easi-scan™
smart display

Instruction manual

BCF™ Technology

Your animal imaging partner

easi-scan™
smart display

Contents

Introduction

Since 1983 BCF Technology Ltd has been developing, manufacturing and distributing worldwide animal husbandry equipment becoming market leader in the development and production of real time ultrasound pregnancy scanners for most animal species.

Using modern touchscreen technology we have developed an entirely new way to use, view and control your Easi-Scan ultrasound scanner.

The **Easi-Scan** is designed and manufactured in Scotland at:

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As specialists in providing ultrasound imaging equipment for veterinary and animal husbandry applications, we realise the importance of equipment reliability and speed of response should service assistance be required. Our engineers and their appointed agents are available to provide rapid service assistance to ensure optimum performance of BCF systems.

The Smart Display meets all essential and safety requirements of all current relevant European Directives. The CE mark on the rear label is a symbol of this conformance. If you require any further information regarding these directives please contact us directly. This product is classed as electronic equipment. At the end of its useful life it should not be disposed of with general waste,it should be taken to a recycling point for electrical/electronic equipment. The crossed-out wheelie bin symbol is placed on the front label as a reminder and in conformance with the European WEEE Directive.

Note: All BCF Technology products are to be used for animal applications only.

System features

Smart display is designed to enhance the features of your Easi-Scan, providing a large display and a new, touchscreen, interface.

- Integrated VGA touchscreen display, providing simple, intuitive access to the additional features.
- New modes designed specifically for first-pass tendon work, existing modes revised for viewing on Smart Display.
- Foetal ageing measurements for cattle, trunk diameter and crown rump length.
- Calculate cross-sectional area as you trace on screen, calculate damaged area as a percentage of total.
- Annotate frozen images, add notes & caliper measurements.
- Store images and ten second video clips on internal memory (sufficient for 2500 images, or 300 ten second video clips).
- Powered via Easi-Scan, no additional batteries required, runs 3 hours continuously from a single battery (longer with standby mode enabled).
- Meat quality modes, allowing the measurement of fat thickness and meat depth on cattle, pigs and sheep.
- Can also be used body mounted in landscape format.

Operator safety

Smart Display is designed to be powered via an Easi-Scan with its associated battery.

The batteries must be charged using only the BCF Standalone charger, battery charger or integrated carry case powered from the car power outlet (12 V DC) or the BCF mains power supply. The carry case must not be closed during charging. If the unit must be charged using the mains adapter, use only in dry conditions.

1 Operating instructions

1.1 Power

Connect the Easi-Scan to the back of the Smart Display, (See Appendix 1 for docking procedure) making sure it is securely clipped in, then attach the battery and switch on the system by pressing the power button ⏻ on the Smart Display and holding until the BCF logo is displayed on the Smart Display and the Easi-Scan beeps.

To switch the system off, press and hold the power button until the scanner beeps.

Note: The system will power on with the same settings it had when last switched off.

1.2 Normal scanning

The Smart Display loads the user's preferences at start up, setting the correct mode, gain level, brightness, contrast etc. No menu is displayed on screen during normal scanning, to display the menu, touch anywhere on the screen. To freeze the image, briefly press the power button ⏻ .

1.2.1 Main menu

The main menu is as shown below, touching on any of the icons will bring up the associated sub menu.

Mode **Display** **Load image** **Settings**

1.2.2 Mode selection

For Easi-Scan, touching on the 'Mode' Icon in the main menu will display the mode menu as follows:

4 cm Detail Mode, optimised for extremely close imaging and focus with a wide dynamic range for structures close to the surface such as tendons

Foetal Sexing, similar to Ovary/ Early with an image optimised for detection of external genetalia in foetal development, range 8 cm

6 cm Detail Mode, similar to 4 cm Detail in terms of dynamic range and frequency, but with a deeper focus and penetration

Late Mode, lowest frequency, optimised for deeper penetration up to 12 cm

8 cm Ovary/Early pregnancy Mode, is optimised for ovarian study and early pregnancy scanning

Meat Science Mode, provides access to the various meat science modes (see section 1.4)

