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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

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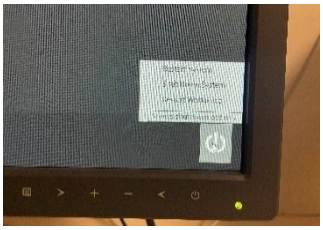
5. BMC Techs	BMCTechs@mednet.ucla.edu	(424) 652-6290
6. BMC Emergency ONLY Line: 323-999-1593		

Scanner Operation

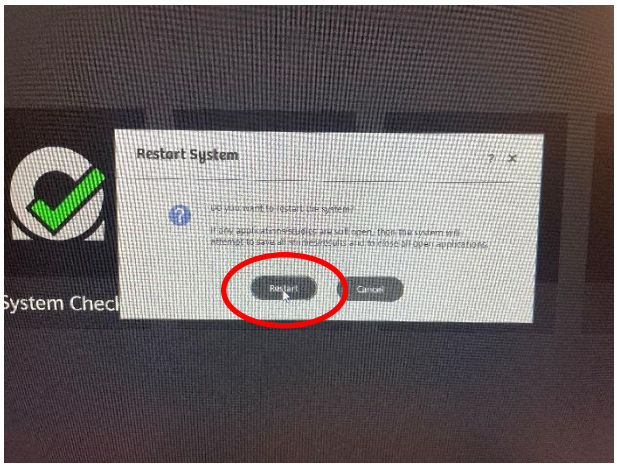
How to do a "Restart System" Reboot

This type of reboot clears most errors and takes approximately 6 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 elements should be plugged in
3. Go to the home screen and you will see a Power Button icon at the bottom right of screen
4. Click on "Restart System"



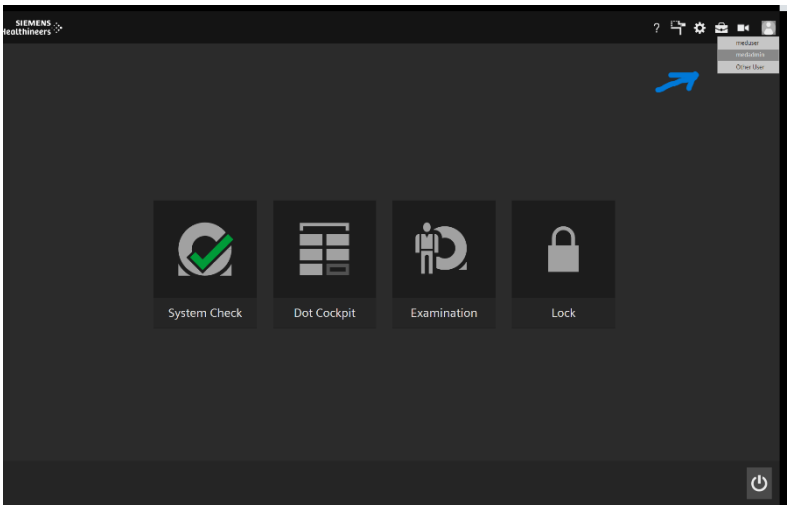
5. You'll get a pop-up box, click "Restart" - the computer screen will stay on for a bit & then turn black.



6. After the console software loads, login to the software:

    a. Click the "person" icon on the top right and select "medadmin" from the dropdown menu > click OK
    b. Type in the password located on the console monitor

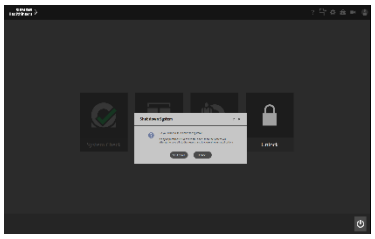
c. Then press Tab + Delete + Send on the keyboard all at the same time to complete the logon process (keys highlighted green in picture)



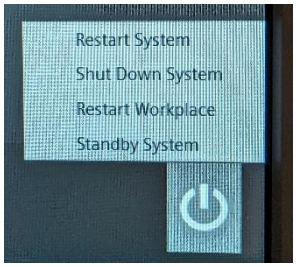
How to Turn Off the MRI Scanner/Computer (Full Shutdown)

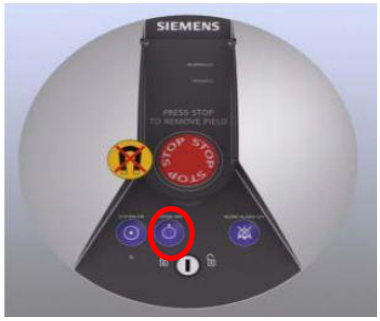
This type of full shutdown takes approximately 20 minutes – try this method if a "Restart" reboot did not clear the issue.

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 elements should be plugged in OR all unplugged
3. Go to the home screen and you will see a Power Button icon at the bottom right of screen
4. Click "Shut down system"
5. You'll see a pop-up box, Click "Shut down"



6. It will take approximately 5-10 minutes before you hear a clunk sound AND the LCD monitor on the scanner will turn black.
7. Note – the console computer will still look like it is on – you will see the mouse on a black screen or see the PC desktop screen.
8. Press the blue "system off" button on the Siemens scanner control box located on the wall next to the MR Scanner window





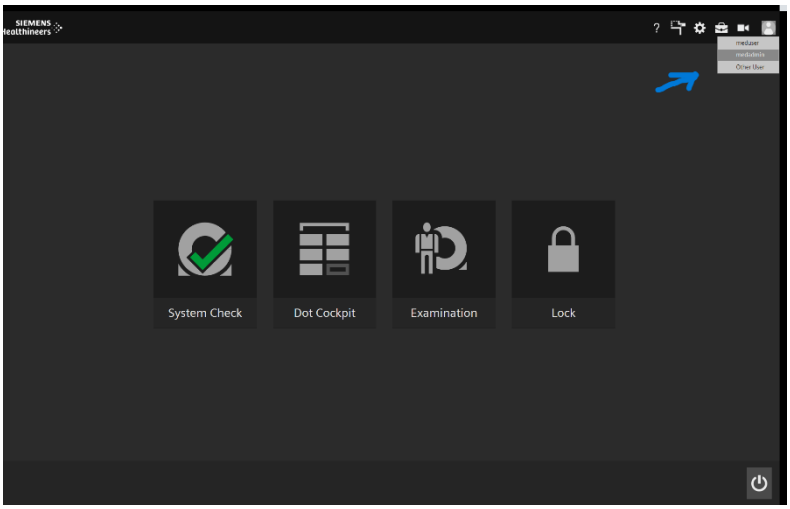
9. Wait 5min before turning the system back on

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 10 minutes for the system to completely boot up
3. After a successful reboot you will hear 3 small beeps and the LCD in the scanner will show the home screen. The console software will load first before the LCD screen finishes booting.
4. After the console software loads, login to the software (you can do this before the LCD finishes booting up:

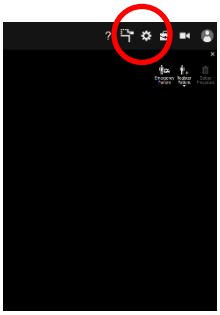
    - Click the "person" icon on the top right and select "medadmin" from the dropdown menu > click OK
    - Type in the password located on the console monitor
    - Then press Tab + Delete + Send on the keyboard all at the same time to complete the logon process (keys highlighted green in picture)

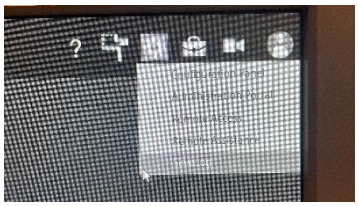


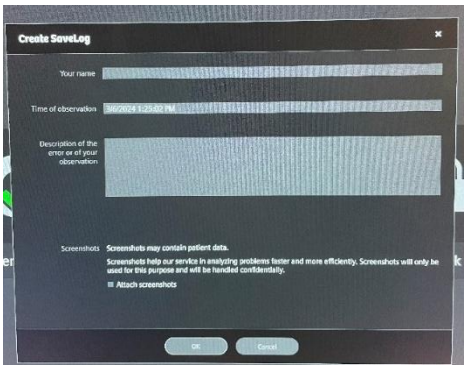
MR Scanner Error Save Log

1. Only do this if an engineer or tech tells you to make an MR save log.
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 – look to the right and find the "cog wheel" icon & click it
    - Click on "SaveLog""
        - You will see a box pop up, fill in the requested information about the error as best as possible
        - 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



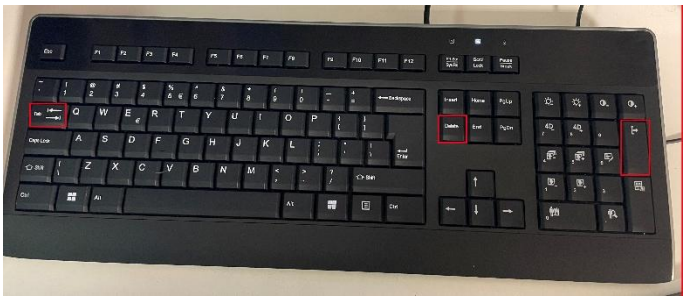




Re-import DICOM Data

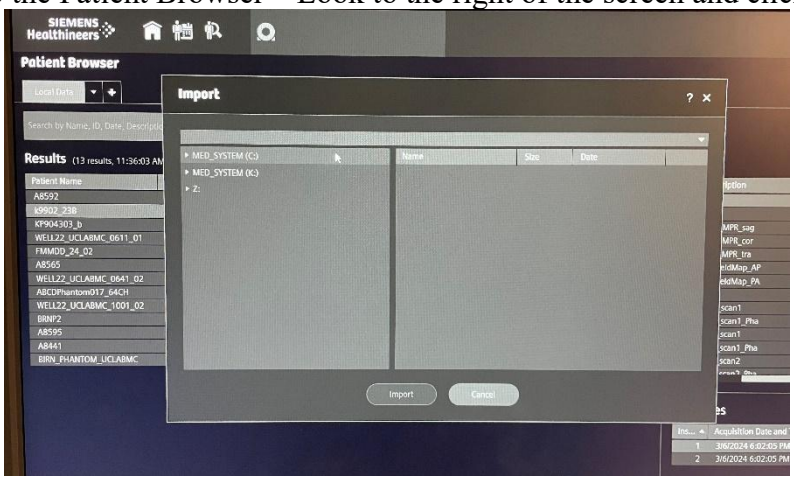
How to Map a Dicom Network Folder on the Scanner Console to Re-import a Scan

1. Click control and click escape key. You should see the PC computer menu/dashboard.
    - If you do not see the PC computer menu/dashboard, you will need to access it by holding 3 buttons at once: the Tab, Delete and Send buttons. This toggles you into PC access mode.

