

ITS Installation Guide

(Tracker version 2.33, 2010)

1 Welcome

Thank you for purchasing ITS. This Installation Guide will instruct you how to set up your hardware and software to run behavioral experiments successfully.

Please take care to perform each task exactly as it is described in this Installation Guide in order to prevent problems which may occur during installation.

2 Before you start

Before you start to install ITS, make sure that all of the equipment matches the packing list, and that nothing is missing or damaged. If something is missing or damaged, please contact us immediately.

NOTE: If you are not installing the package from the CD supplied by BSG, you need to download the drivers and software from the BSG website.

- **Drivers for DT3155 framegrabber (only if you are using analog camera)**
<http://www.biosignalgroup.com/download/Drivers.zip>
You need to unzip this file to your local hard drive.
- **Firewire camera drivers**
<http://www.biosignalgroup.com/download/flycapture.exe>
- **Instacal - driver for DIO-24 card**
<http://www.biosignalgroup.com/download/icalsetup.exe>
- **Microsoft NET Framework 3.5** redistributable (optional)
You can check to see if you already have the .NET Framework 3.5 installed by clicking **Start**, selecting **Control Panel**, and then double-clicking the **Add or Remove Programs** icon (Programs and Features in Windows Vista). When that window appears, scroll through the list of applications. If you see Microsoft .NET Compact Framework 3.5 listed, it is already installed and you do not need to install it again.)

Go to <http://www.microsoft.com> and search for Microsoft .NET Framework Version 3.5 Redistributable.

- **Microsoft DirectX 9**
You can check to see if you already have the DirectX installed by clicking **Start**, **Run** and typing **dxdiag**. The DirectX diagnostic tool is launched and it shows the DirectX version under the System tab. Version **9.0** is required.

If you don't have the DirectX installed, download it from the Microsoft's website:
<http://www.microsoft.com/directx>

- **Tracker software**
http://www.biosignalgroup.com/download_install.htm
- **GhostView and GhostScript**
<http://pages.cs.wisc.edu/~ghost/>
- **DivX codec (only if you plan to save video)**
<http://www.divx.com>

3 Camera installation

To install drivers and software, you need to login as the **Administrator**, or user with Administrator rights into your computer.

ITS is designed to track objects from an overhead perspective. You need to mount your camera on the ceiling at a height which will make the entire tracking field visible for the camera.

ITS can work with two video sources – digital **firewire camera** or an analog **CCTV camera**.

3.1 CCTV (analog) camera installation

Installation of the CCTV (analog) camera is done in two steps:

- DT3155 framegrabber installation
- Camera and cables installation

3.1.1 DT3155 framegrabber installation

CCTV camera needs a framegrabber which digitizes analog video. ITS uses DT3155 framegrabber (Data Translation, Inc.)

Several steps are needed when installing the DT3155 board into your computer :

- Turn off your computer and all connected peripherals (monitor, printer etc.)
- Unplug all connections to your PC (wall cable, monitor, printer, network cable, etc.)
- Open the enclosure of your computer as it is described in your PC manual. If you are not sure how to do it, ask the support company of your computer.

To avoid risk of serious injury, before opening the computer to install the cards make absolutely sure that the power has been switched off and the plug disconnected.

NOTE: some of the PC's have a LED identification of the remaining power in the computer, when you see the light inside the unplugged computer, please wait until this light goes off.

NOTE: many of the inside computer components and also the expansion cards (e.g. DT3155 card) can be destroyed by the static energy discharge. If you want to avoid this risk, make sure that you are grounded. You can ground yourself by touching central heating (metal parts) or such objects. Make you sure that when you are mounting the cards, your clothes don't touch any of the components.

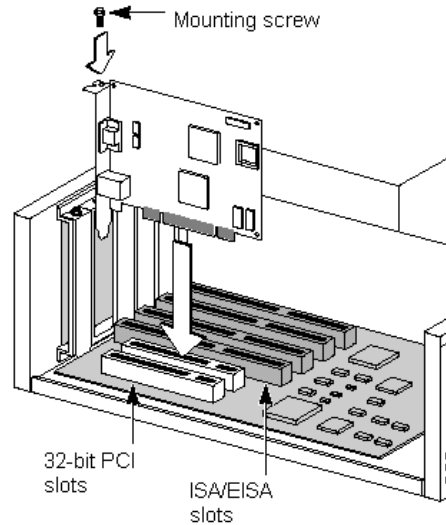


Figure: Inserting the PCI card

- Ground yourself to a ground point (e.g. a heating or a sink).
- Select the free PCI expansion slot and remove the extension cover. Make sure, that the screw is put aside safely.
- Unpack the DT3155 card and place it into a free slot (PCI standard). Press it carefully into position and fix with the screw you removed in the previous step.
- Close your computer cover and start the computer.
- After you start your computer with the DT3155 framegrabber card inserted, "Found new hardware..." dialog appears.

