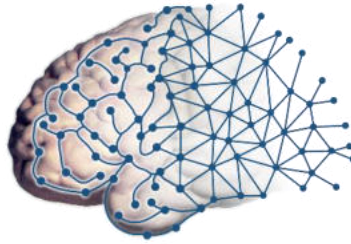


Siemens Prisma 3T MRI Scanner

User Guide



UCLA
Brain Mapping Center

Ahmanson-Lovelace Brain Mapping Center
University of California, Los Angeles

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BMC Contacts

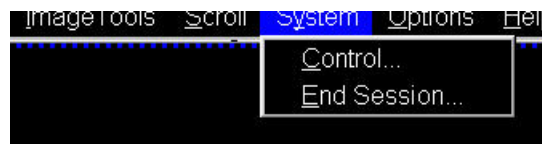
1. Ludmila Budilo	Building Manager	x52699
2. Mary Susselman	PET/MRI Tech	x64291
3. Trent Thixton	Lead MRI Tech	x59217
4. Darin Williams	Engineer	x64291
5. Dr. Roger Woods	Center Director	x44057
6. BMC Techs	BMCTechs@mednet.ucla.edu	(424) 652-6290
7. BMC Emergency ONLY Line: 323-999-1593		

Scanner Operation

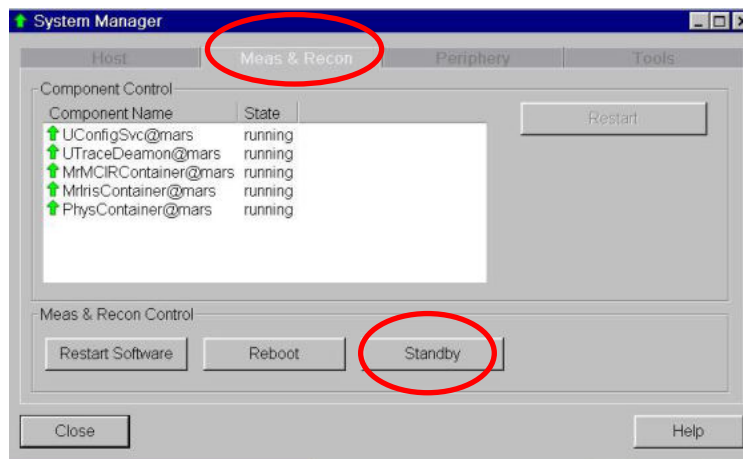
How to do a “Standby” Reboot

This type of reboot clears most errors and takes approximately 10 minutes

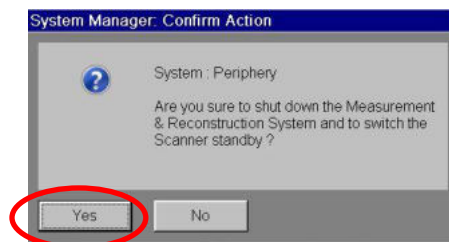
1. Make sure the scanner bed is at the home position (all the way up and all the way out)
2. If a coil is on the table, all element should be plugged in
3. Click the “System” tab at the top of the screen
4. Click on “Control”



5. Click the “Meas & Recon” Tab
6. Click “Standby”



7. Click “Yes” to the pop up message if needed



8. The system will take 1-2 minutes to turn off – you will hear a “clunk” when the equipment shutdowns and the LCD screen in the scanner room will turn off

9. Wait a few seconds and then press the “system on” button on the Siemens scanner control box located on the wall next to the MR Scanner window

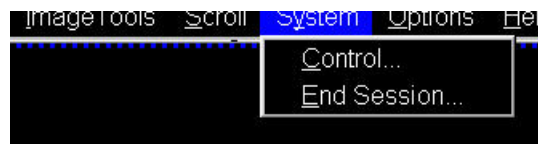


10. When the scanner starts booting up, the LCD screen in the scanner room will turn back on
11. It will take approximately 6 minutes for the system to completely boot up
12. After a successful reboot you will hear 3 beeps

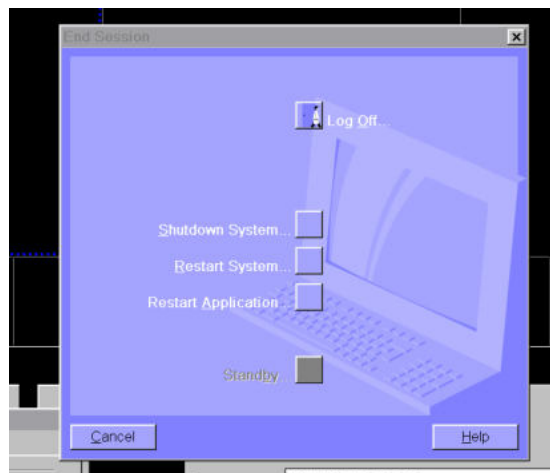
How to Turn Off the MRI Scanner/Computer (Full Shutdown)

This type of full shutdown takes approximately 20 minutes – try this method if a “[Standby](#)” reboot did clear the issue

1. Make sure the scanner bed is at the home position (all the way up and all the way out)
2. If a coil is on the table, all element should be plugged in
3. Click the “System” tab at the top of the screen
4. Click on “End Session”



5. Click “Shutdown System”



6. It will take approximately 5 minutes before you see “it is now safe to turn off your computer”

7. Press the blue “system off” button on the Siemens scanner control box located on the wall next to the MR Scanner window



How to Turn on the MRI Scanner/Computer

1. You must first press the “system on” button on the Siemens scanner control box located on the wall next to the MR Scanner window



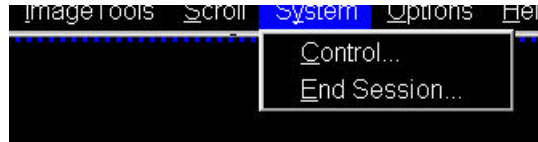
2. It will take approximately 15 minutes for the system to completely boot up
3. After a successful reboot you will hear 3 beeps

MR Scanner Error Save Log

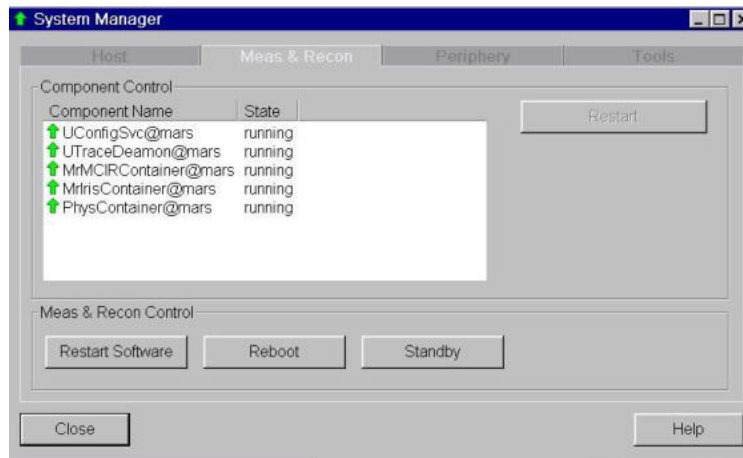
1. If you ever have a scanner problem that requires you to reboot, it is very important to make a MR Save Log entry **BEFORE** you reboot the system
2. This log entry helps the Siemens engineer isolate the scanner problem and expedite the system repair. To make a MR Save Log entry, you must do the following:
 - At the top of the screen – click system, then control, then tools
 - Click on “Save system log files”
 - You will see a box pop up with script on a black background, **LEAVE THIS ALONE!**
 - Another box will pop up where you can input the problem
 - Fill out the “User” section and then click OK
 - You must wait until the black pop box with script closes before you can proceed to reboot, scan etc
3. Please email BMCTechs@mednet.ucla.edu with details of the problem

How to Check the System Manager

1. Click the “System” tab at the top of the screen
2. Click on “Control”

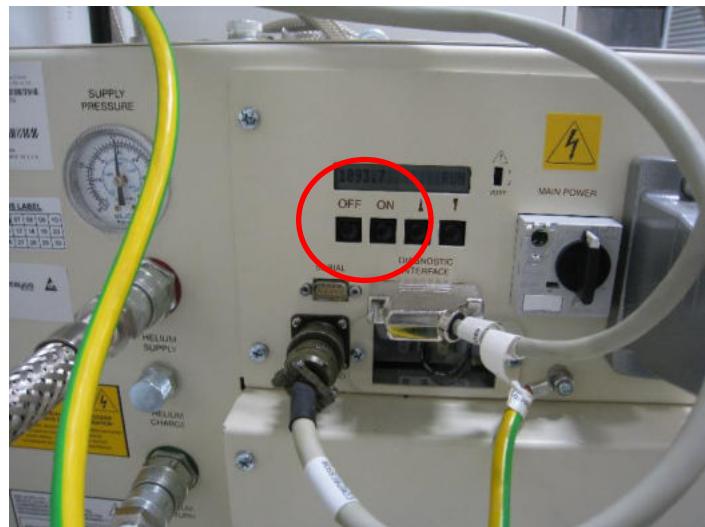
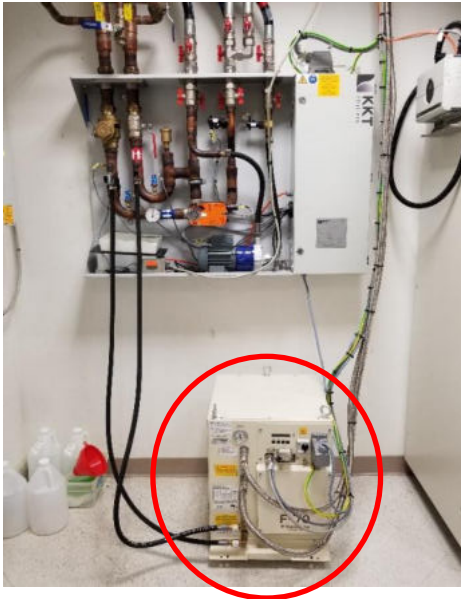