For Easi-Scan Curve, touching on the 'Mode' Icon in the main menu will display the mode menu as follows:

8cm Mode, optimised for close study of early pregnancy with a high frequency and close focus for improved detail

16cm Mode, optimised for late pregnancy up to 17 weeks

12cm Mode, optimised for later pregnancy up to 12 weeks

24cm Mode, optimised for very late pregnancies or abdominal scanning

For Easi-Scan Micro-convex, touching on the 'Mode' Icon in the main menu will display the mode menu as follows:

OPU Mode, designed specifically for Ovum Pickup in cattle, high frequency and close focus for maximum detail with on-screen needle guide

Mid Mode, 8cm

Near Mode, 6cm

Far Mode, 12cm

1.2.3 Display menu

Touching on the 'Display' Icon in the main menu will show the display menu as follows:

Gain, touching this icon brings up a slider control to adjust the scanner gain.

Contrast, touching this icon brings up a slider control to adjust the screen contrast.

Brightness, touching this icon brings up a slider control to adjust the screen brightness.

1.2.4 Load image

Touching on the 'Load File' image in the main menu will bring up the file browser (see section 1.3.6).

1.2.5 Settings

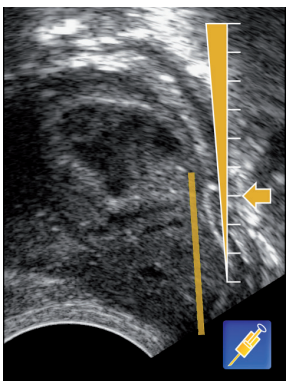
Touching on the 'Settings' icon in the main menu will bring up the settings menu as follows:

Opens the User settings menu where you can change the grid, change the probe orientation, battery settings, menu timer, standby timer and cine length (see section 1.2.5.1).

Opens the System settings sub menu where you can re-calibrate the touchscreen, reset the scanner to factory default and alter other system settings (see section 1.2.5.2).

If an Easi-Scan Micro-convex is connected then the following option is available:

Opens the Needle guide settings sub menu where you can adjust the position and visibility of the needle guide.



Using the slider you can adjust transparency of the Needle guide. The Needle icon switches the guide on and off. To move the Needle guide touch the screen at either end of the Needle guide and drag to move.

1.2.5.1 User settings

Opens the Probe Orientation sub menu where you can select the on-screen probe orientation, tip of the probe to the left or right of the screen.

Opens the Battery sub menu where you can choose if you want the battery level displayed. See section 1.5 for information on the battery indicator.

Opens the Menu Timer sub menu where you can select how long the menu is displayed before automatically blanking, choose from long or short.

Opens the Standby sub menu where you can choose the idle time before the Smart Display goes into standby mode, choose 'Off', 2, 5 or 10 seconds.

Opens the Cine Length sub menu where you can choose how long the saved cine loops are, short (approx 5 seconds) or long (approx 10 seconds).

Grid and Scale, touching this icon brings up the grid and scale sub menu.

Note: Cine loop saving takes some time, for a short loop, the user interface will halt for approximately 5 seconds before returning to user control, file saving continues in the background, taking approximately 1 minute to complete.

For a long loop, the user interface halts for approximately 1 minute before returning to user control with background file saving requiring a further 2 minutes.

While background saving is ongoing, a disk icon is displayed on screen, during this time, no further saving is possible. Do not power off or remove the battery at this time.

1.2.5.2 Information settings sub menu

Screen Calibration, selecting this allows you to re-calibrate the touchscreen.

Factory Reset, selecting this will delete all your preferences and return the scanner to the factory standard settings.

User Information, selecting this allows you to enter your practice name and contact number. The Practice name will be displayed on all frozen images.

File Information, selecting this allows you to enter information into 3 fields [See section 1.3.3.1]

Time and date, selecting this allows you to adjust the system date and time.

If the Smart Display is the harness type then the following icon is visible:

Rotate Display: To rotate the display, select this icon, this will force a restart and screen calibration.

1.2.5.3 Grid & scale sub menu

Grid off, switches off all grid and scale markers.

Displays scale markings at ½ cm intervals on screen.

1 cm, displays a 1 cm grid on screen.

