Nidek RT-5100 Automated Phropter/SC-1600 Chart User Guide

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Introduction

The Nidek RT-5100 automated phoropter allows for rapid and accurate refraction of patients in a more comfortable and modern way compared to trial frame and lenses.

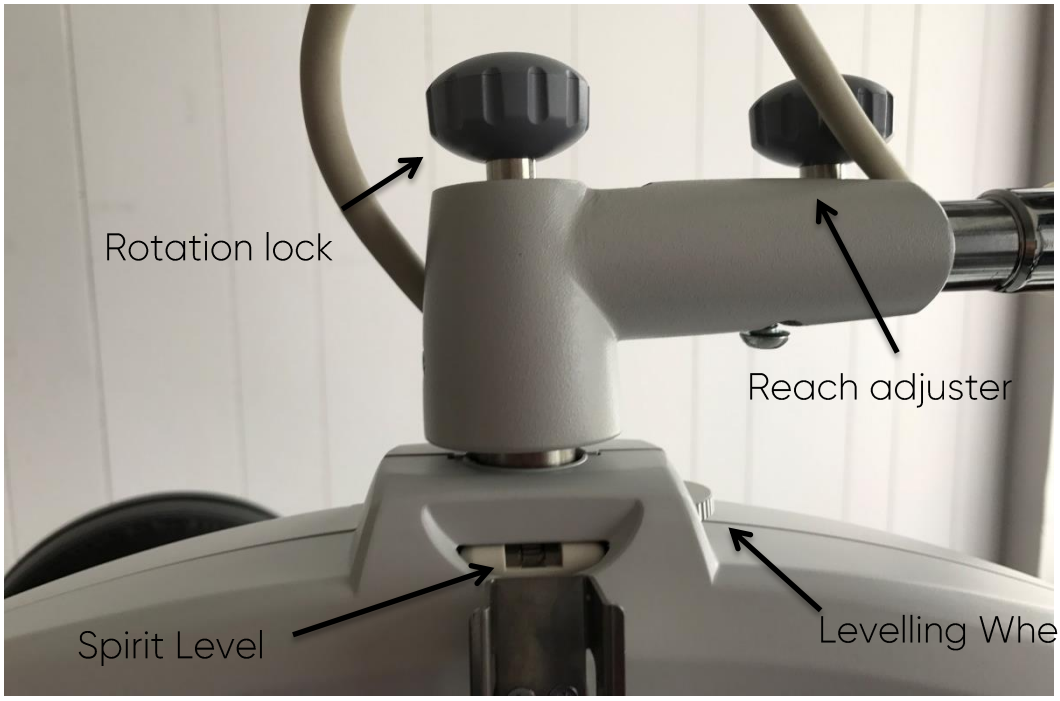
On the left we can see the phoropter in position on a combi unit post and chair with the console next to it. On the right we can see the touch screen console in more detail.

Alignment of the phoropter and patient set-up

The phoropter arm has a lever as shown which allows you to lock and unlock the position of the phoropter head. Between eye examinations, it is normally stowed up and to the side of the combi unit.

With the patient sat in the chair, unlock the lever and pull the phoropter into position in front of their face. Lock the handle when the eye pieces are level with the patient's eyes.

Alignment of the phoropter and patient set-up



You can alter the levelling of the phoropter using the wheel as shown below (there is a spirit level present too if you want the phoropter to be level with the ground). Most of the time, the levelling is used where the patient's face is not symmetrical and perhaps one eye is a little higher than the other.

You can also alter the frontal rotation of the phoropter, so it can be adjusted to be perpendicular to the viewing plane or the patient's face. You can also alter the reach of the holding arm (see diagram).

