





Glance  
Optical Pty.Ltd.



# Instruction Manual

-  MRF Diabetes
-  MRF Glaucoma
-  MRF Macular
-  MRF Neural



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## 1. A message from the creators of MRF

The Melbourne Rapid Fields (MRF) App is an iOS application designed for use with the Apple iPad. The MRF is meticulously designed to perform vision and visual field testing on portable tablet devices. It can be used in optometry practices or eye clinics or in the home by patients.

Our mission is to design products that help to preserve vision by being:

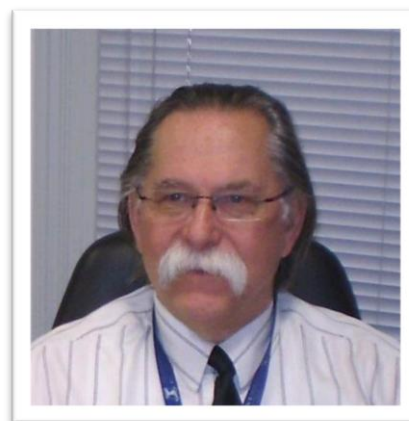
1. Clinically validated, portable and cheap.
2. Suitable for patients to monitor their own vision at home.
3. Suitable for doctors, optometrists and general practitioners to perform ALL aspects of vision evaluation.

In creating these products, we have used the most contemporary test methods that incorporate modern knowledge of vision processing to give you a reliable test of vision that we hope is easy to use for you and your patients. We thank you for joining us on this unique and novel journey and we look forward to any feedback that you might have on our products.



Dr George Kong

(Glaucoma specialist and IT expert)



Prof Algis Vingrys

(Professor in clinical optometry)



*MRF is marketed as a partnership between the University of Melbourne and the Royal Victorian Eye and Ear Hospital. Ó 2017 The University of Melbourne, The Royal Victorian Eye & Ear Hospital.*


## 2. Downloading the MRF App

### 2.1 Compatible hardware and software

The following hardware is required for the use of MRF:

- Apple iPad (Apple, Cupertino, USA) with retina display, including:
  - iPad 9.7" 5<sup>th</sup> generation or newer
  - iPad Air 3<sup>rd</sup> generation, iPad Air 2
  - iPad Pro 9.7", 10.5", 11.0", 12.9" Gen 1 or newer
  - iPad Mini Gen 5<sup>th</sup> generation or newer, iPad Mini 4 (Note: iPad Minis are compatible with MRF Macular only)
- A minimum of 16GB of storage
- Internet connection via WiFi (or optionally via 3G/4G) to create a user account

The following software is required for the use of MRF:


- iOS version 13 or later
- Access to the Apple App Store application (inbuilt in iOS) 

The following items are optional:

- Apple Smart Keyboard (or a compatible Bluetooth keyboard)
- WiFi printer

## 2.2 Purchasing the MRF app from the Apple App Store

To Download the MRF app from the Apple App Store, do the following:

1. Tap on the Apple App Store application from the home screen .
2. Type in MRF Diabetes, MRF Glaucoma, MRF Macular or MRF Neural in the search bar.

The MRF app will appear in the list of apps that match the search description.

3. Download by tapping the button next to the app icon (Note the 'Lite' version of each app is free to download but is only there as a trial. It is limited to 8 saves).

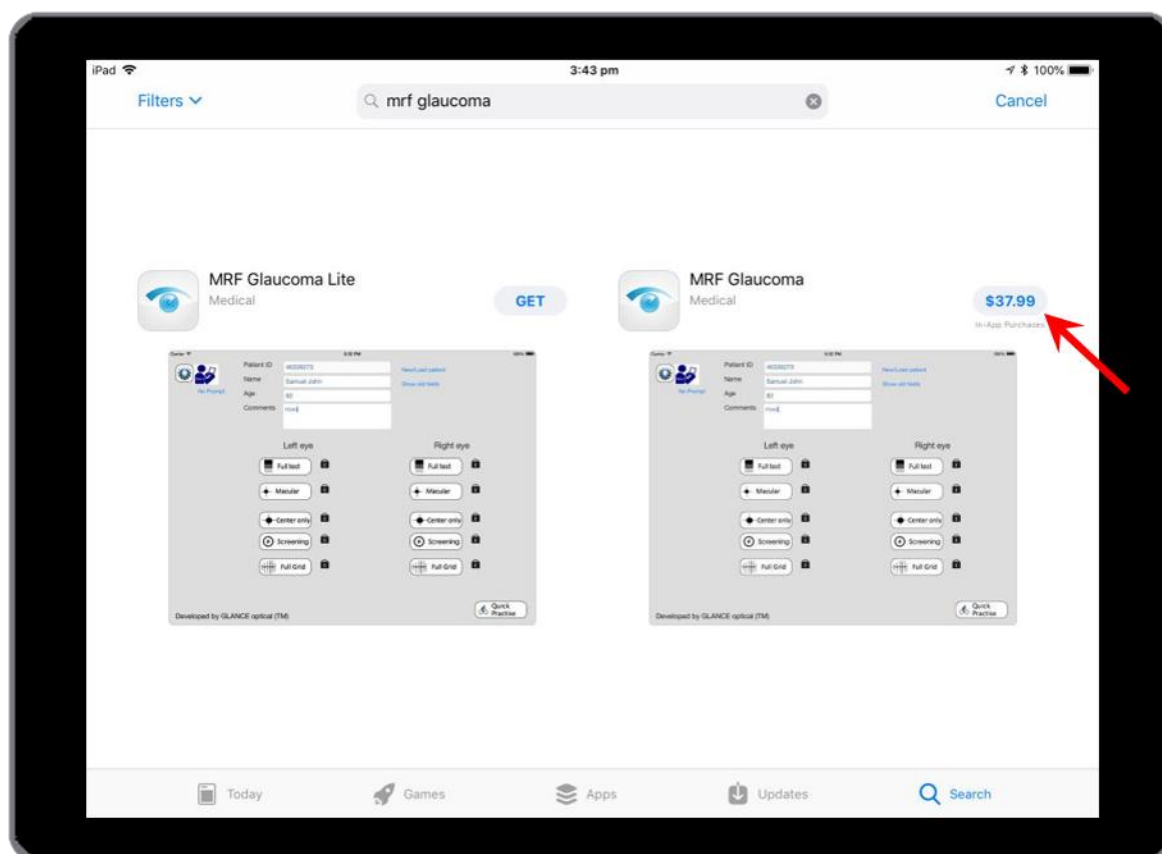



Figure 1. Purchasing the MRF app from the Apple App Store.

4. Follow the on-screen instructions of the Apple App Store to complete the purchase and install the app.



## 2.3 Downloading the MRF app via a download code

To Download the MRF app using a download code supplied by your sales representative, do the following:

1. Tap on the Apple iTunes application .
2. On the homepage, scroll down to the bottom and tap on Redeem.

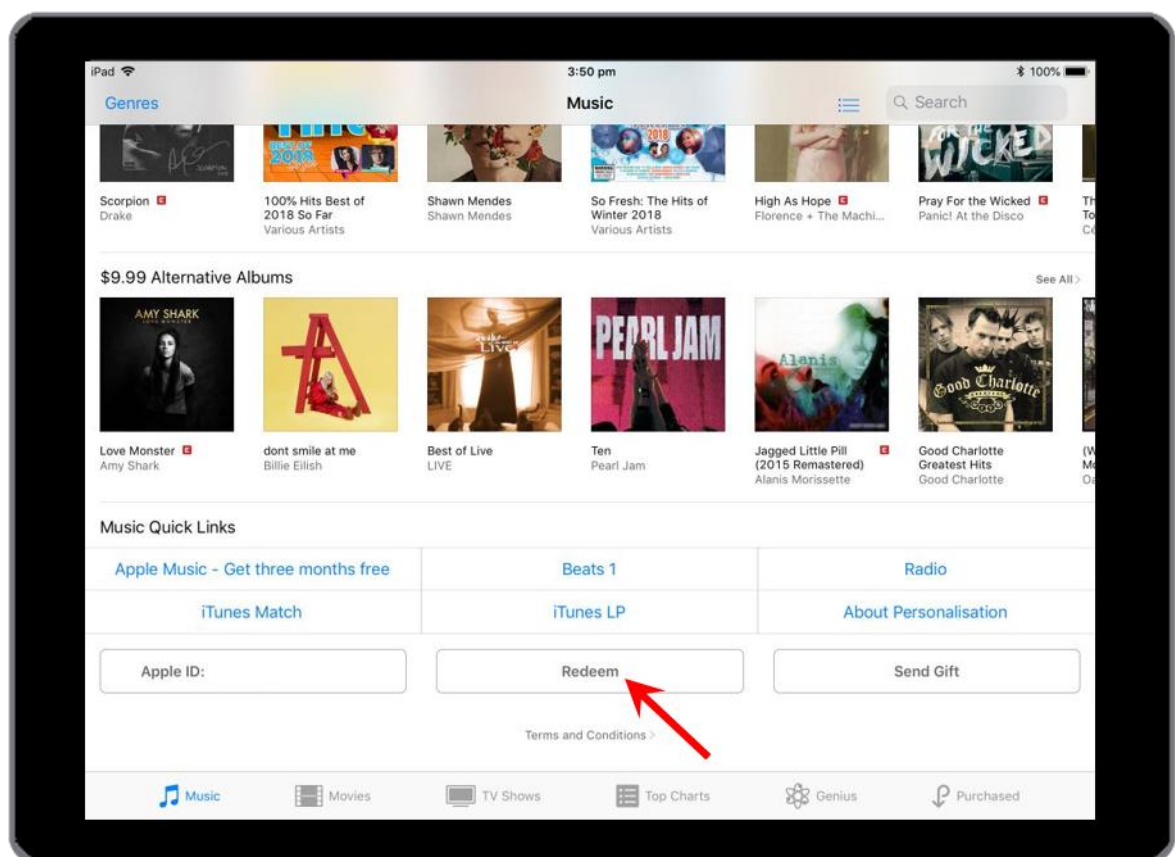



Figure 2. Redeeming a download code from the Apple App Store.

3. Enter the download code supplied by your sales representative.
4. Follow the on-screen instructions to install the MRF app.

## 2.4 Opening the app

To open the MRF app, locate the icon on the iOS desktop and tap  to launch.

## 3. Using the MRF app for the first time

Upon launching the MRF app for the first time, the user will be greeted with the login screen.

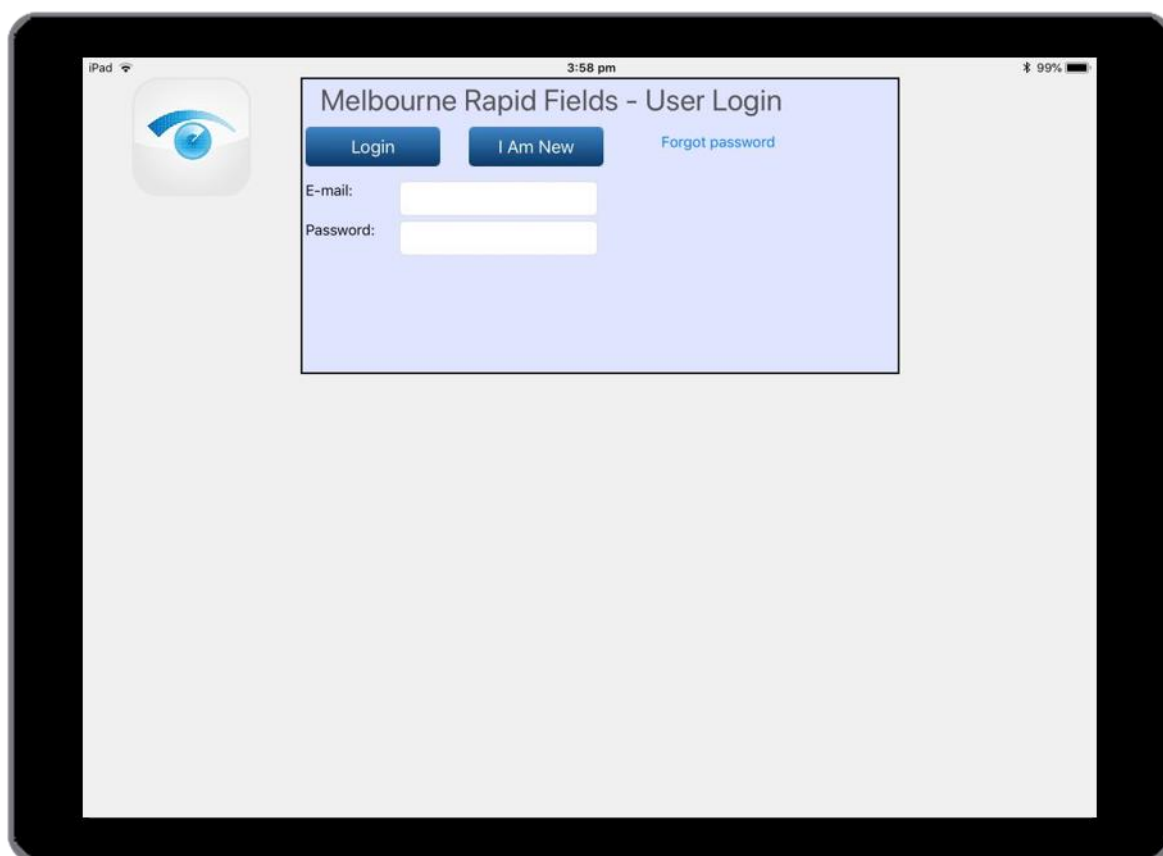



Figure 3. The MRF login screen

To create a new user, see section [3.1 Setting up a user account](#). To log into the app, see section [3.2 Logging into the app](#).

### 3.1 Setting up a user account

To set up a new user account, do the following:

1. Tap on the  button to bring up the Create New User Dialogue Box.
2. Complete the following fields:
  - i. **Select user type:** Either “Patient” or “Other (eg. optometrist, ophthalmologist)”.
  - ii. **Select iPad type:** Choose from 9.7”, 10.5”, 11.0”, 12.9” depending on the screen size of your iPad. This may be changed later on in the settings (see [Section 4](#)).
  - iii. **E-mail:** Enter a valid e-mail address.
  - iv. **Choose password:** Choose a password that is secure and able to be remembered by the user.
  - v. **Retype password:** Retype the same password again to confirm. Forgotten password will be covered in a later section.

Tap the  button to proceed.

- vi. **First name:** Enter the user’s first name. vii. **Last name:** Enter the user’s last name. viii. **Organisation:** Enter the name of your organisation (optional).

Tap the  button to proceed.

- ix. **Your doctor’s e-mail or Code (optional):** In this field, the patient can choose to enter the e-mail address of their clinician (optometrist, ophthalmologist, general practitioner).

The user should seek permission of their clinician prior to using this function as their clinician will receive an e-mail invitation notifying them that they have been nominated by the user to review their results. The nominated clinician will not be able to review the user's results until they have accepted the invitation.

- x. **Country:** Enter your country (required). xi. **State:** Enter your state (optional).

3. Tap **Create New Login** to complete the new user account.

4. The main control panel of the app will now be displayed (see section 4. Elements of the main control panel).

### 3.2 Logging into the app

To log into the app the user must enter their e-mail address and password in the login dialogue box. If the user does not have an account, see section 3.1 Setting up a user account.

Alternatively, the user may tap **Forgot password** to set a new password.

## 4. Elements of the main control panel

The following diagram shows the main control panel.

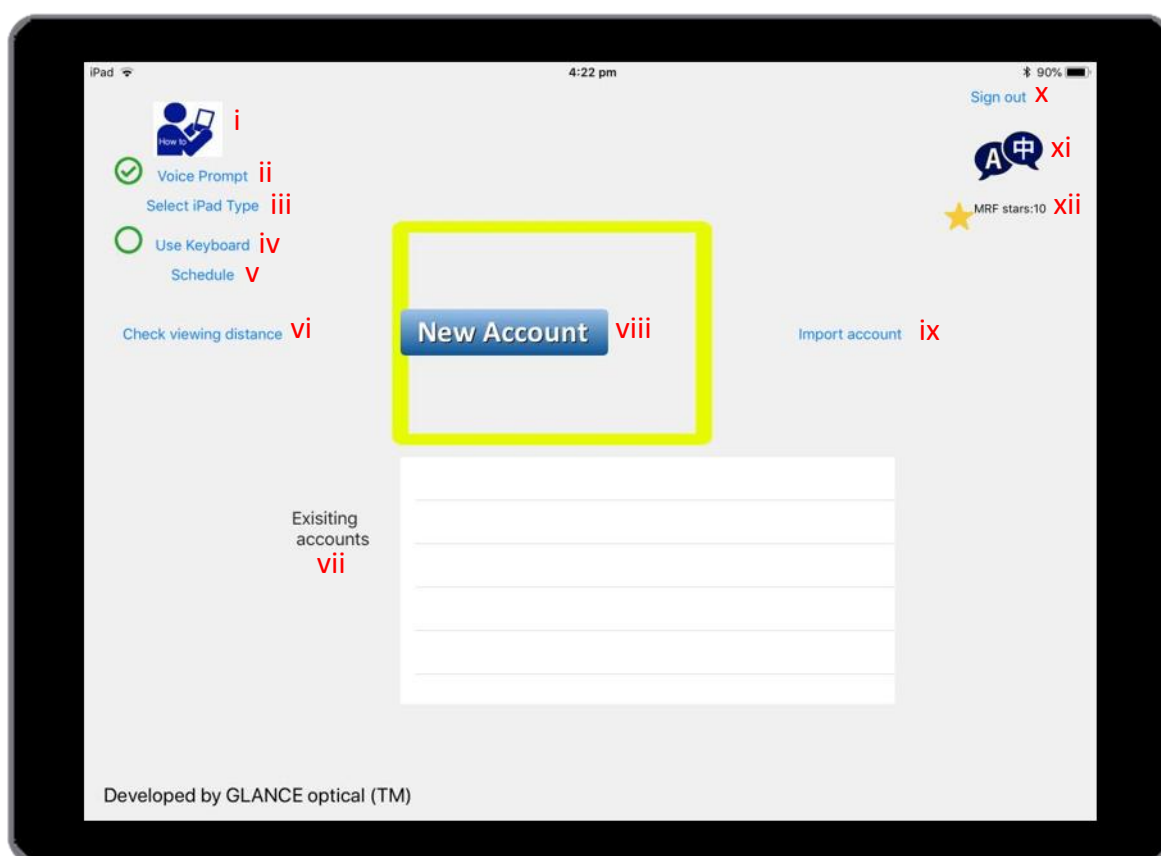


Figure 4. Elements of the main control panel.

Each element is discussed in further detail below:

- i. **How to:** Tap this button to bring up the electronic user manual.
- ii. **Voice prompt:** Tap this button to enable/disable the voice prompt during testing. iii. **Select iPad type:** Sets the iPad screen type. Choose from: 9.7", 10.5", 11.0", 12.9".
- iv. **Use keyboard:** Tap this button to enable the patient to respond via the space bar on a keyboard linked to the iPad. Turning this off allows the patient to respond by tapping the touch zone on the screen.
- v. **Schedule:** Set a reminder for visual field monitoring (daily, monthly, weekly, cancel).
- vi. **Check viewing distance:** Tap this to set the patient at the correct viewing distance (optional).


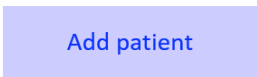


- vii. **Existing accounts:** List existing visual field test accounts.
- viii. **New patient form:**
  - a. **Name:** Enter the full name of the person to be tested.
  - b. **Age:** Enter the age of the person the be tested.
  - c. **Comments:** Enter any additional comments regarding the patient.
  - d. **Add new button:** Add a new patient to the list of existing accounts.
- ix. **Import account:** A visual field test saved on another iPad device (on same user account) may be imported to the current iPad device.
- x. **Sign out:** Log out of the app.
- xi. **Language:** Change the language of the voice prompt.
- xii. **MRF stars:** Shows the number of MRF stars held by the user.

## 5. Adding/selecting a patient

### 5.1 Adding a new patient

To add a new patient, do the following:

1. Tap  on the main control panel and complete the form:
  - a. **Patient ID:** Enter an ID for the patient.
  - b. **Name:** Enter the full name of the patient.
  - c. **Age:** Enter the age of the patient.
  - d. **Comments:** Enter additional comments related to the patient (optional).
2. Tap the  button to add the patient. Note that the screen will

advance to the visual field test screen.

## 5.2 Selecting an existing patient

Existing patients will be displayed in the main control panel. To select an existing patient, do the following:

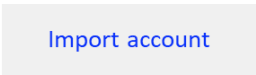
1. Navigate to the “Existing accounts” window of the main control panel (Figure 4 vii).
2. Scroll through the list and tap the desired patient account.

The screen will now advance to the visual field test screen. To return to the main control

panel, tap .

## 5.3 Importing an existing patient

If a patient has been tested on a separate device under the same user account, their file may be imported to the current device. To do so, perform the following steps from the main control panel:

1. Tap  (Figure 4 ix).
2. Tap the patient(s) from the list of online accounts. The account will be imported.
3. Tap OK to confirm.
4. Tap Done when finished.
5. The imported patient(s) account(s) will now be displayed in the main control panel.
6. Tap the patient in the list and the screen will advance to the visual field test screen.

## 6. Setting up the patient

Prior to conducting a visual field exam using MRF, set up the patient according to the following instructions to ensure reliable results.

### 6.1 Room set up

Prior to performing an MRF exam, select an area where the patient can be seated comfortably. Ensure the iPad screen is free from dirt and fingerprints by wiping it with a microfibre cloth. Dim the room lights and ensure the iPad is oriented such that there are no reflections off the screen (e.g. from ceiling lights, doors, windows, etc).

### 6.2 Using the MRF hood (optional)

The MRF hood is designed to be used in conjunction with the MRF app to reduce reflections off the screen and to place the patient at the correct viewing distance (33cm or 13"). A hood may have been supplied as part of your MRF package. A new or replacement hood can be purchased through your MRF sales assistant. Please refer to the separate user instructions on how to assemble the MRF hood. The iPad must have a stand (eg: Apple Smart Keyboard Folio) to be used with the hood (stand not supplied). The MRF hood is designed for use with the following iPad models:

- iPad 2, 3, 4
- iPad Air 1, 2
- iPad Pro 9.7", 10.5", 11.0", 12.9"

### 6.3 Near correction

The user must wear their habitual near correction whilst performing the exam. This may be in the form of single vision near spectacles, multifocal spectacles (including bifocals), contact lenses or habitually unaided.