Displays a 1 cm grid with ½ cm scale markers.

½ cm, displays a ½ cm grid on screen.

1.3 Freeze mode operation

Once the image is frozen, touching the screen will bring up the Freeze Menu, pressing the power button again will return to normal scanning mode.

1.3.1 Freeze menu

Cine menu **Save menu** **Compare** **Measurements**

1.3.2 Cine menu

Touching the 'Cine Menu' icon brings up the Cine menu:

Play – Play the stored cine loop

Forward – Advance forward one frame in the cine loop

Back – Go back one frame in the cine loop.

When the cine loop is playing, touching anywhere on the screen or on any of the icons will pause playback.

1.3.3 Save menu

Touching the 'Save Menu' icon, when not in Meat Quality mode, brings up the Save Menu, which consists of the File Information entries [see section 1.3.3.1] and the following icons:

Save current frame as an image, complete with any annotations, caliper values, ageing values etc

Save current cine loop as a video file, length determined by the Cine Length setting [see section 1.2.5.1].

Cancel, exit without saving.

Touching the "Save Menu" icon when in Meat Quality mode brings up the Body Condition save menu [see Appendix 3 for information].

1.3.3.1 File information settings

The File Information Settings allows you to enter the default names that will be used for filing your stored images and videos, three entry fields are available:

Main Directory: Normally the Farm name or Customer name

Sub Directory: Normally animal name or ID

Filename, will be appended to the name of the saved file.

E.g. Main Directory = Racing Stables
Sub Directory = Dobbin
Filename = Left Leg

File will be named IMG XXXX "Date" Left Leg.bmp. Located in "Racing Stables/Dobbin/".

The XXXX part is automatically increased every time you save an image or video.

1.3.4 Compare menu

Touching the 'Compare' button on the Freeze Menu brings up the compare menu.

Open file requester to load image for comparison (see section 1.3.6)

Copy current frame to memory for comparison.

Once an image is loaded for comparison, the comparison icon is displayed, touching this icon switches between the current, frozen, frame and the comparison image.

If the currently displayed image is the frozen frame, the icon looks like this, with the right side semi transparent.

If the currently displayed image is the comparison image, the icon looks like this, with the left side semi-transparent.

1.3.5 Measurements menu

The measurements menu will depend upon the scanner type being used, for all scanners, the following options are available:

Annotate: allows you to write on screen, draw around areas of interest etc.

Calipers: gives you 4 pairs of calipers with which to measure on screen. Press on the caliper to select and then drag to move, the distance between each pair is automatically updated.

Selecting Calipers while in meat quality mode will allow you to select one of the following measurement options:

Normal measurement: Measures the distance between the 2 cursors

Vertical measurements: Measures the vertical distance between the 2 cursors.

Horizontal measurement: Measures the horizontal distance between the 2 cursors

When in one of the Meat Quality modes (only available when using an Easi-Scan), the following option is available:

Line adjust: Selecting this allows you to adjust the position of the fat and meat lines on screen, red and blue arrows will appear, allowing you to adjust the fat and meat lines respectively.

For the Easi-Scan Micro-convex, the following option is available:

Cross-sectional area: Two measurements, selected by touching the coloured blocks in the top left. Draw around the complete tendon or ligament with one colour, select the other colour and draw around the damaged area. The cross sectional area of both measurements is displayed and the damaged area is calculated as a percentage of total area.

For the Easi-Scan and Easi-Scan Curve, the following options are available:

Cattle measurements: opens up the cattle measurements sub menu (see section 1.3.5.1).

Equine measurements: opens the equine measurements sub menu (see section 1.3.5.2).

See Appendix 4 for screenshots of the different measurement modes in use.

In all measurement modes, the following icons are visible:

Reset: In annotate mode, this will clear all annotations, in Caliper, Trunk Diameter, Crown Rump Length, C.E.D, F.E.L & E.C.D modes this resets all measurements, in Cross-sectional mode, it resets the currently selected measurement.

Exit, this returns to the Freeze Menu.

1.3.5.1 Cattle measurements

Cattle Eye Diameter: 1 pair of calipers used to measure the foetal eye diameter, the distance between the calipers is displayed in mm, the approximate age of the foetus in days and weeks is also displayed.