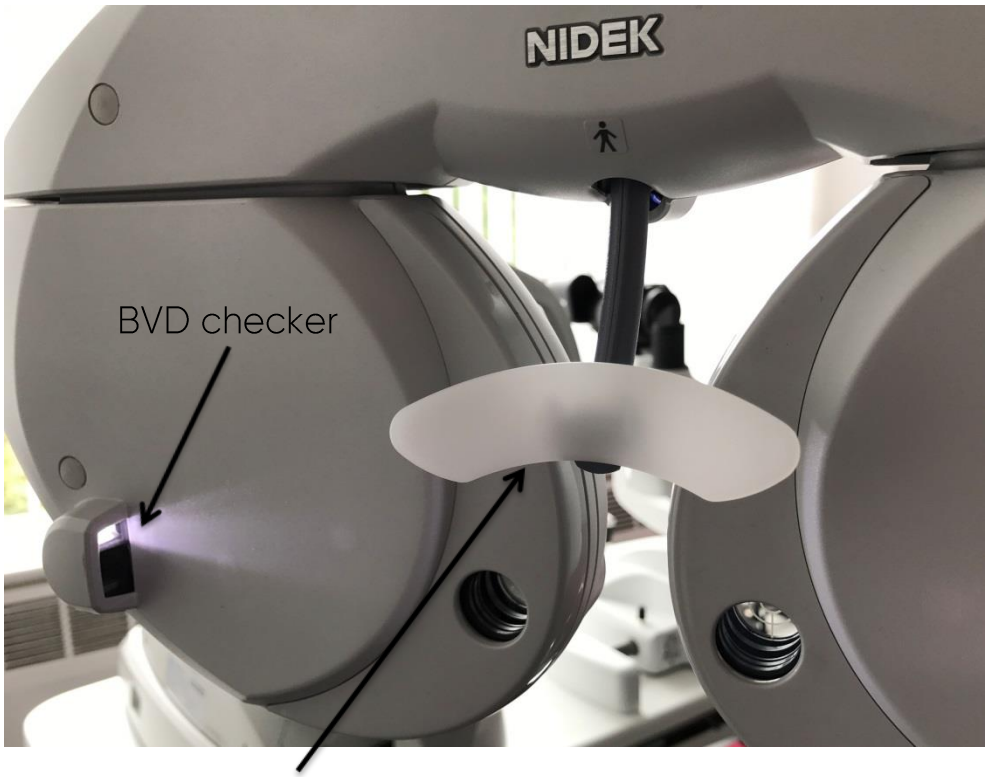
You'll find that with regular use, there will be little need to make adjustments to the positioning of the phoropter head.

ADJUSTING PD AND PATIENT POSITION

Press 'PD' on the console and the cross hairs will appear as shown. Use the dial wheel on the console to adjust the PD to line up with the patient's pupils. You can press 'R' and 'L' on the console to allow for monocular PD adjustment (press BIN to allow for binocular adjustment).

Note the blue light. When this is present, it means the patient's forehead is not in contact with the forehead rest as shown next. You can turn the wheel just above the blue light to alter the position of the forehead rest (alter the BVD).

ADJUSTING PD AND PATIENT POSITION



With PD still in place, a light will also appear on the back of the phoropter to allow viewing through the front BVD checker to measure off the patients corneal vertex position.

HINT – ensure the patient is leaning their head forward or backward when aligning with the phoropter. This normally ensures a reasonable BVD position.

The standard BVD is 12mm. To check the BVD, adjust your head position so the triangles seen through the BVD checker line up with the dotted line. You can then see which solid measuring line the patients anterior corneal surface is closest to. The one that corresponds with the dotted line is 12mm. They are in 1mm steps.

The Console

The console has a touch screen, which is primarily for altering the charts that are presented to the patient (normally the device is linked to a Nidek chart such as the SC-1600).

The bottom part of the console is primarily for altering the lenses and filters presented in the phoropter.