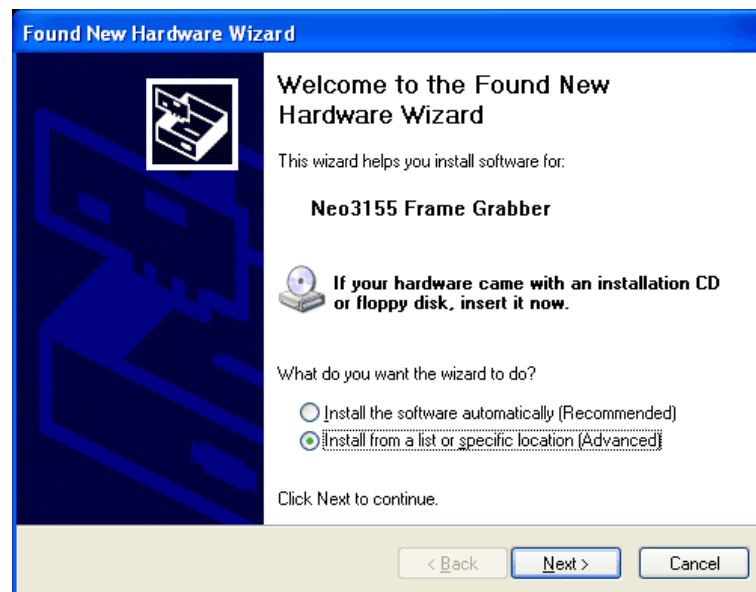


Figure: DT3155 installation

- Choose the option "**Install from a list or specific location (Advanced)**" and click **Next**, following dialog appears :

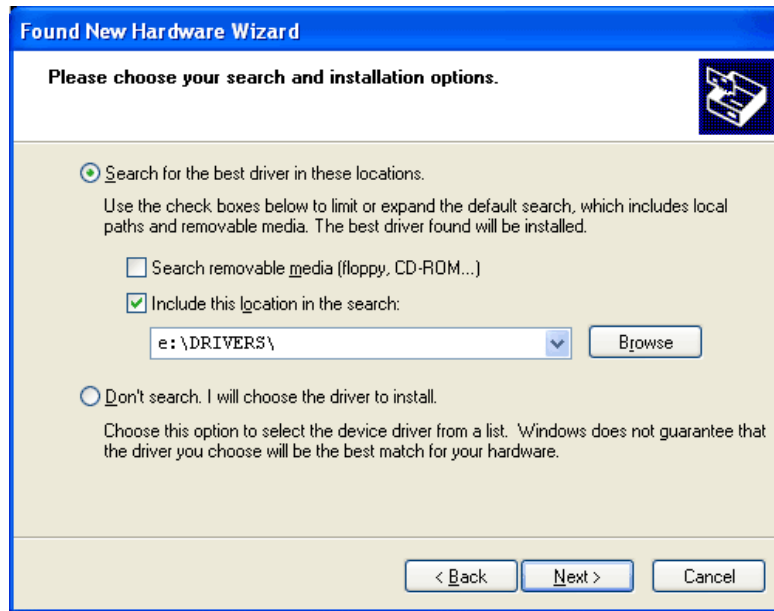


Figure: DT3155 installation

- Now, select "**Include this location in the search**", click **Browse** button and find the DT3155 drivers directory (e.g. *E:\DRIVERS\NEO 3155\Driver1*). Click **Next** to proceed.
- After several moments, the new hardware wizard will indicate that it has completed the installation. Click **Finish**.

When the driver is installed correctly, you can see a new class section in the **Device Manager**, called **Frame Grabber**. To access the device manager, click Start – Settings – Control Panel – System – Hardware – Device Manager.