### 6.4 Test distance

The MRF test distance is 33cm or 13". This can be achieved using the MRF hood. If MRF is to be used without a hood the correct viewing distance for a 9.7", 10.5" or 11" iPad screen can be achieved by cutting a piece of string to 87cm/34", wrapping it around the iPad and bringing the two ends to touch at the patient's nose. The correct length of string needed for 12.9" iPads is 97cm/38" and iPad mini is 83cm/32.5".



Figure 5. Setting the correct test distance without using a hood.

## 7. Test overview

The MRF uses a Bayes predictor and neighbourhood logic resulting in a very efficient method of thresholding. For ALL test grids (except RED threshold) spot size increases from the fovea (about Goldmann size II) to peripheral locations (about Goldmann size V) to return fixed thresholds and variability at all locations. This has the benefit of making early defects easier to expose in the periphery. Spots have 'soft' edges with a luminance ramp (see Figure 8).

Test grids optimise spot locations for ALL causes of vision loss but also have specific patterns further refined for monitoring diabetes, glaucoma, macular or neural losses.

Screening is performed at 2-3dB below expected threshold on an optimised grid designed to detect ALL causes of vision loss and implements a neighbourhood logic for retesting missed locations.

## 8. MRF Diabetes App

### 8.1 Elements of the test selection screen (MRF Diabetes)

The following diagram shows the test selection screen. It is separated into Left eye tests on the left side of the screen and Right eye tests on the right side of the screen.

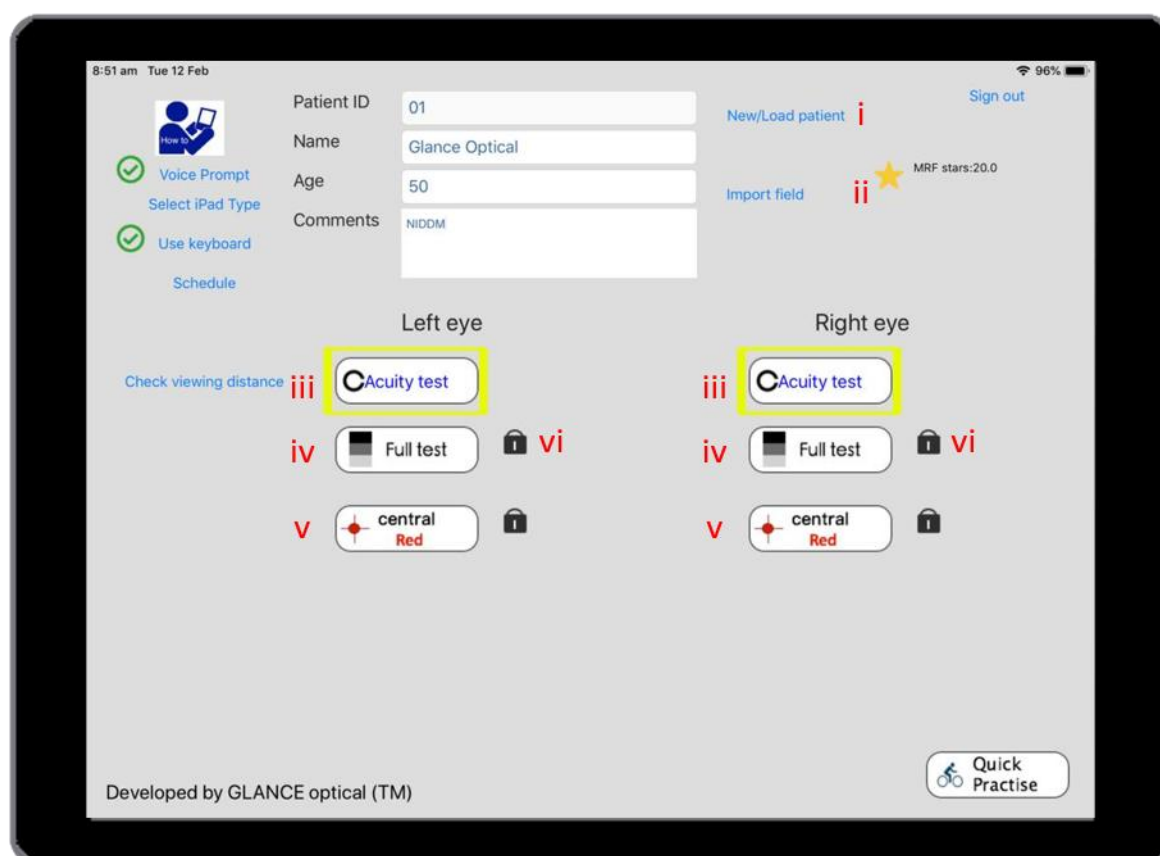


Figure 6. Elements of the test selection screen (MRF Diabetes).

Each element is discussed in further detail below:

- i. **New/load user:** Switch to a different patient account.
- ii. **Import field:** See a history of the patient's previous visual field results.
- iii. **Acuity test:** Performs visual acuity testing.

- iv. **Full test:** Performs full thresholding testing using a 67-point grid with a 24-2 configuration. The outermost 10 points have been removed and an extra 20 points have been added to the macular region to form a very tight grid for the detection of macular oedema.
- v. **Central red:** A 41-point thresholding algorithm with points concentrated at the macular region.
- vi. **Lock button:** Located next to each module. When activated, only the selected module will be visible for future testing. It is recommended that the lock button is tapped next to full test for right eye and left eye to ensure that the Full test is performed for all subsequent visits.

## 8.2 Visual acuity testing (MRF Diabetes)




Each eye should be tested one at a time. The eye that is not being tested should be covered by hand, by folding a tissue over the glasses, or by using an eye patch. Select an existing patient or create a new patient to start testing. Ensure the patient has been set up



appropriately according to the steps in section 6. [Setting up the patient.](#)

### 8.2.1 Types of acuity testing

MRF Diabetes permits for the testing of:

-  • High contrast acuity ( $L_b = 135\text{cd/m}^2$ ,  $C = 94\%$ )
-  • Low luminance, low contrast acuity ( $L_b = 5\text{cd/m}^2$ ,  $C = 15\%$ )
-  • Acuity in noise ( $L_b = 110\text{cd/m}^2$ )

### 8.2.2 Performing an acuity test (MRF Diabetes)

The patient is required to match the stimulus by tapping the correct orientation at the bottom of the screen. If they are unsure they may choose the “?” option (see Figure 7).

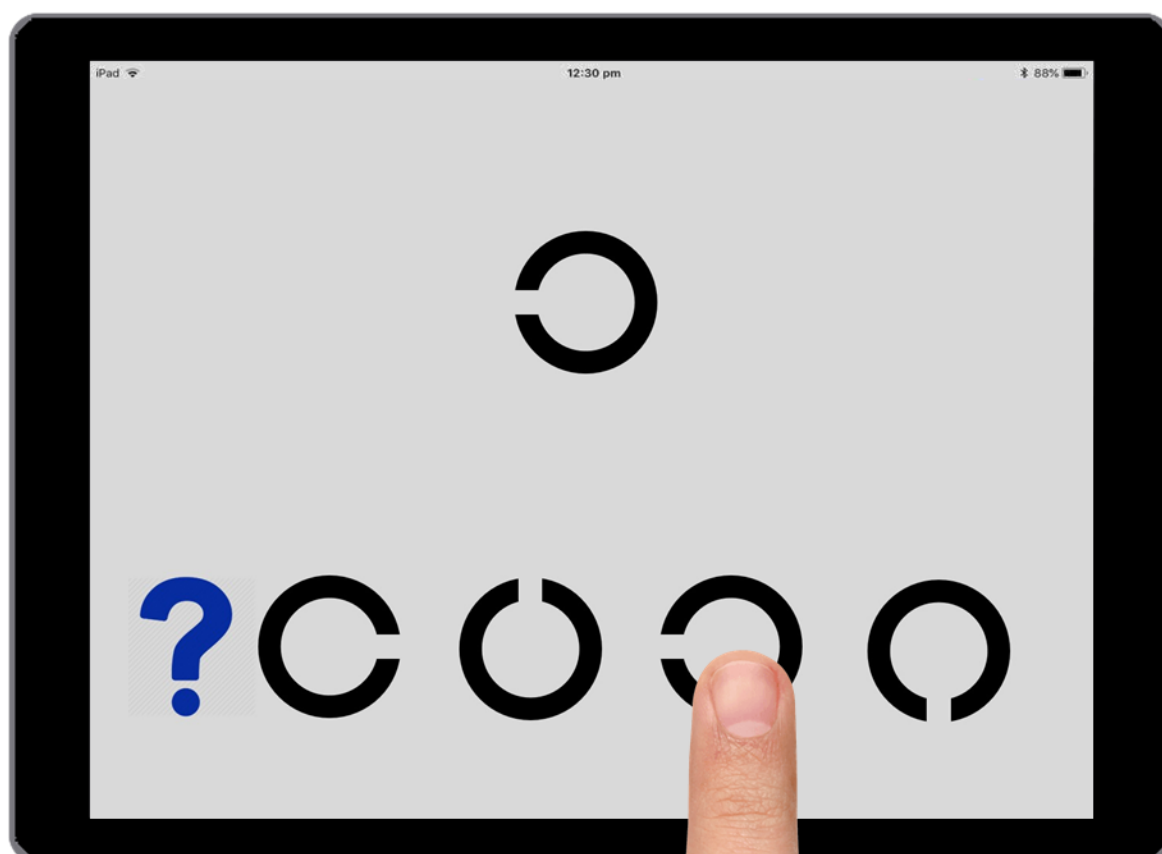


Figure 7. Performing an acuity test (MRF Diabetes). High contrast acuity target shown ( $L_b = 135\text{cd/m}^2$ ,  $C = 94\%$ )

## 8.3 Visual field testing (MRF Diabetes)

### 8.3.1 Selecting a visual field test (MRF Diabetes)

Visual field thresholding can be performed via one of two test protocols; Full Test or Central Red. Each of these protocols are described in more detail in the following sections



#### 8.3.1.1 Full Test

Full test is the recommended visual field thresholding protocol for MRF Diabetes. This uses a 67-point grid pattern with additional test points added in the macula region. It can test 21° x 15° of visual field. A neighbourhood logic is employed to add extra test locations at the edges of regions where visual field loss is suspected. An example of the full test grid with schematic scaled spots is shown in Figure 8:

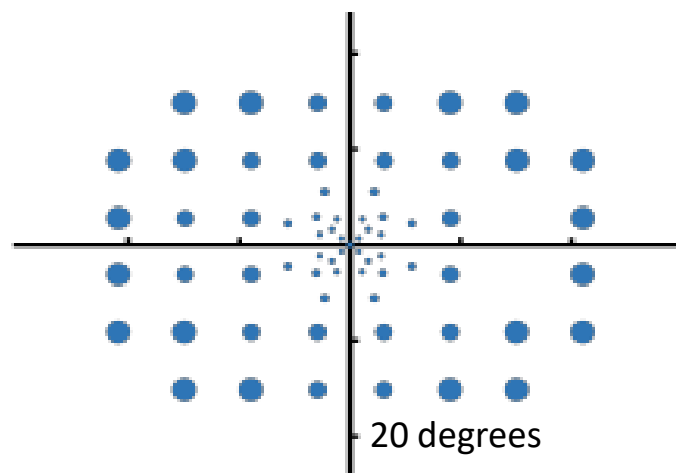


Figure 8. Visual field test pattern for 67-point grid Full test (MRF Diabetes). Spots have been size-scaled.

#### 8.3.1.2 Central Red

The Central Red test is recommended for the early detection of diabetes. This uses a fixed Goldmann size V test spot shown at 41-points in a radial pattern that gives tight coverage in the macula region. It can test 9.5° x 9.5° of visual field. An example of the full test grid is shown in Figure 9:

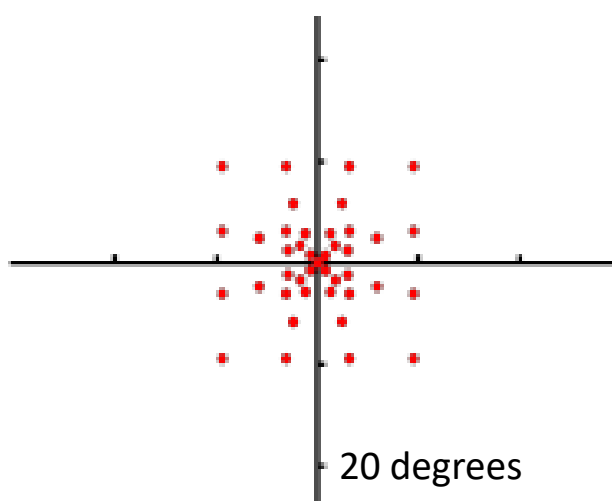


Figure 9. Visual field test pattern for 41-point Central Red test (MRF Diabetes). Spots have been size-scaled.

### 8.3.2 Elements of the visual field test screen (MRF Diabetes)

The following screenshot shows the visual field test screen.

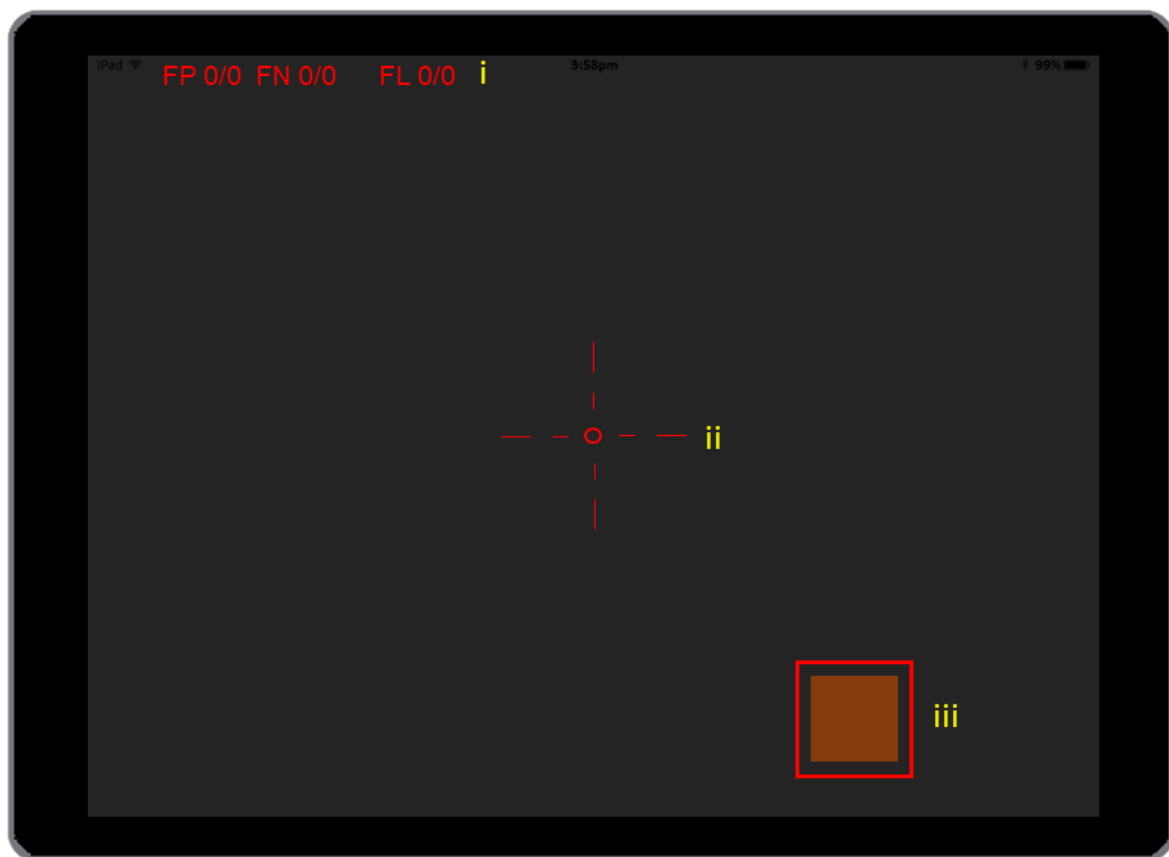


Figure 10. Elements of the visual field test screen (MRF Diabetes).

Each element is discussed in further detail below:

- i. **Reliability indices:** The reliability indices thus far are presented in red in the upper left corner of the screen. These results are updated in real time throughout the test.  
  
Indices measured using volley sampling are:
  - **FP:** False positive rate. A FP rate  $\leq 25\%$  is acceptable.
  - **FN:** False negative rate. Affected by scotoma and not a good index of reliability.
  - **FL:** Fixation loss. Measured with a blind-spot monitor.
- ii. **Fixation target:** The patient is required to observe the red fixation target located in the centre of the screen for the entire duration of the exam. Depending on the patient's

visual acuity (recorded from the Visual acuity test) the size of the fixation target may be automatically adjusted by the MRF app. The voice over (if enabled) will periodically remind the patient to maintain fixation. Note that the location of the blind spot is identified at the commencement of a visual field test. Depending on the screen size of iPad and test grid, the fixation cross may move to different locations on the screen to test peripheral locations in the visual field.

- iii. **Touch zone:** Only displayed when not using a keyboard to poll the patient's response. See section [8.3.3 Registering a response](#) for more information.

### 8.3.3 Registering a response (MRF Diabetes)

The patient is instructed to respond to lights flashed anywhere on the screen whilst they look at the fixation target. Patient responses can be polled via one of the following methods:

1. **Tapping the space bar:** If a keyboard is connected to the iPad, the patient may respond by tapping it each time they see a grey light. Ensure the "Use Keyboard" option is selected on the test screen (see section [4. iv Use Keyboard](#) for more information). An Apple Smart Keyboard is the preferred keyboard as it does not require charging. Alternatively, the user may connect a Bluetooth keyboard to the iPad.
2. **Tapping the touch zone:** If a keyboard is not connected the patient may respond by tapping the touch zone. Note that the patient may tap anywhere on the screen to poll a response, however, using the touch zone is recommended to reduce fingerprints on the screen and minimise screen blemishes.

### 8.3.4 Pausing/exiting a test (MRF Diabetes)

To pause a test, either the clinical assistant or the patient can tap on the red fixation cross.

An option will be presented to resume or exit the test.

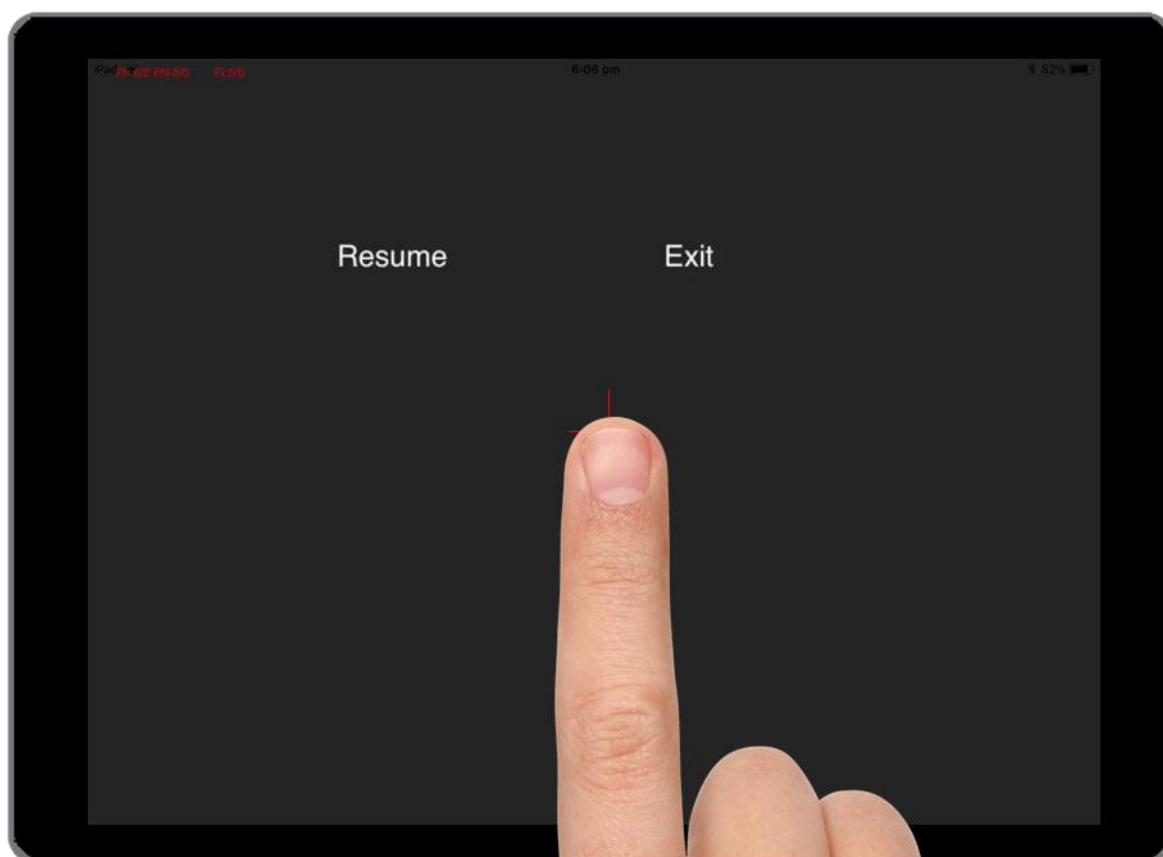


Figure 11. Pausing/exiting a test (MRF Diabetes).

#### 8.4 Visual field results (MRF Diabetes)

Visual field results will be displayed on screen at the end of a test. Alternatively, the user may view past results by selecting a patient from the main control panel and tapping on the Show old fields button (see section [8.1 Elements of the test selection screen](#)). The user can then


cycle through previous visual field exams using the

<<Next

and

Prev>>

buttons. An option to print the desired field is presented at the top of the

screen by tapping the  icon. Thresholds have been normalised to white-spot dB values.

#### 8.4.1 Elements of the results screen (MRF Diabetes)

The elements of the results screen may vary depending on the test protocol used. These elements may include the following:

- **Test details**

- i. Patient ID. ii. Patient age.
- iii. Patient name.
- iv. Test time.
- v. Date.
- vi. iPad type.
- vii. Visual acuity.

- **Reliability indices** viii.

**FP:** False positives. ix. **FN:** False negatives.

- x. **FL:** Fixation loss.

- **Global indices** xi. **MD:**

Mean defect\*.

- xii. **MRF MD:** MRF Mean defect\*\*.

xiii. **PD:** Pattern defect. xiv.

**VC:** Visual capacity.

\*The MD value is adjusted using a correction factor to approximate HFA (Humphrey Field Analyser) MD.

\*\*MRF MD the is the raw MD calculated from the MRF results prior to correction.

Note: The Mean defect values range from +0.50dB to -30dB with the more negative number indicating a worse visual field threshold. The MD has been colour-coded to signify abnormality (see point xx in the following section).