Trunk Diameter: 1 pair of calipers used to measure Trunk Diameter in Cattle the distance between the calipers is displayed in mm, the approximate age of the foetus in days and weeks is also displayed.

Crown Rump Length: 1 pair of calipers used to measure Crown Rump Length in Cattle the distance between the calipers is displayed in mm, the approximate age of the foetus in days and weeks is also displayed.

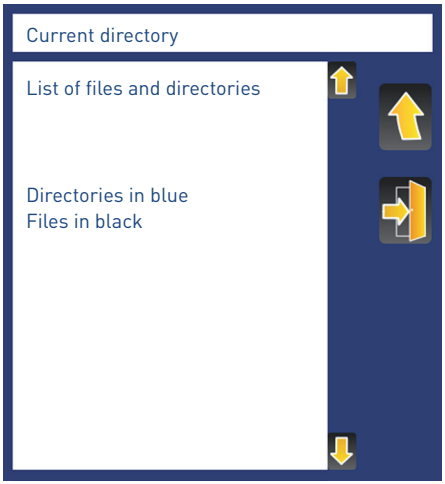
1.3.5.2 Equine measurements

Foetal Eye Length: 1 pair of calipers used to measure the foetal eye length, the distance between the calipers is displayed in mm, the approximate age of the foetus in days and weeks is also displayed. As is the estimated parturition date.

Cross-sectional area: Two measurements, selected by touching the coloured blocks in the top left. Draw around the complete tendon or ligament with one colour, select the other colour and draw around the damaged area. The cross sectional area of both measurements is displayed and the damaged area is calculated as a percentage of total area.

Equine Conceptus Diameter: 1 pair of calipers used to measure the Equine Conceptus Diameter, the distance between the calipers is displayed in mm, the approximate age of the foetus in days and weeks is also displayed. As is the estimated parturition date.

1.3.6 File browser



The file browser allows you to load a previously saved image for comparison or review purposes. Selecting a directory will open that directory, selecting a saved image will load it and switch the Smart Display into review mode (see section 1.6).

Once an image is loaded, it remains in memory, for comparison, until replaced, if there is an image in memory then the comparison icon will appear in the upper right when in freeze mode (see section 1.3.4).

The large up arrow icon moves back up to the parent directory, the exit icon exits the file browser and returns to the previous mode.

If there is more than one page of files or folders small down and up arrow icons appear to allow scrolling to the next/previous page.

1.4 Meat science operation

Note: Meat science modes are only available when using an Easi-Scan, not Easi-Scan Curve or Easi-Scan Micro-convex

In Meat science mode, the live ultrasound image is overlaid with information relating to the specific mode you've selected. See Appendix 2 for details on the Meat science modes

1.4.1 Meat science menu

Mode **Display** **Meat science settings** **Settings**

1.4.2 Meat science mode menu

Touching the 'Mode' button from the Meat science menu brings up the Modes menu.

Cattle mode: Measures fat thickness and meat depth with settings optimised for cattle.

Pig mode: Measures fat thickness and meat depth with settings optimised for pigs.

Sheep mode: Measures fat thickness and meat depth with settings optimised for sheep.

Body condition scoring: Provides the ability to perform multiple fat scans on a single animal and store the information for each scan in a spreadsheet [See Appendix 3 for more information).

Exit: Return to normal scanning mode.

Pig mode has 2 options for the meat depth:

This option scans top down using the whole width of the screen and draws the line at the top of the ribs.

This option scans from the bottom up using a narrow section of the display (indicated by the vertical, purple lines) and draws a line at the interstitial tissue between the ribs.

1.4.3 Meat science display menu

Touching on the 'Display' Icon in the Meat Science menu will show the display menu as follows:

Fat Threshold setting: Used to adjust the sensitivity of the fat detection, a high value needs a very bright line to detect it, a low value will detect a very faint line.

Meat Threshold setting: Used to adjust the sensitivity of the fat detection, a high value needs a very bright line to detect it, a low value will detect a very faint line.