Console Phoropter Controls

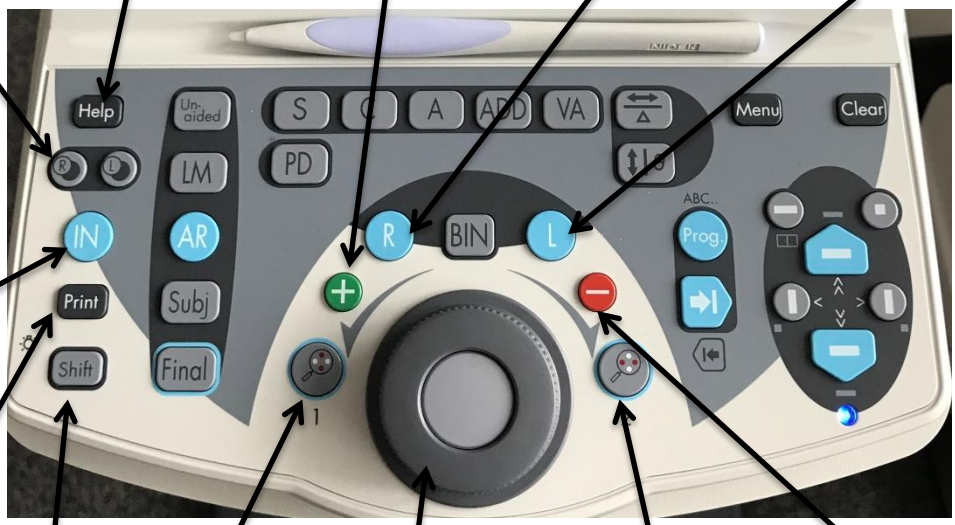
Add plus power to the SPH or CYL Rx

Help button – this provides information on whichever chart is being displayed on the console

R - selects the left eye and occludes the left

Quick occlude select – this allows you to add or remove an occlude in front of either eye rapidly

L - selects the left eye and occludes the right



IN – imports information from the patient data card (rarely used)

Add plus power to the SPH or CYL Rx

Print - locks the data or prints final result

Adjustment wheel

Cross cyl position 1

Cross cyl position 2

Shift – provides other functions on some buttons(such as larger changes in SPH,CYL and AXIS with shift pressed

Console Phoropter Controls

LM – Allows for input of the lensmeter results. Use PRINT to lock this into the system

Unaided – Allows for input of uncorrected visual acuity

PD – Allows you to adjust the eyepiece separation to match the patient PD. You

Δ – Allows for input of horizontal prism

AR – Allows for input of the autorefractor results. Use PRINT to lock this into the system

θ – Allows for input of vertical prism

Subj – here you will conduct refraction and use PRINT to lock the result

Quick select button – This scrolls through SPH, CYL and AXIS each time it is pressed for quick Rx input or changes

BIN – Selects both eyes for binocular tests, binocular refraction. It removes both occluders.

These buttons allow for selection of individual horizontal letter lines, vertical rows of letters or even single individual letters. The horizontal line can then be randomised if you have the Nidek SC-1600 LCD chart.

Console Phoropter Controls

C – Selects CYL (cylinder). This will allow you to either input the current Rx or alter the CYL as part of the refraction. You can use the +/- buttons or the adjustment dial to change the CYL power. There are also Cross cyl buttons to use with the cylinder dot chart to adjust CYL power and AXIS (see later)

A – This selects the AXIS of the cylinder for astigmatic correction. Use the dial or the cross cyl feature to adjust this

ADD – Allows you to select near vision testing and input the patients age which auto inputs an initial ADD which you can adjust binocularly with the dial (monocular adds are possible too).

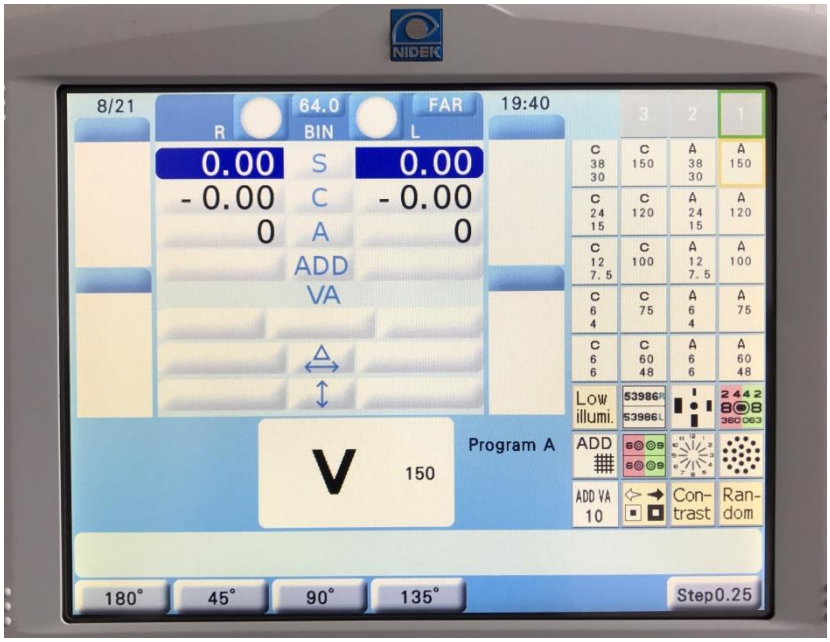
VA – Allows you to input the Snellen visual acuity onto the console using the dial. Most optometrists rarely use this function as they type the result into their computer anyway. Use PRINT to lock the VA