- **Pointwise results xv. Grey**

**scale.** A greyscale representation of the patient's visual field.

xvi. **Numeric plot.** Raw numeric sensitivity of each point tested. 30dB is the highest possible sensitivity with 0dB being the lowest.

xvii. **Total deviation plot.** This indicates the average departure of points from the age-matched expected value.


xviii. **Pattern deviation plot.** This indicates local level of abnormality after correcting for the patient's MD value.

- **Other results xix. F/T.**

Foveal threshold given in dB (average threshold of all points <1°).

xx. **Colour coded indicator for result:**

 Green: within normal limits (95% of normals).

 Amber: Borderline (<5% of normals).

 Red: Abnormal (<1% of normals).

- **Progression analysis**

See [Section 13. Visual field progression](#) for more information.

The results for each protocol are described in more detail in the following section:



#### 8.4.1.1 Full test

An example of the results from a full test is shown below:

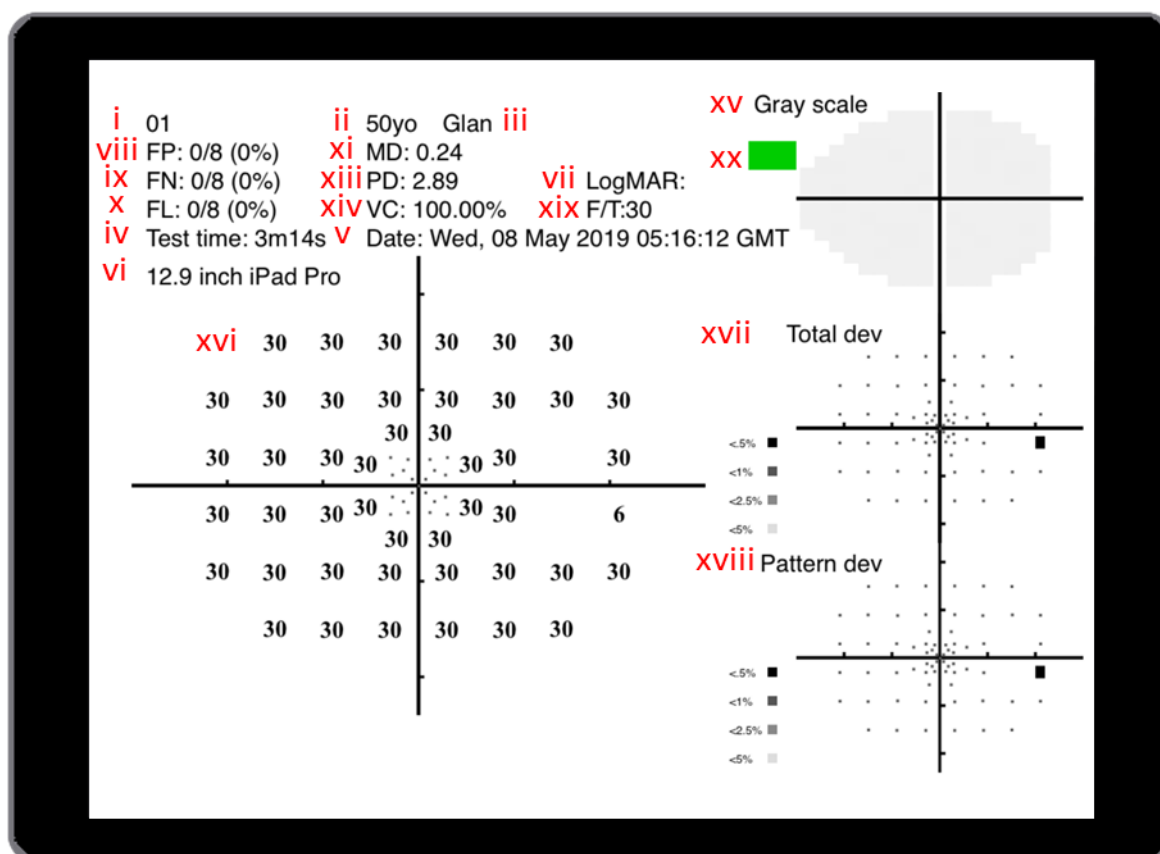


Figure 12. Visual field output for Full test (MRF Diabetes). Crowding in the macular region means that thresholds in this location are shown as a grey scale (dots) and not as numerals. The grey scale corresponds to the Total Deviation scale (to the right).

#### 8.4.1.2 Central red

An example of the results from a central red test is shown below:

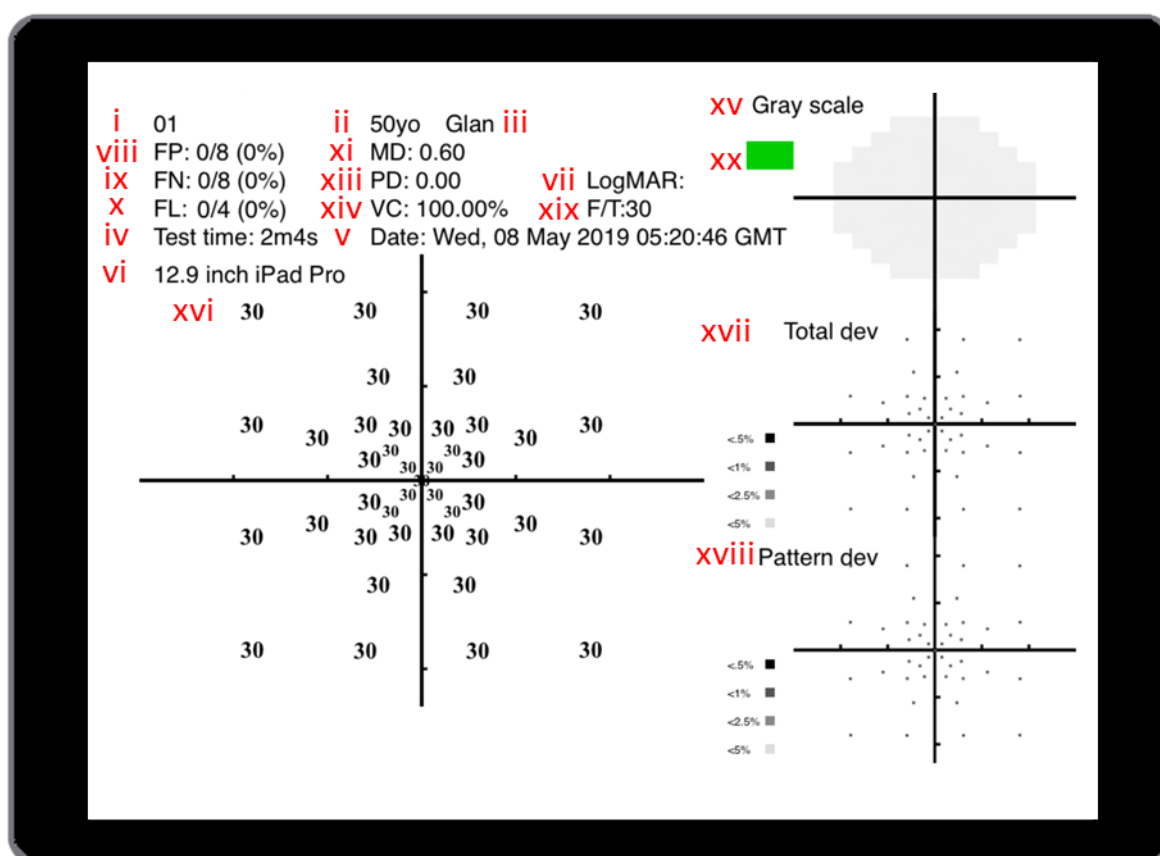


Figure 13. Visual field output for the 41-point Central Red test (MRF Diabetes).

## 9. MRF Glaucoma App

### 9.1 Elements of the test selection screen (MRF Glaucoma)

The following diagram shows the test selection screen. It is separated into Left eye tests on the left side of the screen and Right eye tests on the right side of the screen.

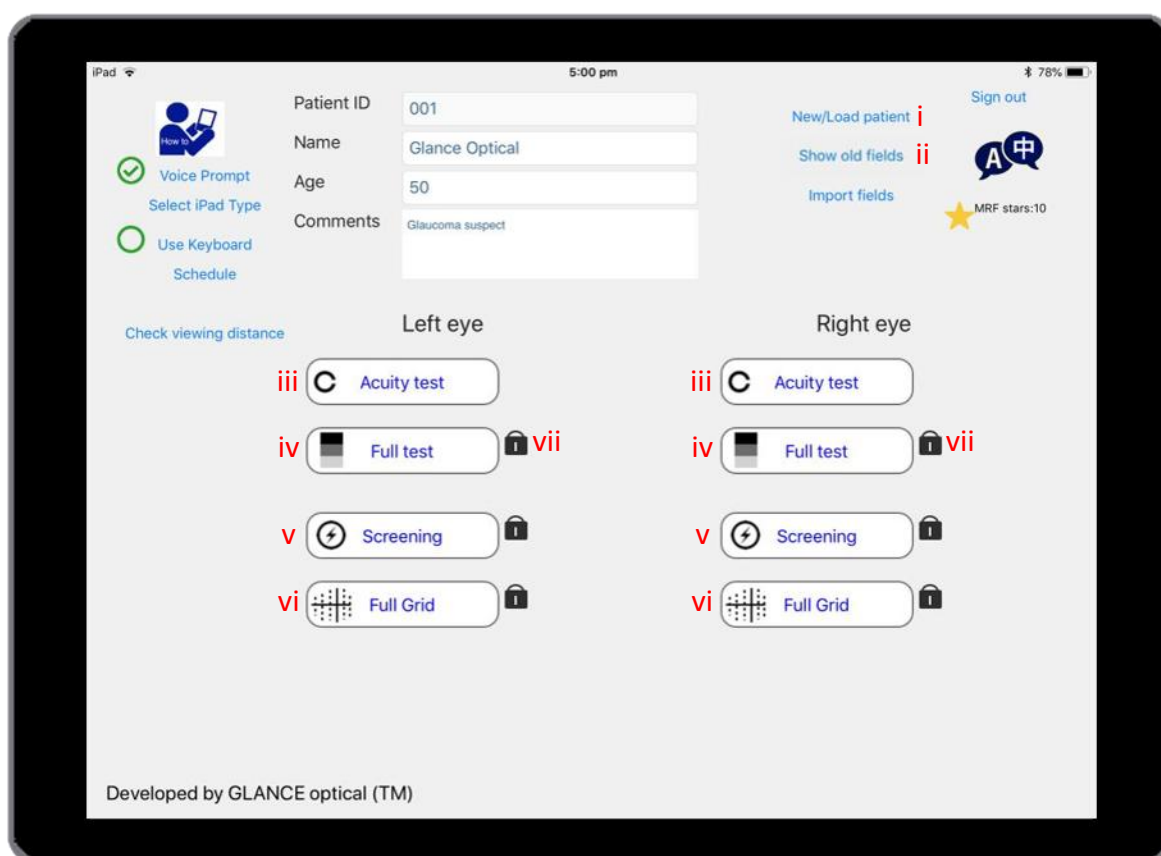


Figure 14. Elements of the test selection screen (MRF Glaucoma).

Each element is discussed in further detail below:

- i. **New/load user:** Switch to a different patient account.
- ii. **Show old fields:** See a history of the patient's previous visual field results stored locally on the device.
- iii. **Import fields:** Import fields online from another device linked to the same account.
- iv. **Acuity test:** Performs high-contrast visual acuity testing.
- v. **Full test:** Performs full thresholding testing which monitors both central and peripheral visual field using a radial test grid.

- vi. **Screening:** Performs a short screening test.
- vii. **Full grid:** Performs full threshold testing using a modified 24-2 grid that has 4 foveal points added.
- viii. **Lock button:** Located next to each module. When activated, only the selected module will be visible for future testing. It is recommended that the lock button is tapped next to full test for right eye and left eye to ensure that the Full test is performed for all subsequent visits.

## 9.2 Visual acuity testing (MRF Glaucoma)

Each eye should be tested one at a time. The eye that is not being tested should be covered by hand, folding a tissue over the glasses, or using an eye patch. Select an existing patient or create a new patient to start testing. Ensure the patient has been set up appropriately according to the steps in [Section 6. Setting up the patient](#).



To perform acuity testing, perform the following steps:


1. Tap on Acuity test under Right/Left eye
2. Instruct the patient to tap on one of the four shapes at the bottom of the screen that matches the shape presented in the centre of the screen. If the patient is unsure, they should tap the question mark option on the bottom left.

Upon completion, visual acuity results will be displayed on screen in Snellen and LogMAR notation.

3. Repeat steps 1 and 2 above to test the other eye.

### 9.2.1 Types of acuity testing (MRF Glaucoma)

MRF Glaucoma permits for the testing of:

-  High contrast acuity ( $L_b = 135\text{cd/m}^2$ ,  $C = 94\%$ )

### 9.2.2 Performing an acuity test (MRF Glaucoma)

The patient is required to match the stimulus by tapping the correct orientation at the bottom of the screen. If they are unsure they may choose the “?” option (see Figure 15).

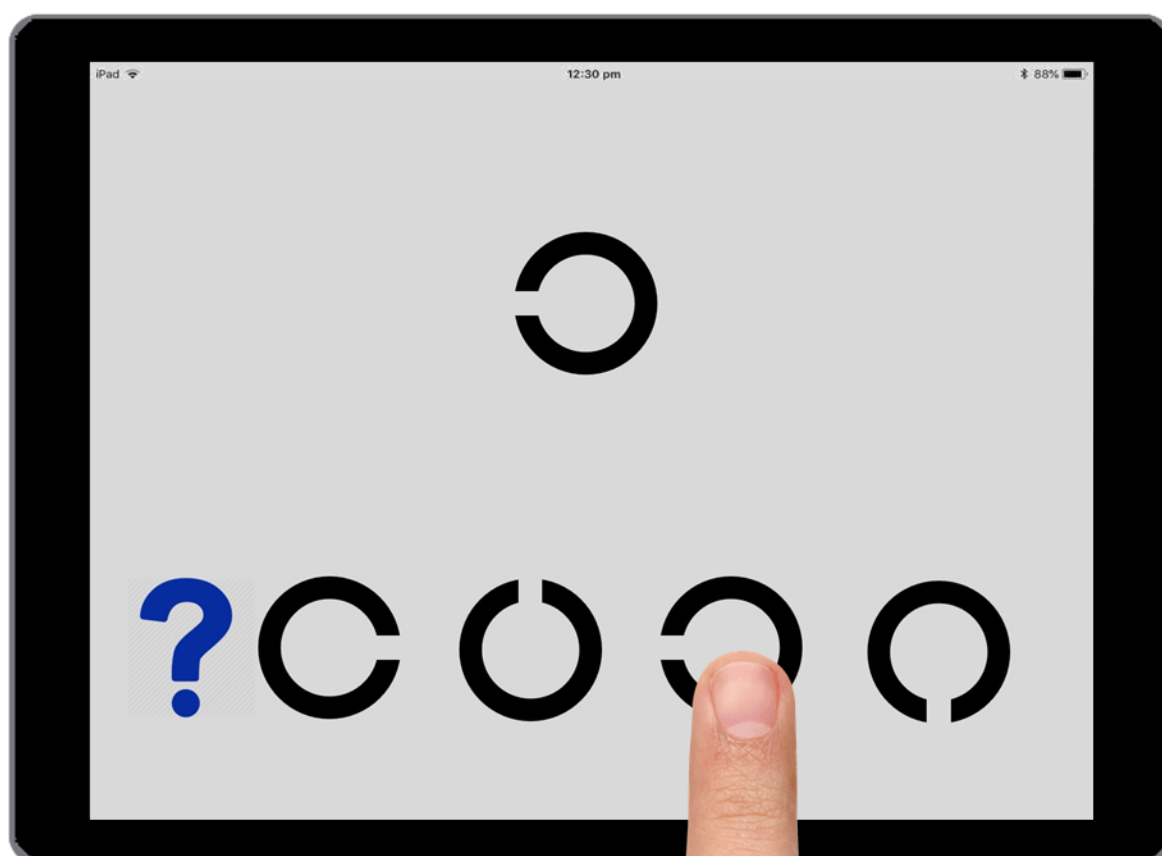


Figure 15. Performing an acuity test (MRF Glaucoma). High contrast acuity target shown ( $L_b = 135\text{cd/m}^2$ ,  $C = 94\%$ )

## 9.3 Visual field testing (MRF Glaucoma)

### 9.3.1 Selecting a visual field test (MRF Glaucoma)

Visual field testing can be performed via one of three test protocols; full test, screening or full grid. Each of these protocols are described in more detail below.

#### 9.3.1.1 Full test

Full test is the recommended visual field thresholding protocol for MRF Glaucoma. This uses a 66-point radial pattern which can test 30° x 20° of visual field. A neighbourhood logic is employed to expand the number of test locations in areas where visual field loss is suspected.

An example of the full test grid with schematic scaled spots is shown in Figure 16:

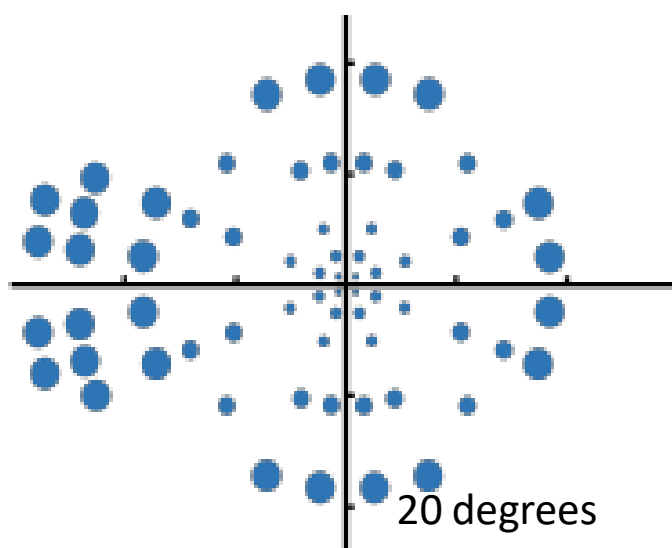


Figure 16. Visual field test pattern for 66-point Full test (MRF Glaucoma).

Spots have been size-scaled.

#### 9.3.1.2 Screening

The screening protocol presents a stimulus of a single intensity at 40 locations in the visual field (30° x 20°). An example of the screening grid is shown in Figure 17:

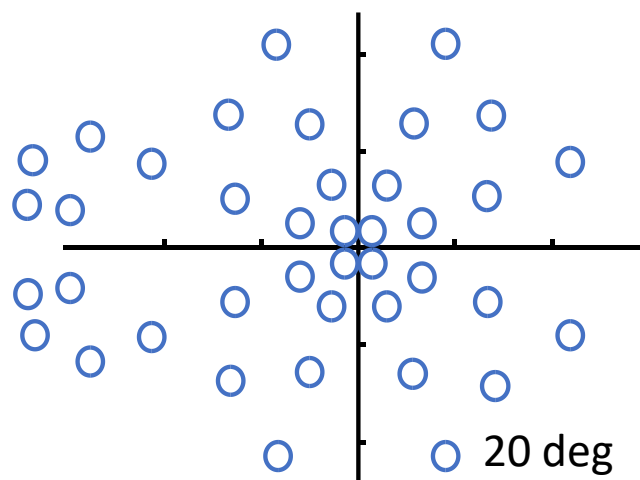


Figure 17. Visual field test pattern for 40-point Screening (MRF Glaucoma). Spots have been size-scaled.

#### 9.3.1.3 Full grid

The full grid protocol uses a more traditional grid for visual field thresholding (27° x 21°). An example of the full grid is shown in Figure 18:

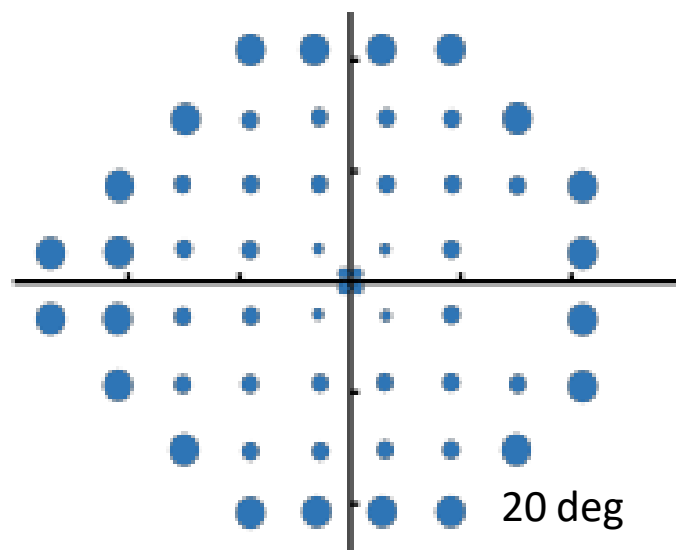


Figure 18. Visual field test pattern for 56-point Full grid (MRF Glaucoma).

Spots have been size-scaled.

9.3.2 Elements of the visual field test screen (MRF Glaucoma) The following screenshot shows the visual field test screen.