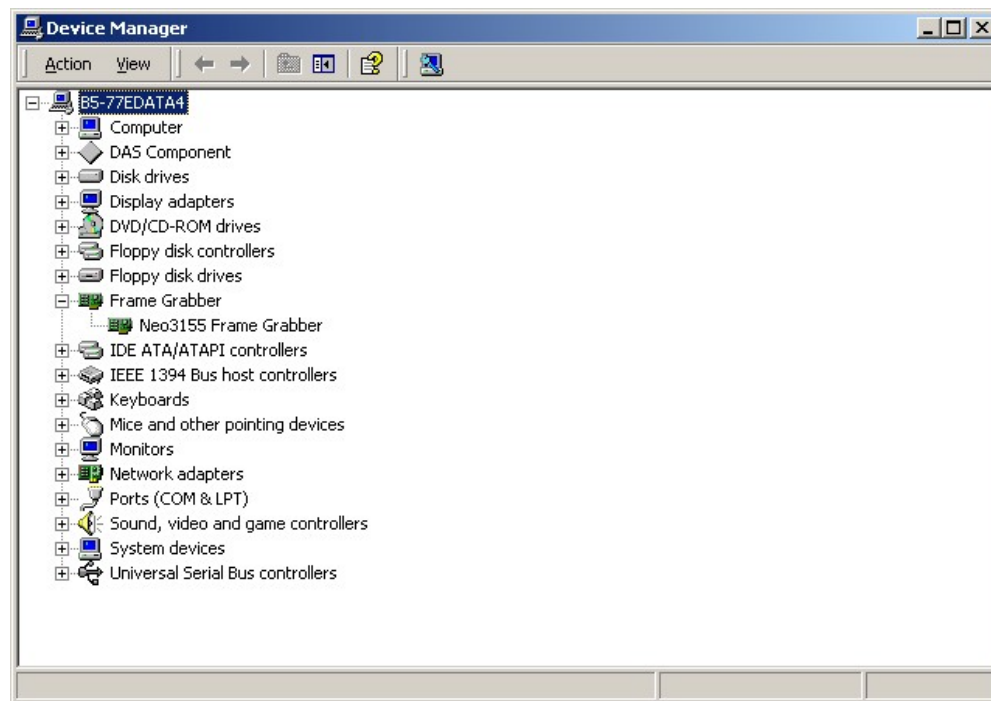


Figure: DT3155 installation

3.1.2 CCTV camera and cables installation

CCTV camera has to be connected to the DT3155 framegrabber using a coaxial cable.

All CCTV cameras must be powered with the voltage specified in their electrical specifications. If your camera is powered by 12V DC, it's consumption is smaller than 500mA and you obtained the Control Box, you can power your camera from the Distribution Board attached to the Control Box. To learn more about this, please refer to **CAFELED distribution board** manual. In other cases, you will need to provide an independent power supply for the camera.

3.2 Firewire (digital) camera installation

Installation of the firewire camera is done in two steps:

- Firewire 1394b card installation
- Camera and cables installation

3.2.1 Firewire port installation

The cable from the firewire camera gets connected to the 1394b PCI Express card. The following steps explain the installation procedure of the card.

- Turn off your computer and all connected peripherals (monitor, printer etc.)
- Unplug all connections to your PC (wall cable, monitor, printer, network cable, etc.)
- Open the enclosure of your computer as it is described in your PC manual. If you are not sure how to do it, ask the support company of your computer.

To avoid risk of serious injury, before opening the computer to install the cards make absolutely sure that the power has been switched off and the plug disconnected.

NOTE: some of the PC's have a LED identification of the remaining power in the computer, when you see the light inside the unplugged computer, please wait until this light goes off.

NOTE: many of the inside computer components and also the expansion cards (e.g. DT3155 card) can be destroyed by the static energy discharge. If you want to avoid this risk, make sure that you are grounded. You can ground yourself by touching central heating (metal parts) or such objects. Make you sure that when you are mounting the cards, your clothes don't touch any of the components.

