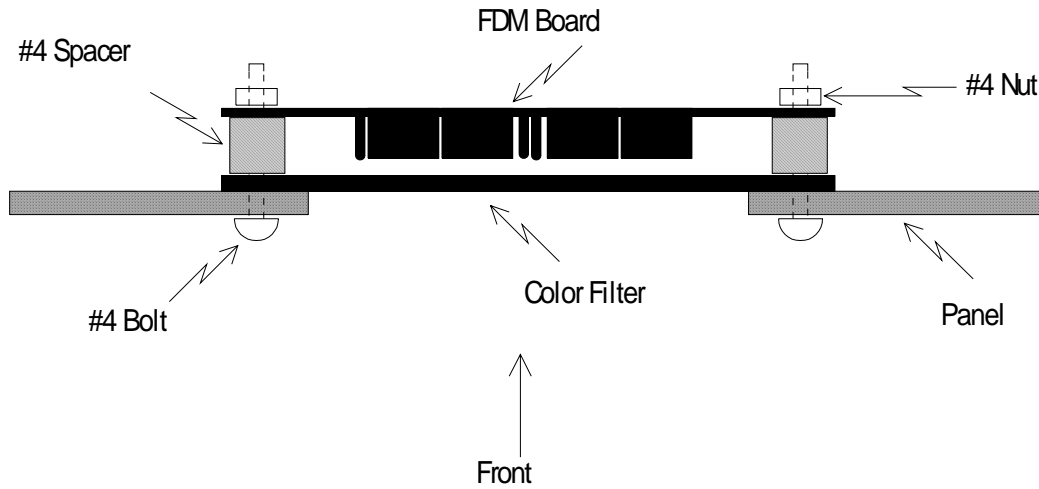


Figure 5: Top View (Not to scale)