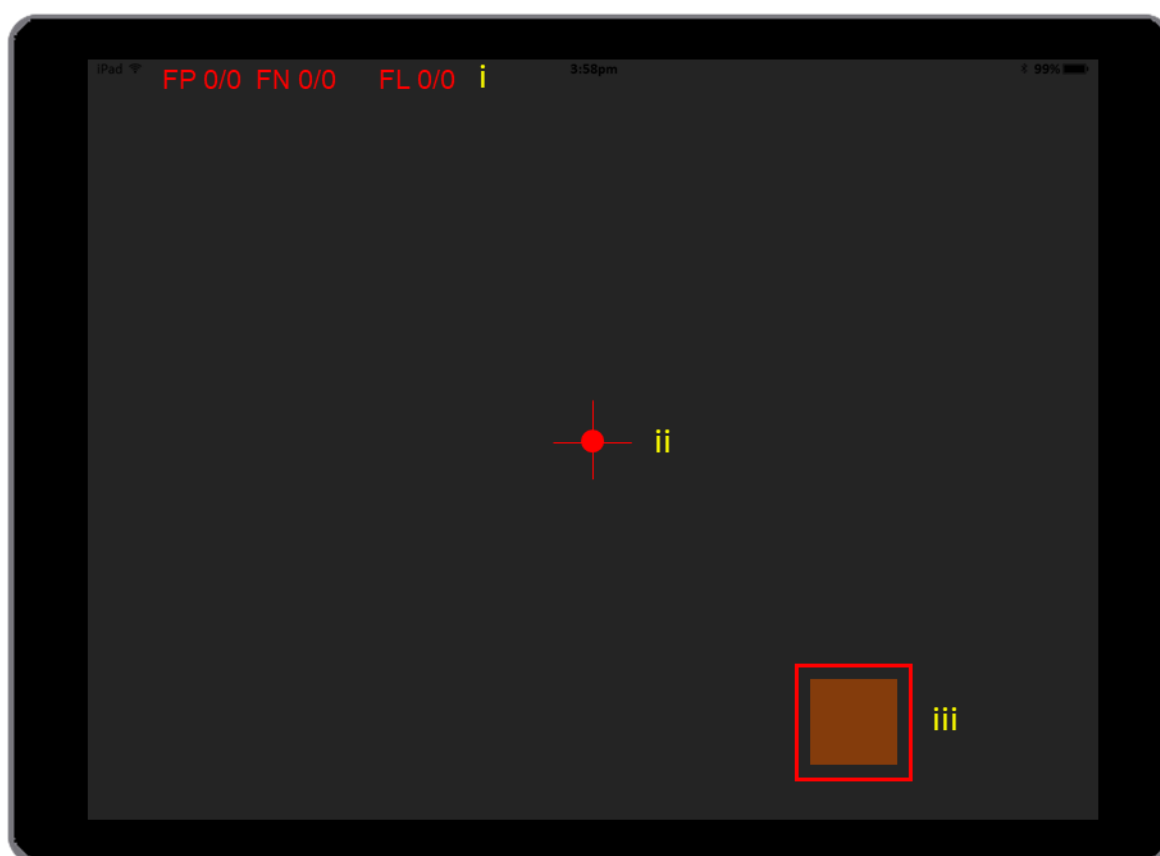


Figure 19. Elements of the visual field test screen (MRF Glaucoma).

Each element is discussed in further detail below:

i. **Reliability indices:** The reliability indices thus far are presented in red in the upper left corner of the screen. These results are updated in real time throughout the test.

Indices measured are:

- **FP:** False positive rate. A FP rate  $\leq 25\%$  is acceptable.
- **FN:** False negative rate. Affected by scotoma and not a good index of reliability.
- **FL:** Fixation loss. Measured with a blind-spot monitor.

ii. **Fixation target:** The patient is required to observe the red fixation target located in the centre of the screen for the entire duration of the exam. Depending on the patient's

visual acuity (recorded from the Visual acuity test) the size of the fixation target may be automatically adjusted by the MRF app. The voice over (if turned on) will periodically remind the patient to maintain fixation. Note that the location of the blind spot is identified at the commencement of a visual field test. Depending on the screen size of iPad, the fixation cross will move to different locations on the screen to test peripheral locations in the visual field. See the following diagram for more information:

**iPad 9.7", 10.5" and 11": 4 changes of fixation (as shown in the following diagram):**

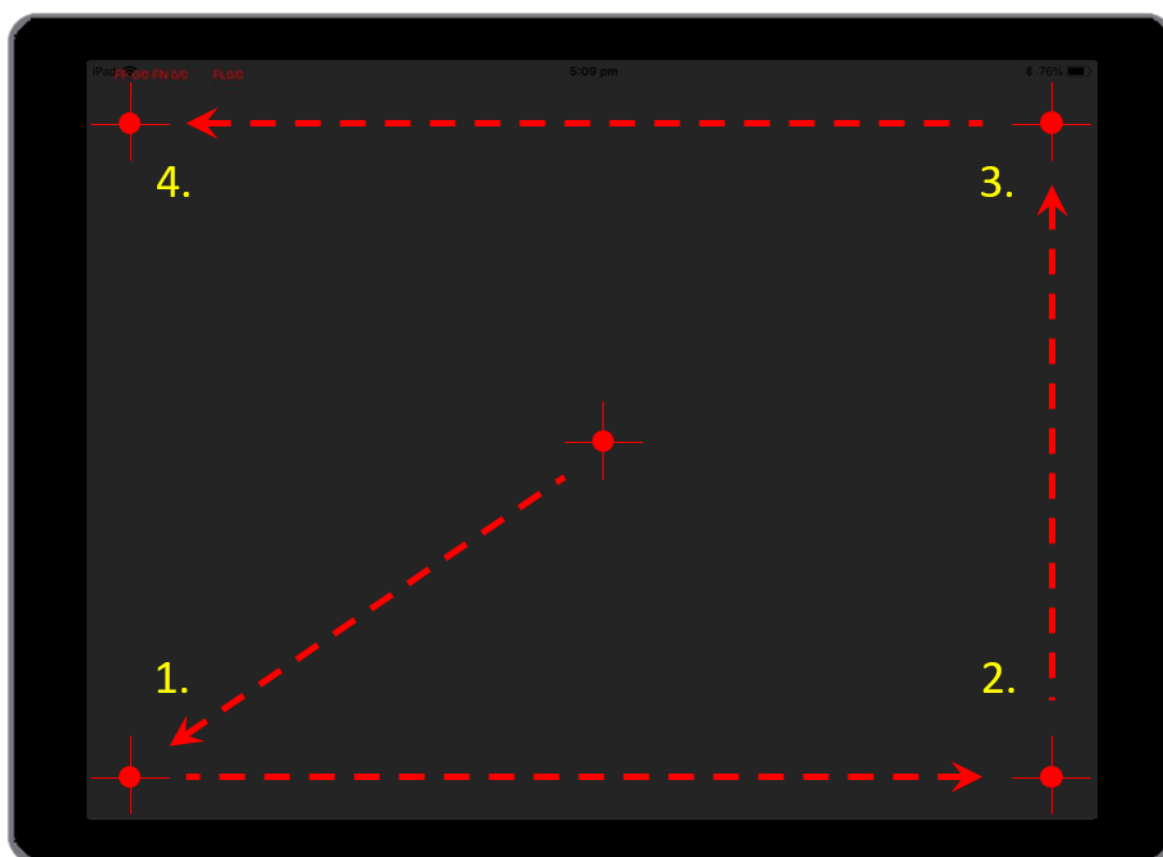


Figure 20. Fixation changes during testing for 9.7", 10.5" and 11" iPads.

**iPad 12.9": 1 change of fixation (as shown in the following diagram):**

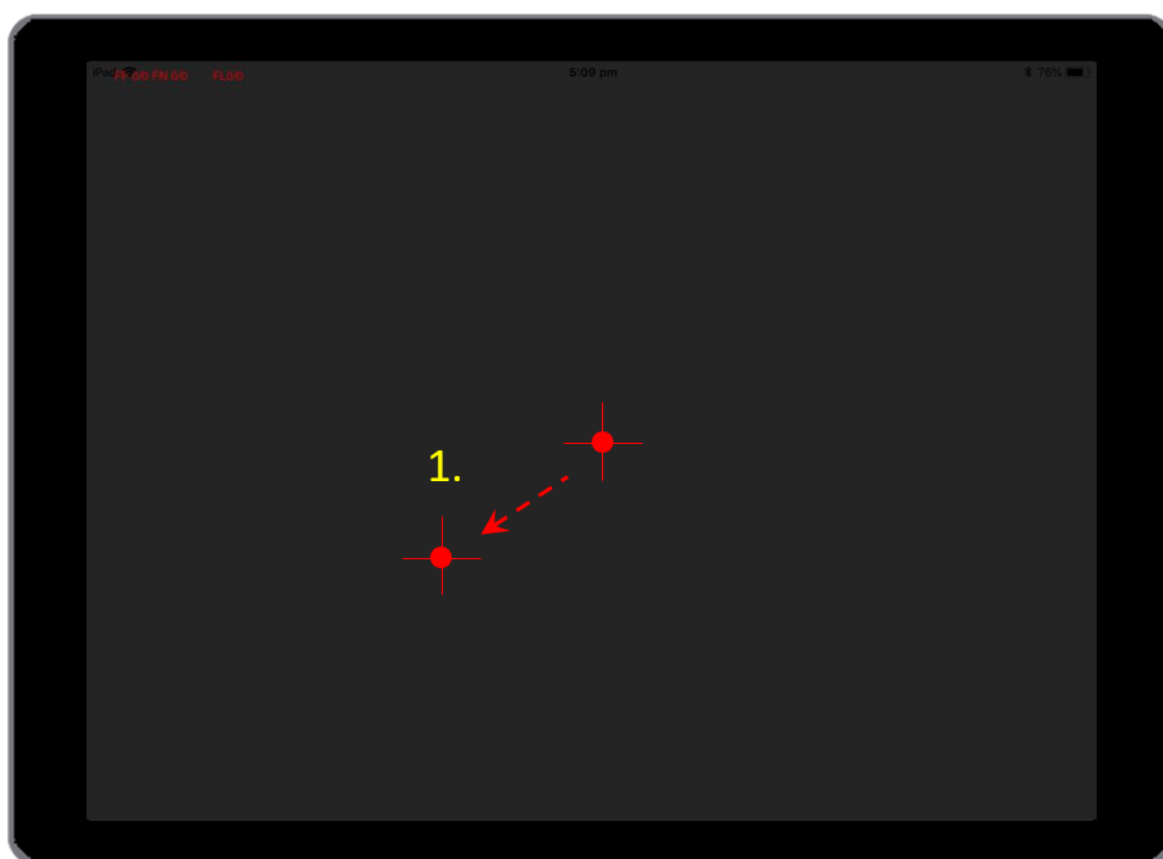


Figure 21. Fixation changes during testing for 12.9" iPad. iii. **Touch zone:** Only displayed when not using a keyboard to poll the patient's response.

See section [9.3.3 Registering a response](#) for more information.

### 9.3.3 Registering a response (MRF Glaucoma)

The patient is instructed to respond to lights flashed anywhere on the screen whilst they look at the fixation target. Patient responses can be polled via one of the following methods:

1. **Tapping the space bar:** If a keyboard is connected to the iPad, the patient may respond by tapping it each time they see a grey light. Ensure the "Use Keyboard" option is selected on the test screen (see section [4. iv Use Keyboard](#) for more information). An

Apple Smart Keyboard is the preferred keyboard as it does not require charging.

Alternatively, the user may connect a Bluetooth keyboard to the iPad.

2. **Tapping the touch zone:** If a keyboard is not connected the patient may respond by tapping the touch zone. Note that the patient may tap anywhere on the screen to poll a response, however, using the touch zone is recommended to reduce fingerprints on the screen and minimise screen blemishes.

#### 9.3.4 Pausing/exiting a test (MRF Glaucoma)

To pause a test, either the clinical assistant or the patient can tap on the red fixation cross.

An option will be presented to resume or exit the test.

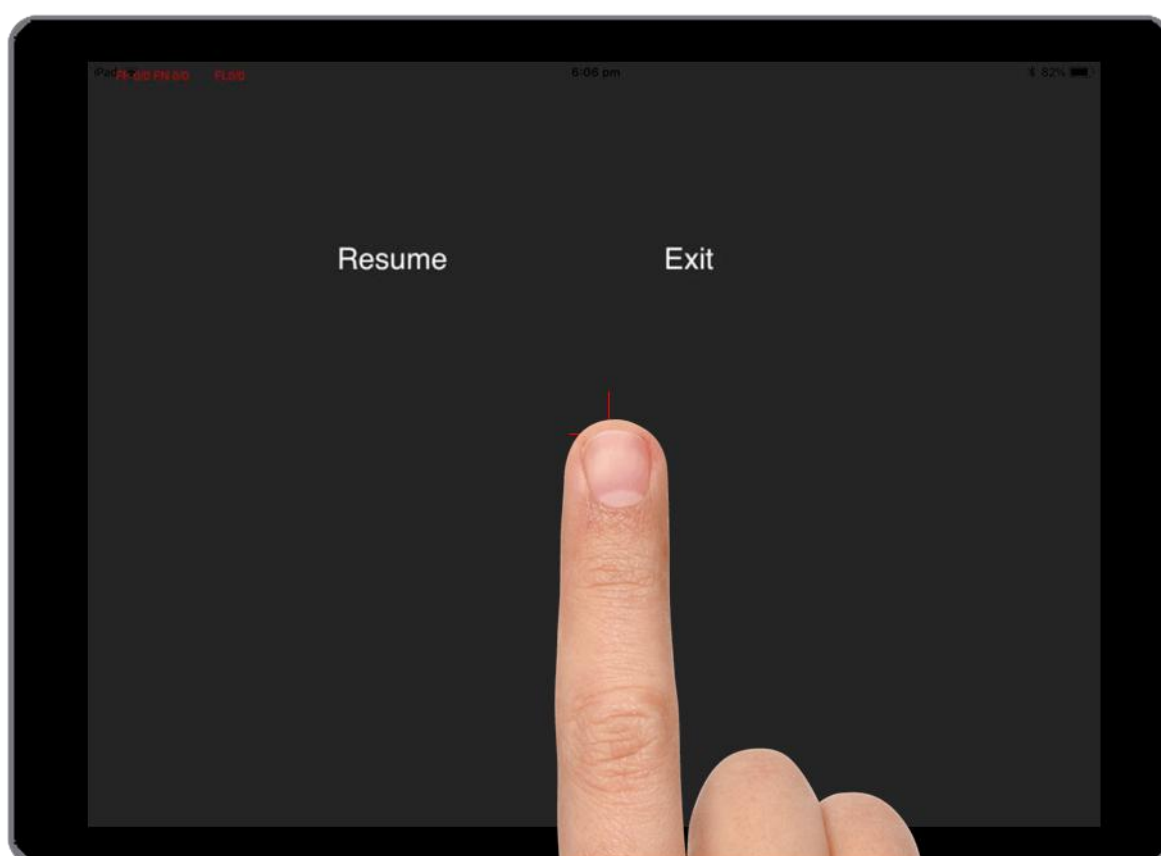





Figure 22. Pausing/exiting a test (MRF Glaucoma).

## 9.4 Visual field results (MRF Glaucoma)

Visual field results will be displayed on screen at the end of a test. Alternatively, the user may view past results by selecting a patient from the main control panel and tapping on the Show old fields button (see section [9.1 Elements of the test selection screen](#)). The user can then

cycle through previous visual field exams using the  and  buttons. An option to print the desired field is presented at the top of the

screen by tapping the  icon. Thresholds have been normalised to white-spot dB values.

### 9.4.1 Elements of the results screen (MRF Glaucoma)

The elements of the results screen may vary depending on the test protocol used. These elements may include the following:

- **Test details**
  - i. Patient ID.
  - ii. Patient age.
  - iii. Patient name.
  - iv. Test time.
  - v. Date.
  - vi. iPad type.
  - vii. Visual acuity.

- **Reliability indices** viii.

**FP:** False positives. ix. **FN:**

False negatives.

x. **FL:** Fixation loss.

- **Global indices** xi. **MD:**

Mean defect\*.

xii. **MRF MD:** MRF Mean defect\*\*.

xiii. **PD:** Pattern defect. xiv.

**VC:** Visual capacity.

\* The MD value is adjusted using a correction factor to approximate HFA (Humphrey Field Analyser) MD.

\*\*MRF MD the is the raw MD calculated from the MRF results prior to correction.

Note: The Mean defect values range from +0.50dB to -30dB with the more negative number indicating a worse visual field threshold. The MD has been colour-coded to signify abnormality (see point xx in the following section).

- **Pointwise results** xv. **Grey scale.** A greyscale representation of the patient's visual field.

xvi. **Numeric plot.** Raw numeric sensitivity of each point tested. 30dB is the highest possible sensitivity with 0dB being the lowest.


xvii. **Total deviation plot.** This indicates the average departure of points from the age-matched expected value. xviii. **Pattern deviation plot.** This indicates local

level of abnormality after correcting

for the patient's MD value.

- **Other indices** xix. **F/T.** Foveal threshold given in dB (average threshold of all points  $<1^\circ$ ).

xx. **Colour coded indicator for result:**

 Green: within normal limits (95% of normals).

 Amber: Borderline ( $<5\%$  of normals).

 Red: Abnormal ( $<1\%$  of normals).

- **Progression analysis**

See section [13 Visual field progression](#) for more information.

The results for each protocol are described in more detail below:

#### *9.4.1.1 Full test*

An example of the results from a full test is shown below:

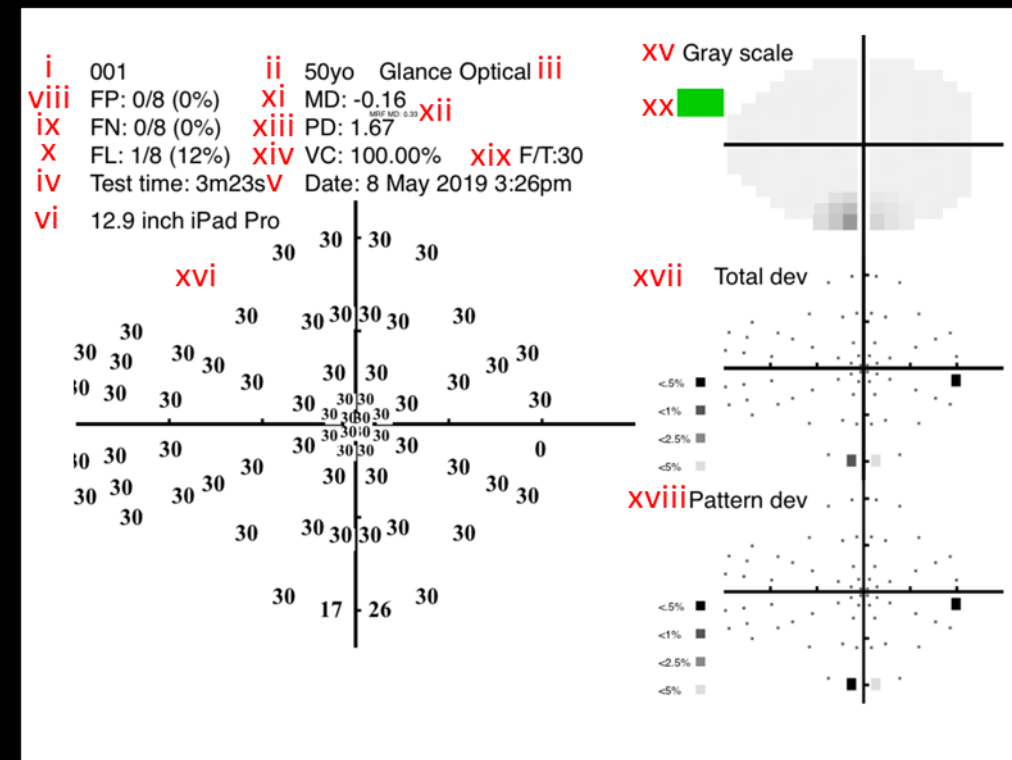


Figure 23. Visual field output for the 66-point Full test (MRF Glaucoma). Note in the presence of a defect extra points might be added to the test grid at the edges of the defect.

#### 9.4.1.2 Screening

An example of the results from a screening test is shown below:



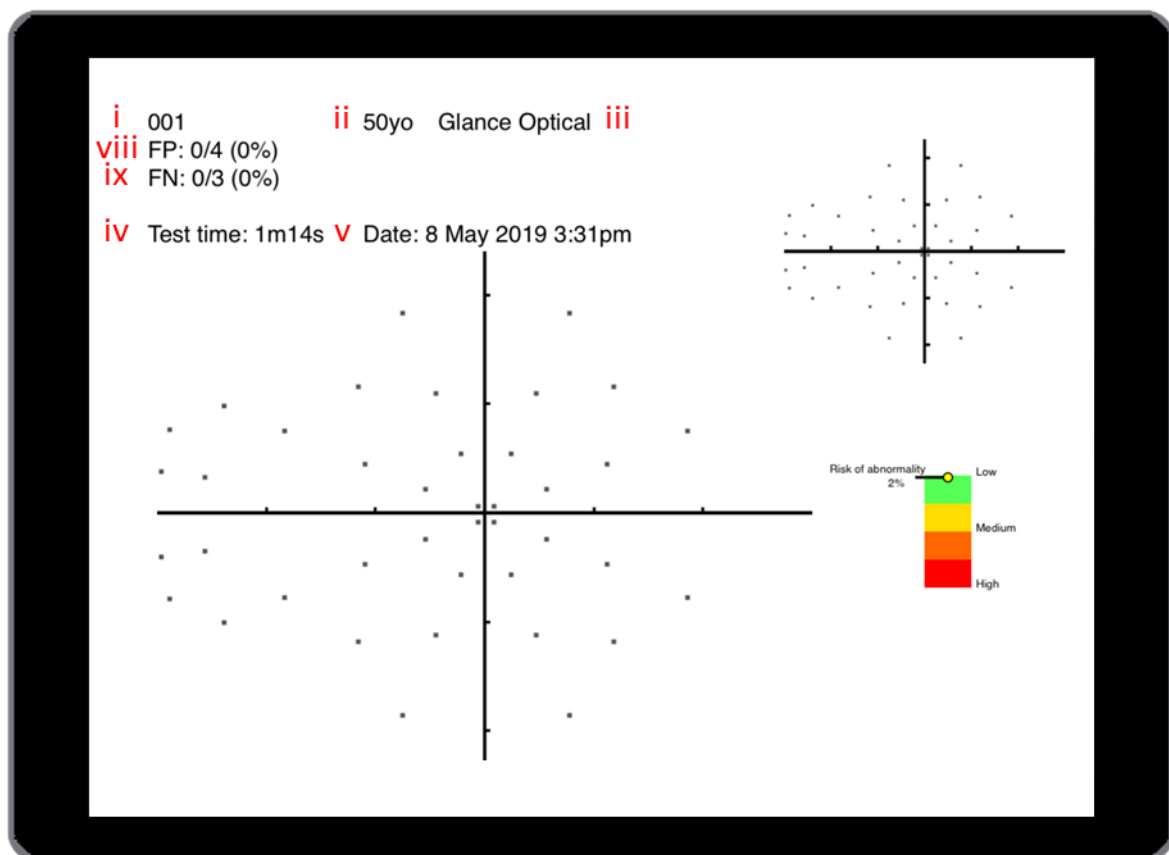


Figure 24. Visual field output for the 40-point Screening test (MRF Glaucoma). Risk of abnormality is a pictorial representation of the likelihood of having a loss of visual field present.