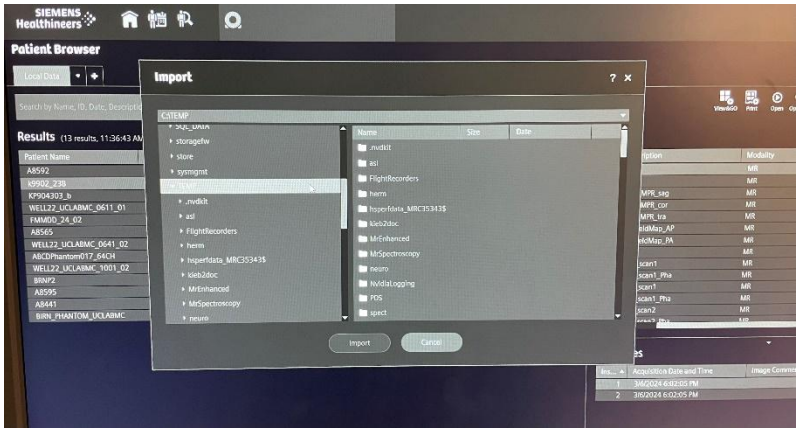


2. Click “This PC”
3. It is possible that the BMC Techs have already logged into the PC side & to Dicom7. If so, you’ll see one or both drives are ready to go & you can proceed to Step 5 below.
4. If the drives are not already logged in, you will need to map a drive
    - After accessing PC side of computer as described above, Right Click on "This PC” and then click, “Map Network Drive”
    - 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 M
    - Under “Folder” choose the path \\10.2.0.98\DICOM7 (or whichever dicom you are trying to access dicom7 is the current data directory)
    - Click on “Connect using different credentials" then click finish
    - Log in with your NRB credentials (don't forget the \bmap) before your name
        - bmap\username
        - Password
5. Navigate to your group folder and choose the participant folder that you want to import
6. Right click on the folder and click Copy
7. Now, open up Computer – then, Med System C: Temp/_User_Data (select a temp folder or create a new one)
8. Paste the copied files into the Temp folder

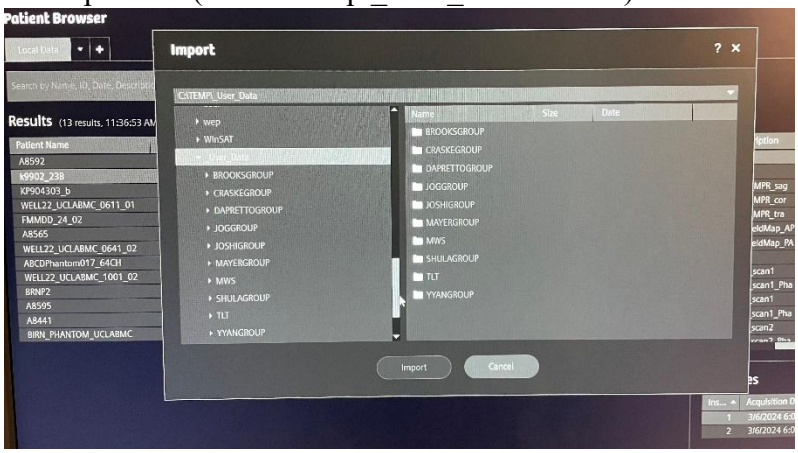
9. Now go to the Patient Browser – Look to the right of the screen and click “Import”



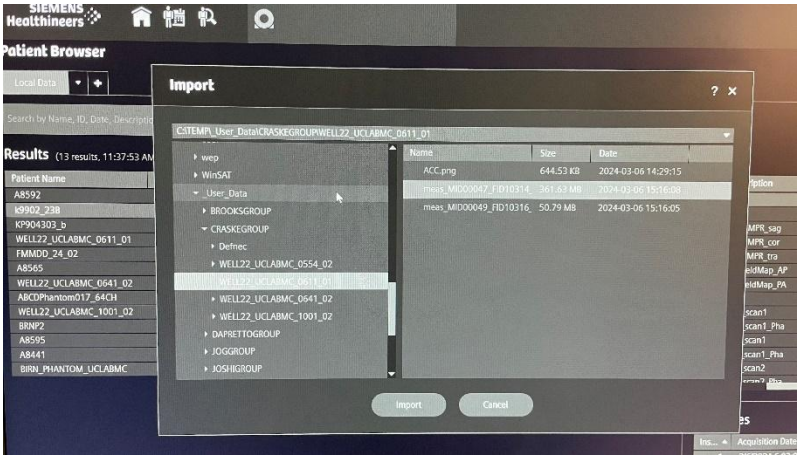
10. A box pops up, select from the left side of box: Medsystem(C):-TEMP-_Userdata



11. Select your Temp folder (i.e. C: Temp/_User_Data/Woods)



12. Select scan folder that you want to import & click “Import”

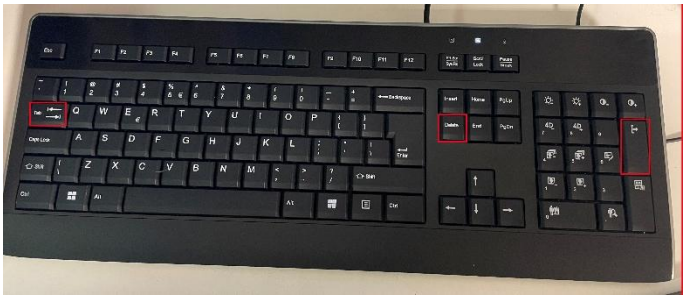


13. This loads the images/sequence to the patient browser
14. You can now export raw data or import sequences into MR view and go

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

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

1. Click control and click escape key. You should see the PC computer menu/dashboard.
    - If you do not see the PC computer menu/dashboard, you will need to access it by holding 3 buttons at once: the Tab, Delete and Send buttons. This toggles you into PC access mode.

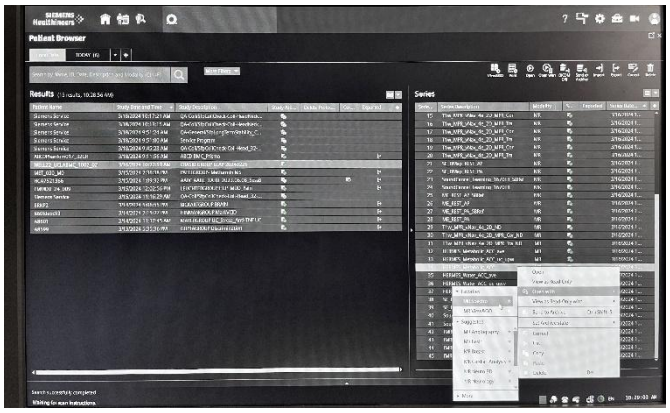


2. Click “This PC”
3. It is possible that the BMC Techs have already logged into the PC side & to MRIFile. If so, you’ll see one or both drives are ready to go & you can proceed to Step 5 below.
4. If the drives are not already logged in, you will need to map a drive
    - After accessing PC side of computer as described above, Right Click on "This PC” and then click, “Map Network Drive”.
    - 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 M
    - Under “Folder” choose the path \\10.2.0.98\MRIFILE or enter the path name manually if this is your first time mapping the drive
    - Click on “Connect using different credentials" then click finish
    - Log in with your NRB credentials (don't forget the \bmap) before your name
        - bmap\username
        - Password
5. Choose your group folder
6. This drive will allow you to save raw data etc into the network folder instead of on a usb drive
7. When you are done close the non-dicom folder windows
8. If your non-dicom NRB account is not working – save the raw data on the C: Drive in Temp/_UserData/LabName/ParticipantID folder
9. **Note – please remember to delete saved data from your non-dicom folder and scanner console temp folder as soon as possible – data is not meant to stay in these folders indefinitely as there is limited space**

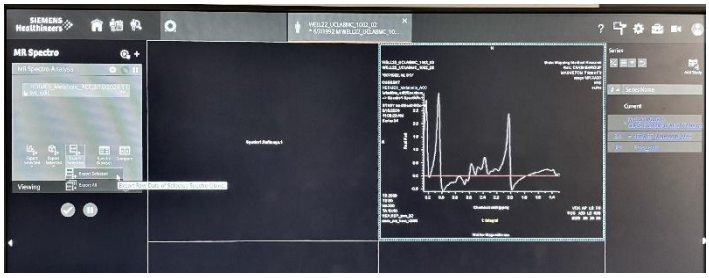
How to Create a Spectroscopy .RDA File

1. Go to Patient Browser
2. Select MRS sequence

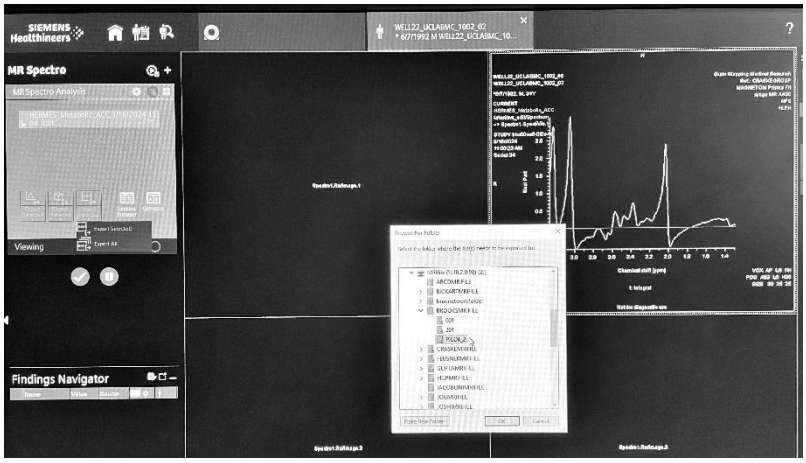
3. At top of the screen, click “Open with MR Spectro”



4. While in MR Spectro application, look to left of the screen and select “Raw-Export Selected”



5. You’ll see a Pop-Up box where you will select the folder to save too. Typically this is: MedSystem C: - Temp – _User_data – BMCGroup OR you can save directly to your MRIFile folder.

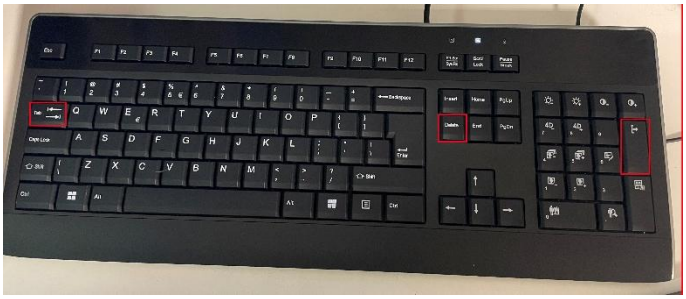


6. Your group should have their own temp folder & Non-dicom MRIFile folder setup prior to this step
7. Then click "OK”
8. This data does not get overwritten as long as you have the scan data

9. **Data needs to be manually deleted from the temp folder and non-dicom folder as soon as possible due to limited space.**

How to Transfer Raw Data Using TWIX Software

1. Click control and click escape key. You should see the PC computer menu/dashboard.
    - If you do not see the PC computer menu/dashboard, you will need to access it by holding 3 buttons at once: the Tab, Delete and Send buttons. This toggles you into PC access mode.



