

GE 3T Survival Guide

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Setting up a patient, and selecting protocols

1. Position a subject on the patient table, set the landmark and send the table to the scanner isocenter.
2. On the scanner host computer: Go to the **Scan** desktop (click desktop button with scanner icon), and click on **New Pt button** (new patient). This starts a new **Exam**, creates a node where the scanned and processed data goes, and opens a window with **Patient Information** fields (on the left) and **Patient Protocols** (Human silhouette on the right).
3. Fill in **Patient ID** and **Patient Name (mandatory)** Enter the same name for both the Patient ID and Patient Name. Use the following convention: PIname-ProjectName-SubjectID. Note that the Project Name must be the same as the approved project name that is used in the Web Scheduler. The Subject ID is a confidential identifying number that is specific to each project. Enter your name in the **Operator** field (**mandatory**) Enter subject weight in the **Weight field (mandatory)**. Use 50 kg for a phantom.
4. Make sure that the tiny menu in the upper-right corner of the window displays **Site** (and not e.g. GE). Click on the Head of the human figure on the right of the Exam info fields. If you already have custom-designed protocols saved on the system, click on **other**.
5. Select desired protocol set by clicking within the left protocol list widow. The protocol list **fmri_All** is a good starting point. If only a single protocol is desired, make selection within the right window. Click **Accept** button. The selected set of protocols shows up as a list in the **Rx Manager** window (lower left portion of the screen). In addition, the following windows are opened: **Patient Position, Autoview, Scan Timing, Additional Parameters, Acquisition Timing, Scanning Range**, an scan monitoring window. Each protocol in Rx Manager list becomes a "series" (i.e. a "scan") and is assigned a state. NEW means that the series has not been run. INRX indicates that the series is the one currently used, 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. SCND indicates that the series has already been scanned. (Put in something about what ACT means). .

Note on Rx Manager: Scan Modes opens controls for SAR Monitor window and automatic data transfer (note: this feature is not recommended and transfer of data to the server will use a different path described below). Gating Control button opens controls for physiological monitoring, and gating. New Series button can be used for inserting a new protocol that is not included in the original protocol set. End Exam button should be used at the end of scanning session. This button will return the GUI back to the initial state.

Note on Patient Position and Imaging Parameters fields: Check the Coil field and make sure that the currently connected coil is indicated (if necessary, click on ... to select the correct coil). Make sure that Pulse Seq, Mode and Imaging Options fields reflect correct pulse sequence options.

The miniature human silhouette icon can be used to go back to protocol selection window.

Running a localizer scan

1. Make sure that loc(alizer) is selected in the Rx Manager list. Click on Save Series. This saves localizer parameters.
2. Click the big Scan button in the lower right corner of the screen. Before acquisition of default localizer images (5 images per each orthogonal planes, 15 total) Prescan and Autoshim are executed automatically. If Autoview button in the Autoview screen is checked, localizer images are displayed in the upper right image window as they are acquired and reconstructed.

Running an EPI scan

1. Click on a desired EPI series in the Rx Manager window (e.g. EPI_bw62.5 for low-bandwidth sequence). The windows on the right will change to the EPI fMRI layout.
2. Start with fMRI Screen button, and select a desired stimulus paradigm. Paradigm selection step is necessary for fMRI scans, as it determines number of reps, TR, and a block-design paradigm used by the Real Time BrainWave software. In Research mode (coming soon) paradigm parameters can be edited at run-time, but in generic mode one has to create a paradigm ahead of time using Paradigm Manager. The fMRI Screen window allows setting slice acquisition order and gating. **Warning:** if the red message "Multiple Acquisitions are not supported ..." shows up, reduce # slices down from default number (35).

Tip: Using Paradigm Manager.

Select Tools desktop by clicking instruments desktop button. Click Utilities in the Service Desktop Manager window. Double-click on Paradigm Manager. Click on Define New Paradigm button. Enter paradigm name and TR. Dummy acquisitions refer to initial images that are not reconstructed. Initial state determines whether the paradigm is started with stimulus or rest block. Number of Phases is Number of reps.

3. Click on the Graphic Rx button to prescribe slices. A graphic Rx window appears. In it, click on any of the 3 localizer projection images to display the default slice prescription. Use mouse to resize the slice stack. Note: slice orientation is controlled in the Imaging Parameters window, Plane field. 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.

4. Adjust FOV, slice thickness, slice spacing as required by experimental goals. Frequency direction can be modified (e.g. default R/L to A/P) to minimize image distortions, but beware of the possibility of peripheral nerve stimulation in that case.
5. Click on Save Series button, Then on Prepare to Scan button on the Rx Manager window. If the slice stack prescription is not centered on the scanner's isocenter, a green button "Move to Scan" starts blinking on the keyboard. Press it and the patient table moves so that prescription becomes centered. **Note:** Table delta parameter can be manipulated to prevent motion, but this will be available only in Research mode.
6. Click on the Prep Scan button in the lower right corner of the screen. This initiates a series of prescans, autoshimming with linear gradients (assuming Autoschim button is checked which is the case by default), and acquisition of a phase map (reference scan, again assuming that Phase Correct box is checked, which is the case by default). Once prescans are over, a BrainWave RT window shows up.

Note: manual Prescan and shimming is possible (using "Manual prescan" button) but not recommended since autoshimming does an excellent job.

7. fMRI scan should be initiated using fMRI SCAN button, since that also starts the BrainWaveRT software, which updates real-time statistical parametric map of fMRI data (real time partial correlation or t-test values).

Tip: The Brainwave window can be maximized by clicking fMRI browser button, or minimized by Minimize button. Use fMRI control button to return back to the original BrainWave window.

8. Click Close to close off the BrainWave RT window. If parametric maps are not saved using Capture All button, a dialog box appears asking whether to save them. **NOTE:** If you don't close the BrainWave RT Window you will not be able to start the next scan.

Running a structural scan

1. Doubleclick on a desired FSPGR protocol in Rx Manager window. Click on Graphic Rx to prescribe a 3D slab. Click on one of the 3 localizer images. Position the prescription as desired. Note that oblique volumes can be prescribed if desired.

Note: the Locs per slab refers to the total # of slices generated from the slab, but the outermost 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. Modify TE, Prep Time, Flip Angle to maximize desired contrast (default parameters are close to optimal for gray/white/CSF contrast).
3. Click Save Series, and then Prepare to Scan. The green Move to Scan button starts blinking. Press it and the patient table moves so that the prescription is centered on the scanner's isocenter (LED display on the scanner indicates the extent of table travel in mm). Click Scan button in the lower right corner of the screen to start the scan.

Notes: the scan progress can be monitored on the secondary flat panel monitor; the scan can be stopped by pressing the Stop Scan button on the keyboard.

Important: **DO NOT USE** the red button with a triangle on the keyboard to stop the scan. This button 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 may take ~20 min.

Finishing a scanning session

1. Press **End Exam** button on the Rx manager window, and Confirm button on the dialog box that appears.
2. Transfer acquired data to the fmrserver.ucsd.edu (use Data Transfer Notes).