Gain, touching this icon brings up a slider control to adjust the scanner gain.

Brightness, touching this icon brings up a slider control to adjust the screen brightness.

Contrast, touching this icon brings up a slider control to adjust the screen contrast.

1.4.4 Meat science settings menu

Touching on the 'Meat Science Settings' Icon in the Meat Science menu will show the Meat Science settings menu as follows:

Auto ID: Automatically increments the ID number, giving each scan a unique Identifier.

Select whether to save an image for each scan. Yes will save an image and data, no will store only the data to file.

Delete the last group of animal data in Body Conditioning mode, delete the last scan in other Meat Quality Modes.

Select the number of scans you wish to perform on each animal in Body Conditioning Mode

Start New session in Body Condition Mode, closes current data file and creates new folder and file with new session ID.

1.4.5 Settings menu

As per Section 1.2.5.

1.5 Battery indicator and auto power down

The Smart Display is designed to automatically switch off once the battery is exhausted. In order to assist monitoring, the battery indicator may be enabled [see section 1.2.5].

The charge level is indicated by the bar within the battery symbol, the bigger the bar, the more charge is left, in addition, the bar will change colour as the battery discharges: Green for a charge level above 66%, Orange for a charge level between 33% and 66% and Red for less than 33%. When the charge level is down to the last 4%, the bar will blink on and off as a warning.

1.6 Image review mode

Image review mode is entered when you select an image from the File Browser while in Normal Scanning Mode.

The Smart Display loads the image and automatically displays it, with the filename displayed in the top left corner, touching on the screen will bring up the following menu:

Next Image: If there are more images in this directory, load and display the next one

Previous Image: if there are previous images in this directory, load and display the previous one.

Re-Open the file requester to select a new file or change directory.

Exit: Return to Normal Scanning Mode.

2 Care & maintenance

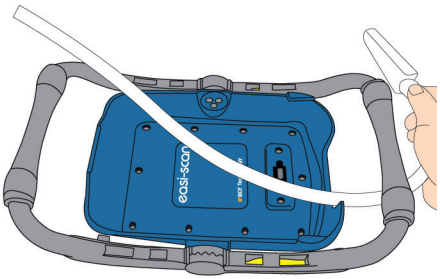
The Smart Display is designed for reliability in the veterinary and animal husbandry marketplace. Our engineers and their appointed agents are available to provide rapid service assistance to ensure optimum performance of BCF systems. However there is no substitute for careful usage. We state that the Smart Display is splashproof, indeed it is sealed to IP65, but you should note the following important points:

1. The unit is not sealed against jets of water. Water will penetrate your scanner if it is hosed down or rinsed under a fast flowing tap
2. The unit is NOT corrosion proof and thus it should not be left wet

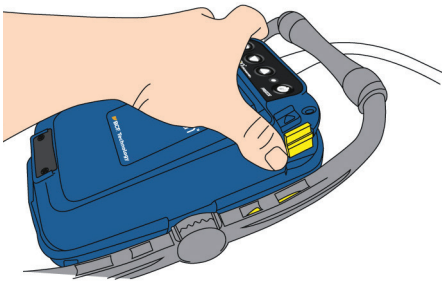
Cleaning

- Antibacterial wet wipes are particularly effective for Smart Display, and reduce the need for drying. This prevents problems related to corrosion following washdown
- Sponging down or even brief, shallow submersion is less aggressive than rinsing or hosing down
- Thoroughly dry the Smart Display before storage or charging.
- Your equipment should be returned periodically to a BCF qualified service engineer. The service agent will use special test equipment to thoroughly check the instrument and advise of any work that appears to be necessary. Any other service problems should be referred to our qualified service engineers

Appendix 1: Docking with the Easi-Scan

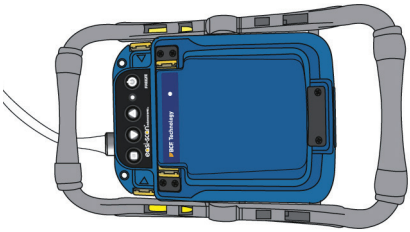


Feed the Easi-Scan probe cable through the lower handle of the Smart Display.