S – Selects SPH (sphere). This will allow you to either input the current Rx or alter the SPH as part of the refraction. You can use the +/- buttons or the adjustment dial to change the SPH power

Menu – brings up the internal console menu for adjusting defaults and entering other functions (see later).

Clear - resets the system and removes all locked data and any refraction results. Only use when you're ready to conduct a new refraction on a new patient

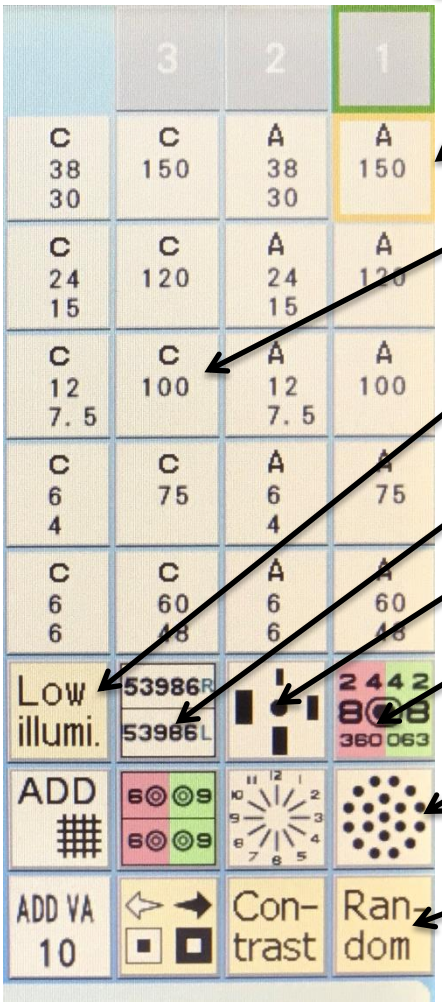
Console Phoropter Controls



This is the Console Touch Screen. This is where you can control the different charts and tests. Essentially this part of the console controls the chart and the appropriate lenses in the phoropter. Touch the screen icons to select them.

From the console screen above, you can see it shows you what chart you have selected and essentially this represents what is displayed on the Nidek chart (such as that shown on the Nidek SC-1600 chart to the right)

Console Phoropter Controls (screen 1)



Console Menu Selection (1 to 3). The green box is the selected menu

Snellen letter selection (maximum 4 letters per line) 6/150 to 6/4

Landolt C selection (maximum 4 letters per line) 6/150 to 6/4

Low illumination (for checking Night Myopia patients)

Binocular Balance (Spherical balance and horizontal prism balance and fusional reserves)