#### 9.4.1.3 Full grid

An example of the results from a full grid test is shown below:

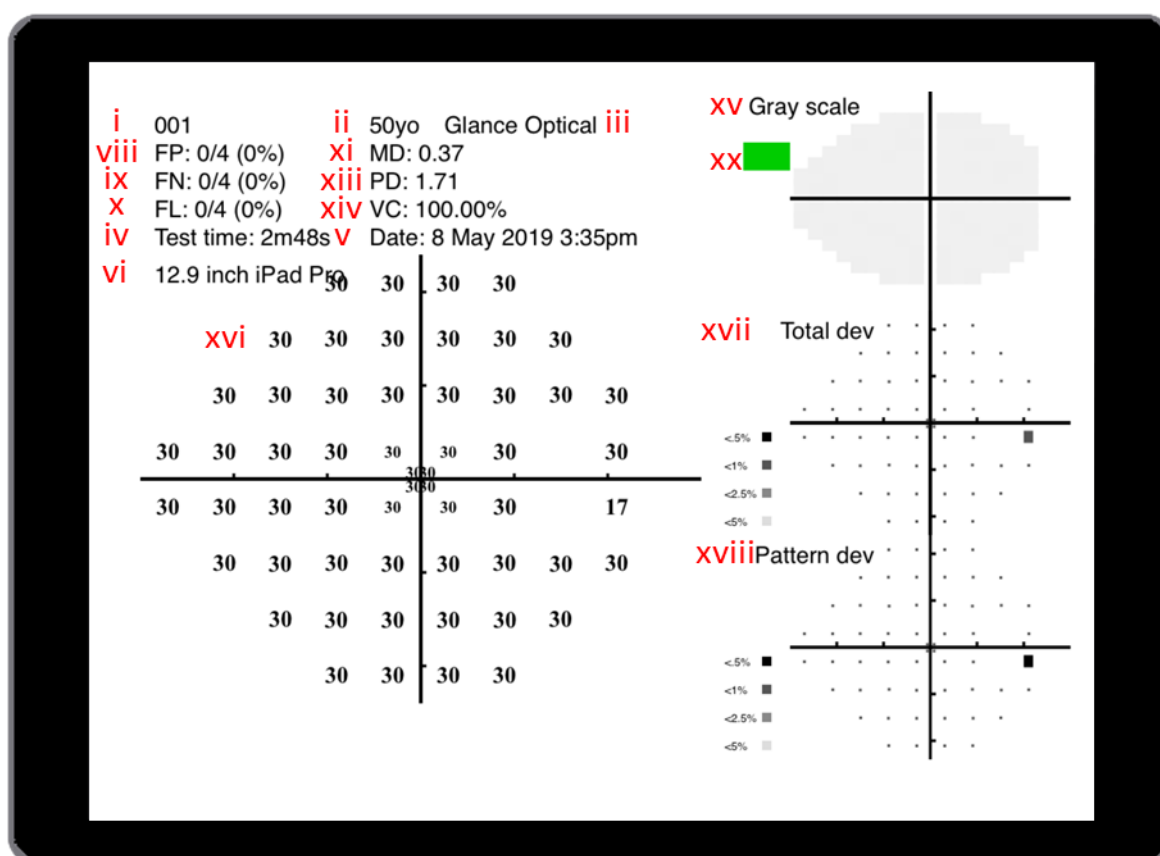


Figure 25. Visual field output for the 56-point, modified 24-2 Full grid

(MRF Glaucoma).

## 10. MRF Macular App

### 10.1 Elements of the test selection screen (MRF Macular)

The following diagram shows the test selection screen. It is separated into Left eye tests on the left side of the screen and Right eye tests on the right side of the screen.

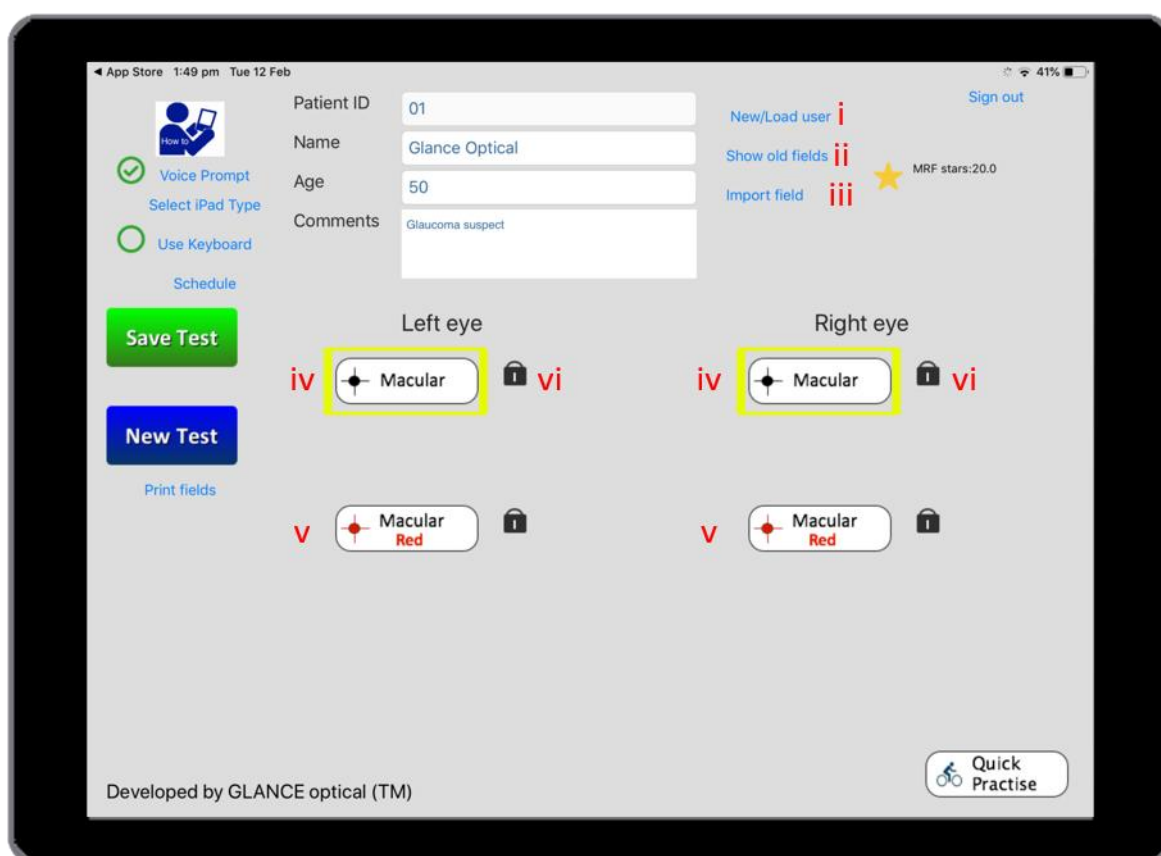


Figure 26. Elements of the test selection screen (MRF Macular).

Each element is discussed in further detail below:

- i. **New/load user:** Switch to a different patient account.
- ii. **Show old fields:** See a history of the patient's previous visual field results stored locally on the device.
- iii. **Import fields:** Import fields online from another device linked to the same account.
- iv. **Macular test:** This differs from previous tests as it automatically performs visual acuity testing, Amsler grid testing, and visual field thresholding.
- v. **Macular red test:** Performs a macular threshold test using a red stimulus.

- vi. **Lock button:** Located next to each module. When activated, only the selected module will be visible for future testing. It is recommended that the lock button is tapped next to full test for right eye and left eye to ensure that the Full test is performed for all subsequent visits.

## 10.2 Visual field testing (MRF Macular)

Visual field testing may be conducted via the Macular test or the Macular red test. Each of these tests are discussed in further detail in the following sections.

### 10.2.1 Macular test

Each eye should be tested one at a time. The eye that is not being tested should be covered by hand, folding a tissue over the glasses, or using an eye patch. Select an existing patient or create a new patient to start testing. Ensure the patient has been set up





appropriately according to the steps in section 6. [Setting up the patient](#). The macular test comprises visual acuity testing, Amsler grid testing and visual field thresholding (macula).

Each component of the macular test is described in the following sections.

#### 10.2.1.1 Acuity testing

MRF Macular tests the following forms of visual acuity:

- 
 • High contrast acuity ( $L_b = 135\text{cd/m}^2$ ,  $C = 94\%$ )
- 
 • Low luminance, low contrast acuity ( $L_b = 5\text{cd/m}^2$ ,  $C = 15\%$ )

#### 10.2.1.2 Performing an acuity test (MRF Macular)

The patient is required to match the stimulus by tapping the correct orientation at the bottom of the screen. If they are unsure they may choose the “?” option (see Figure 27).

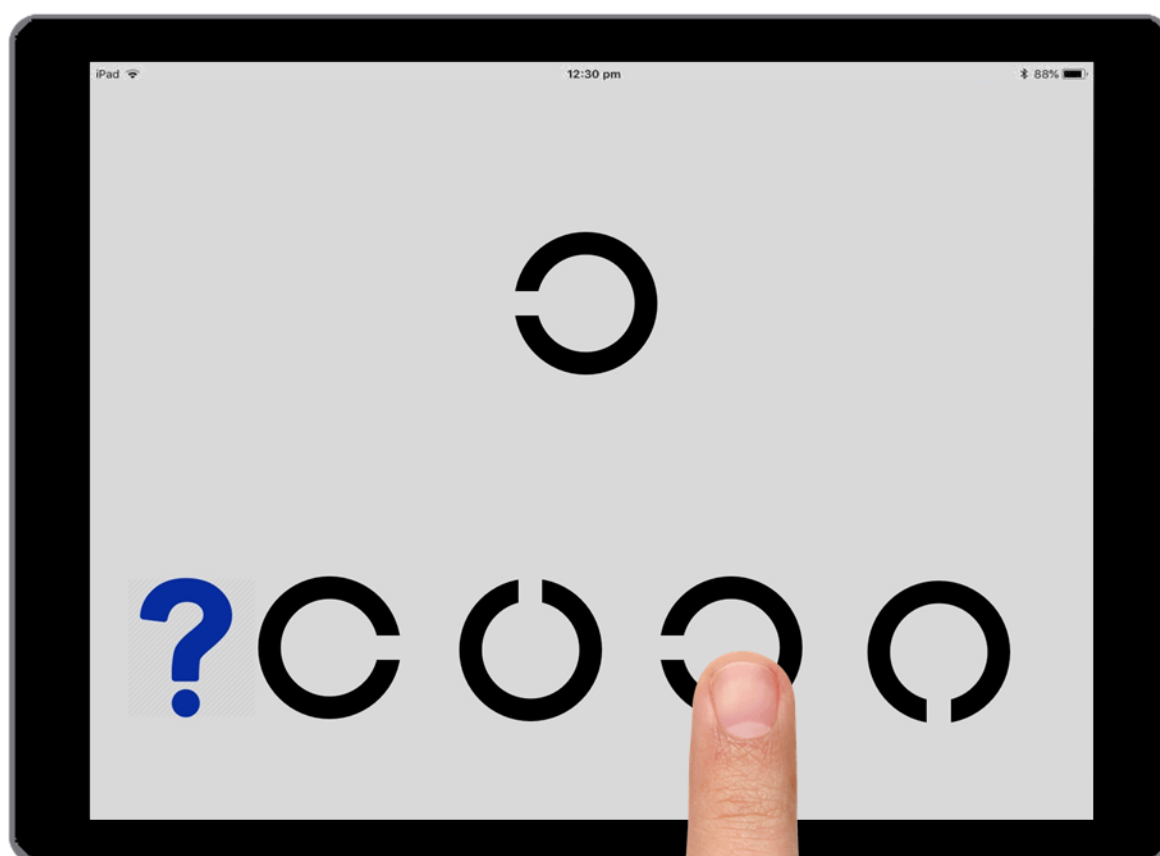


Figure 27. Performing an acuity test (MRF Macular). High contrast acuity target shown ( $L_b = 135\text{cd/m}^2$ ,  $C = 94\%$ )

#### 10.2.1.3 Amsler grid testing

The following diagram shows the Amsler grid test screen:

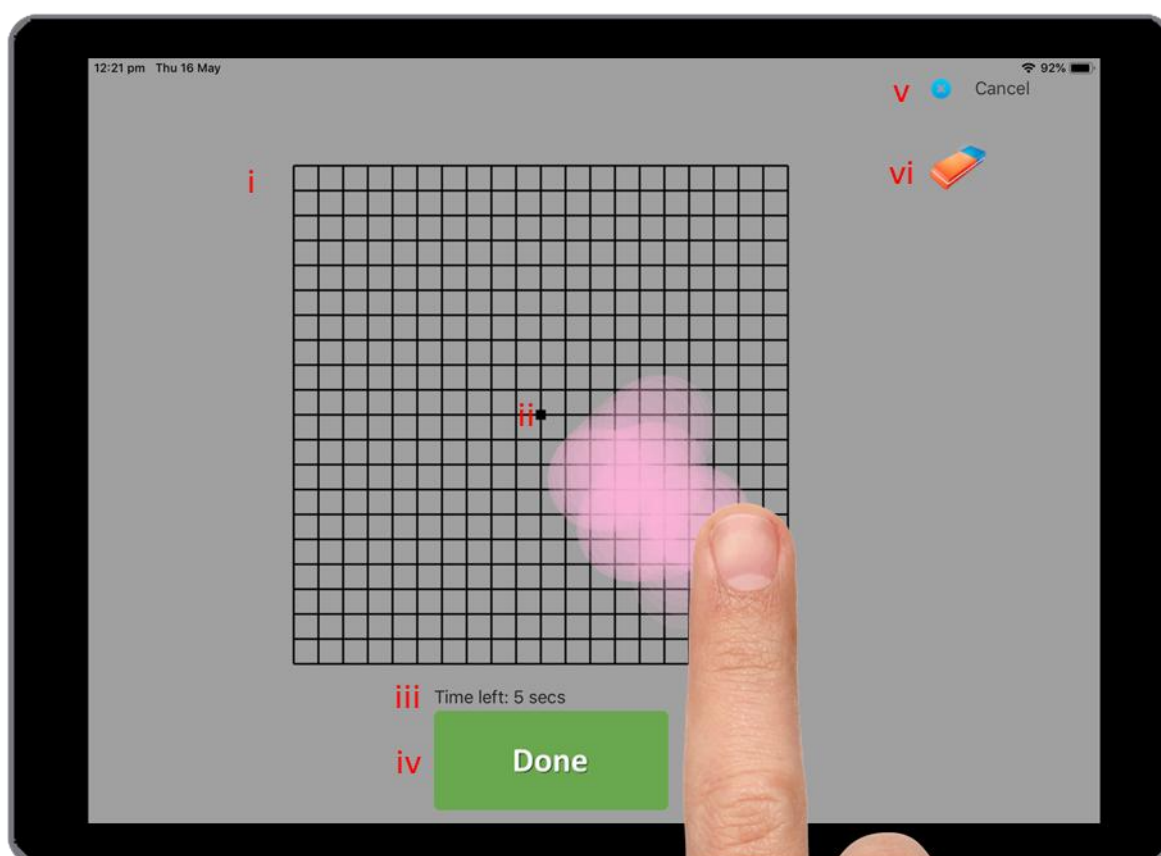


Figure 28. Amsler grid test screen (MRF Macular). The patient is shown tracing their visual field defect on the grid.

The elements of the Amsler grid test screen are described below:

i. **Amsler grid** ii.

**Fixation spot**

iii. **Timer**

iv. **Done**

v. **Cancel** vi.

**Eraser** The

procedure for

## Amsler grid testing

is described below:

1. The patient views the fixation spot (ii) monocularly.
2. Any visual distortions or missing locations are traced on the grid (i) with their finger (as shown in Figure 28).

3. Once complete, the patient taps

Done

4. If the patient makes an error, the screen can be cleared by tapping



5. To cancel the test, the patient may tap



Cancel

### 10.2.1.4 Visual field testing

The following diagram shows the visual field test screen:

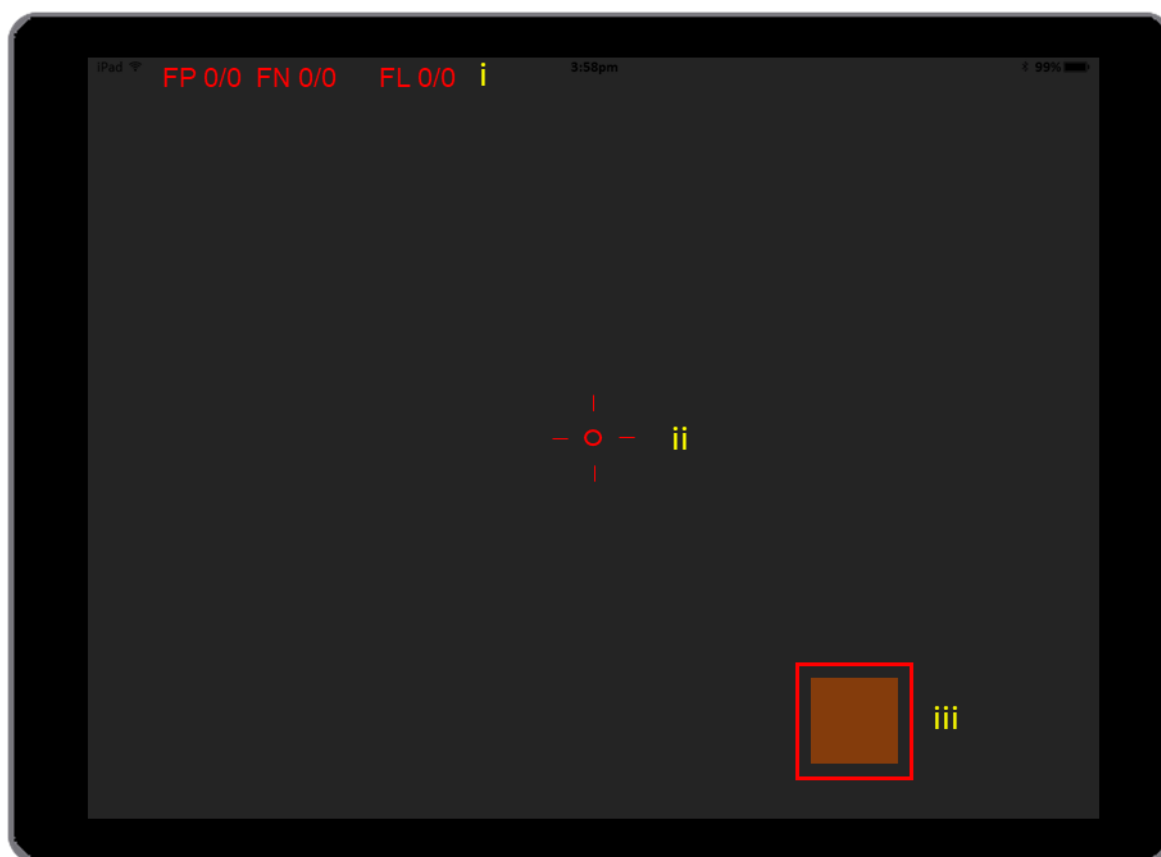


Figure 29. Elements of the visual field test screen (MRF Macular).

Each element is discussed in further detail below:

- i. **Reliability indices:** The reliability indices thus far are presented in red in the upper left corner of the screen. These results are updated in real time throughout the test.  
  
Indices measured are:
  - **FP:** False positive rate. A FP rate  $\leq 25\%$  is acceptable.
  - **FN:** False negative rate. Affected by scotoma and not a good index of reliability.
- ii. **Fixation target:** The patient is required to observe the red fixation target located in the centre of the screen for the entire duration of the exam. Fixation is not monitored.
- iii. **Touch zone:** Only displayed when not using a keyboard to poll the patient's response.

See section [10.2.1.5 Registering a response](#) for more information.



#### 10.2.1.5 Registering a response

The patient is instructed to respond to lights flashed anywhere on the screen whilst they look at the fixation target. Patient responses can be polled via one of the following methods:

1. **Tapping the space bar:** If a keyboard is connected to the iPad, the patient may respond by tapping it each time they see a grey light. Ensure the “Use Keyboard” option is selected on the test screen (see section 4. iv Use Keyboard for more information). An Apple Smart Keyboard is the preferred keyboard as it does not require charging. Alternatively, the user may connect a Bluetooth keyboard to the iPad.
2. **Tapping the touch zone:** If a keyboard is not connected the patient may respond by tapping the touch zone. Note that the patient may tap anywhere on the screen to poll a response, however, using the touch zone is recommended to reduce fingerprints on the screen and minimise screen blemishes.

#### 10.2.1.6 Test pattern

Macular test uses a 33-point radial pattern which can test 9.5 x 9.5° of visual field. A neighbourhood logic is employed to expand the number of test locations in areas where visual field loss is suspected. The test pattern with schematic scaled spots is shown in Figure 30:

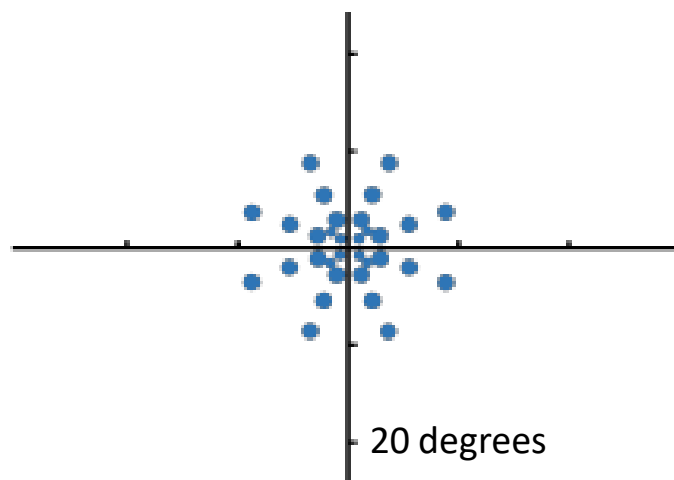


Figure 30. Visual field test pattern for the 33-point protocol (MRF Macular). Spots have been size-scaled.

### 10.2.2 Macular red test

The macular red test is a threshold test that uses Goldmann size V red stimuli. Note that this only performs visual field thresholding, and not visual acuity testing or Amsler grid testing.

#### 10.2.2.1 Test pattern

Macular red test uses a 33-point radial pattern which can test  $9.5 \times 9.5^\circ$  of visual field including a point at fixation. The test pattern for the Red test with Goldmann size V spots is shown in Figure 31:

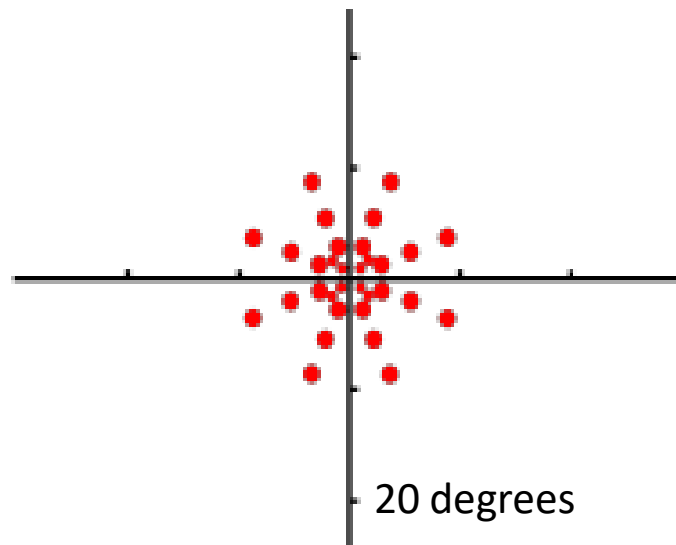


Figure 31. Visual field test pattern for the 33-point Macular red test (MRF Macular).

