FGC-101
Certified FrameGrabber Associate

Lab Manual

Version 1.0

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Lab 0: Introduction to the FrameGrabber Camera System Lab

The FrameGrabber Camera System is an easily expandable camera system suitable for event filming, and security surveillance use. As your venue expands, you may find you need more cameras, servers, etc. To give new users the experience of working with the various components, we have developed the FrameGrabber Camera System Lab. We recommend a standard electronic lab bench for laying out the equipment students will use in doing the labs presented in this Lab Manual. This allows placing all components within easy reach and allows easy storage of lenses, cameras, and other components when the lab is not in use.

There are three lab exercises in this course corresponding to the three subsystems that comprise the FrameGrabber Camera System. Each lab exercise focuses on building out and connecting each subsystem. At the end of the three labs, the student has built a fully working FrameGrabber Camera System with one Camera Subsystem, Fiber-Optic Subsystem, and Server-Side Subsystem.

To keep the cost of operating the lab as reasonable as possible, we only require one Camera Subsystem. However, a more realistic build out would have two Camera Subsystems. The second Camera Subsystem, if used, is connected to the Slave Server.

We hope you enjoy doing the labs and find them useful as you prepare for your Certified FrameGrabber Associate exam.

Lab 1: Building the Camera Subsystem

Estimated Completion Time: 30 min.

In a typical stadium or surveillance installation, you will install several FrameGrabber Camera Subsystems. The number of Camera Subsystems is dependent on the area of the venue. For each Camera Subsystem you plan to deploy, you must mount the components into the weatherproof enclosure in the appropriate locations. These are marked inside the enclosure. Appropriate screws for the mounting are included.

Lab Objectives

In this lab, you:

1. Mount the components of the Camera Subsystem into the Weatherproof Cabinet
2. Connect the components of the camera subsystem, and
3. Ensure the camera subsystem is working properly.

Required Materials

In this lab, you only build out one Camera Subsystem. The materials required to build out each subsystem are:

1 FrameGrabber Camera Subsystem Weatherproof Cabinet
1 JAI SPRP-2000-PMCL Camera
1 Canon Electronically-controlled Lens (Your choice of Prime or Zoom)
1 Birger Adapter
1 Gidel Extender, Model RCLF
1 RS-232 Cable
1 SDR Cable
2 Camera Link Cables
12 Mounting screws

Procedure

This procedure is divided into the following sections:

- Mounting the Components in the Weatherproof Cabinet
- Connecting the Camera to the Extender
- Installing the Lens and Connecting the Birger Adapter
- Connecting the Extender to the Power Supply and Testing the Camera Subsystem

Mounting the Components in the Weatherproof Cabinet

You must first mount the components in the weatherproof cabinet. Although, you could connect the components first, we have found that it is much easier to mount the components into the cabinet and then complete connections. It makes managing the cables much easier. Holes are pre-drilled, and locations labeled for each component. All the screws are of one size to make the mounting process easier.

1. Mount the Camera to the camera mount in the cabinet using four screws to hold the camera in place. Insert the screws from the outside and tighten snugly with a Phillips screwdriver.

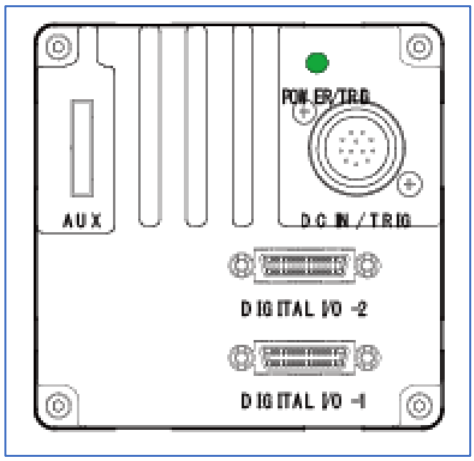
2. Mount the Extender to the extender mount in the cabinet using four screws to hold the extender in place.

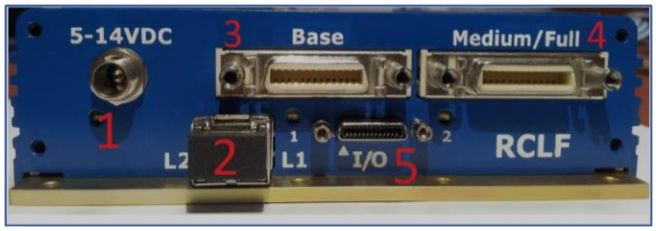
3. Finally, mount the Power Supply to the Power Supply mount in the cabinet using four screws to hold it in place.

This completes the mounting of the components into the Weatherproof Cabinet. Next, we connect the Camera to the Extender.

Connecting the Camera to the Extender

Cameras cannot communicate by themselves over Fiber-Optic links. The Extender connects the Camera to the Fiber-Optic link and facilitates the communication of Camera Link protocol data over Fiber-Optic.





4. Connect a Camera Link Cable from the **DIGITAL I/O 1** connector on the Camera to the **Base** connector on the Extender.