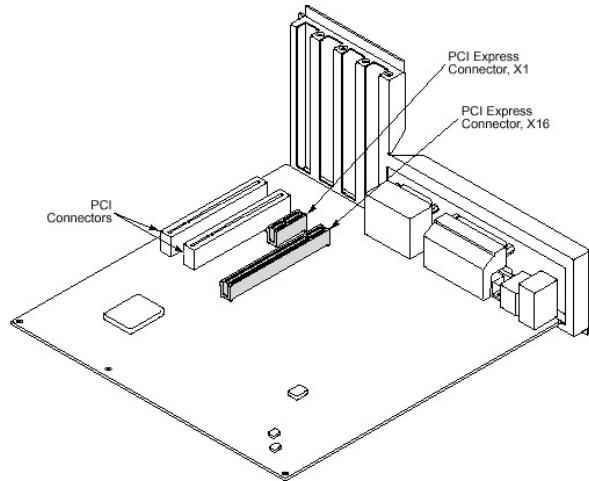


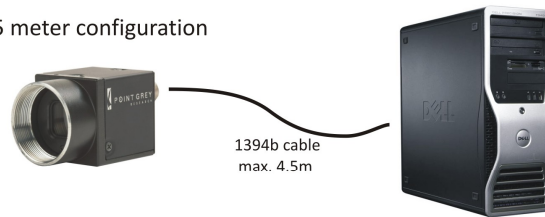
Figure: PCI Express socket

- Ground yourself to a ground point (e.g. a heating or a sink).
- Select the free PCI Express slot and remove the extension cover. Make sure, that the screw is put aside safely.
- Unpack the 1394b card and place it into a free slot. Press it carefully into position and fix with the screw you removed in the previous step.
- Close your computer cover and start the computer.

3.2.2 Firewire camera and cables installation

The firewire camera itself doesn't require any special power adapter, since it is powered through the firewire bus. IEEE1394b standard specifies the maximum length between the two devices as 4.5m so if you need a higher distance between the computer and the camera, repeaters have to be included as shown on the following figure.

4.5 meter configuration



9 meter configuration

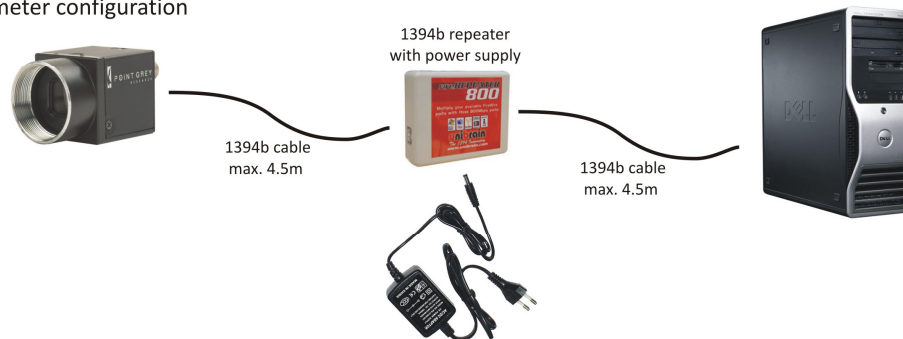


Figure: using 1394b repeaters

According to the camera manufacturer, the maximum number of repeaters shouldn't exceed 7. If higher distance is needed, FireNEX 1394b Optical repeater should be used.

4 Software and drivers installation

4.1 Instacal installation

Instacal is a software package (Measurement Computing Corp.) which contains drivers and tools for the control of DIO cards.

NOTE: Even if you don't have any external device connected to the Tracker software, you have to install the Instacal software (so it can recognize any devices which might be connected in the future).

Locate the **INSTACAL** directory on your CD or among your downloaded files and run the **setup.exe** file.

At the end of the installation you will be prompted to reboot the computer. If you are going to install the DIO-24 card, choose the option of rebooting the computer later and then shut down the computer (so you can install the card). If you are not going to use any of the DIO card, you may just reboot the computer.

4.2 Microsoft NET Framework redistributable

You can check to see if you already have the .NET Framework 2.0 installed by clicking **Start** on your Windows desktop, selecting **Control Panel**, and then double-clicking the **Add or Remove Programs** icon. When that window appears, scroll through the list of applications. If you see Microsoft .NET Framework 2.0 listed, the latest version is already installed and you do not need to install it again.). If you can't find it in the list, download the Redistributable package from the Internet (<http://www.microsoft.com>) and install the package.

4.3 Windows update

Make sure your Windows operating system has all important updates and service packs installed by running the Windows Update (Start – Windows Update)

4.4 Ghostscript and Ghostview

GhostScript and GhostView are used for viewing postscript (.ps) files, which are one of the outputs of the Track Analysis tool.

4.5 DivX video encoder

If you are going to save the video of your experiments, you have to install the DivX codec.