Spots have been size-scaled.

#### 10.2.3 Pausing/exiting a test

To pause a test, either the clinical assistant or the patient can tap on the red fixation cross.

An option will be presented to resume or exit the test.

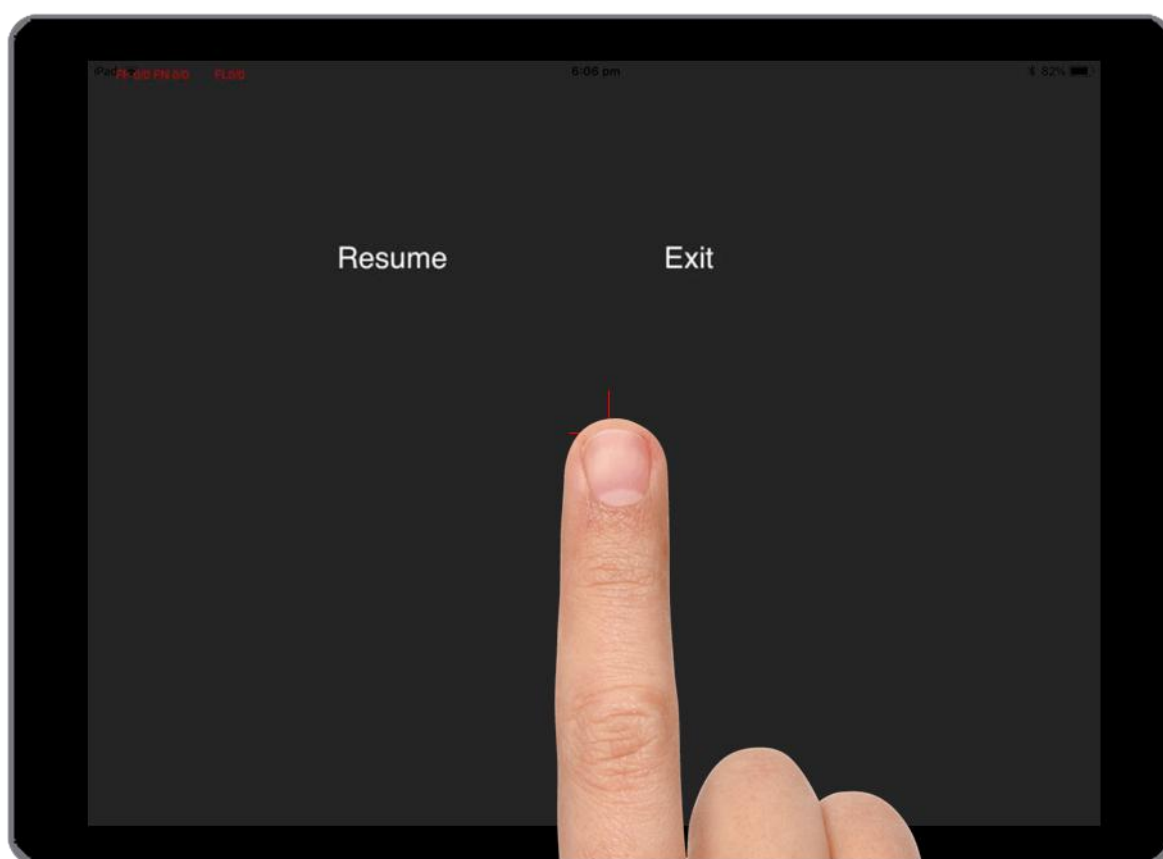


Figure 32. Pausing/exiting a test (MRF Macular).


### 10.3 Visual field results (MRF Macular)

Visual field results will be displayed on screen at the end of a test. Alternatively, the user may view past results by selecting a patient from the main control panel and tapping on the Show old fields button (see section [10.1 Elements of the test selection screen](#)). The user can then

cycle through previous visual field exams using the

<<Next

and buttons. An option to print the desired field is presented at the top of the

screen by tapping the  icon. Thresholds have been normalised to white-spot dB values.

### 10.3.1 Elements of the results screen (MRF Macular)

The elements of the results screen may vary depending on the test protocol used. These elements may include the following:

- **Test details**

- i. Patient ID. ii. Patient age.
- iii. Patient name.
- iv. Test time.
- v. Date.
- vi. iPad type.
- vii. Visual acuity.

- **Reliability indices** viii.

**FP:** False positives.

- ix. **FN:** False negatives.

- **Global indices** xi. **MD:**

Mean defect\*.

- xii. **MRF MD:** MRF Mean defect\*\*.
- xiii. **PD:** Pattern defect. xiv. **VC:** Visual capacity.

\* The MD value is adjusted using a correction factor to approximate HFA (Humphrey Field Analyser) MD.

\*\*MRF MD the is the raw MD calculated from the MRF results prior to correction.

Note: The Mean defect values range from +0.50dB to -30dB with the more negative number indicating a worse visual field threshold. The MD has been colour-coded to signify abnormality (see point xx in the following section).

- **Pointwise results** xv. **Grey scale.** A greyscale representation of the patient's visual field.  
  
xvi. **Numeric plot.** Raw numeric sensitivity of each point tested. 30dB is the highest possible sensitivity with 0dB being the lowest.  
  
xvii. **Total deviation plot.** This indicates the average departure of points from the age-matched expected value. xviii. **Pattern deviation plot.** This indicates local level of abnormality after correcting for the patient's MD value.  
  
• **Other results** xix. **F/T.** Foveal threshold given in dB (average threshold of all points <1°).  
  
xx. **Colour coded indicator for result:**  
  

Green: within normal limits (95% of normals).

Amber: Borderline (<5% of normals).

Red: Abnormal (<1% of normals).
  
- **Progression analysis**

See section 13. [Visual field progression](#) for more information.

#### 10.3.1.1 Macular test

**i** 01  
**viii** FP: 0/8 (0%)  
**ix** FN: 0/8 (0%)  
**iv** Test time: 1m29s

**ii** 50yo Glan  
**xi** MD: 0.48  
**xiii** PD: 0.68  
**xiv** VC: 100.00%

**iii**  
**vii** LogMAR:-0.10  
**xix** F/T:29.2

**xv** Gray scale  
**xx**

**v** Date: Wed, 08 May 2019 05:40:29 GMT

**xvi**

**xvii** Total dev

**xviii** Pattern dev

<5% ■  
 <1% ■  
 <2.5% ■  
 <5% ■

<5% ■  
 <1% ■  
 <2.5% ■  
 <5% ■

MRF-m ver: 1.13

Figure 33. Visual field output for the 33-point Macular test (MRF Macular).

#### 10.3.1.2 Macular red

An example of the results from a macular red test is shown below:

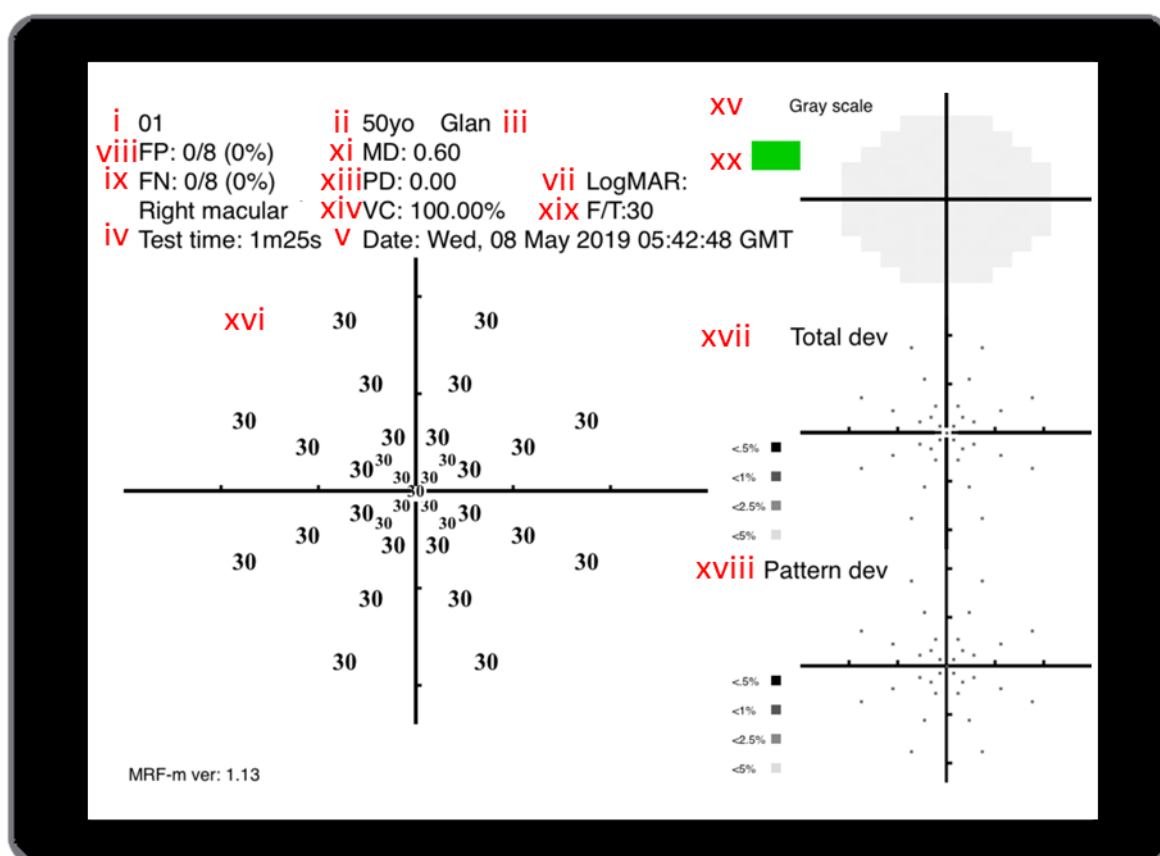


Figure 34. Visual field output for the 33-point Macular red test (MRF Macular).

## 11. MRF Neural App

### 11.1 Elements of the test selection screen (MRF Neural)

This application has been specifically designed for patients with cortical or neural losses. The following diagram shows the test selection screen. It is separated into Left eye tests on the left side of the screen and Right eye tests on the right side of the screen.



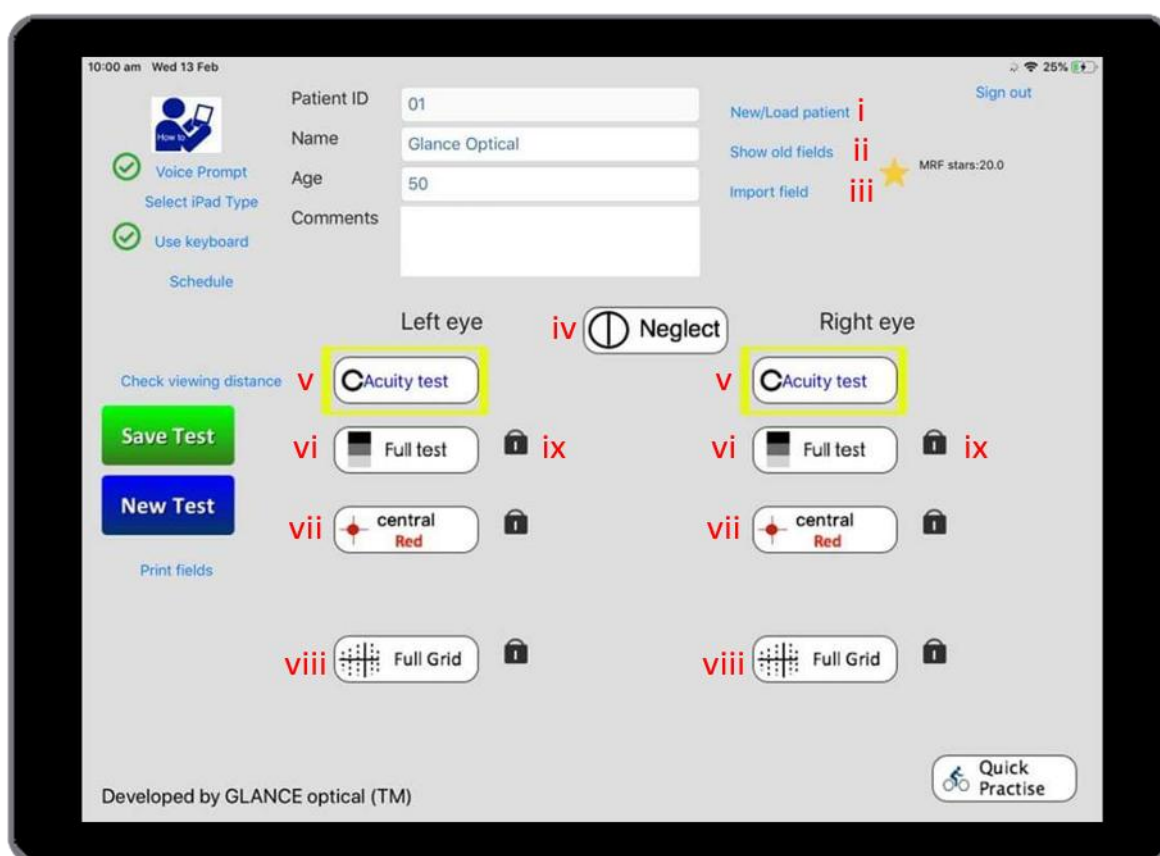


Figure 35. Elements of the test selection screen (MRF Neural).

Each element is discussed in further detail below:

- i. **New/load user:** Switch to a different patient account.
- ii. **Show old fields:** See a history of the patient's previous visual field results stored locally on the device.
- iii. **Import fields:** Import fields online from another device linked to the same account.
- iv. **Neglect test:** Performs testing of hemi-spatial neglect (HSN).
- v. **Acuity test:** Performs testing of high-contrast acuity, low-luminance low-contrast acuity, and acuity in noise.

- vi. **Full test:** Performs visual field thresholding using a 46-point grid.
- vii. **Central red:** Performs central visual field screening using a red target.
- viii. **Full grid:** Performs visual field thresholding using a 56-point modified 24-2 grid.
- ix. **Lock button:** Located next to each module. When activated, only the selected module will be visible for future testing. It is recommended that the lock button is tapped next to full test for right eye and left eye to ensure that the Full test is performed for all subsequent visits.

## 11.2 Neglect test (MRF Neural)

MRF Neural incorporates a test for hemi-spatial neglect. The following diagram shows the neglect test.



Figure 36. Hemispatial neglect test (MRF Neural).

Each element is discussed in further detail below:

- i. **No. correct left eye:** Shows the number of correct responses registered for the left eye.
- ii. **No. correct right eye:** Shows the number of correct responses registered for the right eye.
- iii. **Time:** Shows amount of time elapsed in seconds.
- iv. **Done:** Tap to complete the test.

Test procedure:

1. The patient views the screen with both eyes.
2. The patient taps the frowning faces to convert them into smiley faces (as shown in Figure 36).
3. The time taken for 17 correct responses is recorded for each eye. The hemi-spatial neglect index is the difference between eyes normalised to the fastest eye (eg: L = 60s, R = 90s, HSN index =  $(90-60)/60 = 0.5$ ).




### 11.3 Visual acuity testing (MRF Neural)

Each eye should be tested one at a time. The eye that is not being tested should be covered by hand, folding a tissue over the glasses, or using an eye patch. Select an existing patient or create a new patient to start testing. Ensure the patient has been set up appropriately according to the steps in section 6. [Setting up the patient.](#)



### 11.3.1 Types of acuity testing (MRF Neural)

MRF Neural permits for the testing of:

-  • High contrast acuity ( $L_b = 135\text{cd/m}^2$ ,  $C = 94\%$ )
-  • Low luminance, low contrast acuity ( $L_b = 5\text{cd/m}^2$ ,  $C = 15\%$ )
-  • Acuity in noise ( $L_b = 110\text{cd/m}^2$ )

### 11.3.2 Performing an acuity test (MRF Neural)

The patient is required to match the stimulus by tapping the correct orientation at the bottom of the screen. If they are unsure they may choose the “?” option (see Figure 37 below).

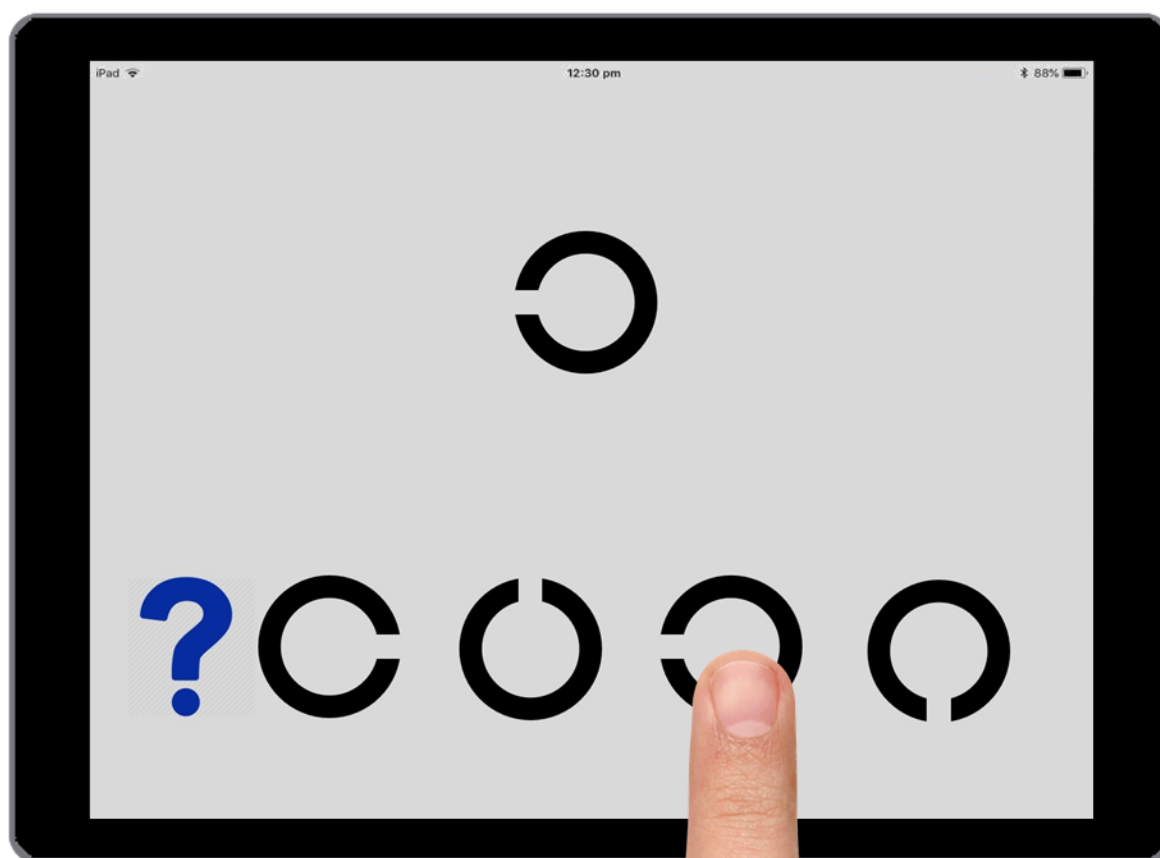


Figure 37. Performing an acuity test (MRF Neural). High contrast acuity

target shown ( $L_b = 135\text{cd/m}^2$ ,  $C = 94\%$ )

## 11.4 Visual field testing (MRF Neural)

### 11.4.1 Selecting a visual field test (MRF Neural)

Visual field testing can be performed via one of three test protocols; full test, central red or full grid. Each of these protocols are described in more detail below.

#### 11.4.1.1 Full test

Full test is the recommended visual field thresholding protocol for MRF Neural. This test uses a 46-point grid which can test  $21 \times 15^\circ$  of visual field. A neighbourhood logic is employed to expand the number of test locations in areas where visual field loss is suspected. The full test grid is a reduced 24-2 grid with the 10 outer peripheral points removed and 4 foveal points added. An example of the full test grid with schematic scaled spots is shown in Figure 38:

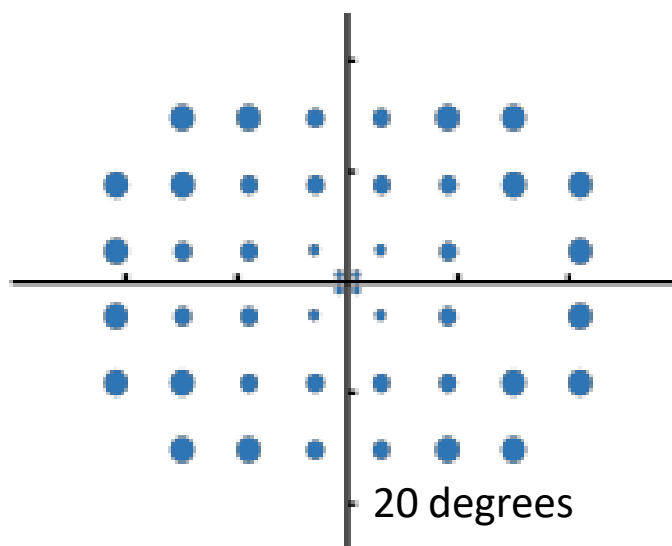


Figure 38. Visual field test pattern for the 46-point Full test (MRF Neural). Spots have been size-scaled.

#### 11.4.1.2 Central red

The central red test thresholds central vision ( $9.5^\circ \times 9.5^\circ$ ) using a Goldmann size V spot at each location of the visual field. An example of the test grid with Goldman Size V spots is shown in Figure 39:

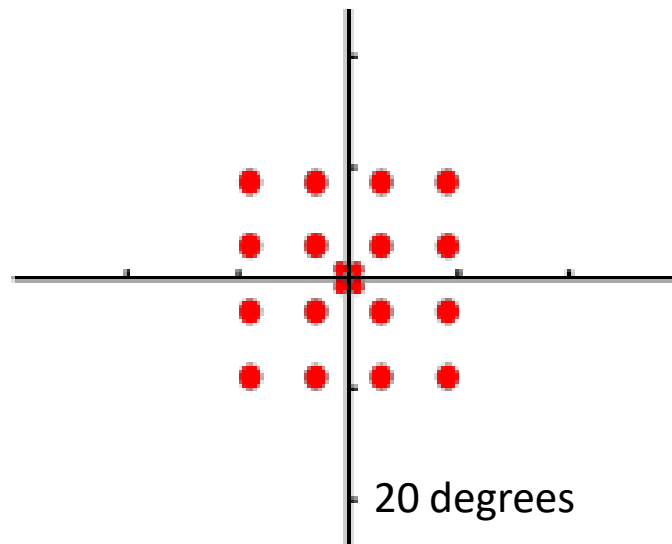


Figure 39. Visual field test pattern for the 20-point Central red test (MRF Neural).