5. Connect the other Camera Link Cable from the **DIGITIAL I/O 2** connector on the Camera to the **Medium/Full** connector on the Extender.

6. Connect the Camera DC cable from the Power Supply to the DC/TRIG connector on the Camera.

This completes the Camera connections to the Extender. Next, we must install the Lens and connect the Birger Adapter. The Birger Adapter allows the photographer / security officer to control the lens aperture, and focus. For zoom lenses the Birger also allows control of the lens' focal length.

Installing the Lens and Connecting the Birger Adapter

To install a lens and connect the Birger Adapter, follow these steps:

7. Connect the desired Lens to the EF mount side of the Birger Adapter.
8. Connect the F mount side of the Birger Adapter to the Camera.
9. Connect the Power Cable on the Birger Adapter to the Birger connector on the Power Supply.
10. Connect the RS-232 cable to the SDR cable. We'll connect the SDR cable when we build out the Server-Side Subsystem.

This completes the installation and connection of the Lens and Birger Adapter. Next, we must connect the Extender to the Power Supply, and test the Camera Subsystem.

Connect Extender to Power Supply and Test Camera Subsystem

To complete installation and testing of the Camera Subsystem, we must connect the Extender to the Power Supply and complete some simple power-on visual checks.

11. Connect the Extender to the Power Supply.
12. Check all connections to ensure you made them properly and that they are snug.
13. Turn on the Power Supply.

14. Turn on the Camera. The green power light should be illuminated to indicate the Camera is receiving power.

15. Turn on the Birger and Extender. The green power light on the Extender should be illuminated indicating the Extender is receiving power.

This completes the Camera Subsystem connections. Leave the Camera Subsystem connected as we will connect it to the Fiber-Optic Subsystem in the next lab.

Lab 2: Building the Fiber-Optic Subsystem

Estimated Completion Time: 30 min.

In the last lab, we built the Camera Subsystem. The Camera Subsystem is connected to the Fiber-Optic Subsystem, and ultimately to the Servers in the server room. Recall that the server room, while normally in the stadium or venue, could be located outside the venue—up to a mile away! In this lab, we connect the Camera Subsystem and the Servers to the Fiber-Optic Subsystem.

Lab Objectives

1. Build the Fiber-Optic Subsystem
2. Connect the Camera Subsystem to the Fiber-Optic Subsystem
3. Connect the Servers to the Fiber-Optic Subsystem

Required Materials

1 Patch Panel
4 L1/L2 LC-LC Fiber Optic Cables
1 SFP+ External Transceiver

Note: We only have one Camera Subsystem, which will be connected to the Master Server. This becomes clearer when we build out the Server-Side Subsystem in its entirety in the next lab. Each Server also requires a FrameGrabber card. These cards and the necessary FrameGrabber application software have been pre-installed. The course *FGC-102 Certified FrameGrabber Technician* covers the Server build out process.

Procedure

The Fiber-Optic Subsystem connects the Camera Subsystems to the Servers in the server room. The Patch Panel is the hub where the Camera Subsystems, Servers, and other Server-Side components terminate.

This procedure is divided into the following sections:

- Building the Fiber-Optic Subsystem
- Connecting the Camera Subsystem to the Fiber-Optic Subsystem
- Connecting the Servers to the Fiber-Optic Subsystem

Building the Fiber-Optic Subsystem

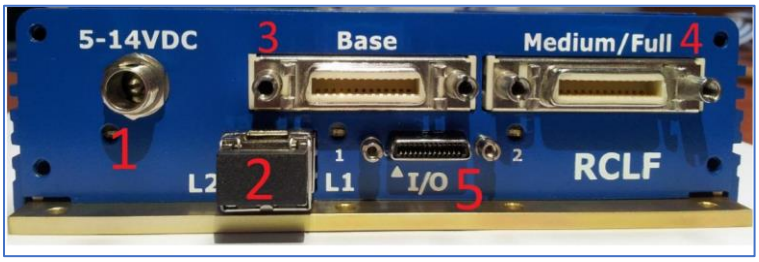
Building out the Fiber-Optic Subsystem begins with mounting the Patch Panel on a network equipment rack. Since the cables can be very long, most Fiber-Optic Subsystems will include cable management devices. For the purposes of this lab, all cables are approximately 12 feet in length to facilitate the building of your Fiber-Optic Subsystem in a reasonable amount of lab time. It is possible to have multiple patch panels in a very large venue.

16. Mount the Patch-Panel to the mini-network rack on your lab bench using the standard network device mounting screws provided.

17. If your lab bench, has cable guides or other cable management, use them to keep your cables neat and prevent damage to your cables.

The bulk of the Fiber-Optic Subsystem build-out is connecting Camera Subsystems and Servers. We begin by connecting our Camera Subsystem we built in Lab 1.