3. You will get a “System Manager” pop-up box - within the “System Manager” box you can check that the “Host,” “Meas & Recon ” and “Periphery” components are working properly



How to Restart the Coldhead

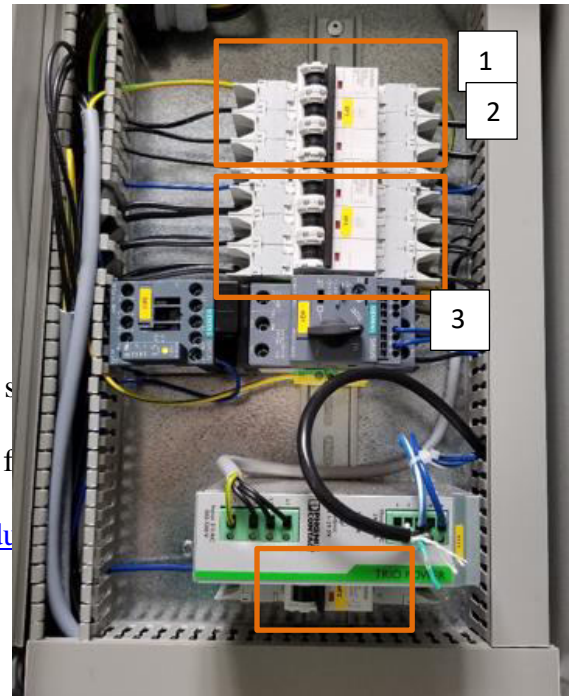
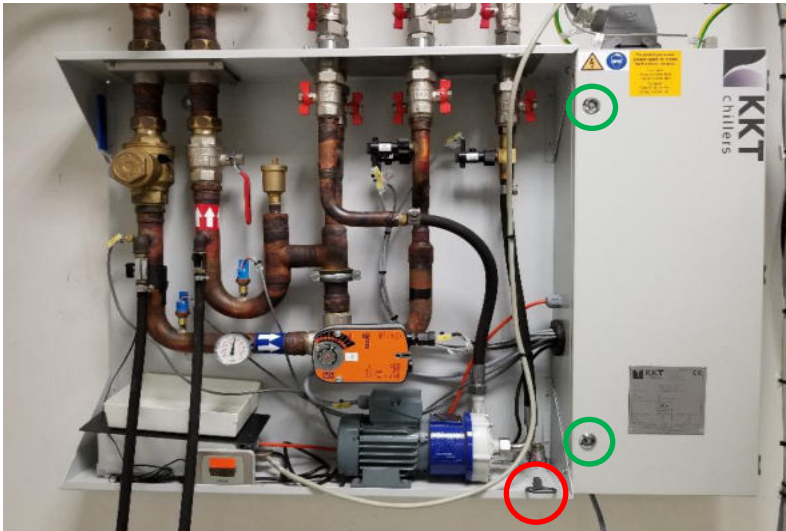
1. In case of a power-surge, or other problem, the Coldhead may need to be restarted
2. You will know the Coldhead has been shut off if you do NOT hear the steady “chirping” noise in the scanner room
3. Enter the equipment room (through the sliding glass door) and look at the south wall (as shown below)



4. The coldhead is the white “box” next to the large cabinet
5. Walk over and look at the front of the coldhead and you will see the Coldhead controls (shown above)
6. Press the ON button and the Coldhead should turn back on
7. Please be sure to notify BMCTechs@mednet.ucla.edu and/or Dr. Woods if this occurs

How to Reboot the Chiller

1. If you get “cooling errors” while scanning you can try to reboot the chiller to clear the faults, some examples include:
 - Cooling System: EPC Temperature High
 - Cooling System: Return Pressure Low
 - Cooling bypass
2. Enter the equipment room (through the sliding glass door) and look at the south wall (as shown below)
3. Locate the key to the chiller cabinet on the ledge (red circle)
4. Unlock the cabinet (green circles)



Export and Save Raw Data Files (.RDA and Raw)

How to Map a Non-Dicom Network Folder on the Scanner Console

1. Enable the advanced user mode (you will need a tech for this step)
2. Click control and click escape key
3. Click Computer
4. Click on "Map Network Drive" on the top tool bar
5. When the box pops up choose an available drive, Z drive is the default, if it is being used choose the next available letter (i.e. Y, X, W etc) – DO NOT use drive A
6. Under "Folder" choose the path [\\10.2.0.135\PI NAME\MRIFILE](#) (i.e. MAYERMRIFILE) or enter the path name manually if this is your first time mapping the drive
7. This drive will allow you to save raw data etc into the network folder instead of on a usb drive
8. Click on "Connect using different credentials" then click finish
9. Log in with your NRB credentials (don't forget the \bmap) before your name
 - bmap\username
 - Password
10. When you are done close the non-dicom folder windows
11. Right click on the drive you mapped and click disconnect - this will log you out
12. If your non-dicom NRB account is not working – save the raw data on the C: Drive in Temp/YourName/SubjectID folder
13. Note – please remember to periodically delete saved data from your non-dicom folder and scanner console temp folder – data is not meant to stay in these folders indefinitely as there is limited space

How to Create a Spectroscopy .RDA File

1. Enable the advanced user mode (you will need a tech for this step)
2. Click control and click escape key
3. Pull the scan back from the server if necessary
4. Go to the spectroscopy tab
5. Click the file browser
6. Load the spectrum of interest in the spectroscopy tab
7. Then click on the spectrum you want to create an .rda file for
8. Click options on the tool bar
9. Then click export raw data
10. Copy and paste these files into a temp folder on the C drive - typically your group will have their own temp folder
11. You can then move/copy it to a flash drive or a non-dicom folder
12. This data does not get over written as long as you have the scan data
13. Data needs to be manually deleted from the temp folder and non-dicom folder

How to Transfer Raw Data Using TWIX Software

1. Enable the advanced user mode (you will need a tech for this step)
2. Click control and click escape key
3. Open the command terminal
4. Type: TWIX - then press enter
5. All raw data will be listed
6. Select the raw data you wish to save by choosing the correct participant ID and sequence
7. Right click on it and choose the top option "copy total raid file"
8. Copy and paste these files into a temp folder on the C drive - typically your group will have their own temp folder
9. These files can then be copied to a non-dicom folder or flash drive
10. Data needs to be manually deleted from the temp folder and non-dicom folder

Prisma Cleanup Procedures

General Cleanup Guidelines

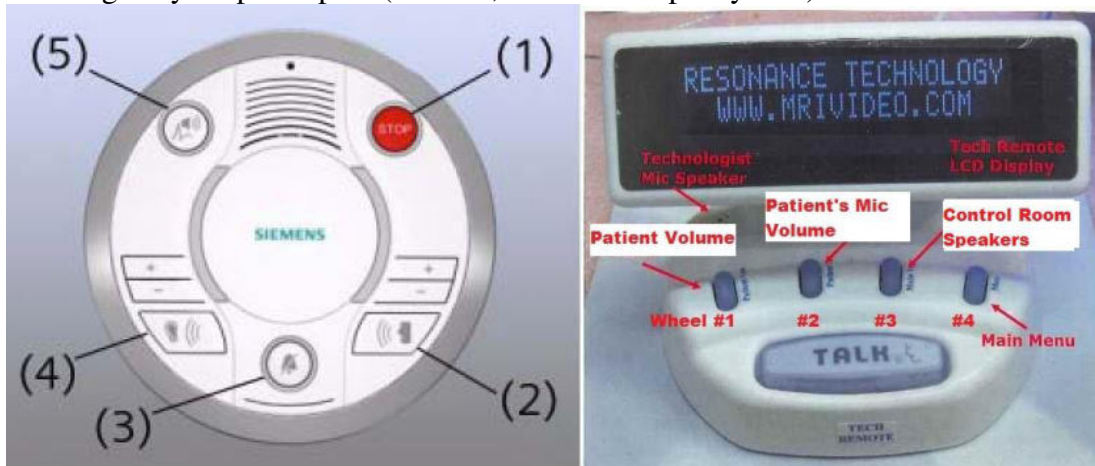
1. Put the head coil away in the coil cabinet with top attached
2. All cables should be untangled and placed on the appropriate hooks completely off the ground to prevent being stepped on (please see below pictures)
3. All equipment (goggles, headphones, button box, squeeze ball/button etc) that you used should be wiped down with alcohol wipes for cleanliness
4. The Opto box should be turned off at back of box
5. The Opto audio cable should be unattached from audio source and coiled up in the drawer
6. The Res Tech system should be turned to “Off” under “System” – you do not need to turn off the “Visor”
7. The projector interface box dial and switch should be turned off
8. The button response box should be disconnected and store in the appropriately labelled drawer - the button response box sleeve should be removed if used
9. The squeeze ball should be coiled at the end of the bed
10. One sandbag should be left on the white cart
11. Everything is labelled for your convenience
12. Note: the top of the cart is now a suitable place to set the top of the coil and/or mirror when you are setting up your participant