2. Open the Command Prompt
3. Type: TWIX - then press enter
4. All raw data will be listed
5. Select the raw data you wish to save by choosing the correct participant ID and sequence(s)
6. Hold down control if selecting multiple files then right click on one and choose the top option "copy total raid file"
7. Copy and paste these files into your non-dicom folder (preferred method) or to a temp folder on the C drive (typically your group will have their own temp folder)
    - Temp files can then be copied to a non-dicom folder
8. **Data needs to be manually deleted from the temp folder and non-dicom folders as soon as possible due to limited hard drive space.**

How to Burn a CD/DVD From the Scanner Console

1. Get USB key from upper left cabinet above Techs desk in the Prisma Control room
2. Unlock one of the USB drives on the Prisma tower computer to the left of the Prisma operator's console
3. Plug the external CD/DVD drive into the open USB port you just unlocked and insert a blank DVD or CD
    - Disks that can be used to burn data:
        - DVD's
            - 8x DVD + or -R
            - 8x DVD + RW
            - 6x DVD – RW
        - CD's
            - 24x CD-R
            - 24x CD-RW
4. Open the patient browser on the console once the blank CD/DVD has loaded. You may need multiple CD's or DVD's depending on the size of your dataset
5. Highlight the participant's parent level folder for the whole scan or any individual sequences you want to burn (use CTRL to highlight multiple seq at once)
    - Must burn all sequences in one setting – you cannot add more later as the disk gets finalized
6. Near the top of the screen, select "Export", this will open up another field
7. Select "Optical disk"
8. Input at least 3 digits in the field "Media label"
9. Select "Include image viewer on disk"
10. "Action" should be set to "Burn"
11. Click "Export"
12. When the disc is done burning, it will automatically eject the disc from the drive
13. Put everything back the way you found it

Prisma Cleanup Procedures

General Cleanup Guidelines

CLEAN EVERYTHING THAT YOU OR THE PARTICIPANT TOUCHED

1. Put the head coil away in the coil cabinet with the top attached

2. All cables should be untangled and placed on the appropriate hooks completely off the ground to prevent being stepped on

Correct

incorrect

3. All equipment (headphones, button box, squeeze bulb, coil etc) that you used should be wiped down with Saniwipes to disinfect

4. The button response box should be disconnected and stored in the appropriately labelled drawer

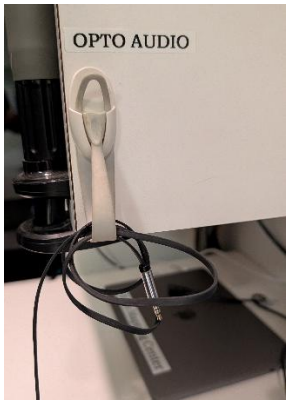
5. The squeeze bulb should be coiled at the end of the bed
6.

7. The sandbags and leg cushion should be stored on the white chair

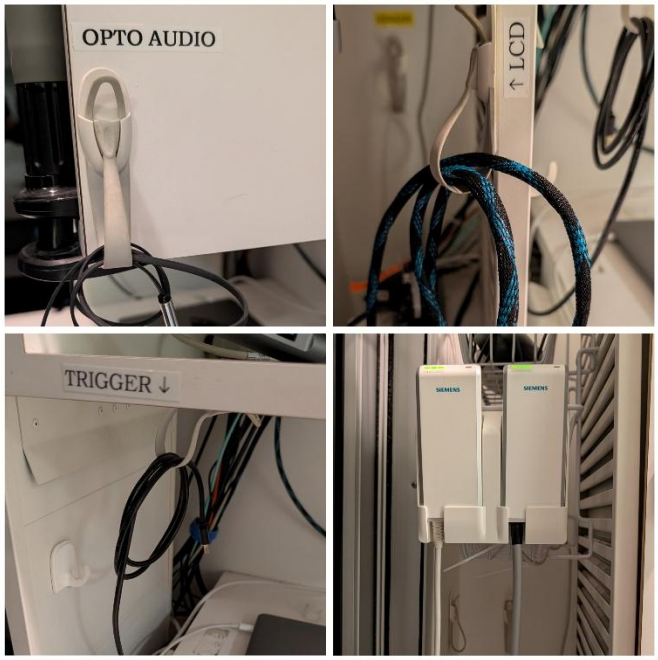
8. The white head cushion should be left on the bed

9. The Opto box should be turned off at back of box
10.

11. The Opto audio cable should be unattached from audio source and coiled up in the bungie hook



12. The trigger, LCD HMDI, Physio and EPI cables should be coiled and stored



13. The LCD switch box should be turned off

14. Everything is labelled for your convenience

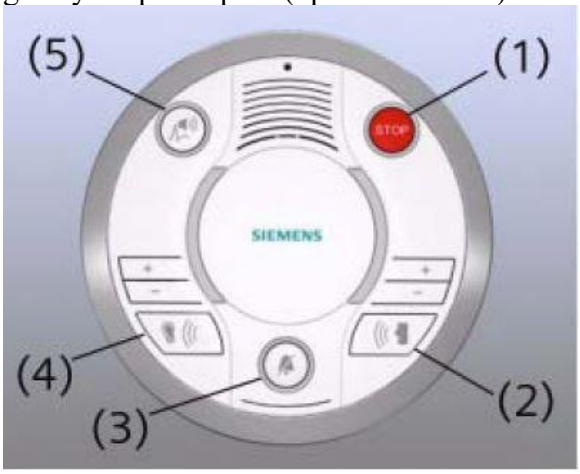
15. Note: the top of the cart is a suitable place to set the top of the coil/mirror when you are setting up your participant

Thank you for helping keep our scanner room clean, safe and organized.

Squeeze Ball/Button Alarm

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

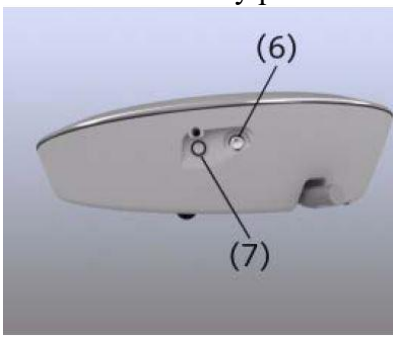
1. Stop the scanner using the mouse and clicking the stop icon in the lower left on the console screen
2. To clear the alarm, press the talk button on the intercom associated with the squeeze ball - Siemens (#2 talk or #3 alarm
3. Talk to your participant through the intercom system associated with the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



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

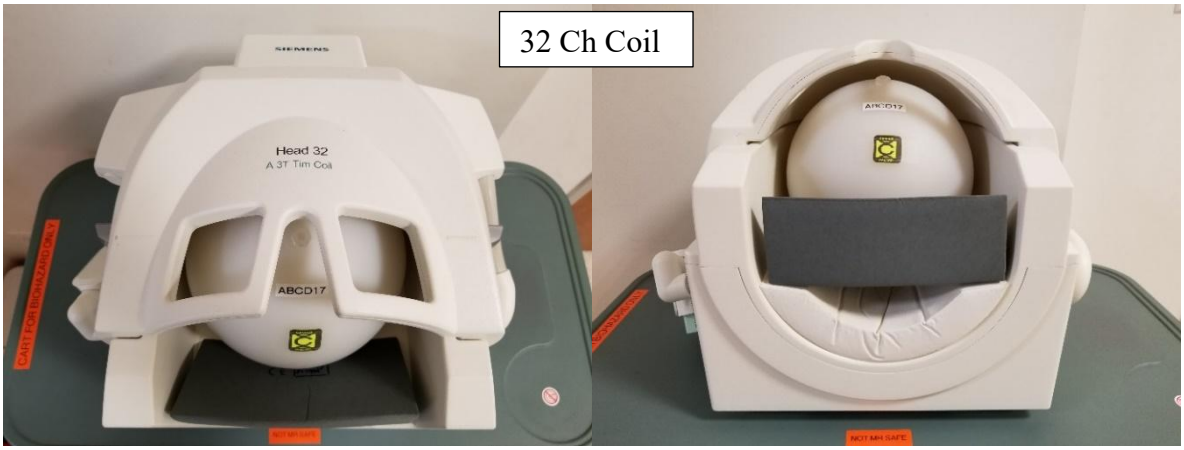


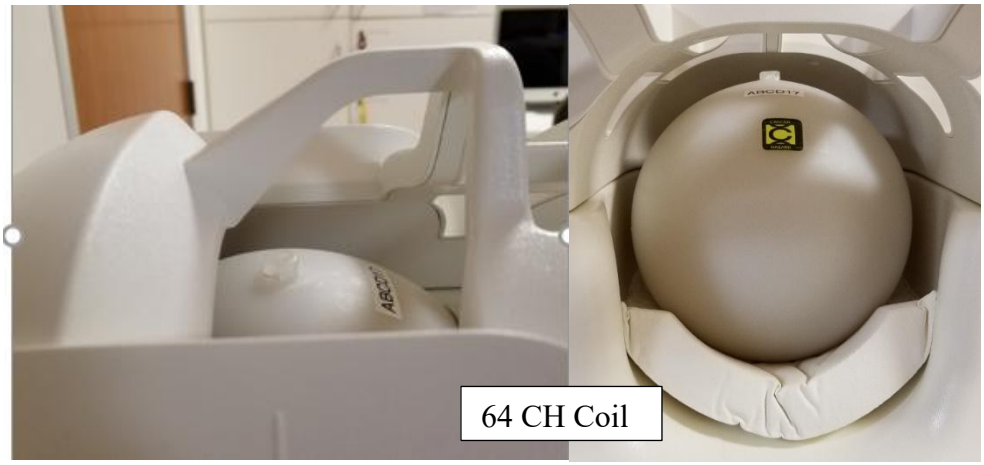
How to Run the ABCD Phantom QA

The ABCD phantom should be run at least once per week. 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

