

CFMRI GE MR750 (3.0T) Survival Guide (Oct 19, 2011)

Setting up a patient, and selecting protocols

1. Screen subject using the CFMRI provided screen forms and metal detector.
2. Instruct subject to wear ear plugs.
3. Position the headcoil and mirror on the patient table.
4. Position subject in the head coil on patient table, set landmark and send table to scanner isocenter.
5. On the scanner console: go to the **Work List**, and click on **Create New Work List Item** (new patient). This starts a new **Exam**, and opens a window with **Patient Information** and **Exam Information**.
6. Fill in **Patient Name** and **Patient ID** (mandatory). Use the following convention for Patient ID: PName_ProjectName_SubjectID. Enter your full name in the **Operator** field. Enter subject weight in the **Weight** field (mandatory). Use 100 lb for phantoms.
7. Click **Show All Protocol** to open the **Protocol Selector** window. Make sure that the **fmri3tw** and **Adult** buttons are selected. Click on **Other** tab if you already have a PI specific protocol saved on the system. Otherwise you can click on the **Head** tab for CFMRI standard protocols.
8. Highlight the desired **Protocol** (sorted alphabetically) and click the **Arrow** button to select it. The selected protocol appears in the right window: **Multi Protocol Basket**. Click **Accept** at lower right. This will return you to the **Work List Manager** screen,

***Note:** If only a single series of the protocol is desired, click the folder icon to the left of the protocol to expand the contents, and then highlight the desired series and click the **Arrow** button.*

9. Click **Start Exam**.
10. Accept **First Level** in the popup **SAR** and **db/dt** window.
11. The protocol will be listed in the **Work Flow Manager** (upper left of the screen). Each scan series in the protocol is assigned a state. **INRX** indicates that the series is currently in prescription, and its parameters are displayed in the parameter fields in the windows on the right. **Rxd** indicates a series that has been prescribed and saved. **ACT** indicates that the scan is currently active. **Done** indicates that the series has been completed.

Running a localizer scan

1. Click **Loc** (localizer) in the Work Flow Manger List. Click on **Save RX**.
2. Click **Scan**.

***Note:** **Prescan** and **Autoshim** are executed automatically before the acquisition starts. If **Autoview** is checked in the upper right corner of the screen, localizer images are displayed in the auto view window as they are acquired.*

Running a T1 structural scan

1. Select a desired FSPGR series in **Work Flow Manger List Window** by a single mouse click on the series and then click on **Set Up**. Click on one of the three Rx windows views to prescribe a 3D slab. Position the prescription as desired in each view.

Note: *Locs per slab refers to the total # of slices generated from the slab, but the outer most 2 slices on each side are discarded (to deal with signal fading at the edges due to imperfect slab selection). The graphical prescription correctly indicates the area covered by N-4 slices.*

2. Adjust scan parameters if needed. (CFMRI default parameters are close to optimal for gray/white/CSF contrast).
3. Click **Save RX**, and then **Scan**. The green **Move to Scan** button starts blinking. Press it to allow the patient table to move so that the prescribed volume is centered at the scanner's isocenter (the LED screen on top of the scanner indicates the extent of table travel in mm).

Note: *If **Move to Scan Button** is not pressed immediately, the request for **Scan** may time out. Press **Scan button** again to start scan. The scan may be stopped anytime during the scan by pressing the Stop Scan button on the keyboard.*

Important: *The **Red Button** with a triangle on the top left of the keyboard should be used only in case of fire. Pressing the red button cuts power to all of the scanner's equipment, and recovery of the system takes ~20 min.*

Running an ASSET calibration scan

1. Select **ASSET Cal** series in **Work Flow Manger List Window** and click **Set Up**. Prescribe slices to cover the entire volume of interest and beyond.
2. Click **Save RX**, and then **Scan**. The green **Move to Scan** button starts blinking. Press it to allow the patient table to move so that the prescribed volume is centered at the scanner's isocenter (the LED screen on top of the scanner indicates the extent of table travel in mm).

Note: *ASSET cal slice Rx must minimally cover the entire volume of interest prescribed in the **EPI** or **FSPGR** scan. If not, the uncovered area will be zero (black) in the images.*

Running an EPI scan

1. Select an **EPI** series in **Work Flow Manger List Window** (e.g. EPI_bw62.5) and click **Set Up**.
2. If the task paradigm needs to be setup or modified, click **fMRI** button, select **Research** in the paradigm list. Click on **Unlock** (may need to click more than once until the text fields editing is enabled). Enter the TR, number of total samples, #

dummy samples and block-design parameters (Active and Rest #samples); delay should be set to 0. The **fMRI** screen window also allows choice of slice acquisition order and gating.