4.6 DirectX

If you use the 3D features of the Tracker software, make sure your computer has DirectX 9 installed. If it doesn't, install the package. To check the version of the DirectX, click Start – Run and type in **dxdiag**.

4.7 Firewire camera drivers

Locate and run **flycapture.exe** file. Follow the instructions to install firewire camera drivers and utilities.

After drivers are installed, it is very important to switch the firewire port into high speed mode.

Start the **driverControlGUI** utility (Start – Programs – Point Grey Research – PGRFlycapture – Utilities – driverControlGUI).

The 'Cameras' panel shows available cameras. The '1394 Devices' shows available firewire ports. Select 'OHCI Compliant IEEE 1394 Host Controller' and make sure that **Signed PGR PRO Driver** is selected in 'PGR 1394 Device Drivers'. Click **Switch** button to switch the driver into high speed mode.

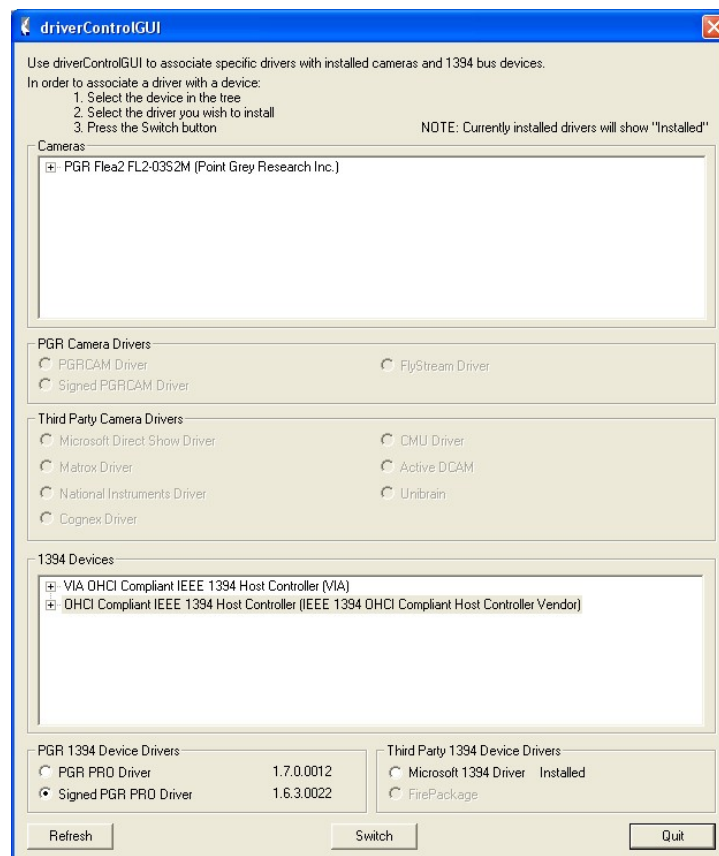
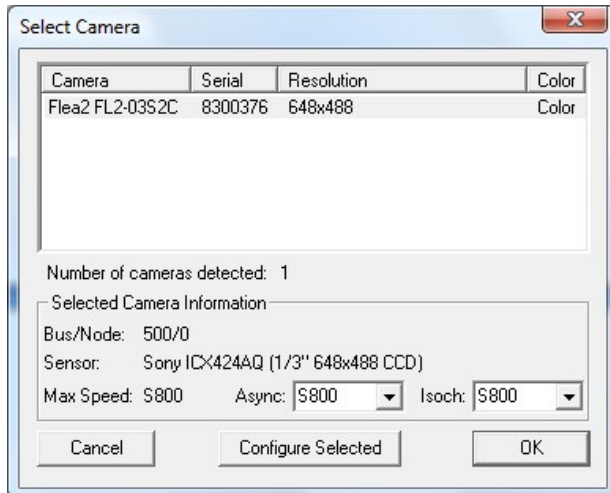


Figure: switching drivers

Note: After the camera is switched into the high speed mode, it will disappear from the 'Cameras' window. This is because the PGR PRO drivers take control over the camera instead of the default low-speed Windows driver.

Run **flycap** utility (Start – Programs – Point Grey Research – PGR FlyCapture – FlyCap). This utility shows available cameras as well as the actual camera speed (Max Speed). Make sure that the Max Speed says 'S800'.