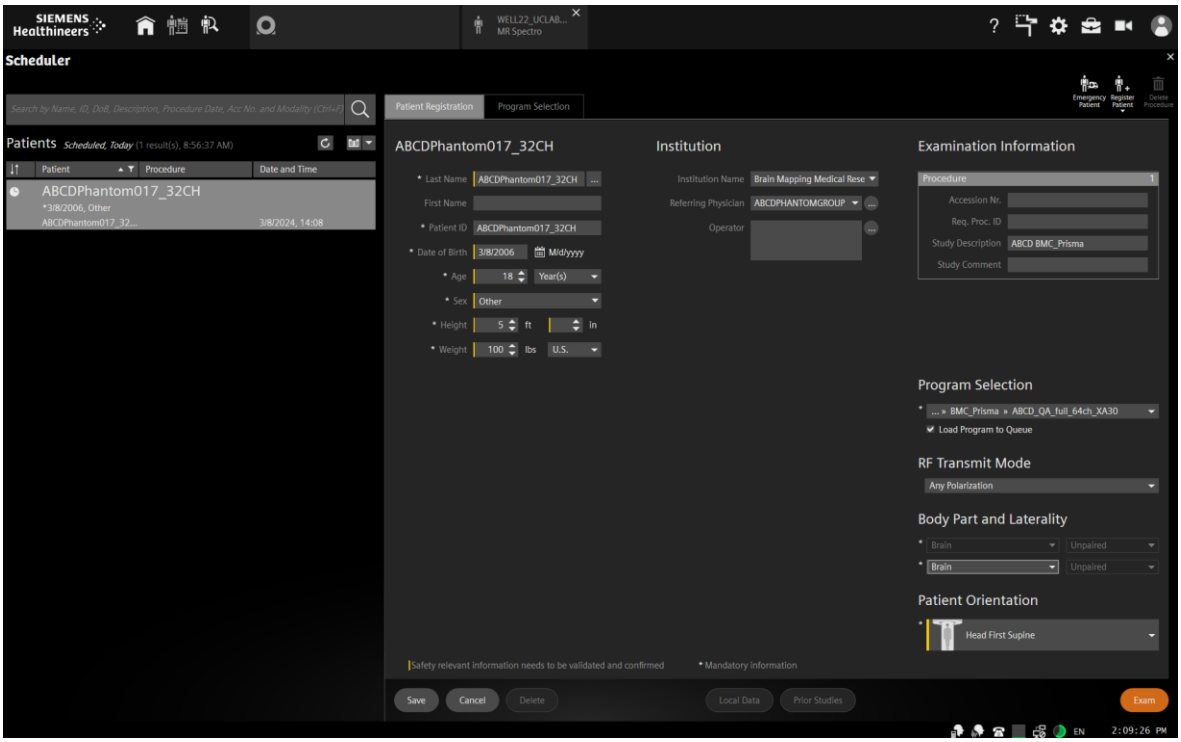


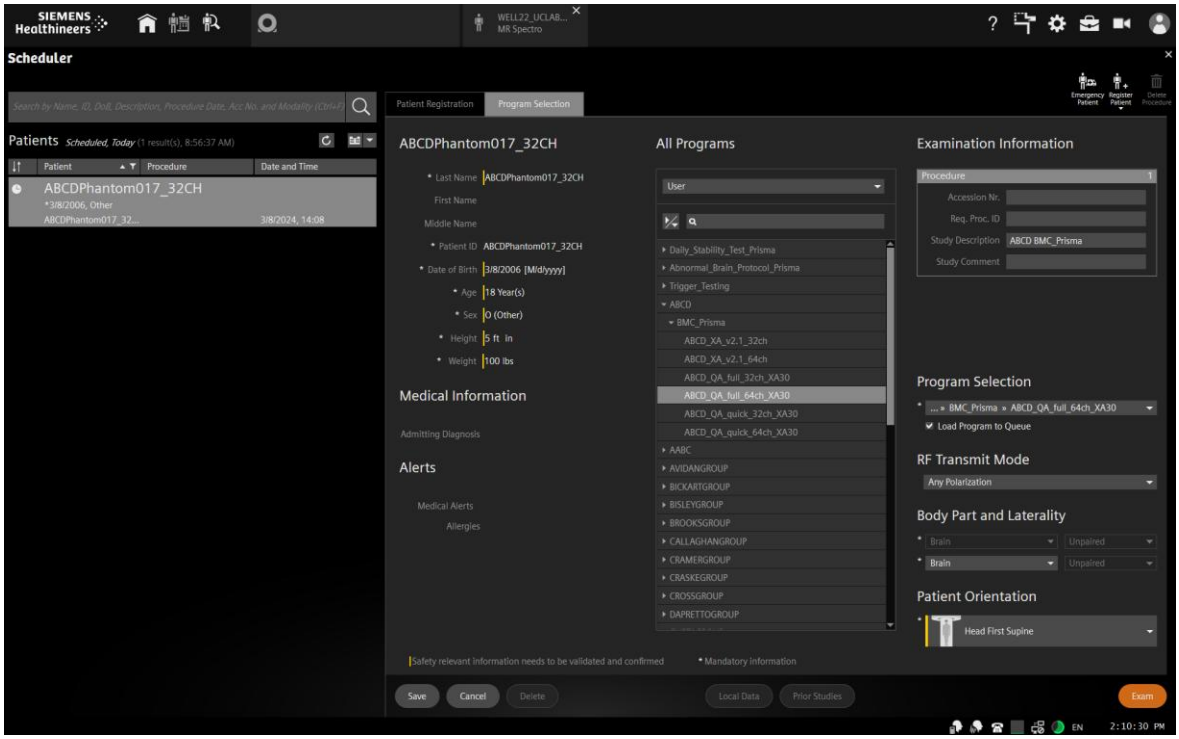


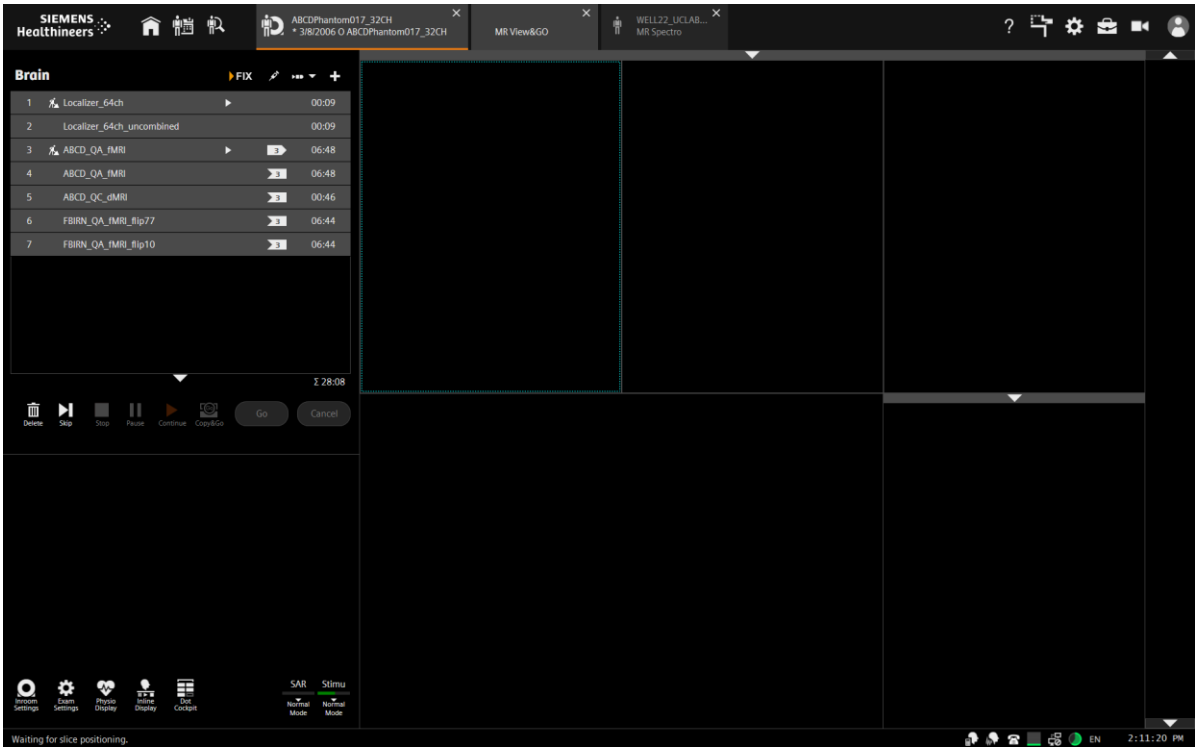
Register the Phantom

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** = ABCDPhantom017_32CH **or** ABCDPhantom017_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”