Spots have been size-scaled.

#### 11.4.1.3 Full grid

The full grid protocol uses a 56-point grid which can test 27° x 21° of visual field. An example of the test grid with schematic scaled spots is shown below:

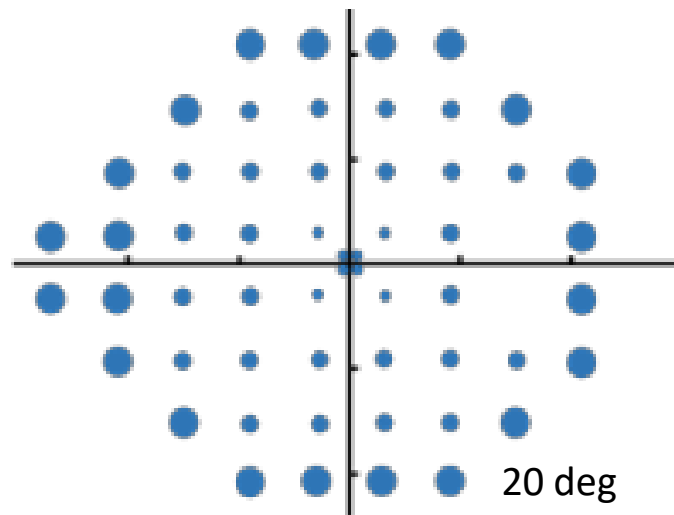


Figure 40. Visual field test pattern for the 56-point Full grid (MRF Neural). Spots have been size-scaled.

#### 11.4.2 Elements of the visual field test screen (MRF Neural)

The following screenshot shows the visual field test screen.

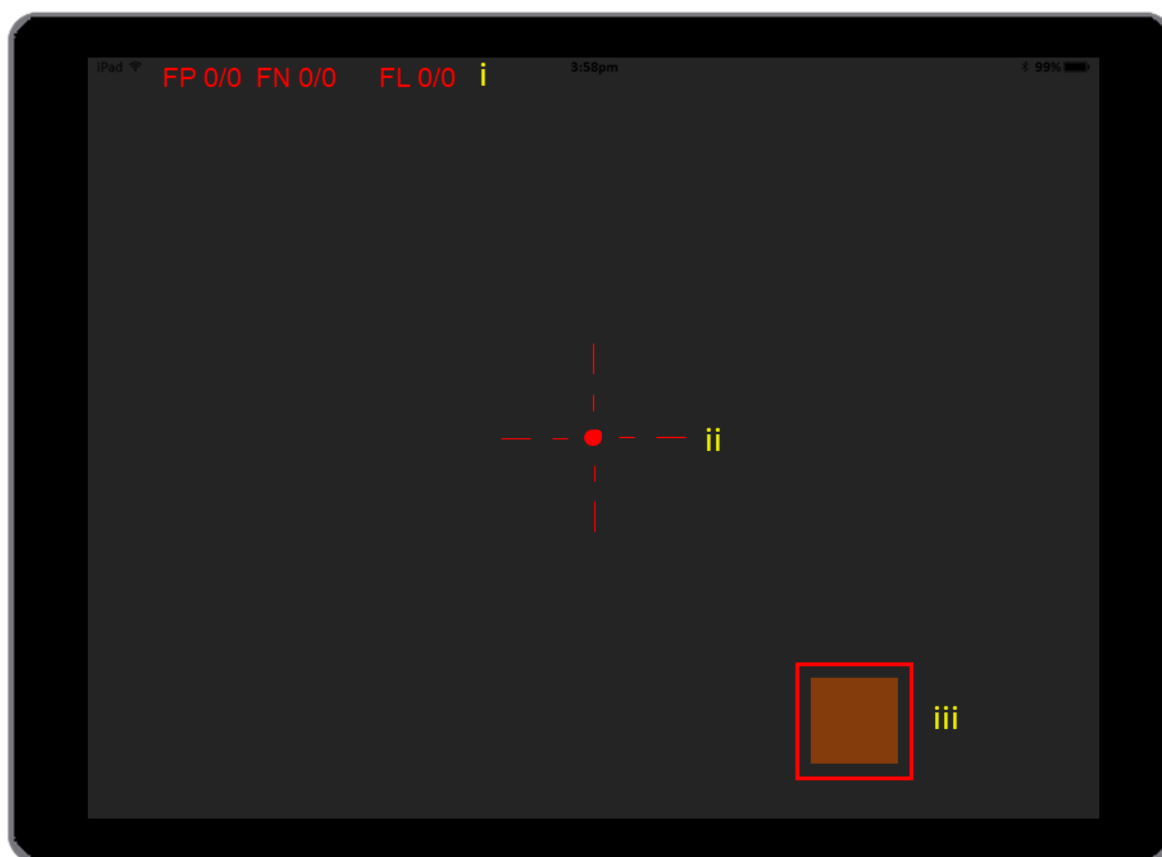


Figure 41. Elements of the visual field test screen (MRF Neural).

Each element is discussed in further detail below:

- i. **Reliability indices:** The reliability indices thus far are presented in red in the upper left corner of the screen. These results are updated in real time throughout the test.  
  
Indices measured are:
  - **FP:** False positive rate. A FP rate  $\leq 25\%$  is acceptable.
  - **FN:** False negative rate. Affected by scotoma and not a good index of reliability.
  - **FL:** Fixation loss. Measured with a blind-spot monitor.
- ii. **Fixation target:** The patient is required to observe the red fixation target located in the centre of the screen for the entire duration of the exam. Depending on the patient's



visual acuity (recorded from the Visual acuity test) the size of the fixation target may be automatically adjusted by the MRF app. The voice over (if enabled) will periodically remind the patient to maintain fixation. Note that the location of the blind spot is identified at the commencement of a visual field test. Depending on the screen size of iPad, the fixation cross may move to different locations on the screen to test peripheral locations in the visual field.

- iii. **Touch zone:** Only displayed when not using a keyboard to poll the patient's response. See section [11.4.3 Registering a response](#) for more information.

#### 11.4.3 Registering a response (MRF Neural)

The patient is instructed to respond to lights flashed anywhere on the screen whilst they look at the fixation target. Patient responses can be polled via one of the following methods:

1. **Tapping the space bar:** If a keyboard is connected to the iPad, the patient may respond by tapping it each time they see a grey light. Ensure the "Use Keyboard" option is selected on the test screen (see section [4. iv Use Keyboard](#) for more information). An Apple Smart Keyboard is the preferred keyboard as it does not require charging. Alternatively, the user may connect a Bluetooth keyboard to the iPad.
2. **Tapping the touch zone:** If a keyboard is not connected the patient may respond by tapping the touch zone. Note that the patient may tap anywhere on the screen to poll a response, however, using the touch zone is recommended to reduce fingerprints on the screen and minimise screen blemishes.

#### 11.4.4 Pausing/exiting a test (MRF Neural)

To pause a test, either the clinical assistant or the patient can tap on the red fixation cross.

An option will be presented to resume or exit the test.

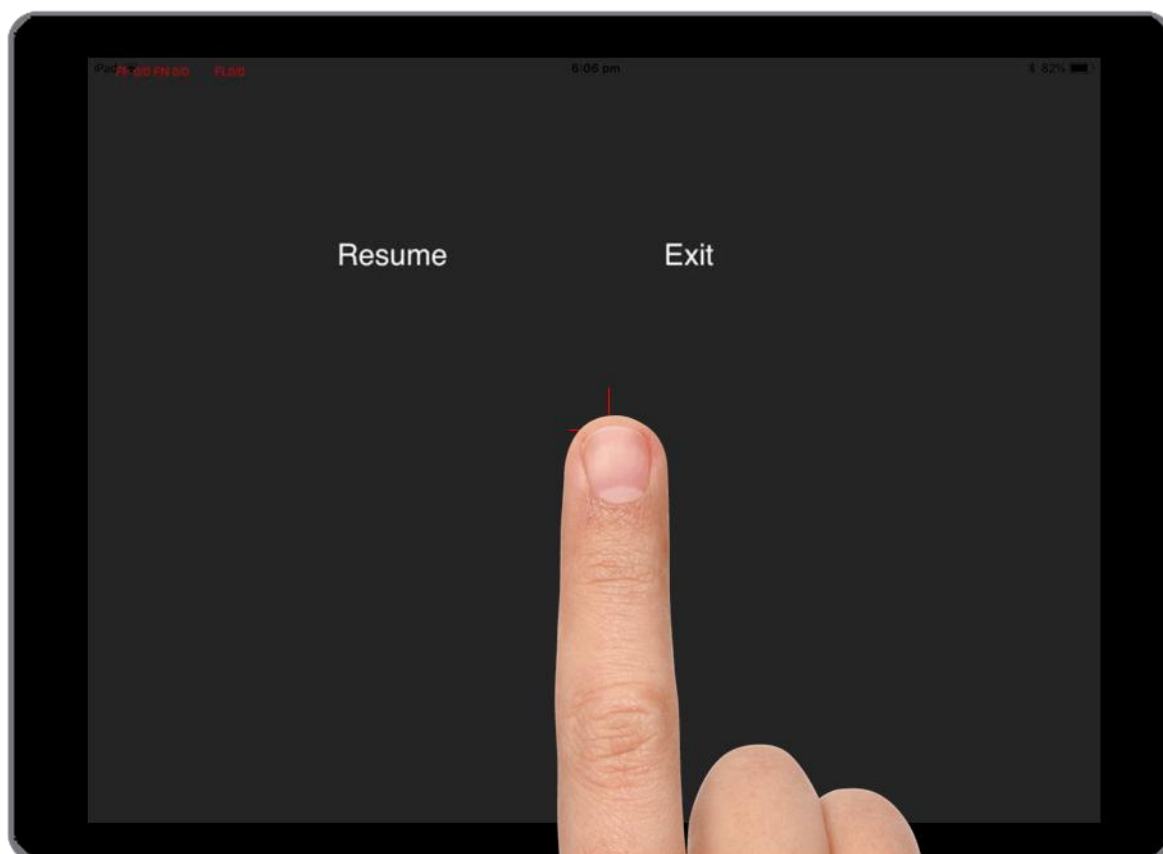


Figure 42. Pausing/exiting a test (MRF Macular).

#### 11.5 Visual field results (MRF Neural)

Visual field results will be displayed on screen at the end of a test. Alternatively, the user may view past results by selecting a patient from the main control panel and tapping on the Show old fields button (see section [11.1 Elements of the test selection screen](#)). The user can then


cycle through previous visual field exams using the

<<Next

and

Prev>>

buttons. An option to print the desired field is presented at the top of the

screen by tapping the  icon. Thresholds have been normalised to white-spot dB values.

### 11.5.1 Elements of the results screen (MRF Neural)

The elements of the results screen may vary depending on the test protocol used. These elements may include the following:

- **Test details**

- i. Patient ID. ii. Patient age.
- iii. Patient name.
- iv. Test time.
- v. Date.
- vi. iPad type.
- vii. Visual acuity.

- **Reliability indices** viii.

**FP:** False positives. ix. **FN:** False negatives.

- x. **FL:** Fixation loss.

- **Global indices** xi. **MD:**

Mean defect\*.

xii. **MRF MD:** MRF Mean defect\*\*.

xiii. **PD:** Pattern defect. xiv.

**VC:** Visual capacity.

\* The MD value is adjusted using a correction factor to approximate HFA (Humphrey Field Analyser) MD.

\*\*MRF MD the is the raw MD calculated from the MRF results prior to correction.

Note: The Mean defect values range from +0.50dB to -30dB with the more negative number indicating a worse visual field threshold. The MD has been colour-coded to signify abnormality (see point xx in the following section).

- **Pointwise results** xv. **Grey scale.** A greyscale representation of the patient's visual field.
- xvi. **Numeric plot.** Raw numeric sensitivity of each point tested. 30dB is the highest possible sensitivity with 0dB being the lowest.
- xvii. **Total deviation plot.** This indicates the average departure of points from the age-matched expected value. xviii. **Pattern deviation plot.** This indicates local level of abnormality after correcting for the patient's MD value.
- **Other results** xix. **F/T.** Foveal threshold given in dB (average threshold of all points <1°). xx. **Colour coded indicator for result:**

- Green: within normal limits (95% of normals).
- Amber: Borderline (<5% of normals).
- Red: Abnormal (<1% of normals).

- **Progression analysis**

See section 13. [Visual field progression](#) for more information.

The results for each protocol are described in more detail below:

#### 11.5.1.1 Full test

An example of the results from a full test is shown below:

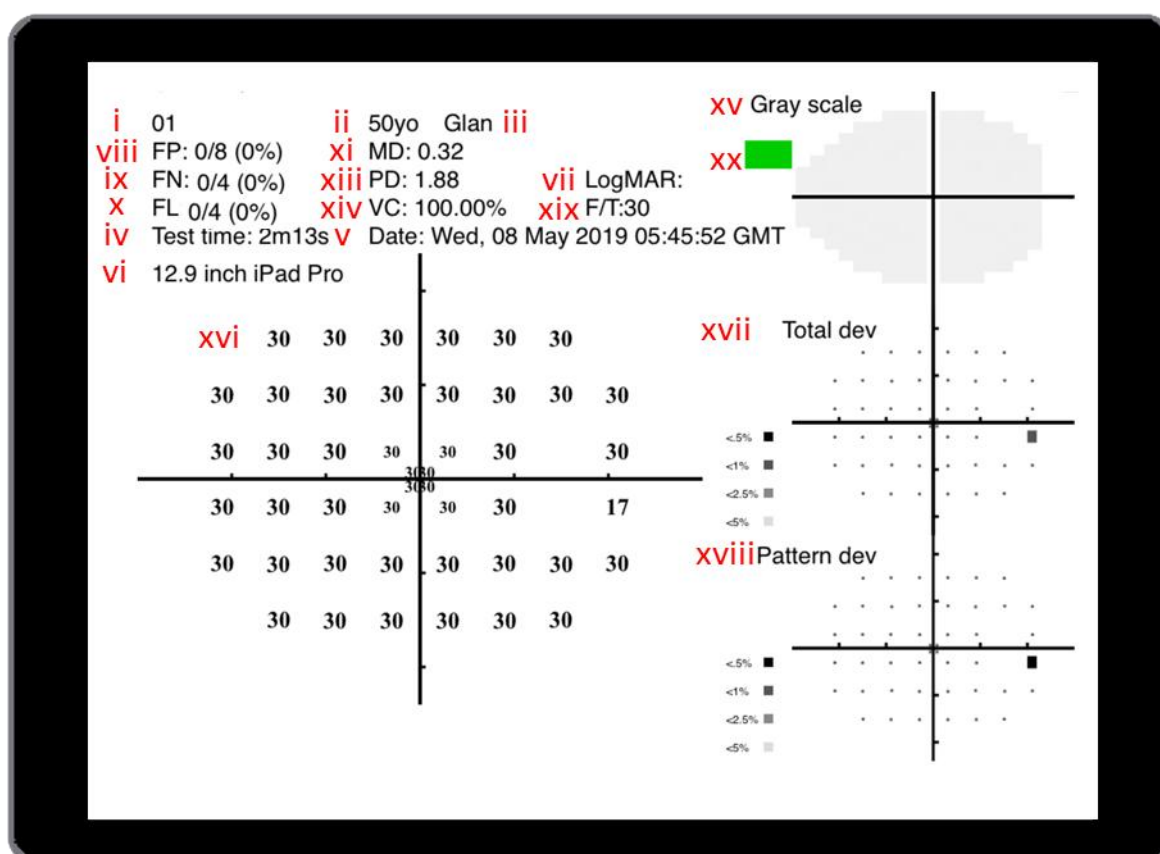


Figure 43. Visual field output for the 46-point Full test (MRF Neural).

### 11.5.1.2 Central Red

An example of the results from a Central Red test is shown below:

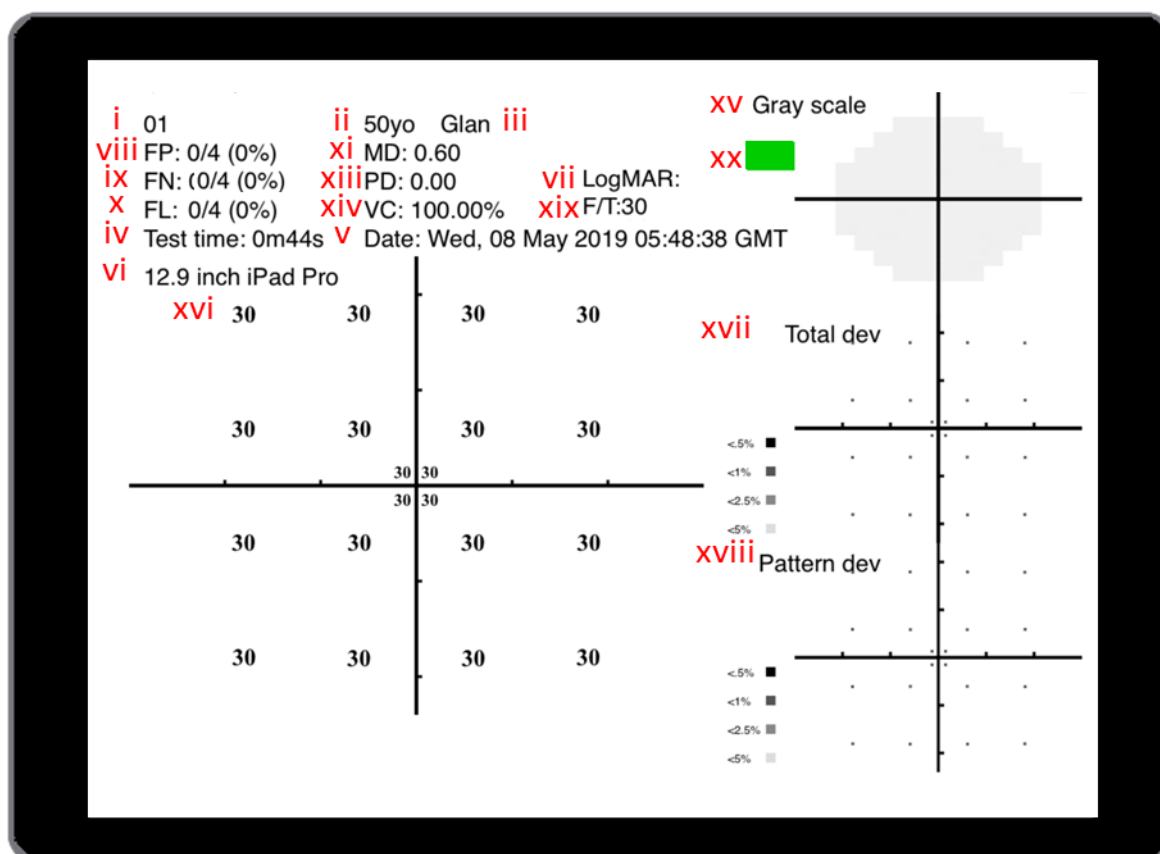


Figure 44. Visual field output for the 20-point Central Red test (MRF Neural).

### 11.5.1.3 Full grid

An example of the results from a full grid test is shown below:

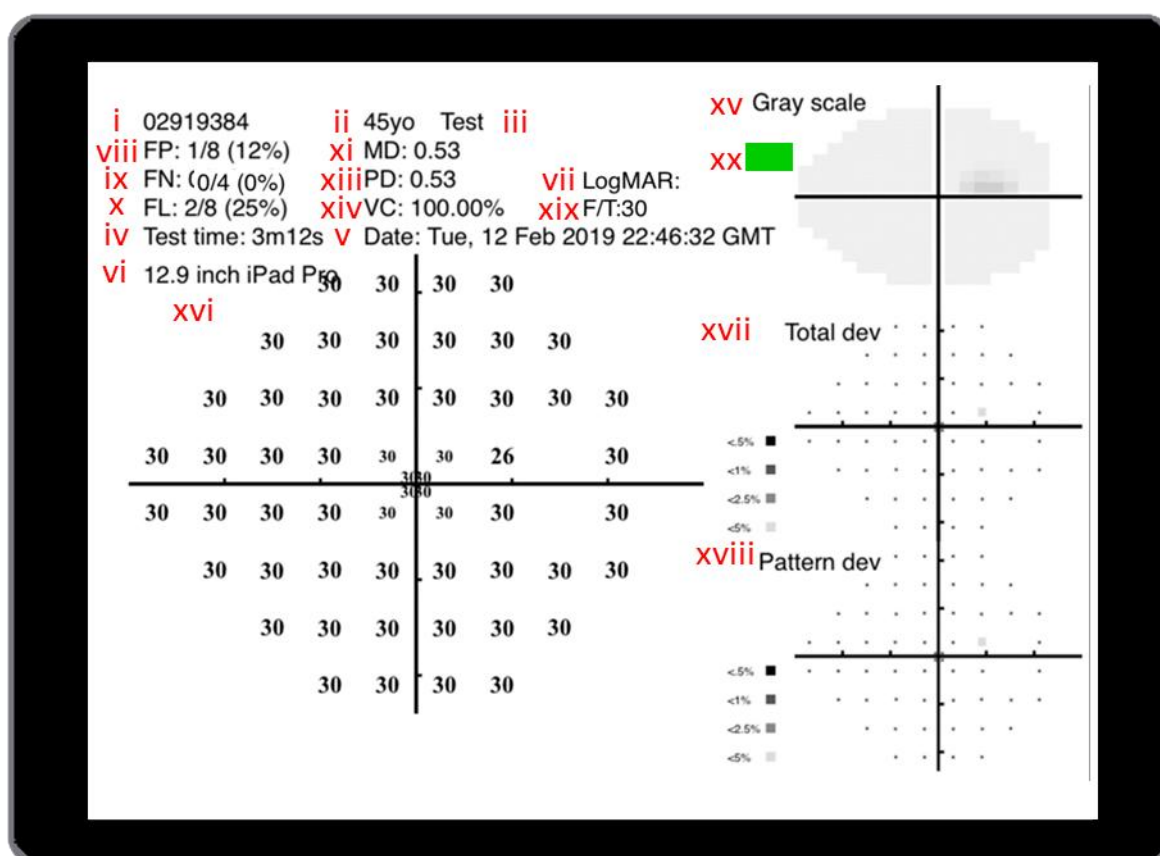



Figure 45. Visual field output for the 56-point Full grid (MRF Neural).