Squeeze Ball/Button Alarm

What to do when the Squeeze Ball/Button Alarm Goes Off

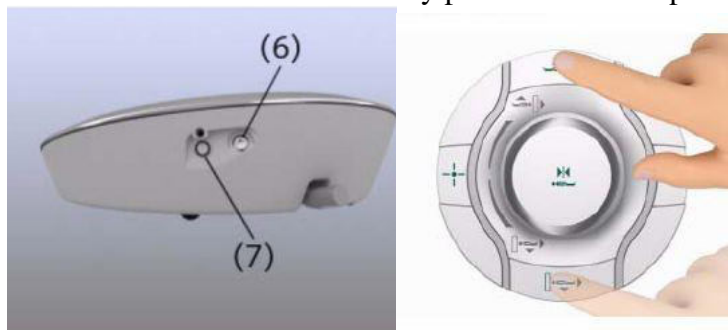
1. Stop the scanner using the mouse and clicking the stop icon in the lower left on the console screen
2. To clear the alarm, press the talk button on the intercom associated with the squeeze ball - Siemens (#2 talk or #3 alarm) or headphones button - Res Tech (TALK) you gave the participant
3. Talk to your participant through the intercom system associated with the headphones you gave your participant (res tech, siemens or opto system)



4. **DO NOT** press the “Stop” button (#1) on the Siemens Talk Box
5. If you press this, you will need to reset the table
6. To reset the table follow the below instructions

Reset the Table

1. Press the (#7) button on the side of the intercom box
2. Go into the scanner room and simultaneously press the Table Up and Table Down button



How to Run the Daily Stability Warmup

Setting up the Phantom

1. Place the phantom and phantom cushion inside the either the 20, 32 or 64 channel head coil (round end at top of coil)
2. Secure the top half of the head coil by clicking it in and plugging in cable(s) if necessary
3. Raise the table
7. Turn on the laser light and set the landmark
8. Slide the table fully into the scanner
9. Close and flip the air seal on the scanner door

Register Phantom

1. Press the “little person” key on the keyboard to bring up the registration screen
2. Enter phantom information (all required fields are indicated in **bold** except required data destination= Referring physician)
 - **Last Name** = enter information in the following format – *Stability-date-of-scan_name-of-scanner*.
 - e.g. “Stability082609_Prisma”
 - **Patient ID** = copy the information from the **Last Name** field to the **Patient ID** field.
 - **Sex** = “other”
 - **Age** = “18”
 - **Height** = “5ft”
 - **Weight** = “125 lbs”
 - **Referring Physician** = select “QC Group”
 - **Patient Position** = select “Head First Supine”
3. Click “Exam”
4. Another box will pop up
 - Choose Study = Daily_Stability_Test_Prisma
 - Choose stability sequence based on the head coil you used (BMC_20ch, BMC_32ch or BMC_64ch etc)
 - Click “Confirm”

Running Scans

1. Press the green play button to start the first localizer
2. First stability sequence will open itself – center the box on the phantom and then click “the green check”
3. The other stability sequences will automatically copy the slice locations from the first stability sequence and will automatically start (you will not need to click continue)
4. When scanning is complete, remove the phantom/holder and place them securely in the phantom cabinet bin

Registration Pictures

The image shows two overlapping software windows. The top window is titled "Patient Registration" and is divided into three main sections: PATIENT, PROCEDURE, and INSTITUTION. The PATIENT section includes fields for Last name (Stability031617_Prisma), First name, Title, Patient ID (Stability031617_Prisma), Date of birth (3/5/1999), Sex (Male, Female, Other), Age (18 Years), Height (5 ft), and Weight (125 lbs). The PROCEDURE section includes Accession No, Request ID, Requested procedure(s), and Patient position (Head First - Supine). The INSTITUTION section includes Institution name (UCLA Brain Mapping Center), 1. Performing physician, and 1. Operator. A HOSPITAL section at the bottom left includes Referring physician (QCGROUP), Requesting physician, and Admission ID. Buttons for "Ereregister", "Exam", "Search", "Cancel", and "Help" are at the bottom. The bottom window is titled "Patient Confirmation" and is divided into PATIENT SAFETY, FIRST LEVEL MODE, MEDICAL INFORMATION, and STUDY. PATIENT SAFETY shows Name (Stability031617_Prisma), Position (Head First - Supine), Height (5' [ftin]), and Weight (125.00 [lb]). FIRST LEVEL MODE has SAR and Gradient checkboxes. MEDICAL INFORMATION has fields for Contrast Allergies, Pregnancy Status, Medical Alerts, and Special Needs. The STUDY section shows a tree view of programs under "All Programs" and "Frequent", with "Daily_Stability_Test_Prisma" selected. Below the tree is a "Requested Procedure" section with "Study Description" (Daily_Stability_Test_Prisma 20ch_Hd...) and an "Add Study Comment" link. The "Body Part and Laterality" section shows "Brain" selected for both "Body Part" and "Laterality". A note at the bottom says "There are steps without Body Part assignment. Please select:" with "Brain" selected. "Confirm" and "Cancel" buttons are at the bottom right.

Patient Registration

PATIENT

Last name: Stability031617_Prisma
First name:
Title:
Patient ID: Stability031617_Prisma
Date of birth: 3/5/1999 [M/d/yyyy]
Sex: Male Female Other
Age: 18 Years
Height: 5 ft in
Weight: 125 lbs oz Metric
Additional info:
Details...

PROCEDURE

Accession No:
Request ID:
Requested procedure(s):
Patient position: Head First - Supine

INSTITUTION

Institution name: UCLA Brain Mapping Center
1. Performing physician:
1. Operator:

HOSPITAL

Referring physician: QCGROUP
Requesting physician:
Admission ID:

Ereregister Exam Search Cancel Help

ISO_IR 100

Patient Confirmation

PATIENT SAFETY

Name: Stability031617_Prisma
Position: Head First - Supine
Height: 5' [ftin]
Weight: 125.00 [lb]

FIRST LEVEL MODE

SAR
Gradient

MEDICAL INFORMATION

Contrast Allergies:
Pregnancy Status:
Medical Alerts:
Special Needs:

STUDY

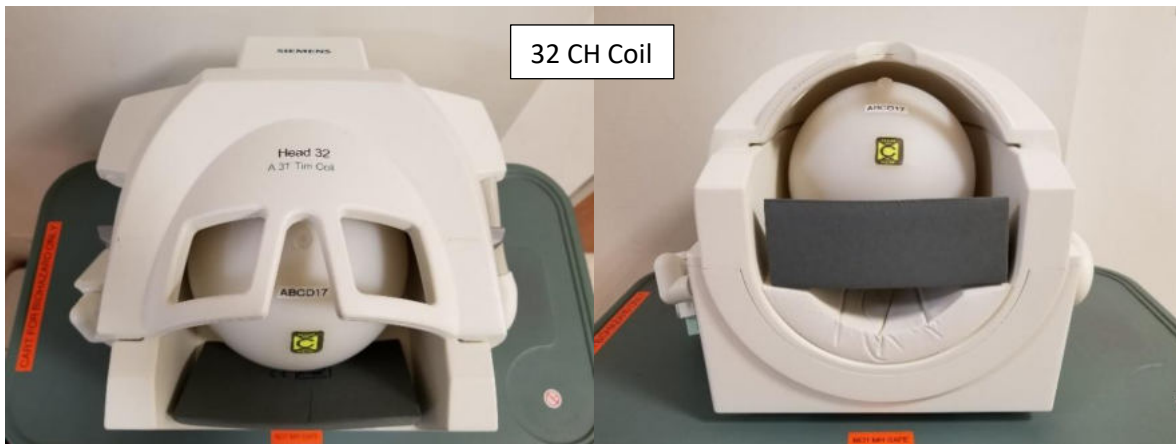
All Programs Frequent
USER
Daily_Stability_Test_Prisma
20ch_hdneck
BMC_20ch
32ch_hdcoil
BMC_32ch
64ch_hdneck
BMC_64ch
TXRX_hdcoil
1ch_bodycoil
32ch_spine
Abnormal_Brain_Protocol_Prisma
TriggerTesting
ALGERGROUP
BASSOGROUP
BEARDENGROUP
BILDERGROUP
BISLEYGROUP
CRASKFGROUP
 Load Program to Queue
Requested Procedure
Study Description: Daily_Stability_Test_Prisma 20ch_Hd...
Add Study Comment
Body Part and Laterality
Brain Unpaired
There are steps without Body Part assignment. Please select:
Brain Unpaired
Confirm Cancel

How to Run the ABCD Phantom QA

The ABCD phantom should be run at least once per week. This QA protocol may take the place of the daily warmup. The full version takes 29min and the quick version takes 16min.