Registration Pictures

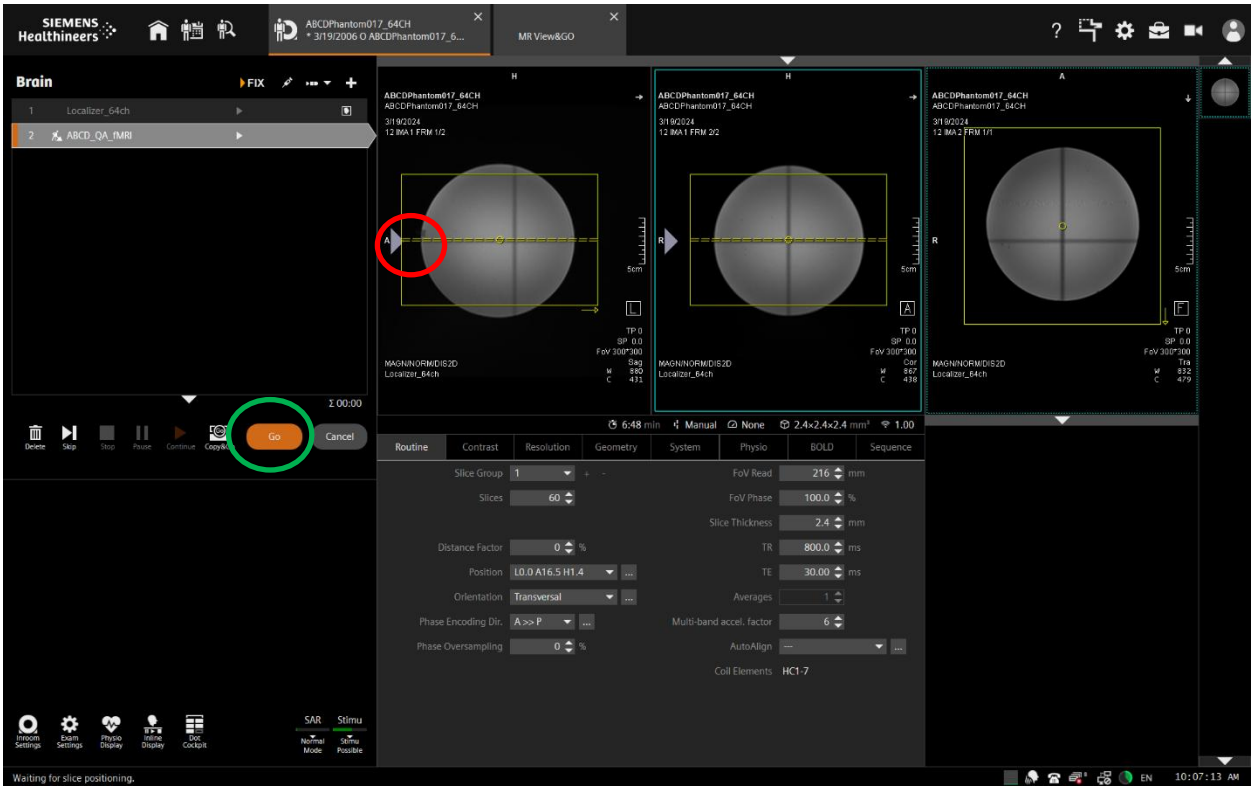



SIEMENS Healthineers
Scheduler
Patients
Patient
Procedure
Date and Time
ABCDPhantom017_32CH
Patient Registration
Program Selection
ABCDPhantom017_32CH
Last Name
First Name
Middle Name
Patient ID
Date of Birth
Age
Sex
Height
Weight
Medical Information
Admitting Diagnosis
Alerts
Medical Alerts
Allergies
All Programs
User
Daily_Stability_Test_Prisma
Abnormal_Brain_Protocol_Prisma
Trigger_Testing
ABCD
BMC_Prisma
ABCD_XA_v2.1_32ch
ABCD_XA_v2.1_64ch
ABCD_QA_full_32ch_XA30
ABCD_QA_full_64ch_XA30
ABCD_QA_quick_32ch_XA30
ABCD_QA_quick_64ch_XA30
AABC
AVIDANGROUP
BICKARTGROUP
BISLEYGROUP
BROOKSGROUP
CALLAGHANGROUP
CRAMERGROUP
CRASKEGROUP
CROSSGROUP
DAPRETTOGROUP
Examination Information
Procedure
Accession Nr.
Req. Proc. ID
Study Description
ABCD BMC_Prisma
Study Comment
Program Selection
... » BMC_Prisma » ABCD_QA_full_64ch_XA30
Load Program to Queue
RF Transmit Mode
Any Polarization
Body Part and Laterality
Brain
Unpaired
Patient Orientation
Head First Supine
Safety relevant information needs to be validated and confirmed
* Mandatory information
Save
Cancel
Delete
Local Data
Prior Studies
Exam


SIEMENS Healthineers
ABCDPhantom017_32CH
* 3/8/2006 O ABCDPhantom017_32CH
MR View&GO
Brain
FIX
1 Localizer_64ch 00:09
2 Localizer_64ch_uncombined 00:09
3 ABCD_QA_fMRI 06:48
4 ABCD_QA_fMRI 06:48
5 ABCD_QC_dMRI 00:46
6 FBIRN_QA_fMRI_flip77 06:44
7 FBIRN_QA_fMRI_flip10 06:44
Σ 28:08
Delete
Skip
Stop
Pause
Continue
Copy&Go
Go
Cancel
SAR
Stimu
Waiting for slice positioning.

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 orange go (green circle)



3. Set up sequence #4 by centering the yellow box on the phantom – click the orange Go
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

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
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 = *TriggerTest*
    - **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 "QC Group"
    - **Patient Position =** select "Head First Supine"
3. Click "Exam"
4. Another box will pop up
    - Choose Study = TriggerTest
    - Click "Confirm"

Click for registration Pictures

Running Scans

1. Double check the sequence to open and then click the "the orange Go" 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

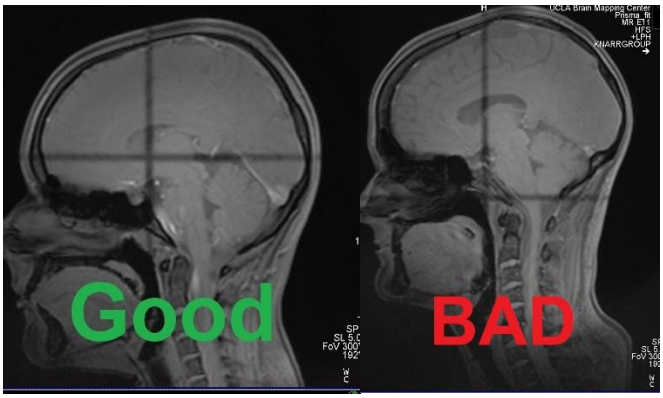
Quality Assurance: How to Check Your Scan Data

EVERY sequence should be checked after completion for quality assurance. They can be opened in the viewing tab or 3D tab for T1 and T2 sequences.

The techs will try to show everyone how to properly QA data as it is collected. Next time you are scanning please feel free to ask for a lesson. Good scanning technique means reviewing every sequence as you collect them!

Check Your Localizer

1. If you are running HCP/CMRR localizers, it is very helpful to review the **first** localizer (not the one called localizer aligned) to confirm a good head position within the magnet.

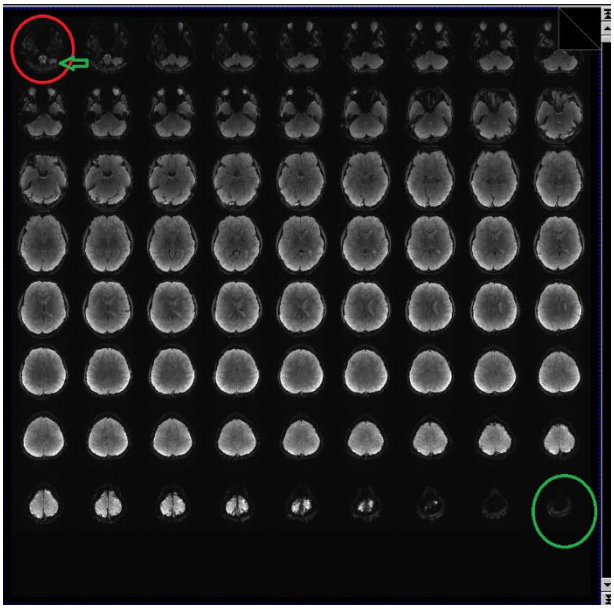


2. If you think of the brain as a full circle, the cross hair should be roughly in the middle. A little off top to bottom is ok, but it should not be outside of the brain
3. If it is outside the brain, then the participant was not "landmarked/lasered" properly
4. If this happens stop the scan as soon as you see the issue (should be within first min of scanning), re-laser (do not remove coil), click re-run from here on the first localizer to start over
5. The laser line should be roughly at the participant's eyebrows
    - This position should correlate, if possible, with the line on the side of the coil
    - If the participant's anatomy can't be matched up with the line due to a short neck etc, then laser to the participant's eyebrows only (not to the coil line)
    - BUT do your best to match them both up by having participant move up or down accordingly if possible

Verify Full Coverage of the Brain

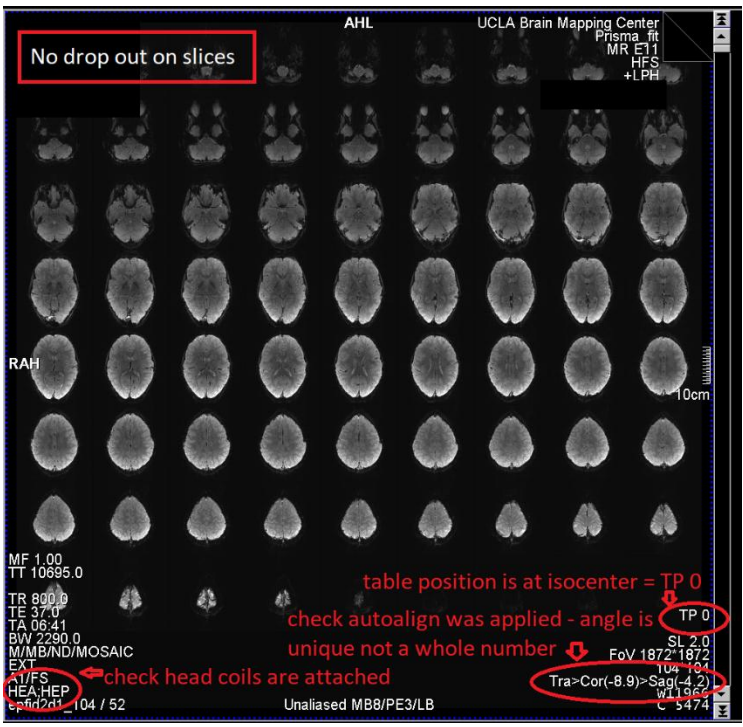
1. After you load the sequence into MR View and Go click the tile with the sequence you want to review and then click the mosaic icon (bottom left)
2. Press the 9 on the keyboard to auto window the contrast
3. Verify that you have full brain coverage from the top of the head to cerebellum
4. To do this review the first and last slice

- If the participant moved up or down too much you will start to lose either the top slices of the brain or the bottom slices (cerebellum)
- If the participant moves to the point where you are cutting off the top or bottom structures, stop scanning and fix the positioning
- If the position is only slightly off, you can just rerun your ‘localizer block’ to update autoalign
- If they have moved a lot, then you will need to go in the scanner room and reposition/re-laser them in the coil
- After you re-laser repeat all 5 localizer scans if using HCP/CMRR sequences (loc, autoalign, loc aligned and 2 spin echoes)
- Then delete any sequences you have successfully completed and continue where you left off
- In this picture, you will see the bottom slice (red circle) still has a little bit of cerebellum in it
    - Ideally there would be only brain stem showing, but this is usable
    - The top slice (green circle) should be basically empty



Check for Dropout in Your Slices

1. Verify there is no dropout/fading throughout your slices
2. If using CMRR/HCP sequences always check your SBref for dropoff and stop and repeat the scan if you encounter dropout
    - A bad sbref scan will contaminate the rest of the sequence

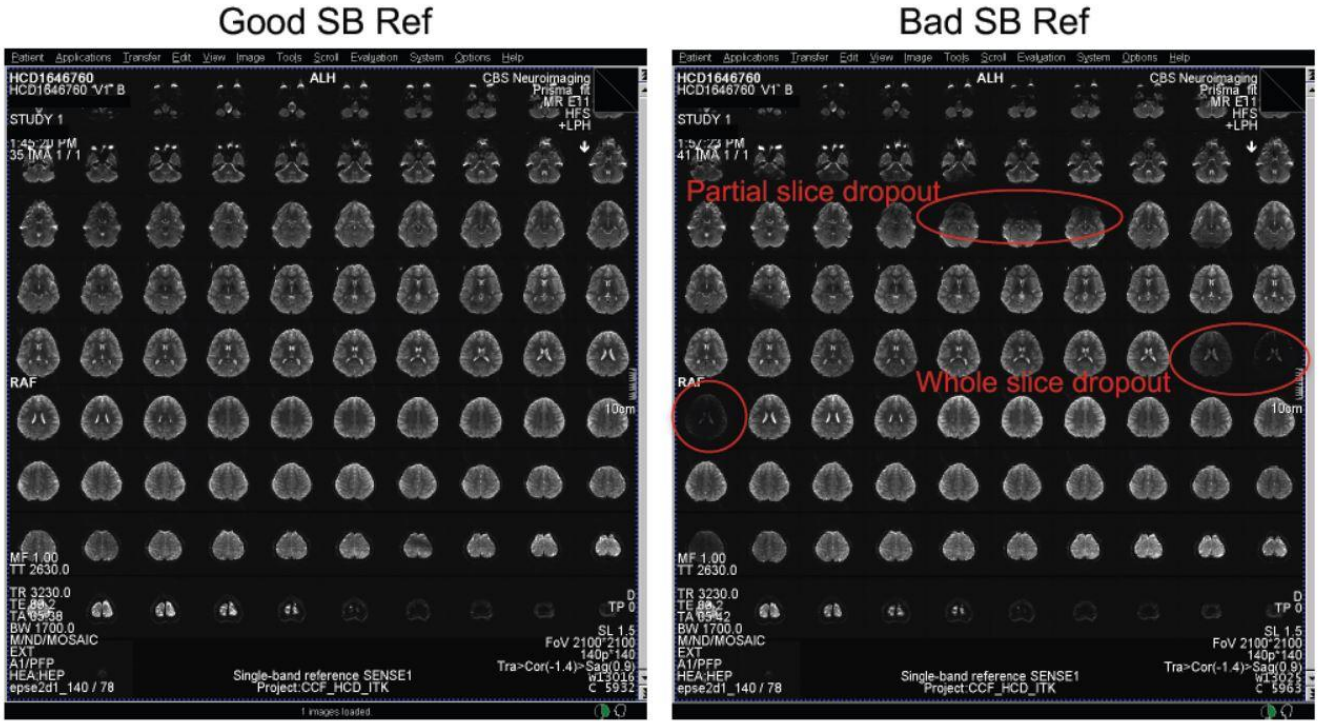


Check to Make Sure Your Head Coils Are Attached

1. 32 ch: HEA HEP
2. 64 ch: HC1-7 or HC1-7;NC1,2 if using neck elements
3. 20ch: HE1-4
4. More info on head coil warnings