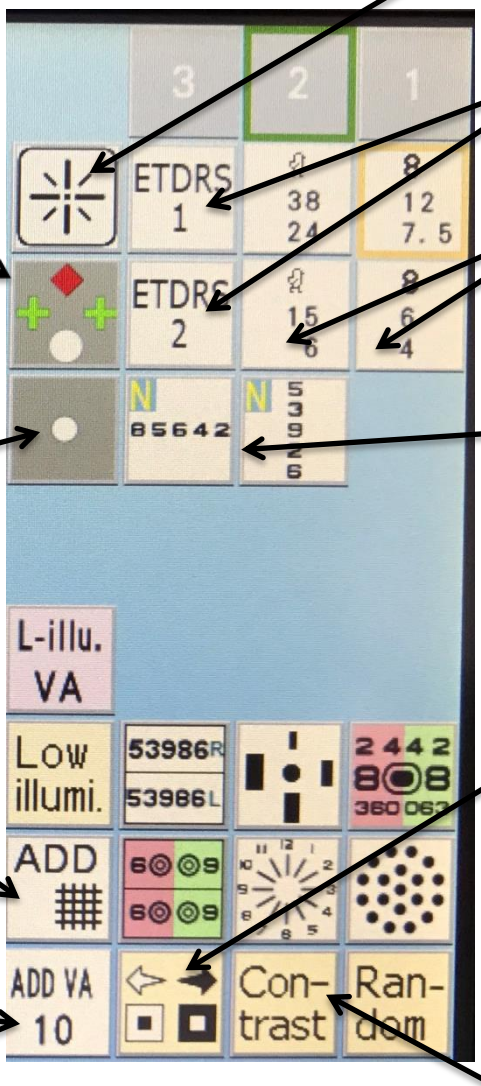
Distance stereopsis (10' to 1' of arc)

Duochrome for accommodative control

Cross-cylinder target – automatically brings up the cross cylinders in the phoropter

Randomise letters – this works when you select a single line of letters using the blue buttons on the console as shown

Console Phoropter Controls (screen 2)



Partially Dissociated Phoria (Mallett type) test

ETDRS LogMAR charts (more crowding, with Snellen VA's)

Worth 4 dots chart for suppression checking

Numerical and Pictorial Opto types

Maddox Rod for dissociated phoria (press once for horizontal and again for vertical)

Horizontal and vertical near muscle balance charts (for use with the near rod (uses split prism)

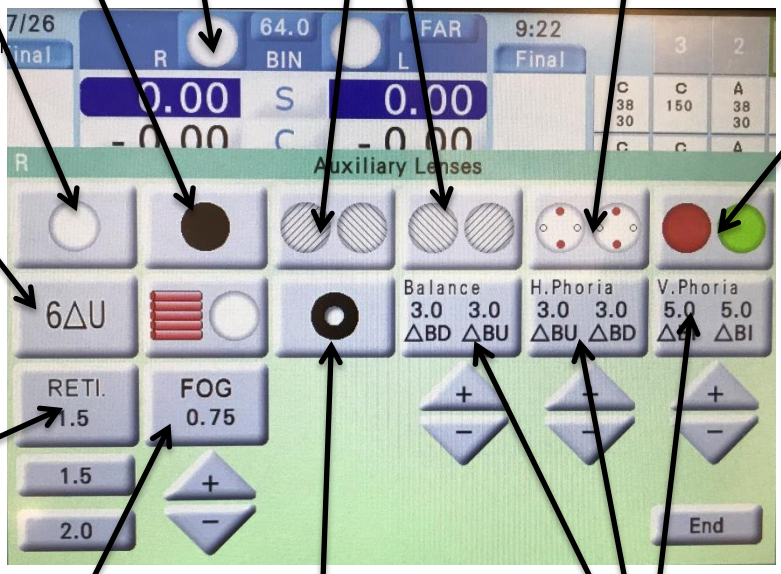
Reverse letter colouring (white on black) for some low vision patients

Add verification using near rod and 0.50 cross cylinders

Corrected near visual acuity

Contrast reduction (when presenting letters press once for 25% contrast, again for 12% and again for 6% - press once more to return to full contrast)

Occluder Selection



Occluder selection

Occlude the eye selected

No occlude for the eye selected

Prism for dissociation for the eye selected

Retinoscope working distance lenses for the eye selected (change the power below)

Fogging lenses for binocular refraction (changing the selected eye will swap the fogging lens to the other eye (use +/- to change the fogging lens power)

Pinhole for the selected eye

Cross Polarisers (for SC-1600 POLA only)