Setting up the Phantom

1. Place the spherical ABCD phantom inside 32 (ABCD/HCP protocols) or 64 (Other) head coil on top of the white cushion
2. Place the gray cushion in front to secure the phantom (32ch coil only)
3. Cushions are located next to the phantom in the bin
4. The cap of the phantom should be center as if it were the nose – it should line up with the laser landmark line on the coil
5. Secure the top half of the head coil by clicking it in and plugging in cable(s) if necessary
6. Raise the table
7. Turn on the laser light and set the landmark to run through the cap
8. Slide the table fully into the scanner
9. Close and flip the air seal on the scanner door

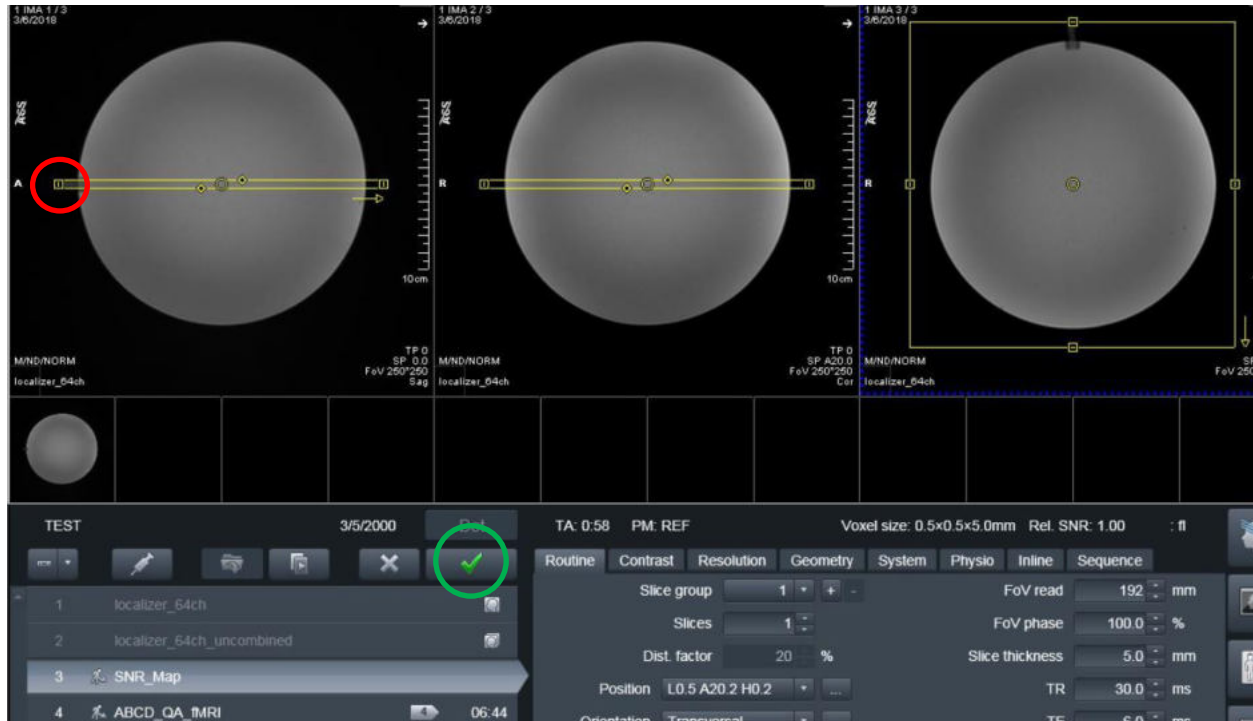


Register the Phantom

1. Press the “little person” key on the keyboard to bring up the registration screen
2. Enter phantom information (all required fields are indicated in **bold** except required data destination= Referring physician)
 - **Last Name** = ABCDPhantom17_32CH or ABCDPhantom17_64CH
 - **Patient ID** = *copy the information from the **Last Name** field to the **Patient ID** field.*
 - **Sex** = “other”
 - **Age** = “18”
 - **Height** = “5ft”
 - **Weight** = “100 lbs”
 - **Referring Physician** = select “ABCDPHANTOMGROUP”
 - **Patient Position** = select “Head First Supine”
3. Click “Exam”
4. Another box will pop up
 - Under ABCD choose the appropriate protocol:
 - ABCD_QA_full__32ch (29:04min)
 - ABCD_QA_quick__32ch (15:36min)
 - ABCD_QA_full__64ch (29:04min)
 - ABCD_QA_quick__64ch (15:36min)
 - Click “Confirm”

Running Scans

1. Press the green play button to start the first localizer
2. Set up sequence #3: SNR_Map by centering the yellow box on the phantom – it should be placed right through the cap (the cap is circled in red below) then click the green check (green circle)



3. Set up sequence #4 by centering the yellow box on the phantom – click the green check
4. **Press ok to the “Stimulation Monitor Warning” that will pop up after #3 finishes running** – you can step away to let the sequences auto run after this step
5. The rest of the sequences will automatically copy the slice locations from #4 and run automatically
6. When scanning is complete, remove the phantom/cushions and place them securely in the phantom cabinet bin

Registration Pictures

PATIENT

Last name: ABCDPhantom17

First name:

Title:

Patient ID: ABCDPhantom17

Date of birth: 10/25/1999 [M/d/yyyy]

Sex: Male Female Other

Age: 18 Years

Height: 5 ft in

Weight: 100 lbs oz Metric

Additional info:

PROCEDURE

Accession No:

Request ID:

Requested procedure(s):

Patient position: Head First - Supine

INSTITUTION

Institution name: UCLA Brain Mapping Center

1. Performing physician:

1. Operator:

HOSPITAL

Referring physician: ABCDPHANTOMGROUP

Requesting physician:

Admission ID:

ISO_IR 100

PATIENT SAFETY

Name: ABCDPhantom17

Position: Head First - Supine

Height: 5' [ft/in]

Weight: 100.00 [lb]

STUDY

All Programs | Frequent

USER:

- ▶ BEARDENGROUP
- ▶ BILDERGROUP
- ▶ BISLEYGROUP
- ▶ CHARLESGROUP
- ▶ CRASKEGROUP
- ▶ DAPRETTOGROUP
- ▶ ABCD
 - ▶ 20170306b
 - ABCD_PROTOCOL_one_session_32ch
 - ABCD_PROTOCOL_one_session_streaming_32ch
 - ABCD_PROTOCOL_one_session_64ch
 - ABCD_PROTOCOL_one_session_streaming_64ch
 - ABCD_QA_full_32ch**
 - ABCD_QA_quick_32ch
 - ABCD_QA_full_64ch
 - ABCD_QA_quick_64ch
- ▶ EISENBERGERGROUP
- ▶ FEUSNERGROUP
- ▶ GREENGROUP
- ▶ HARRISGROUP
- ▶ HORANGROUP
- ▶ HOSONGROUP

Load Program to Queue

Requested Procedure: ABCD 20170306b

Study Description: ABCD 20170306b [Add Study Comment](#)

Body Part and Laterality: Brain Unpaired

FIRST LEVEL MODE

SAR:

Gradient:

MEDICAL INFORMATION

Contrast Allergies:

Pregnancy Status:

Medical Alerts:

Special Needs:

How to Trigger Test Stimuli/Tasks

Setting up the Phantom

1. Place the phantom and phantom cushion inside the 20ch head coil (round end at top of coil)
2. Secure the top half of the head coil by clicking it in and plugging in cable(s) if necessary
3. Raise the table
10. Turn on the laser light and set the landmark
11. Slide the table fully into the scanner
12. Close and flip the air seal on the scanner door

Register Phantom

1. Press the “little person” key on the keyboard to bring up the registration screen
2. Enter phantom information (all required fields are indicated in **bold** except required data destination= Referring physician)
 - **Last Name** = *TriggerTest*
 - **Patient ID** = *copy the information from the Last Name field to the Patient ID field.*
 - **Sex** = “other”
 - **Age** = “18”
 - **Height** = “5ft”
 - **Weight** = “125 lbs”
 - **Referring Physician** = select “QC Group”
 - **Patient Position** = select “Head First Supine”
3. Click “Exam”
4. Another box will pop up
 - Choose Study = TriggerTest
 - Click “Confirm”

Running Scans

1. Double check the sequence to open and then click the “the green check” to start the shim
2. When you are ready to trigger your task please the continue button
3. Don’t forget to plug the trigger cable into your computer
4. When scanning is complete, remove the phantom and place it securely in the phantom cabin

Registration Pictures

Patient Registration

PATIENT

Last name: TriggerTest

First name:

Title:

Patient ID: TriggerTest

Date of birth: 5/4/1999 [M/d/yyyy]

Sex: Male Female Other

Age: 18 Years

Height: 5 ft in

Weight: 125 lbs oz Metric

Additional info:

[Details...](#)

PROCEDURE

Accession No:

Request ID:

Requested procedure(s):

Patient position: Head First - Supine

HOSPITAL

Referring physician: QCGROUP

Requesting physician:

Admission ID:

INSTITUTION

Institution name: UCLA Brain Mapping Center

1. Performing physician:

1. Operator:

ISO_IR 100

Patient Confirmation

PATIENT SAFETY

Name: TriggerTest

Position: Head First - Supine

Height: 5' [ft]

Weight: 125.00 [lb]

FIRST LEVEL MODE

SAR

Gradient

MEDICAL INFORMATION

Contrast Allergies:

Pregnancy Status:

Medical Alerts:

Special Needs:

STUDY

All Programs | Frequent

USER

- ▶ Daily_Stability_Test_Prisma
- ▶ Abnormal_Brain_Protocol_Prisma
- ▶ TriggerTesting
 - ▶ TTL_20ch_ONLY
 - BMC_Prisma
- ▶ ALGERGROUP
- ▶ BASSOGROUP
- ▶ BEARDENGROUP
- ▶ BILDERGROUP
- ▶ BISLEYGROUP
- ▶ CRASKEGROUP
- ▶ DAPRETTOGROUP
- ▶ ABCD
- ▶ EISENBERGERGROUP
- ▶ FEUSNERGROUP
- ▶ GREENGROUP
- ▶ HARRISGROUP
- ▶ HORANGROUP
- ▶ IACOBONIGROUP
- ▶ JAINGROUP
- ▶ JOSHIGROUP
- ▶ KNARRGROUP

Load Program to Queue

Requested Procedure: Daily_Stability_Test_Prisma 20ch_hdn...