Check That the Table is at Isocenter

1. It should say TP 0

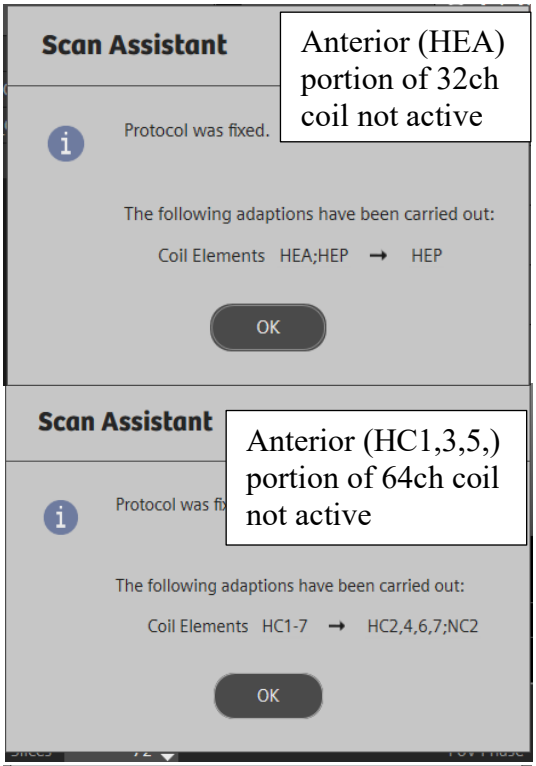


Coil Warnings - Protocol Was Fixed

If you see warning messages while scanning, please read the message and address the issue. **DO NOT** just click "OK". Ask a tech for help if you are uncomfortable with resolving the issue on your own. Please be vigilant, as we do not refund scans for this type of error.

Main Reasons for Coil Warnings

1. The coil wasn't plugged in at all or properly
2. The participant was registered and the protocol was loaded into the exam card before plugging in the coil
3. You put the wrong coil on the table



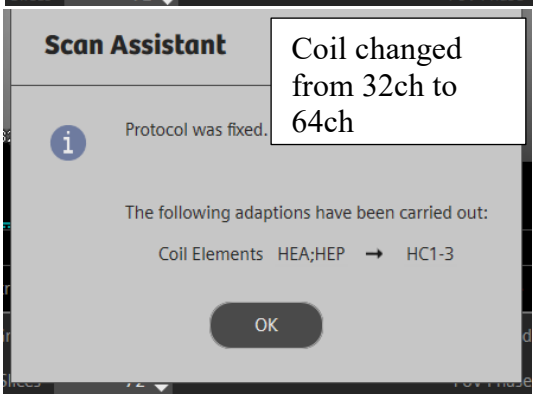
Anterior or Posterior Protocol Fixed Warning Messages

1. The pop-up message will let you know that it is turning off the elements that are not plugged in properly
2. If you click "OK", you will be approving this change and you will lose signal from that part of the coil
3. Data collected in the manner will be suboptimal and most likely unusable!

Coil Issue Resolution

1. Check the coil plugs
2. Reseat the plug if necessary
3. Make sure the LCD screen displays the anterior and posterior elements
4. Close your patient
5. Resume registration and try again

Wrong Coil Protocol Fixed Warning Messages



1. The wrong coil was put on the scanner bed
    - The message will let you know that it is changing the coil to the one you put on the scanner bed
    - Your data will not be "bad" per se, but you won't be using the proper coil for your study
    - **Resolution:** change the coil, close and resume registration for your participant
2. The protocol was not setup for the correct coil
    - The message will let you know that it is changing the coil to the one you put on the scanner bed
    - **Resolution**: this is the only scenario where it is ok to click "OK" and proceed
    - Let a tech know your protocol is setup with the wrong coil so it can be fixed
    - Check which coils are turned on in the system card of the sequence after the system auto detects the new coil to make sure they are correct
    - Note – if you are using the 20ch or 64ch coils the neck elements "NC" do not need to be on unless your study requires neck imaging

Prisma XA30 Software Bugs

This is a list of known software bugs/glitches. If you encounter any other suspected issues, please report them to bmctechs@mednet.ucla.edu and during study reporting.

AP/PA Copy Reference Issue

If you are using Siemens product sequences with different phase encoding directions (e.g. AP then PA), you MUST NOT use the copy reference option. This glitch will change your second PA sequence to RL. This glitch does not affect CMRR, HCP or ABCD sequences as the phase encoding direction is controlled on the special card instead of the routine parameter card.

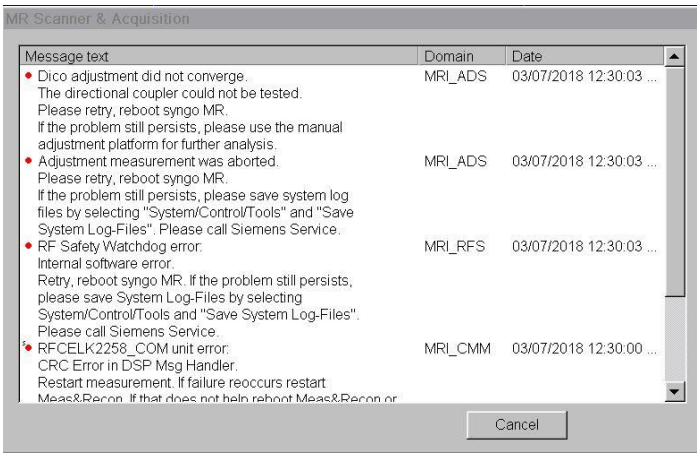
Workaround:

1. You must manually input the angle for each sequence if you are manually prescribing your FOV
2. If you use autoalign and DO NOT manually adjust your FOV in any way, then your scans will not be affected and there would be no need to use copy reference

   ***This glitch has been reported to Siemens, but there is no way to know when and if there will be a fix.

Prisma XA30 Scanner Warnings/Messages/Errors

Adjustment Measurement Was Aborted

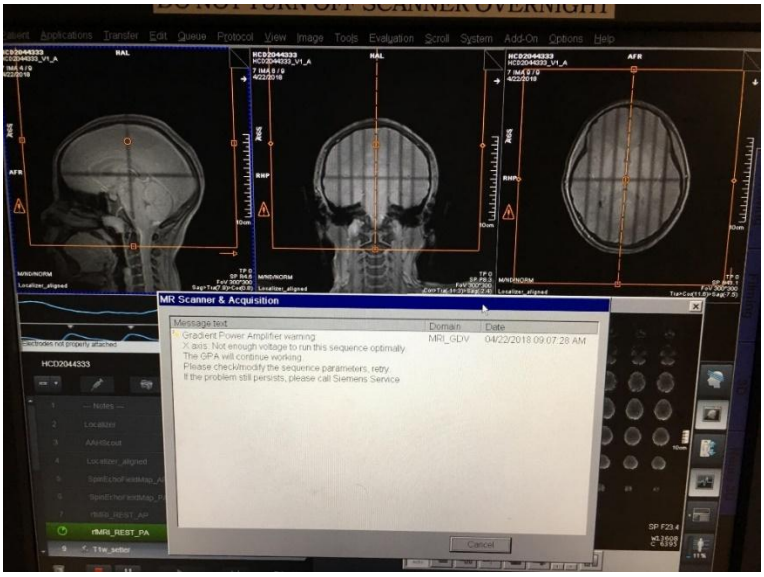


- If you ever encounter any kind of adjustment error try to see if the scanner will let you continue scanning by clicking ok on the error and re-running the sequence
- You can also try running a simple sequence like a localizer first, removing and re-plugging the coil and then re-lasering the participant
- Make sure you close the patient and resume registration after if you try these methods
- If you still can't continue then perform a restart which takes about 7-10 min
- Some examples are show below
- Please submit the issue as an equipment failure during study reporting
    - Critical if you couldn't collect some or all of your data and
    - Minor if you were able to complete the scan after fixing the issue

Gradient Power Amplifier Warning

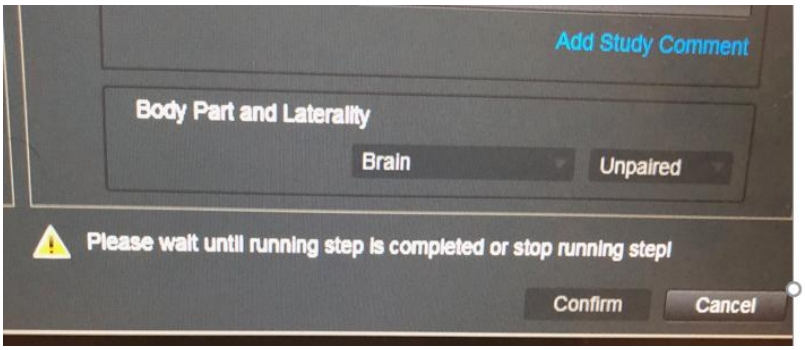
If you ever seen the below warning/orange FOV box,

1. Check your first localizer to ensure the participant's brain is positioned correctly at isocenter – the cross hair should be center in the brain in the head to foot direction (see below pic)
2. If it is, then it is safe to continue scanning as is, but please alert bmctechs@mednet.ucla.edu
3. If it is not, stop scanning, re-laser your participant to their eyebrows, close the patient, resume registration