## 12. Saving a visual field test

Upon completion of a visual field test, the results will be displayed on screen. To save the results, do the following:

1. Tap anywhere on the screen to return to the visual field test screen.

Save Test

2. Tap on the green  button to the left of the screen.
3. A confirmation text box will appear to confirm that the test has been saved.

Note that an option to retest each eye will become available to the user.

### 13. Visual field progression

Progression analysis is available for the MRF suite of apps. The progression indicator is displayed on the results screen if at **least 5 exams** have been performed using the same protocol. An example of progression analysis for a normal patient is shown in Figure 46. Each element is described in further detail.

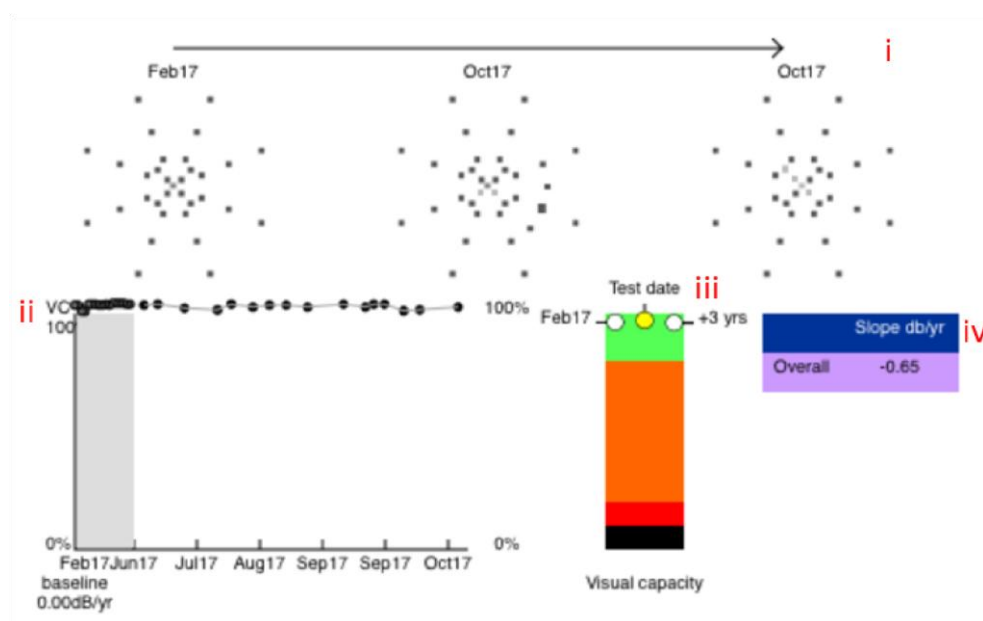


Figure 46. Example of progression analysis in a normal patient (MRF Macular).

- i. **Event analysis:** Compares today's performance to baseline on a pointwise basis. Points are colour coded according to the following legend (see Figure 47):

- Grey: No change.
- Black: Change from baseline (worsening).
- Red: Change confirmed at retest (see Fig 47).



- ii. **Trend analysis:** Patient's visual capacity (MD normalised to age-expected values) plotted over time. The last 5 months of testing is shown in the white section of the graph. All prior exams are compressed into the grey portion (baseline).
- iii. **Progression analysis:** Coloured bars show visual capacity from 100% (green) to 0% (black). The left circle shows visual capacity at baseline, the middle circle (yellow) shows visual capacity at the current exam, the right circle gives a 3year prediction of visual capacity based on 5-month trend (linear regression) for the data.
- iv. **Rate of progression:** The rate of progression is given in dB per year in the purple box. An example is shown of disease progression in a patient with agerelated macular degeneration (Figure 47). A statistically significant downward trend is identified by an asterisk shown in Figure 47.

An example of disease progression in a patient with age-related macular degeneration is shown in Figure 47.

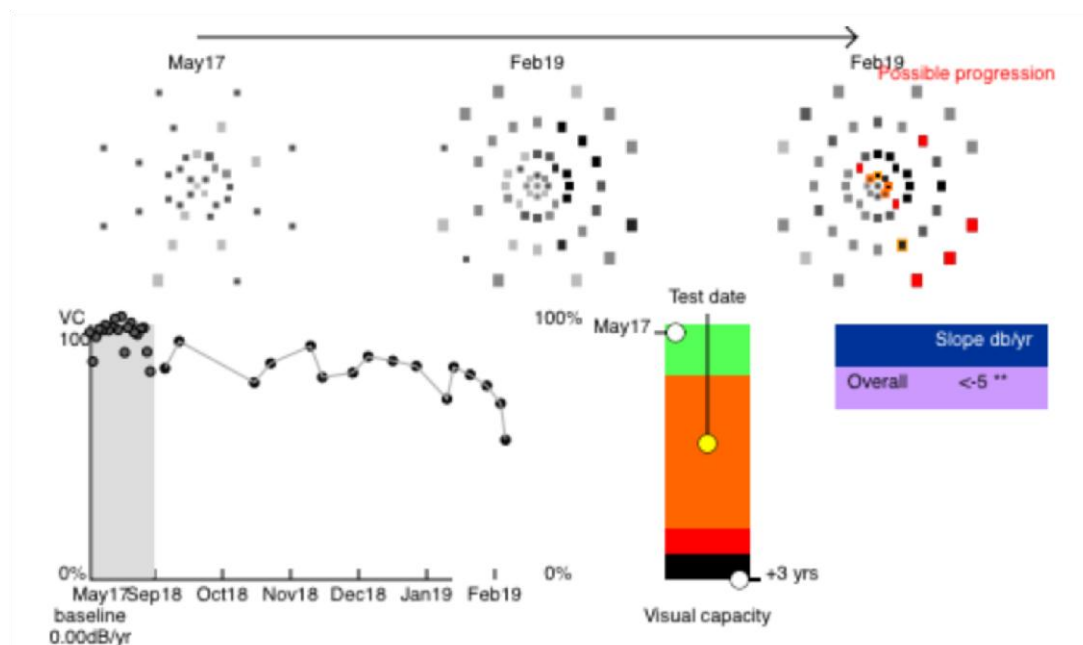


Figure 47. Example of disease progression a patient with age-related macular degeneration (MRF Macular). Note that “possible progression” is printed in the upper right corner with several points flagged as red squares in the event analysis (repeated loss) and a significant rate of progression identified by the trend analysis (\*\*).

## 14. Emailing a visual field result



To email a visual field result, do the following:

1. Select a patient from the main control panel.
2. Tap show old fields and navigate to the desired exam result.
3. Tap the (email) icon at the top of the page.
4. Enter the e-mail address of the recipient.
5. Tap send.
6. Tap done in the top right corner of the screen to return to the test selection screen.

Note: A copy of the raw pointwise data is sent along with the results. An email account must be set up on the Apple Mail App to use the email function.

## 15. Printing a visual field result


To print a visual field result, do the following:

1. Select a patient from the main control panel.
2. Tap  and navigate to the desired exam result.
3. Tap the  icon at the top of the screen.
4. Select the printer.
5. Tap print.
6. Tap done in the top right corner of the screen to return to the test selection screen.

Note: A WiFi printer must be set up in order to print a visual field result from the iPad.

## 16. Exiting the app

To exit the app, do the following:

1. Tap  in the top right corner of the main control panel or the test selection screen.
2. Press the home button on the iPad to exit the app.

Note: To permanently close the app, double tap the home button, locate the MRF Glaucoma app and swipe up on this to close.

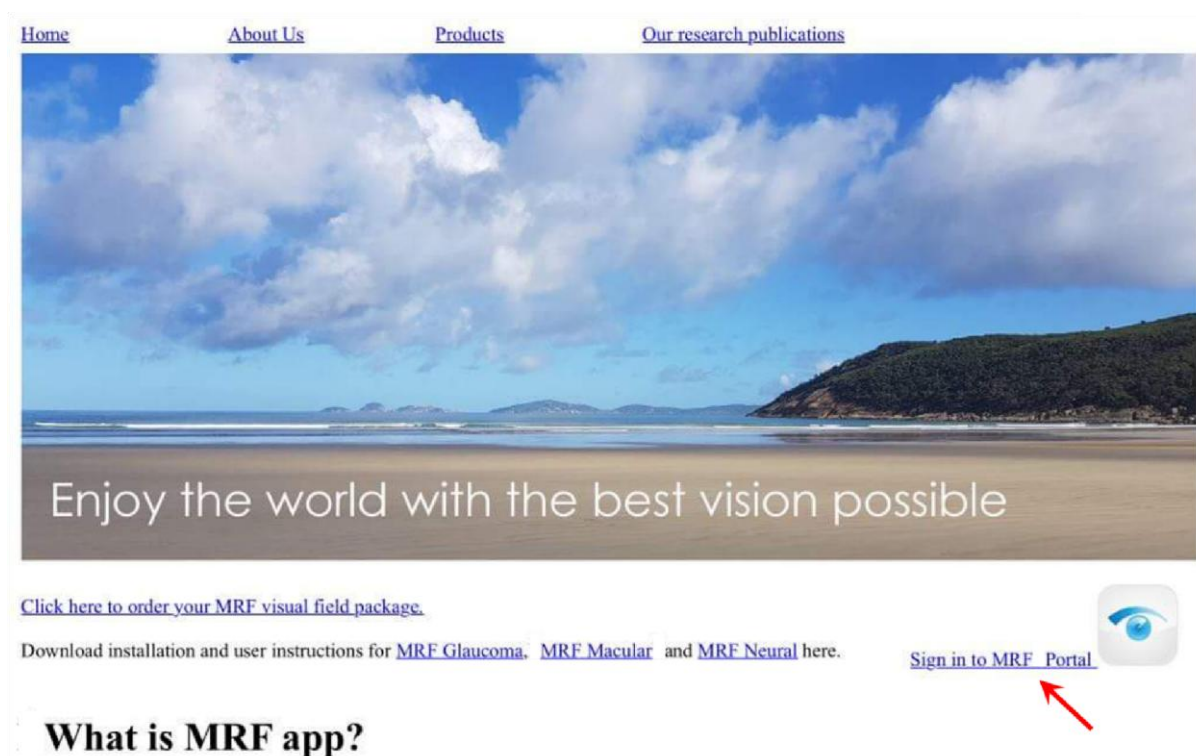
## 17. The MRF online portal

The MRF online portal allows users and patients to access saved visual fields online. The portal can be accessed from any device with an active internet connection.

### 17.1 Logging on to the MRF online portal

To access the MRF online portal, do the following:

1. Open a web browser.
2. Navigate to [visioninhome.com](http://visioninhome.com).
3. Click on [Sign in to MRF Portal](#).



4. Enter the user's email address and password.



**MRF visual field data online portal login**

email

password

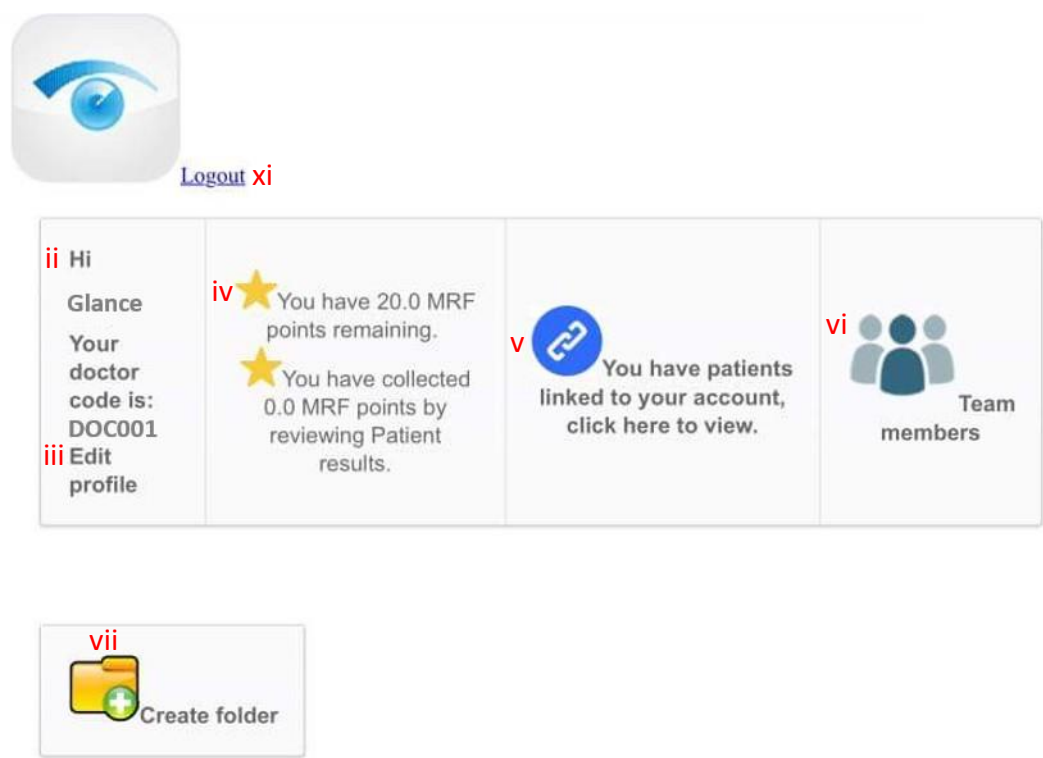
If you do not yet have an account on MRF, [click here to register.](#)  
[Forgot password?](#)

GLANCE optical (tm)

5. Click Submit.

17.2 Elements of the main portal screen

The following screenshot shows the main portal screen. Each element is discussed below:



Here are your accounts:

Search for name or ID:

ix

unique ID	Name	Age	Comments	x Assign Folder	Create date
001	Glance	50		<input type="button" value="Assign Folder"/>	2016-11-13 00:52:51.0

i



viii

- i. **Home button:** Click here return to the main portal screen.
- ii. **Doctor code:** Click to generate a doctor code. This code can be given out to patients who wish to nominate you as their designated clinician instead of using your name.

You can then review their home-monitoring visual field results from the online portal.

Once your doctor code has been generated it will be displayed here.

- iii. **Edit profile:** Click to change the doctor name, password, or organisation name.
- iv. **MRF stars:** Displays the number of MRF stars remaining, in addition to stars accumulated by reviewing patient results.
- v. **Linked patients:** Click to see patients linked to your account.
- vi. **Team members:** Click here to add a team member to your account. Team members will receive progression notifications from patients and be able to view patient data who have nominated you as their doctor.
- vii. **Create folder:** Create a new folder to store patient data. **viii. Search for name or ID:** Search for a patient using their name or ID.
- ix. **Patient account list:** A list of all patients tested on your account ordered by date of

account creation.

- x. **Assign folder:** Select a folder from the dropdown list to assign a patient. xi.

**Logout:** Log out of the MRF online portal.

### 17.3 Reviewing a patient's results from the MRF online portal

To review a patient's results, perform the following steps:

1. Search for their name either by typing it in the search box or scrolling down the patient account list.
2. Click on their unique ID.

unique ID	Name	Age	Comments	Assign Folder	Create date
001	Glance	50		<input type="text"/>	2016-11-13 00:52:51.0
002	Test	23		<input type="text"/>	2017-03-14 17:16:40.0

A list of all the patient's visual field results will be displayed ordered by date with their most recent exam first.

3. Search for the exam you wish to review and click on the date.

Date	Left VA	Left MD	Left progression slope	Left progression events	Right VA	Right MD	Right progression slope
Thu, 26 Jul 2018 09:22:52 GMT		0	0 dB/yr	0		-0.47	0 dB/yr
Mon, 07 Aug 2017 01:00:57 GMT	-0.10	0	0 dB/yr	0	-0.10	-14.12	0 dB/yr

The visual field test results will be displayed.

## 17.4 Printing a patient's results from the MRF online portal

To print a patient's results from the MRF online portal, do the following:

1. Follow steps 1 to 3 in section 17.3 [Reviewing a patient's results from the MRF online portal](#) to search for the desired exam.
2. Click on [Printer friendly version](#).
3. Press Ctrl + P to print the results.

## 17.5 Logging out of the MRF online portal

To log out of the MRF online portal, click on "Logout" at the top of the page.

# 18. MRF stars system

## 18.1 What are MRF stars?

The MRF stars system forms part of the subscription service which allows a user or patient access to the MRF app and its progression analysis. Upon downloading the app, the user is given 10 MRF stars. If you have purchased a package, you may have additional stars as part of a 12-month subscription as part of your purchase.

## 18.2 My stars are diminishing!?










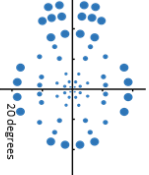
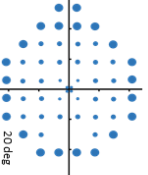
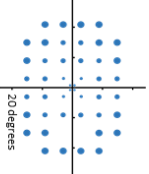
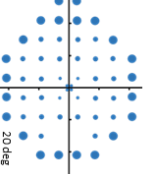
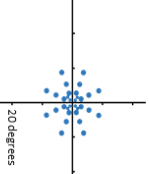
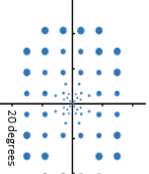
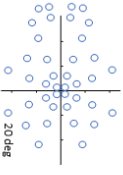
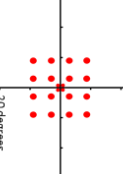
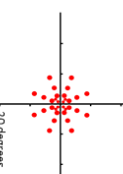
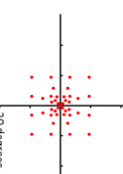
Each visual field examination costs 0.4 MRF stars (0.2 MRF stars per eye). Each month, the number of stars reduces by 2 even if zero tests were performed for that month (note that this permits for 5 tests per month:  $2/0.4 = 5$  tests). Once the user's account reaches zero stars they must purchase more to continue using the program. As a patient, your stars will reduce by a further 5 each time visual field progression is detected, and your doctor is asked to review your results.

## 18.3 How do I get more stars?

The user can obtain MRF stars by the following methods:

1. **Purchasing stars:** Contact your MRF sales assistant to purchase additional stars. These are typically sold as a 12-month subscription (24 stars) or 6-month (12 stars).
2. **Reviewing patient exams:** A doctor can accumulate MRF stars by reviewing their patient's home-monitoring results. If the doctor prescribes MRF to their patient, the patient must purchase the app from the Apple App Store and nominate their doctor by providing their email address. The patient performs weekly home monitoring of their visual fields using MRF and their doctor is notified via email when there is a change in vision detected by our software. The doctor gains 5 MRF stars each time they are asked to review the results of a patient who may be progressing.

## 19. Summary of tests

<p>MRF <b>Glaucoma</b></p>  <p>High contrast</p>			
<p>MRF <b>Neural</b></p>  <p>High contrast</p>  <p>Low luminance, low contrast</p>  <p>Acuity in noise</p>			
<p>MRF <b>Macular</b></p>  <p>High contrast</p>  <p>Low luminance, low contrast</p>			
<p>MRF <b>Diabetes</b></p>  <p>High contrast</p>  <p>Low luminance, low contrast</p>  <p>Acuity in noise</p>			
<p><b>Full test</b></p> <ul style="list-style-type: none"> <li>• 66 points</li> <li>• Radial pattern</li> <li>• Expanding field</li> <li>• 30° x 20°</li> <li>• ~5 min*</li> </ul>  <p>20 degrees</p> <p><b>Full grid</b></p> <ul style="list-style-type: none"> <li>• 56 points</li> <li>• Modified 24-2</li> <li>• +4 foveal points</li> <li>• 27° x 21°</li> <li>• ~4 min*</li> </ul>  <p>20 deg</p>	<p><b>Full test</b></p> <ul style="list-style-type: none"> <li>• 46 points</li> <li>• Modified 24-2</li> <li>• +4 foveal pts</li> <li>• -10 peripheral</li> <li>• 21° x 15°</li> <li>• ~2.5 min*</li> </ul>  <p>20 degrees</p> <p><b>Full grid</b></p> <ul style="list-style-type: none"> <li>• 56 points</li> <li>• Modified 24-2</li> <li>• +4 foveal points</li> <li>• 27° x 21°</li> <li>• ~4 min*</li> </ul>  <p>20 deg</p>	<p><b>Macular test</b></p> <ul style="list-style-type: none"> <li>• 33 points</li> <li>• Radial pattern</li> <li>• Expanding field</li> <li>• 9.5° x 9.5°</li> <li>• ~1.5 min*</li> </ul>  <p>20 degrees</p>	<p><b>Full test</b></p> <ul style="list-style-type: none"> <li>• 67 points</li> <li>• Modified 24-2</li> <li>• +20 macular pts</li> <li>• -10 peripheral</li> <li>• 21° x 15°</li> <li>• ~3 min*</li> </ul>  <p>20 degrees</p>
<p><b>Other</b></p>  <p>20 deg</p> <p><b>Radial screen</b></p> <ul style="list-style-type: none"> <li>• 40 points</li> <li>• Radial pattern</li> <li>• Expanding field</li> <li>• 30° x 20°</li> <li>• ~1.5 mins*</li> </ul>	<p><b>Central red</b></p>  <p>20 degrees</p> <ul style="list-style-type: none"> <li>• 20 points</li> <li>• Threshold</li> <li>• Grid pattern</li> <li>• 9.5° x 9.5°</li> <li>• ~45 sec</li> </ul> <p>Hemispacial neglect</p>	<p><b>Macular red test</b></p>  <p>20 degrees</p> <ul style="list-style-type: none"> <li>• 33 points</li> <li>• Threshold</li> <li>• Radial pattern</li> <li>• 9.5° x 9.5°</li> <li>• ~1.5 mins</li> </ul>	<p><b>Central red test</b></p>  <p>20 degrees</p> <ul style="list-style-type: none"> <li>• 41 points</li> <li>• Threshold</li> <li>• Radial pattern</li> <li>• 9.5° x 9.5°</li> <li>• ~2min</li> </ul>

Note: ALL spots size scaled. RED spots G-V.

## 20. Support

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Note: The information in this manual is true and correct as at May 2019. Glance Optical Pty. Ltd. reserves the right to alter this information at any time without notice.

Document created by Selwyn Marc Prea.

## 21. Glossary of terms

<b>App</b>	Application.
<b>dB</b>	Decibel.
<b>iOS</b>	Operating system of the Apple iPad.
<b>MRF</b>	Melbourne Rapid Fields
<b>MRF Stars</b>	The subscription fee which enables a user access to MRF.
<b>Patient</b>	The person who will be performing the test.
<b>User</b>	The person who will be administering the test (eg: Optometrist, Ophthalmologist, Doctor, etc).







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