Study Description: TriggerTesting TTL_20ch_ONLY [Add Study Comment](#)

Body Part and Laterality: Brain Unpaired

Slice Timing for BOLD Sequences and other BOLD Questions

1. When EPI slice are collected in a mosaic/volume, are they interleaved or sequential?
 - Interleaved (that is the default)
2. When collected interleaved, are all the odd numbered slices collected first?
 - It depends on the number of slices in the group
 - If there are an even # of slices then even numbered slices are collected first
 - If there are an odd # of slices then odd numbered slices are collected first
3. Is slice #1 always at the “lowest” part of the brain and the last slice at the top?
 - The default “image numbering” in the transversal/axial plane is F>H - so the bottom slice is acquired first
4. In regards to the timing of slices, is the scanner set to collect slices in an equidistant fashion within the TR time or as fast as possible?
 - Within the TR time

Preparation Scans related to Regular BOLD Sequences

1. To ensure that a steady-state magnetization is achieved when multiple averages or measurements are acquired, a number of preparation scans are performed at the start of the measurement
2. The number of preparation scans is set within the sequences, and chosen so that the preparation time is longer than 3 seconds
 - TR = 500 ms 7 preparation scans
 - TR > 501 ms 6 preparation scans
 - TR > 601 ms 5 preparation scans
 - TR > 751 ms 4 preparation scans
 - TR > 1001 ms 3 preparation scans
 - TR > 1501 ms 2 preparation scans
 - TR = 2000 ms 2 preparation scans
 - TR = 2500 ms 2 preparation scans
 - TR = 3000 ms 2 preparation scans
 - TR > 3001 ms 1 preparation scan
3. The preparation scans result in a longer scan time for the first measurement in a time-series acquisition, which should be taken into account when performing BOLD imaging
4. The sequence does not send external trigger pulses when performing these preparation scans, so that they do not have to be considered when triggering external devices for stimulus presentation in BOLD imaging studies
5. This formula does not apply to multiband bold sequences
6. Turning iPAT on will add 1 additional prep scan
7. Turning introduction “on” will add 1 additional prep scan

Current Designs Button Box and Trigger Setup (FORP 932)

There is no on/off switch and this device does not need to be unplugged



Device Selection

1. **DO NOT** set the interface settings until you plug in the button box inside the scanner room – the button responses will not work
2. Note - you do not need to plug in a box if you only need a trigger – just choose your interface setting with appropriate trigger (5s or Ts)
3. Click dial in once and scroll to yes in “change modes” menu and click dial once
4. Scroll to “autoconfigure” and click dial once
5. Scroll to “usb” and click dial once
6. Below is a list of available devices – autoconfigure will automatically choose the box that is connected in the scanner room
 - [HHSC - 1X4-L](#) - buttons straight in a row
 - [HHSC - 2X2](#) - split boxes, you may use just one box if applicable
 - Left box sends dnwe or 9876
 - Right box sends bygr or 1234
 - [HHSC – 2x4](#) - curved row of buttons, you may use just one box if applicable
 - HHSC Joy-1 joystick (older model than what is on the current designs website)
 - [HHSC TRK-1 trackball](#)
7. You may see other devices listed that are not available, contact BMC Techs for more info
8. Once you have selected your device, you will see the “Response Settings” menu

Response Settings

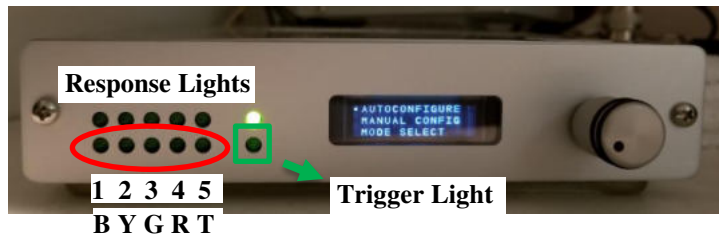
1. Scroll to applicable setting and click dial once
 - HID KEY BYGRT - use this for letter responses and T is the trigger
 - this is the same as 0 setting on previous interface box
 - HID KEY 12345 - use this for number responses and 5 is the trigger
 - this is the same as 4 setting on previous interface box
 - HID KEY NAR - Non-auto release – (release code is not sent until key is released)
 - this is the same as 2 setting on previous interface box
 - [this setting is often required for psycho tool box in matlab](#)
 - HID KEY NAR 12345 - Same as above but with numbers
 - HID KEY 1-9 No 5

- For MacStim users – no trigger will be sent - users must manually start scan
2. On the small screen you will see the “setting description” which includes the device selected as well as the response setting selected
 3. Be sure to plug in the trigger cable before starting your stimuli
 4. Set the interface back to the “autoconfigure” menu after scan



Troubleshooting

Button Response and Trigger Interface Box



A. Button responses are not coming through

1. If the button response lights (red circle above) on the interface are visible, but your computer is not receiving the responses then
 - Check to make sure the trigger cable is plugged into your computer
 - Check to make sure you have chosen the correct response setting (12345 or bygrt)
2. If the button response lights (red circle above) are not visible on the interface
 - Check to make sure the correct button box is plugged in inside the scanner room
 - Make sure your participant is pressing the buttons

B. The task is not triggering

1. Make sure the trigger cable is plugged in to your computer
2. Make sure the interface is set to the appropriate trigger value in your script (5 or T)
3. Make sure you started the scan and waited long enough for the dummy time to complete– the trigger light (green square above) on the interface will blink once triggers are being sent so you can watch for the signal
4. Make sure you are on the correct screen on your computer for the task to begin (sometimes you may need to advance to another screen)
5. Check your script
6. Check the trigger cable connection on the interface box to make sure it is secure
 - the blue circle on the below picture shows where it connects in the back of the interface box – it does not lock in place or screw in, so just push on it gently to make sure it is seated on the connector
 - the yellow square is the other end of the connection – this should not come loose as it screws in, but you can also check it to make sure it is connected
 - BE VERY careful not to unscrew/loosen anything else – DO NOT remove box from velcro



C. USB is flashing on the interface LCD screen

1. This indicates the USB trigger cable is not plugged into your computer

D. It looks like buttons are being held down because the button interface lights are on

1. Check the interface settings first – it is likely that the interface is set for the wrong box (i.e. 2x2 instead of 1x4 etc)
2. Ask the participant if they are pressing/holding down the buttons
3. Check the actual button box to see if something is pressing against the buttons

E. Interface Menu Issues

1. If you get “lost” in the menu, just scroll down to “back” until you get to the proper menu

Goggle Setup

Tech Remote (Talk Box)

1. To change any settings on the Tech Remote intercom you will need to scroll the far right wheel “Menu” to the appropriate setting - press down on the wheel - scroll to change the setting - press down again to lock in that setting
2. Connect the goggle VGA cable to the laptop or select “GOGGLES” on the “desktop switch box” if you are using the desktop computer
3. Connect the appropriate audio cable (res tech or opto) to the computer you will be using
 - Laptop: the audio cable connects directly to the laptop
 - Desktop: the res tech audio cable connects to the audio jack in the white drawer labelled “AUDIO TO DESKTOP”
4. Make sure the computer is on (BMC Mac laptop, your laptop or the Dell Desktop)
5. Go to Menu on the “Tech Remote,” and set the “Video Mode” (what the participant sees)



6. Go to Menu on the Tech Remote and turn on the “System PWR” (turn this off when you are done with your scan)
7. “Visor PWR” should always be on (do not turn off after scan)

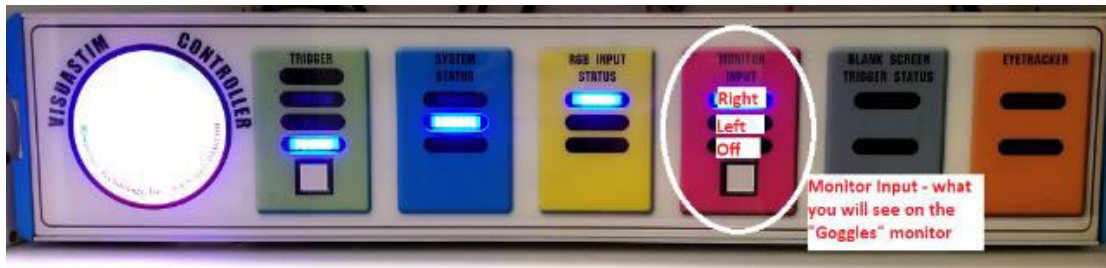


8. DO NOT assume that the display on the “Goggles” monitor will be correctly mirrored to the goggles – always verify the correct display is being projected by physically looking through the goggles during protocol development scans or by asking the participant to describe what they see on the screen

Visuastim Controller

1. On the “Visuastim Controller,” make sure the “Monitor Input” (what the researcher sees on the “Goggles” monitor) is set to:

