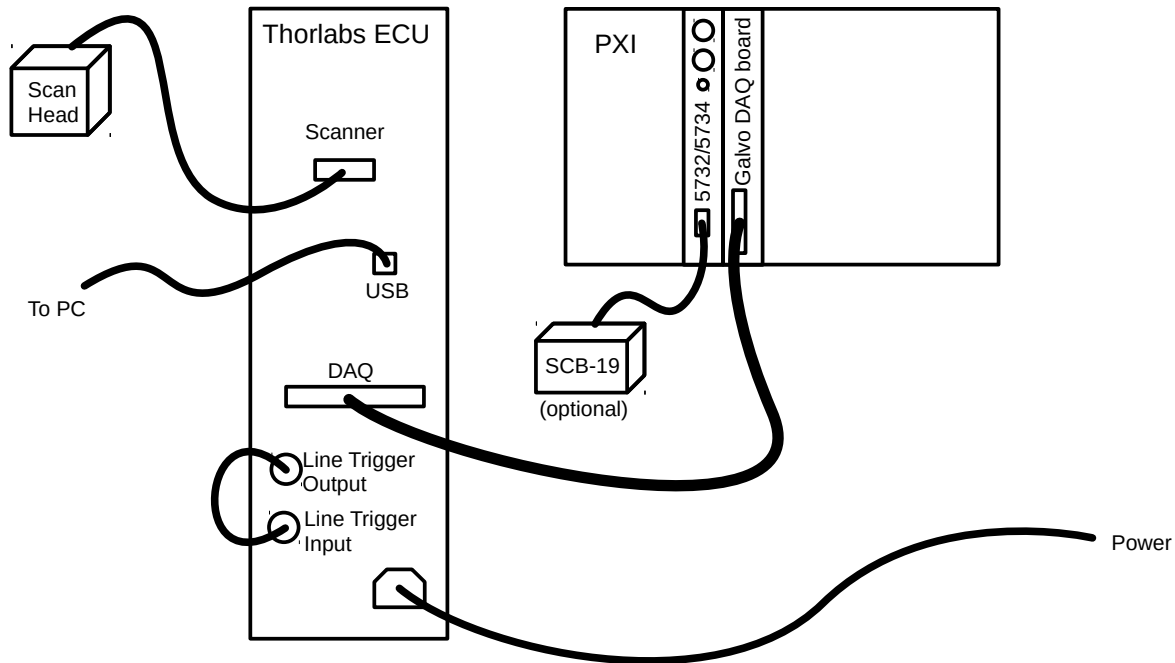


Steps to integrate a Thorlabs ECU into a ScanImage 5 system:

1. Wire the Thor ECU and the ScanImage 5 system

- Loop the ECU's line clock output terminal back to the ECU's line clock input terminal
- Connect the DVI connector to the resonant/galvo scanner assembly
- Connect the 68pin DAQ connector to the resonant/galvo control DAQ board of the ScanImage 5 system
- Connect the ECU's USB cable to the ScanImage 5 PC. Windows will automatically download the drivers (requires an Internet connection) and register a USB serial port.



2. Copy the folder @ThorECU to <ScanImage root>\+scanimage\+plugins

Start ScanImage 5 to generate the section 'ThorECU' in the machine data file. An error will occur on the first run after installing the plugin. This is because of incorrect settings in the machine data file.

3. Edit the ScanImage 5 Machine Data File to configure the Thor ECU Compatibility Mode

```
%% ResScanCtrl
```

```
resonantZoomAOChanID = 0;
```

```
galvoAOChanID = 1;
```

```
%% ThorECU
```

```
enablePlugin = true;
```

```
comPort = 12; % replace 12 with the Thor ECU USB serial port number
```

4. Setup external triggers: Since the PFI terminals of the galvo DAQ board are not accessible for trigger routing in Thor ECU compatibility mode, the trigger signals need to be routed to a different device.

Option 1: Use an FPGA SCB-19 connector block to connect trigger signals

MDF Settings:

```
%% ScanImage
primaryIODeviceType = 'FPGA';
primaryIODeviceName = '';
```

Pin assignment on the SCB-19 connector block:

- trigger inputs: software configurable in ScanImage 'Triggers' Dialog
- DIO1.0: Beam modified line clock output
- DIO1.1: Frame clock output
- DIO1.2: Acquisition trigger output (exports a software generated acquisition trigger)
- DIO1.3: Shutter control output

Option 2: If available use a second DAQ board in the PXI chassis to connect trigger signals.
(for instance the Beams / FastZ daq board):

MDF Settings:

```
%% ScanImage
primaryIODeviceType = 'DAQ';
primaryIODeviceName = 'PXI1Slot4'; %replace with name of second DAQ board
```

Pin assignment on the DAQ board connector block:

- trigger inputs: software configurable in ScanImage 'Triggers' Dialog
- PFI5: Beam modified line clock output
- PFI6: Frame clock output
- PFI7: Acquisition trigger output (exports a software generated acquisition trigger)
- PFI12: Shutter control output