

Data Structure

Table of contents

1 Overview	1
2 Protocol 1 Data Structure	2
2.1 Protocol Folder Naming Convention	2
2.2 Within Each Protocol Folder	3
2.3 Experiment Folder Naming	3
3 Protocol 2 Data Structure	3
3.1 Within Each Experiment Folder	5
4 Key Data Files	5
4.1 metadata.mat / metadata_*.mat	5
4.2 exp_order.mat	6
4.3 processedData.mat	6
4.4 G4_TDMS_Logs_*.mat	6
4.5 TDMS Files	6

This page documents the folder organization for data collected using the Nested RF Protocol. Understanding this structure is essential for locating experiment data and for automated analysis scripts.

1 Overview

Data is organized into two main directories based on which protocol was run:

- **Protocol 1 data:** Located within the protocol folder itself (organized by screen side and protocol version)
- **Protocol 2 data:** Located in a dedicated **data/** subfolder.

2 Protocol 1 Data Structure

Protocol 1 data is stored within the `nested_RF_stimulus/protocol1/` directory, organized first by screen side (LHS/RHS) or background intensity (bkg4), then by protocol version folder.

```
protocol1/
  LHS/                                     # Left half of screen experiments
    protocol1_4reps_12px_6px_LHS_2sbkg_200msfl_50msint_11-27-24_15-02-95/
    protocol1_10kHz_4reps_12px_6px_LHS_2sbkg_200msfl_50msint_12-13-24_14-
33-03/
  RHS/                                     # Right half of screen experiments
    protocol1_10kHz_4reps_12px_6px_RHS_2sbkg_200msfl_50msint_04-08-25_08-
08-42/
    protocol1_10kHz_4reps_12px_6px_RHS2_2sbkg_200msfl_50msint_81_180_05-05-
25_16-18-66/
  bkg4/                                    # Background intensity 4 experiments
    protocol1_10kHz_4reps_12px_6px_LHS_2sbkg_200msfl_150msint_07-10-25_15-
45-60/
```

2.1 Protocol Folder Naming Convention

The protocol folder name encodes key parameters:

`protocol1_[sampleRate]_[reps]_[flashSizes]_[side]_[bkgDuration]_[flashDur]_[interval]_[date]`

Component	Example	Meaning
10kHz	<code>protocol1_10kHz_...</code>	10 kHz sampling rate
4reps	<code>..._4reps_...</code>	4 repetitions of stimulus set
12px_6px	<code>..._12px_6px_...</code>	Flash sizes: 12 pixel and 6 pixel squares
LHS / RHS	<code>..._LHS_...</code>	Left or Right half of screen
2sbkg	<code>..._2sbkg_...</code>	2 second background between repetitions
200msfl	<code>..._200msfl_...</code>	200 ms flash duration
50msint / 150msint	<code>..._50msint_...</code>	Inter-flash interval
12-13-24_14-33-03	Date and time protocol was created	

2.2 Within Each Protocol Folder

```
protocol1_10kHz_4reps_12px_6px_LHS_2sbkg_200msfl_50msint_12-13-24_14-33-03/
  Patterns/                                # Visual stimulus pattern files
    *.mat                                # MATLAB pattern data
    *.pat                                # Compiled pattern files
  Functions/                              # Timing/position function files
    *.mat                                # MATLAB function data
    *.pfn                                # Compiled function files
  Analog Output Functions/                # Analog output timing (if used)
  Log Files/                              # Raw experiment logs
  Aborted_Experiments/                    # Failed or incomplete experiments
  currentExp.mat                          # Current experiment configuration
  processing_settings.mat                  # Analysis settings

  MM_DD_YYYY/                             # Date folders (e.g., 12_18_2024/)
    {strain}-HH_MM_SS/                    # Individual experiment folders
      metadata.mat                        # Experiment metadata
      exp_order.mat                      # Stimulus presentation order
      processedData.mat                  # Processed analysis results
      G4_TDMS_Logs_*.mat                 # Converted log data
      GridPlots.fig                      # MATLAB figure output
      MM-DD-YYYY_HH-MM-SS-ms/           # Raw TDMS data folder
        *.tdms                          # Raw data files
        *.tdms_index                    # TDMS index files
```

2.3 Experiment Folder Naming

Individual experiment folders follow the pattern: {strain}-HH_MM_SS

Examples: - 42F06XJFRC28_T4T5-15_29_81 → Strain: 42F06XJFRC28_T4T5, Time: 15:29:81
- SS00395XJFRC28_TmY3-10_58_33 → Strain: SS00395XJFRC28_TmY3, Time: 10:58:33 -
no_fly-16_20_26 → Test run with no fly