- RIGHT if you want to see the Dell Desktop on the “Goggles” monitor
- LEFT if you want to see the BMC Mac laptop or your laptop on the “Goggles” monitor



Troubleshooting

1. If the goggles aren't working, turn off the “System PWR” on the talk box, wait 10 seconds and then turn it back on
2. If the goggles still aren't working
 - Check the VGA cable if using a laptop
 - Check the “Tech Remote” to make sure
 - “VISOR PWR” is on
 - “System PWR” is on
 - MONO-L or MONO-R has been appropriately chosen
 - “VideoRES” is set to 60Hz, 800x600
 - Make sure the appropriate monitor input is chosen on the “Visuastim Controller” box – this only controls what you see on the monitor not the goggles screen
 - Check to make sure the computer's resolution is set to 800x600 at 60hz
 - Make sure the goggle power supply is turned on
 - black box to the left of the BMC Mac laptop -switch is in the front
 - Make sure that the “Visuastim Controller” is turned on (red circle)



3. If the goggles still aren't working, try the [1-2-3 tech remote reset](#)

Resonance Technology Tech Remote (Talk Box) Setup



Volume Settings

1. Hearing sensitivity varies so always check with your participant to make sure you are using the appropriate volume level - start at a level of 50 and adjust up or down from as needed
2. Patient Volume (wheel #1): Changes the volume in the participant's headphones - what the participant hears task or movie computer
3. Patient Mic (wheel #2): Changes the volume of the participant's voice – what the operator hears when the participant talks
4. Main Volume (wheel #3): Changes the volume of the control room speaker which outputs sound from the operator's computer (i.e. tasks, music or movie) – so you can hear what the participant hears
5. To change the operator's volume - what the participant hears from the researcher – hold down the talk button and scroll wheel #1

Audio Input

1. Should be set on "Audio-1"
2. Click "Menu" then scroll to "Audio Input"
3. If you are plugging in an external audio device to the interface speaker (i.e. ipod) you must change to "Audio-2"

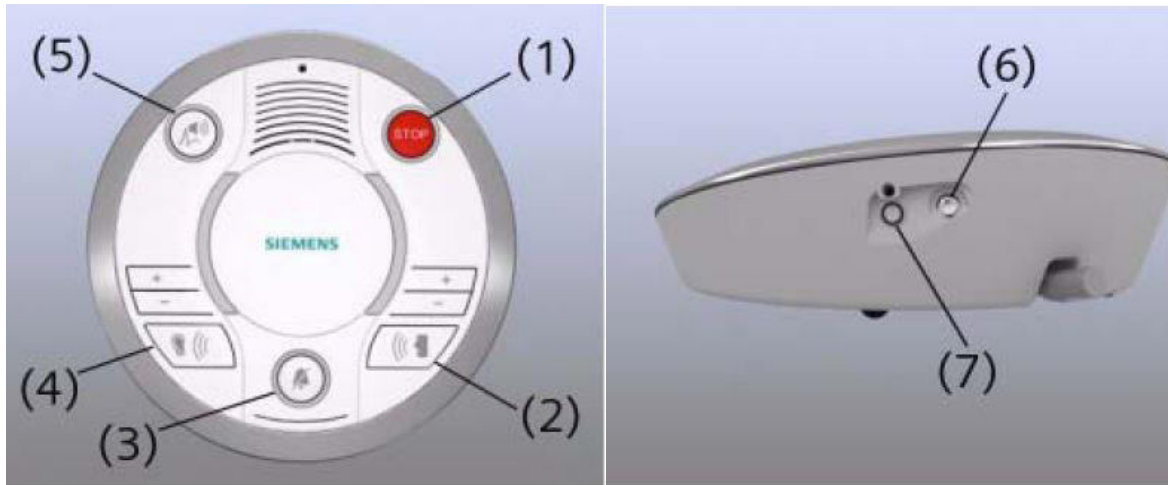
Comm. Mode settings

1. Click "Menu" then scroll to "Comm. Mode"
2. The "manual" setting automatically turns off the sound coming from the participant's mic after a few seconds
3. The "auto" setting will have constant sound coming from the mic – (i.e. you will be able to hear scanner noise - not ideal to use this setting while scanning)

Tech Remote Reset

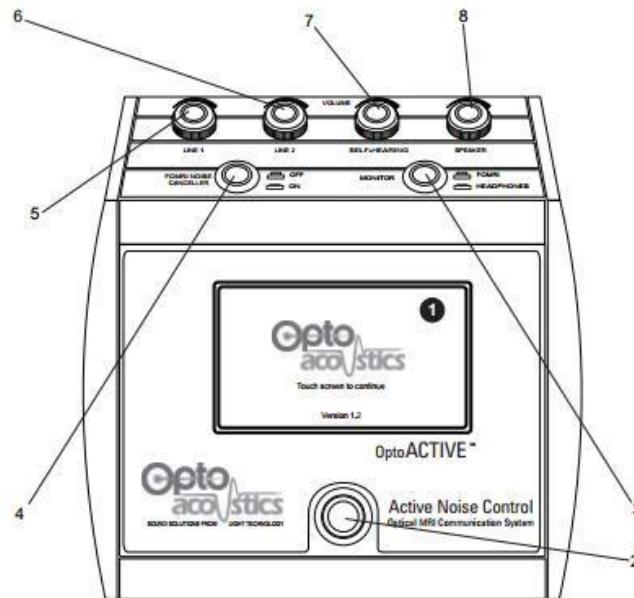
1. Scroll first blue wheel to 1
2. Scroll second blue wheel to 2
3. Scroll third blue wheel to 3
4. Hold down the TALK button until you see it countdown 15 seconds
5. You will see the box initializing and then read: Transducer Off
6. You may now adjust the system according to your specifications
7. You will also see the screen's default appearance as above

Siemens Talk Box Setup



1. You must use the Siemens talk box to talk & listen to your participant if you are using the Siemens headphones or no headphones
2. You must also make sure that the volume on the scanner's control panel is turned up so the participant can hear the task computer
3. Press the "ear" button (#4) to hear the participant
4. This is the sound that comes from bore speaker - you can use this to listen even if you use the res tech or opto headphones
5. Make sure the sound is turned up
6. Press the "talk" button (#2) to talk to the participant
7. Make sure the sound is turned up
8. For music plug in audio device to the port labelled (#6)

Optoacoustics Headphone and Microphone Setup

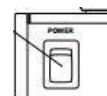


Positioning the Participant

1. You may use the Opto headphones with or without earplugs
2. Position the headphones on the participant and be sure to use pads or paper towels to take up the extra space between the headphones and coil (this is especially important if you are using the active noise cancellation feature)
3. Position the microphone if applicable - be sure it is almost touching the participant's lips

Setting up the Opto Console

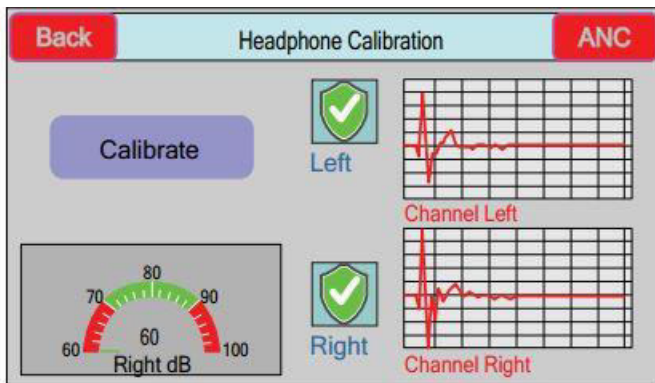
1. **AFTER** moving the participant into the bore, turn on the Opto control box using the black switch on the back right side of the console
2. Touch the screen to continue
3. If you are playing audio (movie, music or an audio task) connect the audio cable to either the green connection inside the white drawer for the desktop computer or to a laptop port – the other end of this should be connected at the back of the Opto console in “line 1”
4. The line 1 (#5) knob controls the volume of this audio
5. The left button (#4 FORMI NOISE CANCELLER) on the Opto console should always be pressed down “On”
6. The right button (#3) should always be up (in the FORMI position) when talking to the participant - otherwise feedback will be generated
7. During the movie or task you can press the right button down (#3 headphones position) to hear what the participant is hearing – just don't forget to put it back up before talking to the participant
8. To talk to the participant press the bottom silver button (#2)



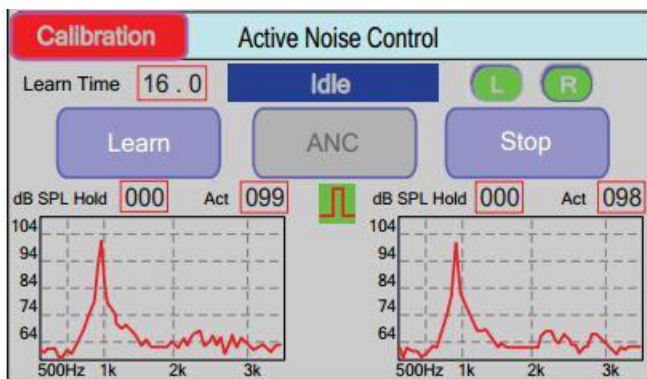
9. Use the Siemens talk box to listen to your participant’s responses
10. The speaker knob (#8) controls the volume that you hear in the control room
11. Note: there is no volume control for the volume of your voice to the participant – please manually adjust your voice volume if need be