3. Click **Accept** to close the **fMRI** window.
4. Prescribe the slices. Note: slice orientation is controlled by the **Scan Plane** parameter. The choice of Oblique option enables slice stack rotation in the Graphic Rx window. The rotation angle is displayed in the form of annotation on the localizer image.
5. Adjust scan parameters as required by experimental goals. Frequency direction can be modified (e.g. default R/L to A/P) to minimize image distortions. The **Advanced** tab includes all the available user CVs.
6. Click on **Save RX** button
7. Click on the downward arrow on the **Scan button**. Select **Research -> Download** in the pull down menu. The green button "**Move to Scan**" on the keyboard may start blinking. Press the blinking button to move the table.
8. Click on the downward arrow on the **Scan button** and select **Prep Scan**. This initiates autoshim, prescan and reference scans.
9. Start scan by either clicking on the **Scan** button on the screen, or by pressing the **Start** button on the keyboard.

Note: manual Prescan and shimming are available (using "Manual prescan" button) but unnecessary most times since auto-shimming does an excellent job.

Running Field Maps

There are currently two field map protocols available at CFMRI.

Field Map Version 1

The body coil is used for this version of field map acquisition.

1. Select the protocol **fm_TE1_NFS** in Work Flow Manger List, Click **Set Up** and confirm changing to body coil in the popup window.
2. Copy graphical slice prescription from the EPI scan. Verify that **auto shim** is off, or auto if the field map is done before the EPI scans.
3. **Save RX** and **Scan**.
4. Repeat the above steps for **fm_TE2_NFS**. Verify that auto shim is off.

Field Map Version 2

The 8ch head coil is used for this version of field map acquisition, and an asset calibration scan is required.

1. Acquire **ASSET calibration** scan if it has not been done. Be sure to prescribe slices to cover the entire volume of interest in the asset calibration scan.
2. Select protocol **fm_grass_64x64** (or **fm_grass_128x128** if a DTI scan) in the Work Flow Manger List and click **Set Up**. Copy the graphical slice prescription of the EPI. Verify that the autos shim setting is correct. **Save RX** and **Scan**.

Finishing a scanning session and transferring Data

1. In the **Work Flow Manager** window click **End**, and then select **End Exam** from the drop down menu to complete the scanning session.
2. Transfer acquired Data to server (fmrserver or cfmri) using gecopy.
 - a) In **Image Data Base** window, highlight the exam to be transferred.

Note and Beware: *The exam highlighted in the Image Data Base window is the exam that will be transferred with gecopy.*

- b) Click on the **downward arrow** on the **Tools Icon** and select **Command Window** in the dropdown menu to open a UNIX shell.
- c) In the UNIX shell, type **gecopy** followed by User Inputs as the example below
Example: gecopy -s fmrserver -r raid6 -d studyname PI

Note: *type gecopy and press ENTER to show instructions.*

- d) Type exam to copy entire exam to server.
3. Clean up the room. Return pads to where they belong in the cabinets; put used sheets and blankets into the hamper; turn off and store all peripheral equipment as required.

Happy Scanning
CFMRI

QUESTIONS

Please contact CFMRI by email: cfmri@ucsd.edu

Appendix I

Post Operator Training To-Do List

1. Sign the CFMRI Operator Certification Form and make a copy for your record.
2. You will receive a confirmation email for having successfully completed the CFMRI Operator Training. Please click on the **Evaluation** link in the confirmation email to provide us feedback on the training.
3. Fill out the online **CFMRI Access Request Form** to apply for access to CFMRI scanners and to the **Webschedule** program for booking scanner time. The CFMRI Access Request Form can be found on our website (fmri.ucsd.edu) under **Forms**.
4. Learn how to use the **Webschedule program** to book scanner time and to report technical problems. You can find the information on the **How To** page on our website, or ask your trainer or colleagues who have used the Webschedule program before.
5. Read and familiarize with the following **CFMRI policies** which are available on our website under **Policy**:
 - Policies regarding magnet room access, operator status, and PI-related activities.
 - Center Locker Policies
 - Guidelines for Clinical Evaluation of Research MRI studies
 - Parking Policy
6. Sign up for the **fMRI User's email list** (if you haven't done so) to receive regular updates from CFMRI and the San Diego fMRI community. Sign up at < <http://mailman.ucsd.edu/mailman/listinfo/fmriusers-l>>.
7. Introduce yourself to the **Noah's cabinet**.

We keep backups of consumables and some peripheral equipment in a dedicated cabinet called Noah's cabinet, such as backup projectors, projector bulbs, VGA cables, extra button boxes etc. The Noah's cabinet is currently located in the 3T East control room and is secured by a pad lock. Please feel free to ask your trainer where it is and how to access its contents.
8. Keep your operator status current by scanning at least once every **4 months**, and by passing the annual online **Safety Test**. If your status lapses, a hands on refresher training is required before your status can be reinstated.

Appendix II

Useful Resources for CFMRI Operators

1. CFMRI website (<http://fmri.ucsd.edu>)
Stay updated on CFMRI safety guideline and policies, get tips on operating and troubleshooting scanners and peripheral equipment, and learn how to use advanced fMRI methods offered at CFMRI.
2. FAQs at MRIsafety.com
Look up MRI safety information for commonly used medical implants and devices.
3. More to come ...