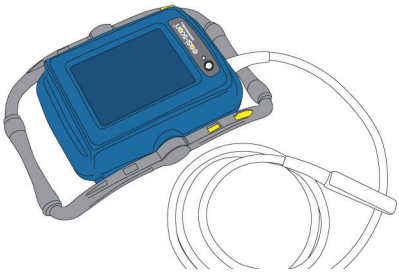


Locate the rear of the Easi-Scan under the lip at the rear of the Smart Display and press the scanner down.

Press the Easi-Scan firmly into place. Make sure that the clips are fully engaged.



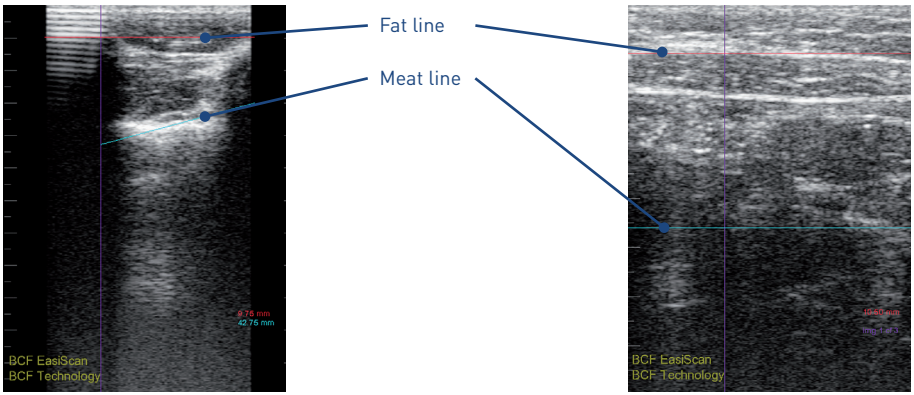
Fit the battery to the Easi-Scan.



Your Scanner ready to use.

Appendix 2: Meat science modes

In Meat Science mode, the Smart Display overlays the Ultrasound data with lines indicating where it has detected the fat level and meat depth, as shown in the images below:



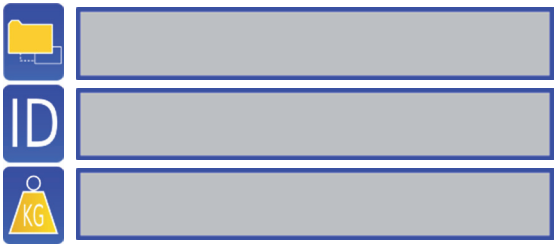
Appendix 3: Body condition scoring

This mode is used to make multiple fat thickness scans on a single animal, storing them in a spreadsheet.

Select the number of scans per animal by touching on "Meat Settings" then "No. Scans" and select how many measurements you want to make.

If you want to save images of each measurement, touch on "Auto Save" and make sure it is enabled.

Scan animal, freeze when correct, select "Save" from Menu, the following menu appears:



Session ID
(Normally customer name)

Animal ID

Animal weight

Extra field 1 can be used to store extra data about the animal, such as age, where the scan was taken etc.

Extra field 2 can be used to store extra data about the animal, such as age, where the scan was taken etc.

Extra field 3 can be used to store extra data about the animal, such as age, where the scan was taken etc.

Gender select

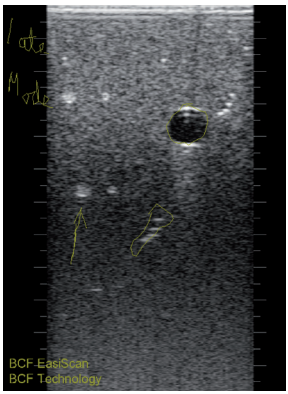
Save

Cancel

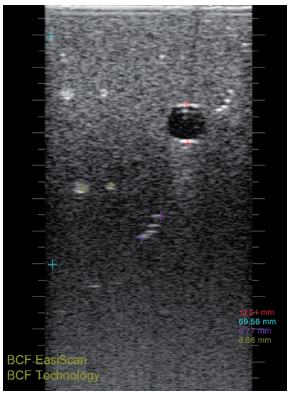
On touching 'Save', the system will save the image (if 'Auto Save' is on) and will create a spreadsheet (if it's a new session) and store the Gender, weight and fat thickness measurements against the animal ID.