Using Active Noise Cancellation

1. Only proceed to the below steps if you are using the active noise cancelling (ANC) feature
2. Press “Start” then “Calibrate” – you should get two green check shields – participant must be inside the bore during this step




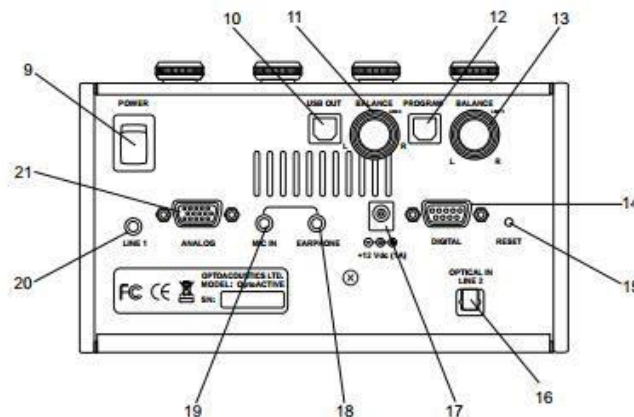
3. When you are ready to calibrate for your BOLD runs, press the red “ANC” button in the top right corner
4. Unplug the audio cable – this eliminates the possibility of accidentally transmitting sounds during the calibration step
5. Start your calibration scan and then immediately press “Learn” – this takes 16 sec – it is very important to not transmit any auditory stimuli/movie during the learn mode












6. NOTE: if you remove you participant from the bore for any reason you will need to repeat steps 2-5
7. You are now ready to start your task

Troubleshooting Tips

1. If you are using the active noise cancellation and get a “out of range” error this means your volume was too high – press the “Stop” wait a couple seconds and then press “ANC” again to reactivate the noise cancellation
2. To reboot the system, turn off the power switch on the back of the console – wait 20s – then turn it back on
3. If the participant can only hear out of one ear, check the balance nodes (#11 and #13) on the back behind the line 1/line 2 knobs – make sure it is balanced in the middle
4. If the participant can’t hear the movie or auditory stimuli check that all the correct cables are connected, the sound on the computer is not muted and the line1 dial is turned up, if everything is ok reset the system (step#2) to resolve the issue
5. If the participant can’t hear you, you will see a “Laser Fault”  icon (see icon list below) on the screen that says “Start” – this is the first screen after “touch screen to continue” – try to reset the system (step#2) to resolve the issue



Console Touch Screen Icons

	Laser Fault Laser is not connected or otherwise not functional
	Checking headphone channel prior to calibration
	Calibration has succeeded for this headphone channel
	Calibration has failed for this headphone channel
	TTL Synchronizing (when the icon is moving)
	Connection is good Communication with System DSP has been established
	Connection is bad Communication with System DSP has not been established
	VU Meter Panels (Left and Right) Measures signal from reference SPL microphone located inside the optical headphones
	Monitored Signal (Left and Right) Shows source and treated audio signals during the scan, after ANC function has been started

Avotec Back Projector Setup



Turning on the Back Projector

1. For laptops: plug the projector HDMI cable into the laptop using an adapter if needed (the desktop is always plugged in and active)
2. Flip the power switch (red circle on picture) on the front of the black “PROJECTOR” switch box to turn the system on
3. Use the select button (green circle on picture) to choose “L” for a laptop computer
4. Use the select button (green circle on picture) to choose “D” for the Dell Desktop computer
5. The monitor labelled “PROJECTOR” is a duplication of what is being projected to the participant’s screen
6. Note - the “PROJECTOR” monitor will show the computer image about 7 seconds before it is displayed on the projector screen so be sure to pause before asking your participant if they can see the screen (it will sometimes go off, then blue, then black then project – be patient)



Positioning the Participant

1. Select the mirror frame and mirror for the coil you are using
2. Place the mirror frame onto the anterior portion of the coil
3. Snap the mirror onto the frame – the curved side of the mirror should point in the direction of the participant’s feet
4. Position the mirror so that the participant can see the whole back projector screen without straining their neck or eyes
5. Laser landmark the participant per usual (if you have trouble marking the laser with the mirror on you may laser the participant before attaching the mirror – be sure you have the participant close their eyes)
6. Prescription lenses are available if needed – they range -6 to +6 and are kept in the cabinet above the participant lockers

Troubleshooting Tips

A. The projector is not displaying the laptop screen, but you can see the desktop computer screen

1. Select “L” on the black projector switch box
2. If the switch box will not let you select “L” that means the laptop is not plugged in properly
3. Check the HDMI connection cable
4. If you are using a mini displayport adapter make sure it has not been plugged in upside down

B. There is no image at all on projector screen or monitor from the laptop or desktop computer

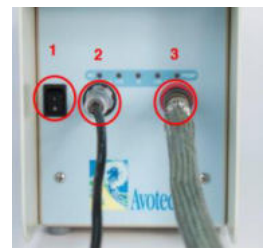
1. Make sure you turned on the black projector switch box
2. Reboot the black projector switch box
 - Turn off the power - wait 5 sec
 - Turn on the power
 - Use the select button to choose “D” or “L”
3. If you tried steps 1-2 and you still do not have an image, reboot the power cooling system in the equipment room
 - First turn off the black projector switch box
 - Flip off the power switch (#1 on cooling system) on west side of the box – leave off for 10sec then turn it back on
 - Wait for the projector to cycle through the boot up splash screens on the projector screen – once it is done you may turn the black projector switch box back on and select “L” or “D”



Power Cooling System

C. The projector turned off after the task ended – the screen is completely blank and there is no light coming from the projector

1. Reboot the power cooling system in the equipment room – which is inside the sliding glass door to your left when you are sitting at the scanner computer
 - First turn off the black projector switch box
 - Flip off the power switch (#1 on cooling system) on west side of the box – leave off for 10sec then turn it back on
 - Wait for the projector to cycle through the boot up splash screens on the projector screen – once it is done you may turn the black projector switch box back on and select “L” or “D”



D. The computer screen is not being projected – the projector screen is black or blue and says “not support”

1. For Laptops: unplug and re-plug HDMI cable after rebooting the black projector switch box
2. Check display settings
 - PCs should be set on 800x600 and 60Hz
 - MAC laptops should be set on “best for display”

3. Reboot the black projector switch box
 - Turn off the power - wait 5 sec
 - Turn on the power
 - Use the select button to choose “D” or “L”
4. If that doesn't work then reboot the power cooling system in the equipment room
 - First turn off the black projector switch box
 - Flip off the power switch (#1 on cooling system) on west side of the box – leave off for 10sec then turn it back on
 - Wait for the projector to cycle through the boot up splash screens on the projector screen – once it is done you may turn the black projector switch box back on and select “L” or “D”

E. The projected image doesn't look right: is split into multiple segments, off centered, lined or dimmed etc

1. Reboot the black projector switch box
 - Turn off the power - wait 5 sec
 - Turn on the power
 - Use the select button to choose “D” or “L”
2. If that doesn't work, for Laptops: unplug and re-plug HDMI cable after rebooting the black projector switch box
3. If that doesn't work then reboot the power cooling system in the equipment room
 - First turn off the black projector switch box
 - Flip off the power switch (#1 on cooling system) on west side of the box – leave off for 10sec then turn it back on
 - Wait for the projector to cycle through the boot up splash screens on the projector screen – once it is done you may turn the black projector switch box back on and select “L” or “D”

F. The projector will not turn off – after turning off the switch box/unplugging the computer, the projector is still showing a blue screen

1. Reboot the power cooling system in the equipment room – which is inside the sliding glass door to your left when you are sitting at the scanner computer
 - Flip off the power switch (#1 on cooling system) on west side of the box – leave off for 10sec then turn it back on

G. The projected image is upside down or backwards when viewing through the mirror

1. Note – the projected image will look backwards when viewing without the mirror – this is normal
2. To adjust the image walk into the back of the scanner room
3. Locate the back panel of the projector and press the image rotation button (#3 on projector) – don't touch #4

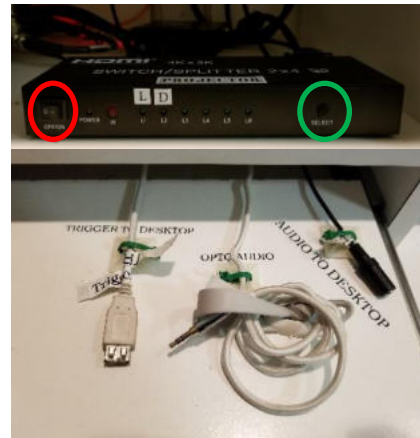


3 Image rotation. Each time this button is pushed, the image will change sequentially to a mirrored video image, inverted video image, or combinations of both states (a pause of about five seconds is required between each button push). Alternatively, if the button is held down, the image orientation will change continuously; release the button when the desired orientation is reached. In either case, the image orientation will be preserved after a system power down.