Click OK to show the camera image.

FlyCap tool is very usefull for troubleshooting camera problems.

4.8 Tracker Software

Locate the **ITS** directory on your CD and run the software installer (**tracker-setup.exe**)

The installer will install the Tracker software, its documentation and the firewire camera drivers.

4.9 Validating software license

After you install the Tracker software, the Tracker would be automatically started and the license dialog would appear.

Every copy of the Tracker comes with a license. The license activates only these features which were acquired from BSG. The Tracker looks online for the license every time it is launched. After the software is installed and launched for the first time, you are asked to enter your license.

Select **Configure as a standalone program**, enter your license and click OK.

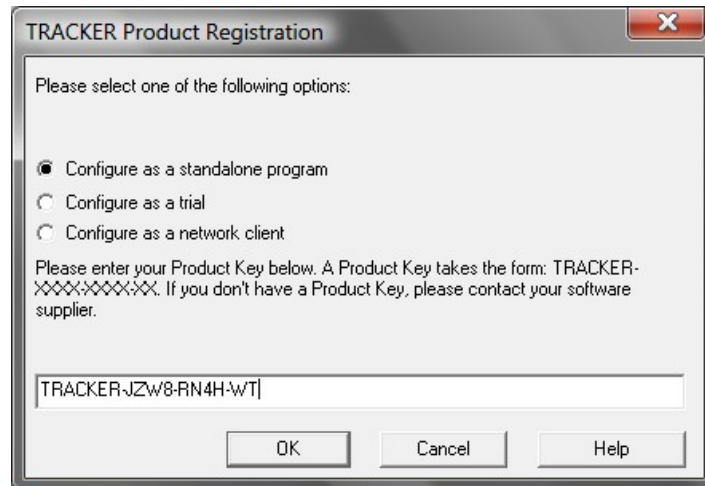


Figure: Entering license information

Note: If you have difficulties activating the software, try to temporarily disable your firewall so the software can contact the licensing server.

Note: ITS Software documentation will be installed in your **Program Files** folder under **Bio-Signal Group Corp\Doc**

5 Peripherals installation

When any external devices are used in ITS (Rotating Arena, Current Source, Feeder, etc.) we have to provide an interface between the software and the connected hardware. This interface is realized by the DIO-24 card, which either comes in the PCI or USB format.

5.1 PCI DIO-24 card installation

To install the PCI version of the card, follow these steps:

- Turn off your computer and all connected peripherals (monitor, printer etc.)
- Unplug all connections to your PC (wall cable, monitor, printer, network cable, etc.)
- Open the enclosure of your computer as it is described in your PC manual. If you are not sure how to do it, ask the support company of your computer.

NOTE: some of the PC's have a LED identification of the remaining power in the computer, when you see the light inside the unplugged computer, please wait until this light goes off.

NOTE: many of the inside computer components and also the expansion cards (e.g. DT3155 card) can be destroyed by the static energy discharge. If you want to avoid this risk, make sure that you are grounded. You can ground yourself by touching central heating (metal parts) or such objects. Make you sure that when you are mounting the cards, your clothes don't touch any of the components.

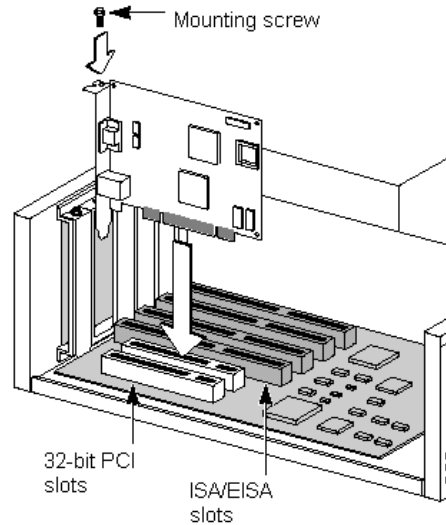


Figure: Inserting the PCI card

- Ground yourself to a ground point (e.g. a heating or a sink).
- Select the free PCI expansion slot and remove the extension cover. Make sure, that the screw is put aside safely.
- Unpack the DIO-24 card and place it into a free slot (PCI standard). Press it carefully into position and fix with the screw you removed in the previous step.
- Close your computer cover and start the computer.
- After you start your computer, **Welcome to the Found New Hardware Wizard** is shown. Select the automatic driver installation and follow the instruction to install the driver. After the driver is installed, you may find the DIO-24 card present in your Device Manager (Start – Settings – Control Panel – System – Hardware – Device Manager).
- Run **Instacal** from the Start menu to check DIO-24 card settings (Start - Program Files – Measurement Computing – Instacal). Information about the new card present in the system will be shown. Confirm that message.