Repeat this for each measurement as selected in 'No. Scans', for each additional image, only the 'Save' & 'Cancel' icons will be available until you've saved the required number of images.

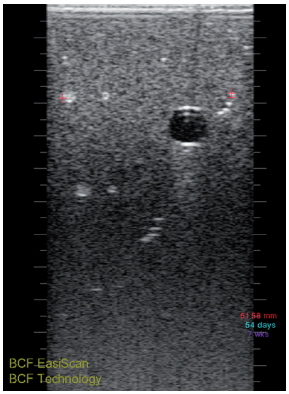
Appendix 4: Measurement modes



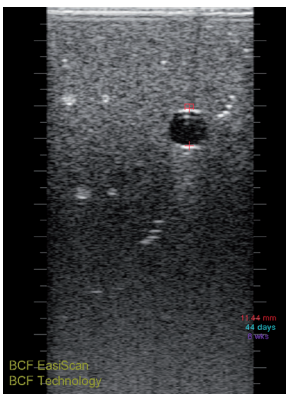
Annotate



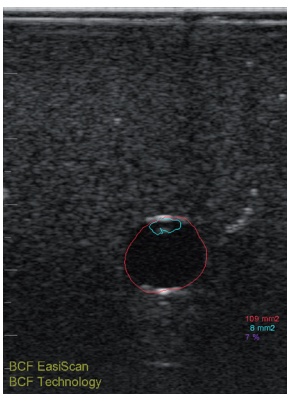
Calipers



Crown rump length



Trunk diameter



Tendon

Appendix 5: Image and video storage

To retrieve the stored images and videos, switch on the Smart Display and connect the supplied cable to the black connector on the Easi-Scan and plug the other end into the USB slot on your computer.

The Smart Display will appear as a flash drive with all the directories and files available. Images are saved as .bmp files, videos as .avi. It is recommended that VLC player is used to playback the stored videos.

Note: *Always make sure that the Easi-scan is switched off before docking with the Smart Display*

Always switch the system on with the power button on the Smart Display.

Press and hold the power button until the system beeps to turn on.

Press and hold the power button until the screen goes blank to turn off.

If the system powers up with a black background instead of an ultrasound image, disconnect the battery from the Easi-Scan, check that the Easi-Scan is properly docked with the Smart Display, re-fit battery and power on normally.

If the system displays "Mode Change Failed" at any point, try selecting a different mode then returning to the original mode, if the system fails to change modes, disconnect the battery and power on again.

Technical specification

Touch Screen controller accessory for Easi-Scan

Size	32 x 20 x 10 cm / 12.5 x 7.8 x 4 in
Weight	900 g / 2 lb
Mechanical	Splashproof, rugged plastic casing. Sealed to IP65

User operation
1 button key pad with LED, touchscreen interface 480 x 640 pixel portrait LCD Display

User functions

- Selection of operating modes optimised to application, automatically setting suitable range, frequency & post processing e.g. dynamic range, edge enhancement
- Detail 4 cm
- Detail 6 cm
- Early pregnancy/ovary
- Later pregnancy
- Overall gain adjustable
- Image freeze
- Foetal ageing measurement calipers
- Meat science modes
- Image and video store and review

User output
Storage of up to 2500 images or 300 ten second video clips. Images 480 x 640 8 bpp bitmaps, Videos 240 x 320 RLE Enconded Avis.

Temperature range

- -10 ºC to 40 ºC / 14 ºF to 104 ºF

easi-scan™
smart display

Service centres

If your Easi-Scan requires servicing please contact official authorised service centres below or distributor in your country. Distributors contact details can be found at www.bcftechnology.com

In the UK:
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F 507-529-8205
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Melbourne, Victoria
Australia

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service@bcfultrasound.com
www.bcfultrasound.com

easi-scan™
smart display

For further information on care and maintenance of the Easi-Scan Smart Display please visit the "Customer support" section of the BCF website **www.bcftechnology.com**

BCF™ Technology