3 Protocol 2 Data Structure

Protocol 2 data is stored in `nested_RF_stimulus/protocol2/data/`. The data folders follow the naming structure `YYYY_MM_DD_HH_MM` and on the experiment computer itself they are automatically stored in `C:\matlabroot\G4_Protocols\nested_RF_protocol2\data`. These

folders were then moved onto the group drive and organized based on the type of experiment (e.g. RNAi knockdown experiments, direction selectivity experiments) and within that by condition (e.g. control vs TTL knockdown, ON vs OFF contrast).

```

protocol2/data/
  RNAi_ttl_2025/          # RNAi knockdown experiments (Dec 2024 - Jan 2025)
    control/             # Control group
      ON/                # ON contrast (bright flashes)
      OFF/               # OFF contrast (dark flashes)
    ttl/                 # TTL knockdown group
      ON/
      OFF/

  DS_v2/                 # Direction selectivity experiments (Apr - May 2025)
    TmY3/                # TmY3 cell type
    TmY18/               # TmY18 cell type
    TmY5a/               # TmY5a cell type
    Tm5Y/                # Tm5Y cell type

  T4T5_Summer2025/       # T4/T5 MARCM experiments (Jul - Sep 2025)
    YYYY_MM_DD_HH_MM/   # Individual experiment folders

  T4T5_autumn2025/       # T4/T5 MARCM experiments (Oct - Nov 2025)
    YYYY_MM_DD_HH_MM/

  2025_whiteplus/        # White+ genetic background controls
    YYYY_MM_DD_HH_MM/

  Octopamine/            # Octopamine pharmacology experiments
    pre/                 # Before drug application
    post/                # After drug application
    wash/                # After washout

  CGP54626/              # CGP54626 (GABA-B antagonist) experiments
    T4/                  # T4 cells
    T5/                  # T5 cells
    pre/                 # Before drug
    post/                # After drug

  SS0324_T4T5/           # SS0324 split-Gal4 line experiments
    OFF/                 # OFF contrast only

```

3.1 Within Each Experiment Folder

Protocol 2 experiment folders follow a consistent structure:

```
YYYY_MM_DD_HH_MM/           # e.g., 2024_12_12_12_12/
  Patterns/                   # Visual stimulus patterns
    *.mat                     # Pattern data files
    *.pat                     # Compiled patterns
  Functions/                  # Timing functions
    *.mat
    *.pfn
  params/                     # Stimulus parameters
    *.mat                     # Parameter files for each stimulus type
  Analog Output Functions/    # Analog outputs (if used)
  Log Files/                  # Raw data
    MM-DD-YYYY_HH-MM-SS-ms/  # TDMS data folder
      *.tdms
      *.tdms_index
    G4_TDMS_Logs_*.mat        # Converted log data
  currentExp.mat              # Experiment configuration
  metadata_YYYY_MM_DD_HH_MM.mat # Experiment metadata
```

All of these files are generated and saved with every run of the `generate_protocol2()` script in MATLAB. This means that there is a lot of redundancy across the different experiment folders, as the patterns and functions are the same for all experiments within a given protocol version. However, this structure enables the user to see the exact patterns/functions used for the experiment. From October 2025, automatic logging to a google sheet was implemented. This [google sheet](#) contains the full experiment log from this date onwards.

4 Key Data Files

4.1 metadata.mat / metadata_*.mat

Contains experiment metadata including: - Fly genotype/strain - Experimenter notes - Protocol parameters used - Date and time of experiment

4.2 exp_order.mat

Contains the order in which stimuli were presented during the experiment.

4.3 processedData.mat

Contains processed analysis results including: - Extracted membrane potential traces - Stimulus-aligned responses - Summary statistics

4.4 G4_TDMS_Logs_*.mat

MATLAB-converted version of the raw TDMS log files, containing: - ADC voltage recordings (electrophysiology data) - Frame position data (stimulus timing) - Timestamps

4.5 TDMS Files

Raw data files from the G4 display system: - *_ADC0_Volts.tdms - Channel 0 voltage (typically membrane potential) - *_ADC1_Volts.tdms - Channel 1 voltage (if used) - *_ADC0_Time.tdms / *_ADC1_Time.tdms - Timestamps - *_Frame_Position.tdms - Current frame being displayed - *_Frame_Time.tdms - Frame timing