5.2 USB DIO-24 interface installation

To install the USB version of the card, follow these steps:

- Connect the interface to the free USB 2.0 slot on your computer.
- After connecting the card, **Welcome to the Found New Hardware Wizard** is shown. Select the automatic driver installation and follow the instruction to install the driver. After the driver is installed, you may find the DIO-24 card present in your Device Manager (Start – Settings – Control Panel – System – Hardware – Device Manager).
- Run **Instacal** from the Start menu to check DIO-24 card settings (Start - Program Files – Measurement Computing – Instacal). Information about the new card present in the system will be shown. Confirm that message.

5.3 Control box installation

Note : Before you start to connect the Control Box, make sure its power switch is in OFF position and your PC is turned off !

The Control Box contains a few internal parts:

- **Rotating Arena controller** - it converts the low power control signals from the PC's DIO-24 card to high power control signals for the Rotating Arena's motor
- **Ground Switch** - used in electrophysiology when you want to record electrophysiological signals and in the same experiment also use the stimulus from the constant current source
- **White Noise Generator** – used to cover up noises which the subject can use to navigate itself
- **Subject LED brightness control** – used to control the brightness of the LED on the subject
- **Current Source control signals** – used to control the constant current source
- **Feeder control signals** – used to control pellet feeder
- **Video field/frame pulse separator** – used to synchronize with electrophysiology part of the system