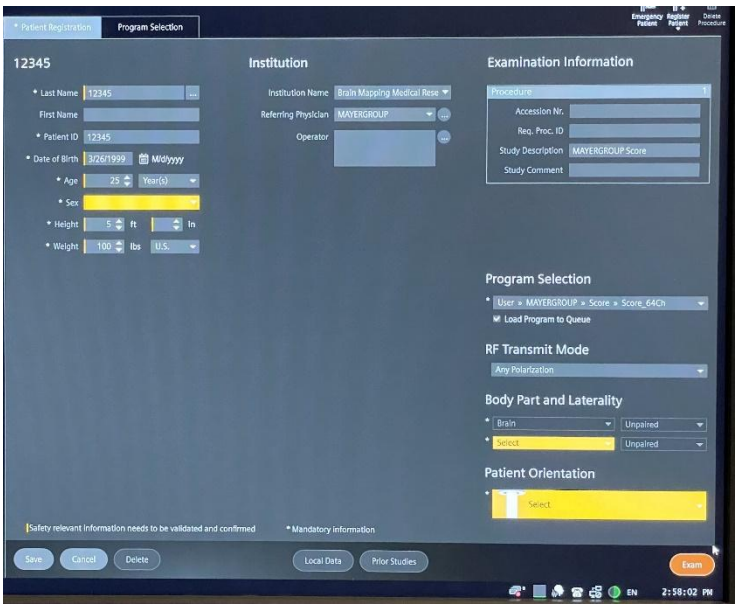


Participant Registration Errors

1. You cannot confirm your registration due to the below error
    - This happens when there are still active sequences in the Exam Card
    - Go back to the Exam card and stop (red square) or Skip (>|) the remaining sequences in the queue
    - This happens when a participant aborts a scan early or the group runs out of time and stops scanning before their protocol is complete
    - Also note, you will not be able to close the patient on the Exam card until the sequences are stopped, skipped and/or deleted



2. You press the registration exam button & fields turn yellow on the registration page
    - This means you have forgotten to complete a required field
    - Required fields have an asterisk next to them & will turn yellow if no information is listed. Fill these fields out and proceed as normal
    - NOTE: “Date of Birth” is bold, but we use “Age” instead – please do not input a DOB – once you input the age a general DOB will be generated
    - NOTE: Referring Physician is not bold but is required to access your data



Preparation Scans (aka dummy time)

Preparation Scans (dummy time) for CMRR/HCP Multiband Sequences

Dummy time for CMRR/HCP MB sequences is always 10 sec

Preparation Scans (dummy time) for 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

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. Regarding 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

How to Manually Trigger Stimuli

The below video will show you how to manually trigger your stimuli if the auto trigger fails to work.

https://uclahs.box.com/shared/static/zycfw0utds7eibdq2t4z9gpowqftoih9.mp4

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

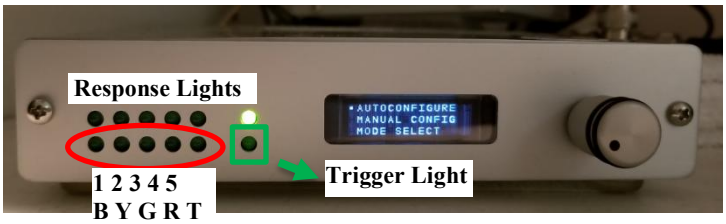
Response Settings

1. Scroll to applicable setting and click dial once
2. "KEY" sends the button press signal as soon as the button is pressed but ***stops sending the button press signal immediately after sending it once***
    1. HID KEY BYGRT - use this for letter responses and T is the trigger
        - this is the same as 0 setting on previous interface box
    2. HID KEY 12345 - use this for number responses and 5 is the trigger
        - this is the same as 4 setting on previous interface box
3. "NAR" sends the button press signal as soon as the button is pressed but ***keeps sending the button press signal until the button is physically released***
    1. HID KEY NAR BYGRT - use this for letter responses and T is the trigger
        - this is the same as 2 setting on previous interface box
        - this setting is often required for psycho tool box in matlab
    2. HID KEY NAR 12345 - use this for number responses and 5 is the trigger

4. HID KEY 1-9 No 5 - for MacStim users: no trigger will be sent, must manually start scan
5. On the small screen you will see the "setting description" which includes the device selected as well as the response setting selected
6. Be sure to plug in the trigger cable before starting your stimuli
7. 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
      - Reset the interface box – you may have set it before the box was plugged in inside the scanner room

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 for 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 when 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

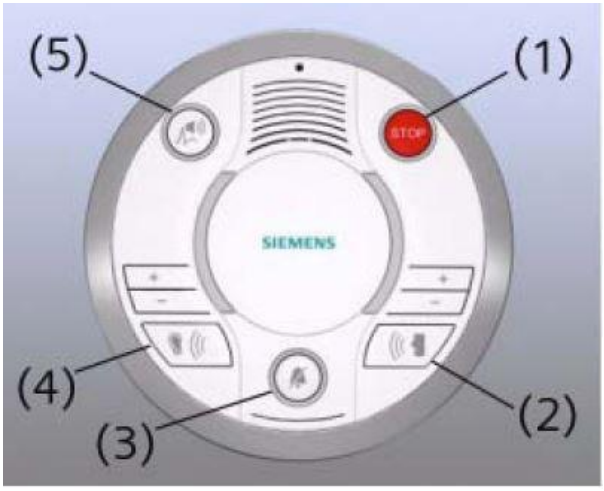
- BE VERY careful not to unscrew/loosen anything else – DO NOT remove box from velcro

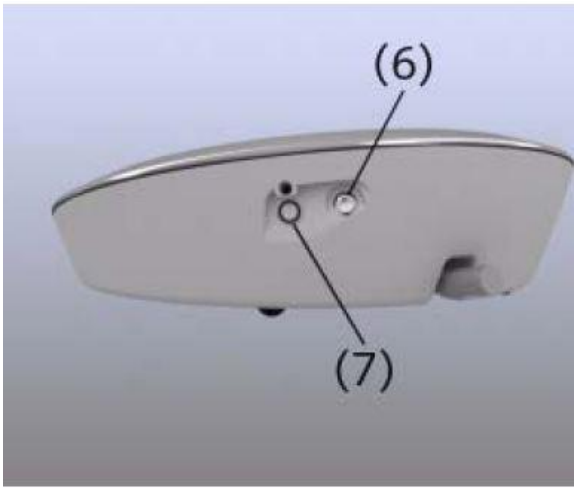
C. USB is flashing on the interface LCD screen
   1. This indicates the USB trigger cable is not plugged into your computer or the computer doesn't see it
   2. Plug or Re-plug or
   3. Reset interface box or
   4. Reboot computer if that doesn't work

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
   4. Reset the interface box – you may have set it before the box was plugged in inside the scanner room

E. Interface Menu Issues
   1. If you get "lost" in the menu, just scroll down to "back" until you get to the proper menu

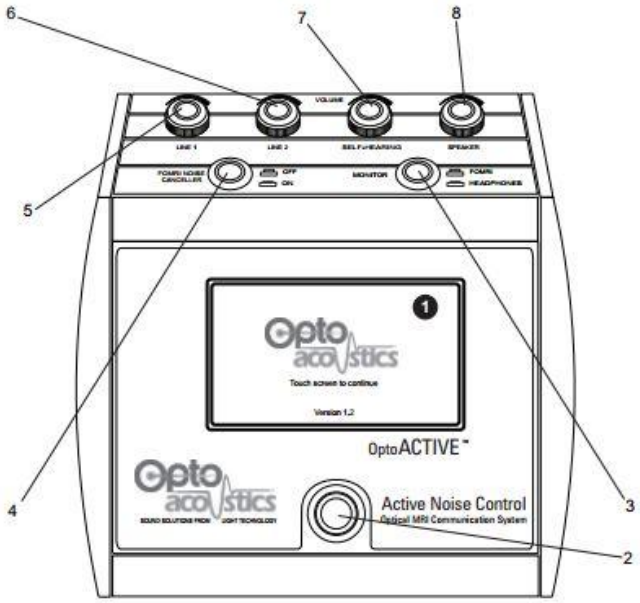
Siemens Talk Box Setup





1. You must use the Siemens talk box to talk & listen to your participant if you are using the Siemens headphones, inner ear 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 stimuli computer
3. Press the "ear" button (#4) to hear the participant
4. This is the sound that comes from bore speaker - you should also use this to listen if you are using the 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 the extra audio cable (hanging in the bungie to the left and behind the console computer) to the port labelled (#6)

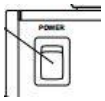
Optoacoustics Headphone and Microphone Setup



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

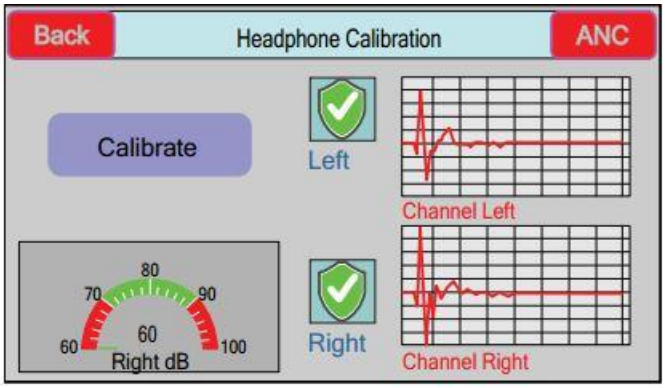


1. **AFTER** moving the participant into the bore, turn on the Opto control box using the black switch on the back right side of the console
2. Touch the screen to continue
3. If you are playing audio (movie, music or an audio task) connect the audio cable to either the green connection inside the white 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

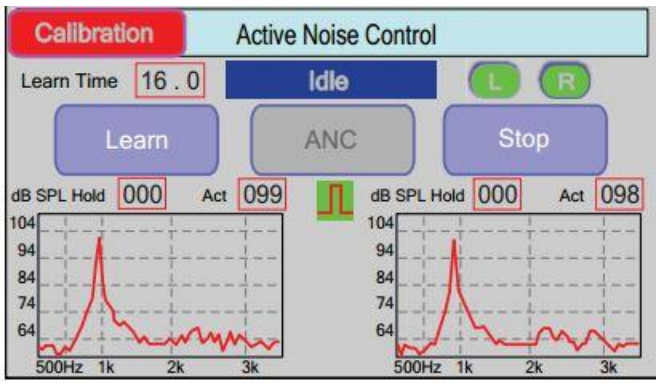
10. The speaker knob (#8) controls the volume that you hear in the control room
11. Note: there is no volume control for the volume of your voice to the participant – please manually adjust your voice volume if need be

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 and there should be no sound playing or talking



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. Press “Learn” then start your calibration scan – this takes 16 sec – it is very important to not transmit any auditory stimuli/movie during the learn mode