How to use E-Prime with the Desktop Computer and Projector

Mirrored Display with E-Prime

1. Setup the display to work with a mirrored E-Prime task
 - You do not need to touch the desktop switch box
 - Turn on the black projector switch box and use the select button to choose "D"
 - The projector and the "PROJECTOR" monitor should turn on
2. Plug in Cables
 - Plug the audio cable into the drawer plug labelled "AUDIO TO DESKTOP"
 - Plug the trigger cable into the drawer labelled "TRIGGER TO DESKTOP "
3. Run task
4. After tasks, unplug the "TRIGGER" from the drawer



Extended Display with E-Prime

1. Setup the display to work with an extended E-Prime task
 - Click the "EXT" setting on the "Desktop" switch box - EXT stands for extended
 - The monitor labelled "PROJECTOR EXTENDED" should turn on
 - Turn on the black projector switch box and use the select button to choose "D"
 - The projector and the "PROJECTOR" monitor should turn on
 - Right click on the desktop and click "Display settings"
 - Under "Multiple Displays" choose "Extend these displays"
2. Plug in Cables
 - Plug the audio cable into the drawer plug labelled "AUDIO TO DESKTOP"
 - Plug the trigger cable into the drawer labelled "TRIGGER TO DESKTOP"
3. Run task
4. After your scan
 - Right click on the desktop and click "Display settings"
 - Under "Multiple Displays" choose "Duplicate these displays"
 - Unplug the "Trigger" from the drawer

HCP Physiological Device Setup

ECG/Respiratory Setup

1. The ECG/Respiratory device **MUST** be placed into the gray holder – this module should never directly touch the participant’s skin

Pulse Setup

1. The finger pulse device should be placed on the left ring finger – nail polish remover is available in the scanner room drawer labelled HCP if needed (note the remover will not work on gel nail polish)
2. The pulse device should be placed in the white holder – this holder is not a safety requirement, but rather a stability aid

See the HCP SOP for “Setting up physiological monitoring in scanner” for more details



How to Use FIRMM to Monitor Motion during BOLD scans

Quick Overview

Register Participant → FIRMM_session_start → Localizer → Start FIRMM Software

Setup the Scanner Console

Follow these steps every time you run an MR session

1. Note – you do not need to be logged into advanced user to run FIRMM
2. On the scanner host computer, register a new patient
3. Then press **Ctrl-Esc**
4. Click **FIRMM_session_start**
5. Any scans that are "applied" after this should be sent to the FIRMM computer

Setup the Computer to View FIRMM

MAC Laptop

1. Plug the Ethernet cable into the BMC MAC laptop
2. Log in – password: albmc
3. The internet will take about a minute to activate – if you click the script shortcut and it doesn't work just wait a bit and try again
4. Make sure to launch the FIRMM software after your first localizer, but before your first fMRI
5. Double click the **Start_FIRMM.sh** script shortcut on the desktop which will execute the below commands:
 - Open a command terminal
 - Type **ssh -X firmmproc@10.2.0.79**
 - Password: **!@firmmuser**
6. Then type **FIRMM** to start the software
7. The software will take a moment to load

PC Dell Desktop

1. Press the "Ext" button on the desktop switch box to turn on the monitor labelled "PROJECTOR EXTENDED"



2. Intranet is already connected
3. Log in – password: **albmc** (if needed)
4. Make sure to launch the FIRMM software after your first localizer, but before your first fMRI
5. Click the **windows button** in the bottom left corner
6. Click on the **Xming** shortcut on the right (nothing obvious will happen)
7. Click the **windows button** in the bottom left corner
8. Then click on the **Xshell** shortcut on the right
9. Once the terminal opens click **Connect**
10. Then type **FIRMM** to start the software
11. The software will take a moment to load
12. When FIRMM starts, an X11 terminal should open and you should see a screen like this:



Using FIRMM

1. Once open, you need to click the start button at the top right of the FIRMM GUI window to begin monitoring for DICOMs

FIRMM version 2.1.0



2. Once FIRMM has been started, it will process each bold sequence
3. There is about a 40sec delay before data is generated for each bold – the data will start to stream from FIRMM around the same time that the inline display shows images

- When FIRMM first begins processing, a dialog box will appear asking you to check that the participant ID on the FIRMM screen is correct



- If the participant ID is correct for the current session, you may continue
- If the participant ID that appears on FIRMM's display is not correct for this session, you will be asked to restart FIRMM after some DICOMs have been sent for your current session
- To restart, close FIRMM and relaunch the program - make sure you have collected at least a localizer scan before you press start again.
- To reload graphs from previous participants, click the [Load Previous Scan](#) button and choose the participant
- Close out all open windows on the dell desktop computer when you are done using FIRMM and turn off the "ext" button on the switch box



HCP Guidelines (see full HCP SOP for more details)

1. STOP and REPEAT SCAN in the first 60 sec if the [**< 0.4 mm section score**] is **50% or less** (green square above)
 - 0.4 mm < 50% in first 60 sec = high motion = stop and repeat scan
2. GIVE FEEDBACK ONLY – let the participant know that their last scan showed “high motion” if the [**< 0.3 mm section score**] is **75% or less** (orange square above)
 - 0.3 mm < 75% = high motion = give participant feedback (do not stop scan)
3. In general, a scan with
 - 0.3 mm < 75% = high motion ☹
 - 0.3 mm > 90% = low motion ☺

After the Scan is Complete

1. Unplug and recoil the Ethernet cable and close the laptop
2. On the scanner host computer press **Ctrl-Esc**
3. Click **FIRMM_session_stop**
 - Note – sessions will also automatically stop when a new participant is registered

How to Use the MR Camera

Quick Overview


EXT On → Open VLC → Ctrl+C → Play → Resize VLC → Plug in Epi USB

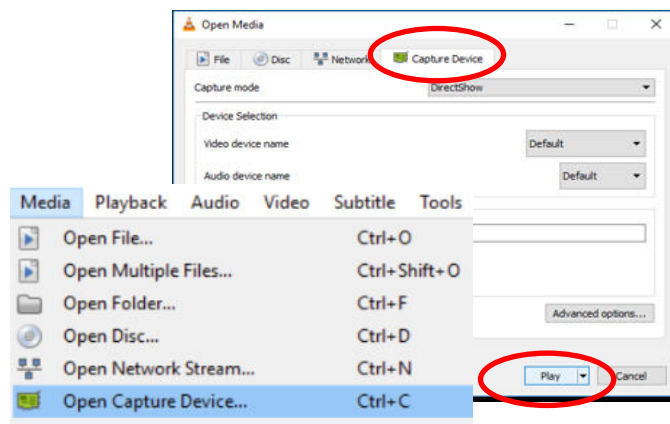
Equipment

1. Head coil
2. Head coil mirror frame
3. MReyes camera (mounted in the back of the bore)
4. Desktop Computer
5. Desktop switch box



Camera Setup

1. Press the **EXT** button on the desktop switch box to turn on the extended monitor
2. Click the **VLC icon** on the bottom task bar of the desktop computer 
3. Press **Ctrl+C** OR click **Media** and then **Open Capture Device**
4. Make sure you are in the Capture Device tab
5. Click **Play**



6. If you use the desktop computer for stimuli – switch it to extended display
 - Right click on the desktop and click **Display settings**
 - Under **Multiple Displays** choose **Extend these displays**
 - Drag your fixation cross or movie to the **projector** monitor so you can display the camera on the **projector extended** monitor
7. Note – the camera cannot be used if
 - Your stimuli requires extended display on the desktop computer
 - Your stimuli requires duplicate display on the desktop computer
 - You use the goggles

Participant Setup

1. Position your participant
2. Position the mirror so the participant can see the whole projector screen
3. Landmark the participant and move them into the bore
4. Verify camera positioning
5. If needed, adjust the camera (in the back of the bore) to see the participant's eyes through the mirror – this step should not need to be done unless someone has accidentally moved the camera
6. Turn the room lights to the HCP projector setting

Camera Cleanup

1. Close VLC
2. Change back to duplicate displays
 - Right click on the desktop and click **Display settings**
 - Under **Multiple Displays** choose **Duplicate these displays**
3. Turn off the extended monitor **EXT** on the desktop switch box

Equipment Manuals

Hard copies of manuals are located on the Prisma tech desk

[Current Designs Button Box and Trigger Manual - Forp 932](#)

[ViewPoint Eyetracker User Guide*](#)

[ViewPoint Eyetracker Data Analysis Guide*](#)

[Optoacoustics Manual](#)

[Avotec Projector Manual](#)

[MRI Safety Manual](#)

*available online only – no hardcopy

Movie List

- A Bug's Life
- Almost Famous
- Big Hero 6
- Cheaper by the Dozen
- Corpse Bride
- Crouching Tiger Hidden Dragon
- Daddy Daycare
- Deadpool
- Despicable Me
- Elf
- Endless Summer II
- Finding Nemo
- Forrest Gump
- Frozen
- Harry Potter and the Sorcerer's Stone
- In Search of Santa
- Incredibles
- Inside Out
- Lion King
- Lord of the Rings Fellowship
- Maleficent
- Napoleon Dynamite
- Planet Earth – Caves, Deserts, Ice Worlds
- Planet Earth – Seasonal Forests and Deep Ocean
- Planet Earth – Pole to Pole, Mountains, Fresh Water
- Planet Earth – Great Plains, Jungles, Shallow Seas
- Planet Earth – Saving Species, Into Wilderness, Living Together
- Predator
- Princess Bride
- Riding Giants
- SNL Chris Farley
- SNL Will Farrell
- Sandlot
- Seinfeld
- Shrek
- Shawshank Redemption
- Sisters
- Sponge Bob
- Stars Wars - The Phantom Menace
- Tangled
- Timeline
- Total Recall
- Toy Story
- The King's Speech
- The Matrix
- The One Jet Li
- The Rock
- The Wizard of Oz
- Up
- Winged Migration

ALSO ON THE BMC MAC LAPTOP