Connecting the Camera Subsystem to the Fiber-Optic Subsystem



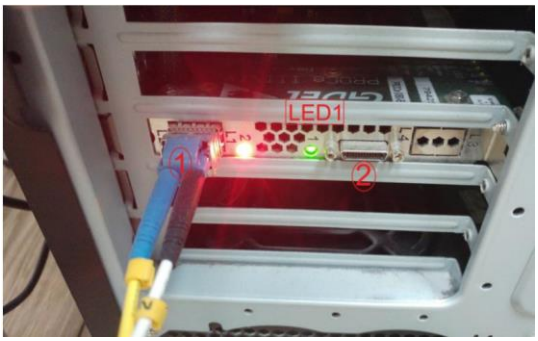
To connect the Camera Subsystem to the Fiber-Optic Subsystem, complete these steps:

3. Connect one end of an L1/L2 LC-LC Fiber-Optic cable to the Fiber to the Extender. Both L1 and L2 connectors are provided on the Extender.

4. Connect the other end to the Patch Panel.

This completes the connection of the Camera Subsystem to the Fiber-Optic Subsystem. Next, we must connect the Servers to the Fiber-Optic Subsystem.

Connecting the Servers to the Fiber Optic Subsystem



To connect the Servers to the Fiber-Optic Subsystem, complete these steps:

5. Connect one end of a Fiber-Optic cable to the Patch Panel.

6. Connect the other end to a Fiber Optic Transceiver. The transceiver is needed since the FrameGrabbver card in the server does not have a built-on transceiver.

7. Connect the transceiver to the FrameGrabber card on the Master Server.

8. Repeat steps 3-5 using another Fiber-Optic cable to connect the Slave Server to the Fiber-Optic Subsystem.

You have successfully connected the servers to Fiber-Optic Subsystem. Leave all the components connected. We will complete the Server-Side Subsystem connections and complete the build-out of your FrameGrabber Camera System in the next and final lab of this course.

Lab 3: Building the Server-Side Subsystem

Insert an introduction to the module here

Lab Objectives

Complete building the Server-Side Subsystem by:

4. Connecting the Trigger Panel to the Servers.
5. Connecting the SDR cable to the Server

Required Materials

Provide a list of the required materials to perform the lab

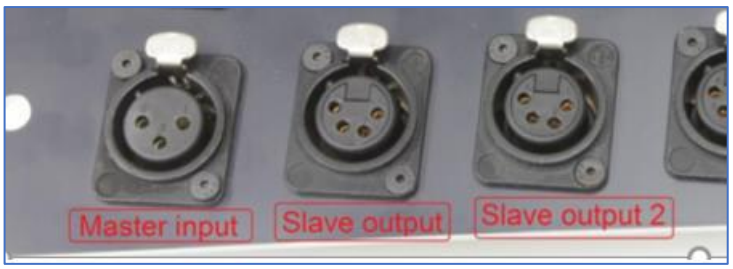
Procedure

In the last lab, we connected the Servers to the Fiber-Optic Subsystem. We now must connect the Servers to the Trigger Panel and to the Camera Subsystem to complete the Server-Side Subsystem connections.

This procedure is divided into the following sections:

- Connecting the Master Server to the Trigger Panel and Camera Subsystem
- Connecting the Slave Server to the Trigger Panel

Connect the Master Server to the Trigger Panel and Camera Subsystem



The Master Server Trigger Cable consists of an SDR connector, an XLR 4-pin connector, and an XLR 3-pin connector. Use the Master Server Trigger Cable to complete these steps:

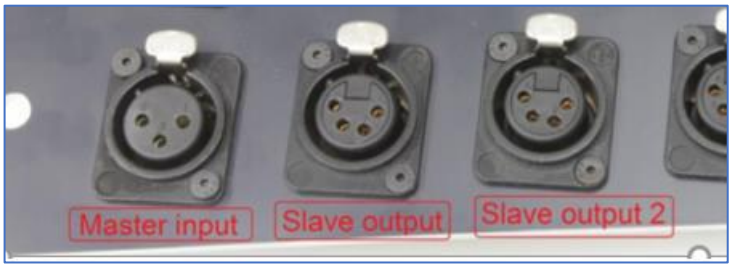
1. Connect the SDR connector of the Trigger cable to the FrameGrabber Card on the Master Server.

2. Connect the 3-pin XLR connector to Master Input connector on the Trigger Panel.

3. Connect the 4-pin XLR connector to Slave Output on the Trigger Panel. Use the Slave Output located next to the Master Input connector on the Trigger Panel.

This completes the connection of the Master Server to the Server-Side Subsystem.

Connecting the Slave Server to the Trigger Panel



The Slave Server Trigger Cable consists of an SDR connector, and an XLR 4-pin connector. To connect the Slave Server to the Trigger Panel, complete these steps:

4. Connect the SDR connector to the FrameGrabber card on the Slave Server.

5. Connect the 4-pin XLR connector to Slave Output on the Trigger Panel.

This completes the connection of the Slave Server to the Trigger Panel. If you had another Camera Subsystem, you would connect its SDR cable to the SDR connector on the FrameGrabber card on the Slave Server. Since we don't have another Camera Subsystem, we have completed connecting the Slave Server to the Trigger Panel and the building of the Server-Side Subsystem.

Congratulations, you have completed the Server-Side connections and installation of your FrameGrabber Camera System.