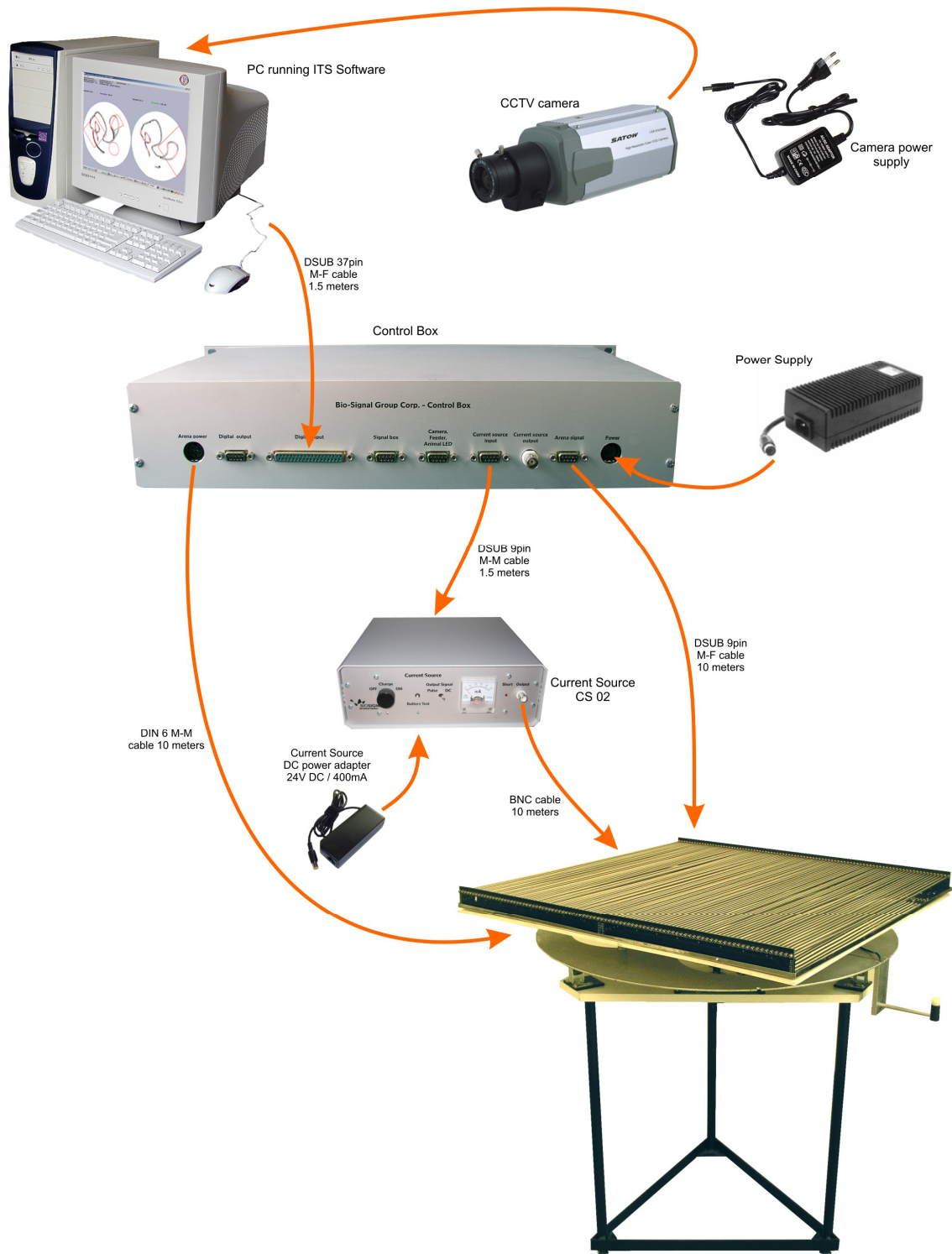


Figure: ITS connecting scheme

To use the ITS Place Avoidance system in the **Grid** configuration, you need to connect following components:

- **DIO-24 PCI** card and the Control Box **Digital Input** connector using **DSUB 37-pin M-F cable**
- Control Box **Current Source Input** and the Current Source **Digital Input** connector using **DSUB 9-pin M-M cable**
- Current Source with the power adapter (24V DC / 400 mA)
- Current Source **Output** with the Rotating Arena **Shock** input using **BNC cable**
- Control Box **Arena Signal** with the Rotating Arena **Signal** connector using **DSUB 9-pin M-F cable**
- Control Box **Arena Power** with the Rotating Arena **Power** connector using **DIN 6-pin M-M cable**
- Control Box with the power adapter (12V DC / 10A)
- Camera and the DT3155 PCI card using **BNC cable**
- Camera with the power adapter (12V DC / 1A)

After all the wiring is done, you may turn on the Control Box. Blue power LED should turn on.

Note: Manuals for the **Control**, **Rotating Arena** and **Cafeled Distribution Board** can be found in the PDF format after the ITS software is installed (step 3.9) in your Program Files - Bio-Signal Group Corp – Doc directory.

IMPORTANT NOTICE: THE CONTROL BOX CONTAINS ELECTRICAL COMPONENTS WHICH MAY BE DANGEROUS. DO NOT OPEN THE CONTROL BOX OR ATTEMPT TO FIX THE CONTROL BOX YOURSELF. IF YOU ENCOUNTER PROBLEMS WITH THE CONTROL BOX, CONTACT BIO SIGNAL SUPPORT FOR HELP. OPENING THE CONTROL BOX VOIDS ANY PRODUCT WARRANTY.

WARNING: THE CURRENT SOURCE INVOLVES THE DELIVERY OF ELECTRICAL SHOCK WHICH CAN BE DANGEROUS. DO NOT OPEN THE CURRENT SOURCE, THIS CAN BE DANGEROUS AND WILL VOID ANY WARRANTY. IF THE CURRENT SOURCE MALFUNCTIONS, NOTIFY BIO-SIGNAL SUPPORT. WE RECOMMEND PERSONS WITH PACEMAKERS OR OTHER ELECTRICAL MEDICAL DEVICES EXERCISE CAUTION WHEN OPERATING THE CURRENT SOURCE.

6 Software test procedure

- Check all the hardware connections.
- Make sure the Camera is powered and the LED on the back of the Camera is on.
- Run the **Tracker** either from the desktop or using the Start menu.
- Click **Edit-Options** to enter the software configuration mode.
- Click **Video**, select the appropriate **Video Source** and click **Open Live Image**.
- Live Image allows you to view the camera image so you can adjust the camera's position and the lens properties - **Iris**, **Focus** and **Zoom** as needed. Make sure all of your experimental arena is visible on the camera image and it also covers as much as possible space of the image (this will increase the resolution of the subject position).
- If you are using the firewire camera, you can adjust the **Shutter speed**, **Gain** and other properties under the **Video** tab in the **Options** dialog.
- Refer for the Tracker manual for more details about experiment setup & calibration.