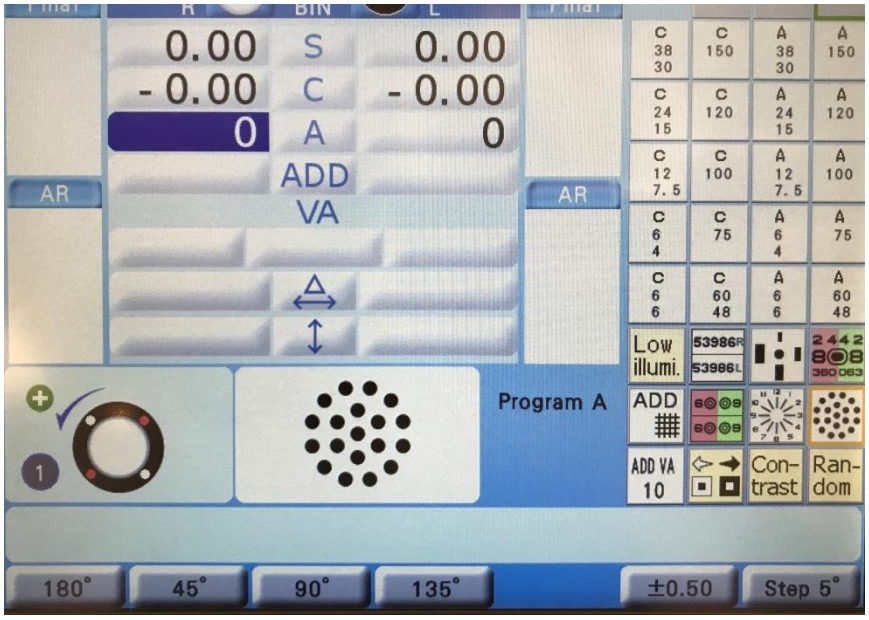
Cross Cylinders both eyes

Red Green visors for dissociation with NON

Split prisms for binocular balance and muscle balance (fusional reserve) tests. You can increase or decrease these as required.

NOTE – Most tests automatically select the appropriate occluders

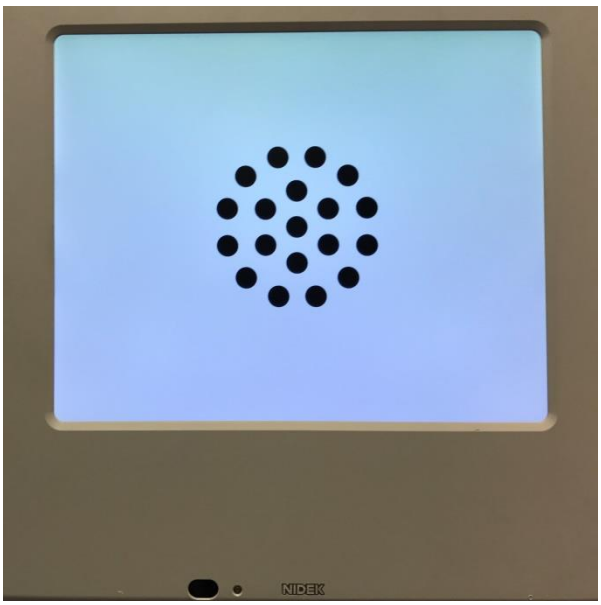
Cross Cylinder Test



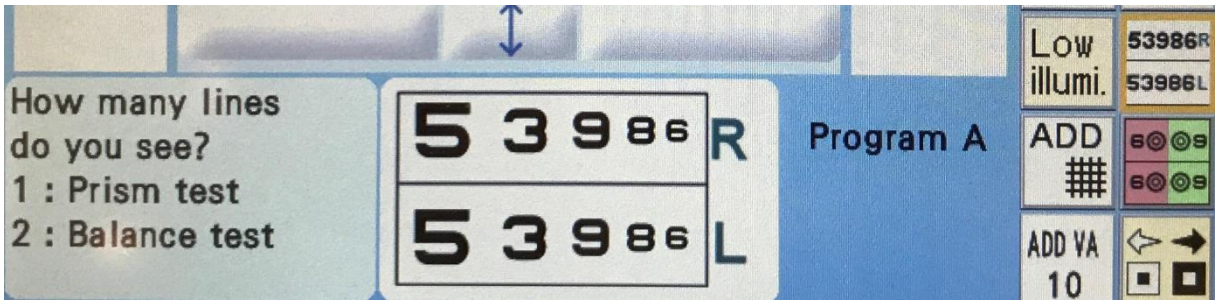
When you press the cross cylinder chart, the cross cylinder lenses are put in place in the phoropter and the dots appear on the test chart. You can select auto, +/-0.25 and +/-0.50 cross cyls.