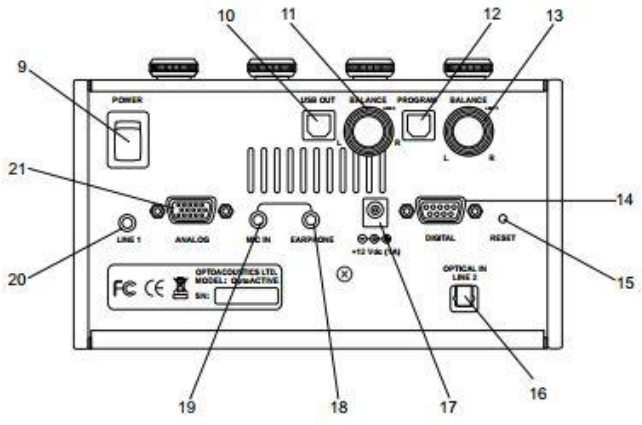


6. NOTE: if you remove you participant from the bore for any reason you will need to repeat steps 2-5
7. You are now ready to start your task

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 **at least 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 the following:
    a. the correct audio cable is connected to the correct port/computer
    b. the sound on the computer is not muted in VLC player or system volume
    c. there are no faults on the opto box (see #5 below)
    d. line 1 on the opto dial is turned up
    e. volume output is set to speakers/headphones. Sometimes the audio defaults to BOLDscreen 24 instead of speakers/headphones – BOLDscreen 24 is the WRONG setting! If it is wrong:
        - Go into sound settings and change it back to speakers/headphones
            - On PC left click on the volume icon in bottom left corner – click the up arrow and choose speakers/headphones
            - On Mac go into settings – click sound – click output – choose MacBook Pro Speakers
5. If everything is ok reset the system (step #2) to try to resolve the issue
6. 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
7. If the participant can't hear you but there is no laser fault, the opto box is on and the participant has the headphones – then check the mic volume
    a. It is a small knob on the back left side of the opto console if you look at it from the top. It should only be turned up a little as it is very sensitive.

8. If the participant can hear "talking" during the scans (not from the movie) there was probably sound playing or talking during the calibration setup – any noise during this step will be dubbed into the headphones during scans – rerun calibration



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

BOLDScreen LCD

Specifications

1. Resolution: 1920 x 1200 (60Hz)
2. 24” screen
3. 52cm wide
4. 151cm from the participant’s eyes to the screen

Turning on the LCD

1. For laptops: plug the LCD 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 “LCD” 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 “LCD” is a duplication of what is being projected to the participant’s screen
6. Note - the LCD takes a couple seconds to display after the switch box is turned on – it will also start dark and lighten up automatically within seconds
7. You **MUST** turn off the switch box after your scan to allow the screen to go to sleep so the static computer image does not “burn” into the display
8. Note – after turning off the LCD switch box the LCD screen will stay on for about 5 min before going into sleep mode – this is normal

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 LCD 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 next to the control room door

Troubleshooting Tips

A. The LCD is not displaying the laptop screen, but you can see the desktop computer screen
   1. Select “L” on the black LCD 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 ensure it is not plugged in upside down

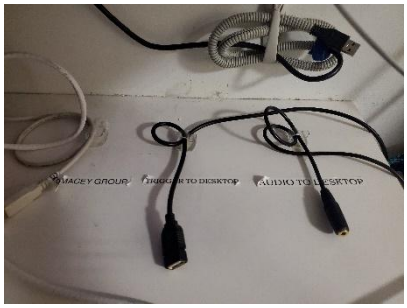
B. The LCD is not displaying the laptop or desktop computer
   1. Make sure you turned on the black LCD switch box
   2. Make sure the connections at the back of the LCD box are plugged in and not loose – there should be 4 cables plugged in
   3. Reboot the black LCD switch box
      - Turn off the power - wait 5 sec then turn it back on
      - Use the select button to choose “D” or “L”
   4. If you are using the desktop, switch to the BMC laptop to see if it is working
      - If the laptop is working, then check the HDMI cable in the back of the dell desktop tower
        - please be careful not to unplug anything
        - do not pull the tower out, but rather look behind it in its current position to avoid unplugging cables
   5. If you are using a laptop, switch to the BMC desktop to see if it is working
      - If the desktop is working, then check the HDMI connection on the laptop (see A above)

C. The The LCD control room Dell monitor is displaying random colors or a solid color. The LCD BOLDscreen in the scanner room may look fine or be out as well.
   1. Cycle the power to the control room LCD Dell monitor by unplugging its power cable
   2. The power cable is located in the power strip to the left of the BMC MAC laptop next to the shelf - it is labelled LCD monitor in orange label tape
   3. Simply unplug it and then plug it back in – the computer screen should appear within a few seconds

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

Duplicate/Mirrored Display with E-Prime

1. Setup the display to work with a duplicate display E-Prime task
    - Turn on the black LCD switch box and use the select button to choose "D"
    - The LCD and the “LCD” monitor should turn on
2. Plug in Cables
    - Plug the audio cable into the port labelled "AUDIO TO DESKTOP"
    - Plug the trigger cable into the port labelled "TRIGGER TO DESKTOP"
3. Run task
4. After tasks, unplug the “Trigger”



Extended Display with E-Prime

1. Setup the display to work with an extended E-Prime task
    - Turn on the dell desktop monitor (lower right corner)
    - Turn on the black LCD switch box and use the select button to choose "D"
    - The LCD in the scanner room and the “LCD” monitor should turn on
    - Change to extended display using the extend shortcut on the desktop or
        - 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 port labelled "AUDIO TO DESKTOP"
    - Plug the trigger cable into the port labelled "TRIGGER TO DESKTOP"
3. Run task
4. After tasks, unplug the “Trigger”

Switching from Extended Display to Duplicate/Mirrored Display

1. Turn on the black LCD switch box and use the select button to choose "D"
2. Turn on the dell desktop monitor (lower right corner)
3. Use the duplicate shortcut on the desktop or
    - Right click on the desktop of the EXTENDED monitor and click "Display settings"
    - Under "Multiple Displays" choose "Duplicate these displays”

Siemens Physiological Device Setup

ECG/Respiratory Setup

1. The gray strap should be placed velcro side down on the bed roughly where the participants ribs/diaphragm would go
2. Wrap the strap around your participant when they lay down and adjust the position as needed. Have them suck in a little as you do it, so it is snug. Make sure to ask them if it is okay (not too tight).
3. Tuck the respiratory "pillow" under the strap
4. Plug the clear cord from the pillow into the respiratory device
5. The ECG/Respiratory device **MUST** be placed into the gray holder for safety reasons– this module should never directly touch the participant's skin as it can heat up
6. A washcloth (located in the bottom shelf of linen cabinet) must be wrapped around the loose cables

Pulse Setup

1. The finger pulse device should be placed on the left ring finger with the red light side on top of the nail – 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 one of the gray holders – this holder is not a safety requirement, but rather a stability aid
3.
4.
5. If the pulse is not working properly (e.g. there is no pulse signal or it is erratic) check the signal and receiver elements inside the finger cuff – these elements sometimes get twisted so they are not showing properly through the cutouts

How to Use the MR Camera

Quick Overview

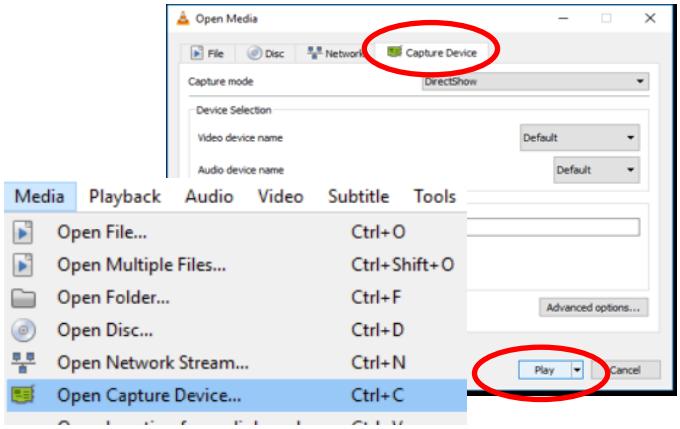
Open VLC → Press Ctrl+C → Play

Equipment

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

Camera Setup

1. Turn on the monitor (small button on bottom right corner of monitor)
2. Click the VLC icon on the bottom task bar of the desktop computer or click the windows button in the bottom left corner then scroll to find VLC in the program list
3. Pres Ctrl+C (shortcut) **OR** click Media 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 movies or fixation – you must switch it to extended display to use the camera – use the extend desktop shortcut or
   - Right click on the desktop and click Display settings
   - Under Multiple Displays choose Extend these displays
   - Drag your fixation cross or movie to the LCD monitor so you can display the camera on the extended monitor
7. Note – the camera cannot be used during your task if you use the desktop computer for the task in duplicate display mode

Participant Setup

1. Position your participant

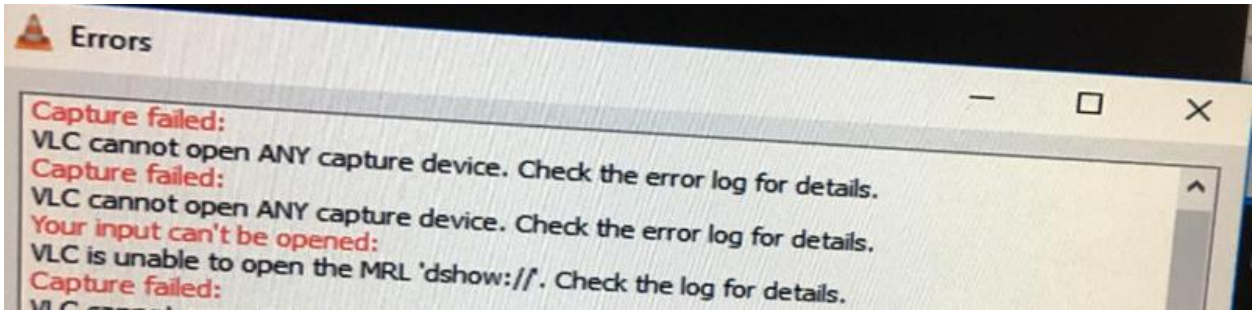
2. Position the mirror so the participant can see the whole LCD screen
3. Landmark the participant and move them into the bore
4. Verify camera positioning
5. If needed, get a tech to adjust the camera (in the back of the bore) to see the participant's eyes through the mirror – this step should not need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

Camera Cleanup

1. Close VLC
2. Turn off the dell monitor (lower right corner)

Troubleshooting Tips

1. If the camera will not stream through VLC and you get the below error then:
    - Unplug and replug the USB cable in the back top right side of the PC desktop tower – labelled MREyes
    - Close VLC and try again



Equipment Manuals

Hard copies of manuals are located on the Prisma tech desk

Current Designs Button Box and Trigger Manual - Forp 932
Optoacoustics Manual
MRI Safety Manual

Movie List

*Has Audio and Subtitles

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