You can change the axis steps as shown and you can quickly select gross meridians on the lower part of the console.

Use the numbers to present positions 1 and 2 for both the cylinder power and axis. Use the + and – buttons to respond to the patients answers.



Binocular Balancing



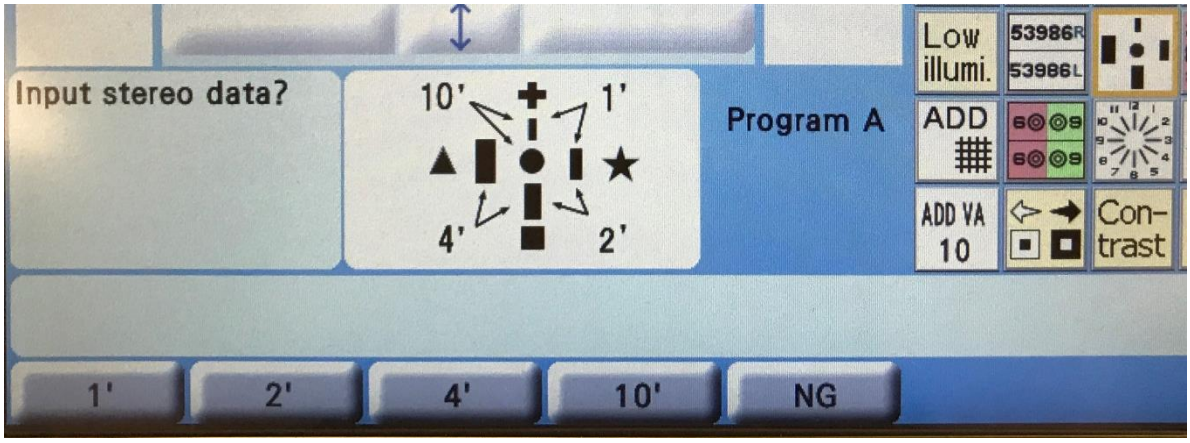
When you select the binocular balance numbers, a single line of numbers appears on the chart, but split vertical prisms create the patients view shown above.

You can then ask the patient if the numbers are equally clear or if one set is clearer than the other. You can then select R or L and alter the SPH to improve the least clear line of numbers.

There may be horizontal separation between the numbers and you can select horizontal prism to level them up or you can conduct convergent and divergent fusional reserve tests with blur, break and recovery.

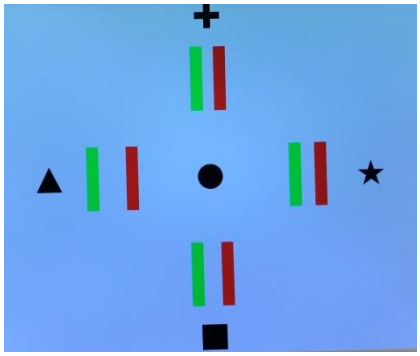
NOTE - The Duochrome version only allows for Spherical balancing and no prism element.

Stereopsis Test



The Stereopsis test for distance brings up coloured bars with varying separation and also Red Green filters before the patient's eyes. The patient then sees black bars next to the different shapes.

Ask the patient which bar appears closest to them (the one next to the triangle) to establish they have stereo acuity / binocularity. Then ask which one appears furthest away to determine their level of stereo acuity. So, if the patient says the furthest bar is next to the + symbol, then the patient has at least 1' of arc stereo acuity (for example).



Menu Screen

The Menu screen allows you to select some patient information displays, such as 'About Eye', 'Vision' and 'Range of Clear Vision' to explain about the eye, some example ocular pathology and what they should see with different types of spectacles.

PARA allows you to set certain default parameters, such as 0.25 or 0.50 cross cyl, the power change with the SHIFT button pressed and so on.

You can use the console as a near vision test chart – though this is quite difficult.

This guide will not cover the full range of parameters.