



Fujifilm Medical Systems, a division of Fujifilm Australia Pty Ltd

**Console Advance User Guide
A Guide to Fujifilm Imaging for VETS**



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START-UP AND SHUTDOWN

System Start-Up

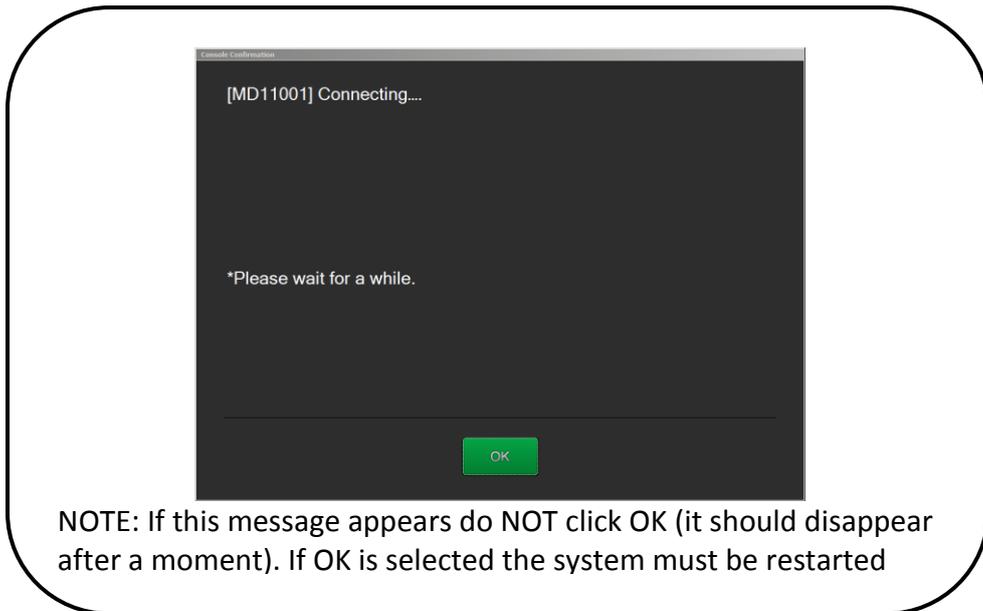
- Turn on the Acquisition Workstation by pressing the power button on the front of the Console Advance computer tower.

For CR systems

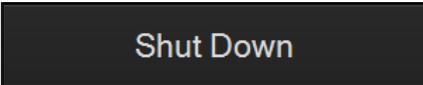
- Turn on the Reader by pressing the power button at front of reader

The DR system needs to calibrate before being used. This takes about 7 minutes.

*NOTE- The DR system will automatically initiate a calibration every 10 minutes if not in use.
This calibration lasts only a few seconds.*



System Shutdown

- Select 
- Select 
- Select  The Console will turn of and the reader(CR sites only)

IMAGING SYSTEMS

The Console Advanced Acquisition Workstation will be linked to either

Fujifilm FDR D-EVO 11 Digital Radiography Flat Panel Detector

or



Fujifilm FCR Computed Radiography Reader with associated Imaging Plates (IP's) and Cassettes .



For information on the correct use of the FCR Reader please refer to the relevant Operator manual.

CHANGING THE BATTERY OF THE D-EVO11 DETECTOR

- Battery removal should be single handed



- Battery insertion should be with 2 hands

D-EVO II is ready for use after less than 30 seconds after replacing battery .

It is recommended that D-EVO II be placed in Docking stand when not in use.

Battery charging will occur when the panel is in the Docking stand.

Battery charging time in Docking stand is 4 hours, in battery charger 3 hours.

The capacity of the battery is displayed on:

The battery indicator on the back of the D-EVO II panel

or

The FDR ready status on the console display



BASIC STEPS FOR IMAGING

REGISTER ANIMAL

- Select  Top left tab
- Enter Animal and Vet/Vet Nurse Information
- Press  bottom right

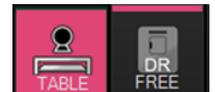
SELECT EXPOSURE MENUS

- Select Views required in the order you plan to take them
- Press  bottom right
- Select  to exit the Registration Screen without registering a Animal

PERFORM EXPOSURE

For FDR

- Prior to X-Ray Exposure Ensure the correct detector is selected
- Check that the 'Exposure Ready' button  is highlighted



For FCR

- Following X-Ray Exposure insert Cassette into the FCR Reader

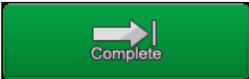
CHECK IMAGE QA

- Check Animal Information (along top of screen)
- Check the S Number & that the Correct Exposure Menu is applied

ADD SIDE MARKERS

- Select 

COMPLETE STUDY

- Press Complete Button  to Deliver images to PACS

POST PROCESSING AND PROBLEM SOLVING

ADDING AND REMOVING EXPOSURE MENUS (VIEWS)

Adding an Exposure Menu

Press 
Select views to be performed.
Press 

Copying an Exposure Menu

To repeat the same image without rejecting the original image
Highlight the exposure menu to be copied.

Select 

Changing an Exposure Menu

The image has been processed using the wrong menu
Highlight the exposure to be changed.

Press 
Select the exposure to change to.
Press 

Deleting an Exposure Menu

Highlight the exposure to be deleted.

Select 

NOTE: Only unused exposures menus may be deleted. Unwanted exposures Menus with an image assigned to them must be rejected (the image will remain on the console but it will not be delivered).

REJECTING AND UN-REJECTING IMAGES

To Reject a Image

- HIGHLIGHT (in green) the projection for rejection



- Click on the MIS-EXPOSURE icon on the right.



This will mark the highlighted projection as rejected and create a new projection for the repeat

(NOTE: the image will NOT be deleted, however it will NOT go to softcopy workstation)

- Continue as normal.

To Reuse a Previously Rejected Image

- HIGHLIGHT the projection which was rejected

- Click on the MIS-EXPOSURE icon on the right.



This will unmark the highlighted projection.

- If the study has already been completed to it will be necessary to REDELIVER  the images in order for the un-rejected images to be viewed on the softcopy workstation

TO ADD/MOVE A MARKER

- Under the image on the active screen select 

- Click on the desired marker to active it

- Left mouse click anywhere in the image.

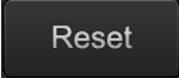
- Drag the marker to the desired location.

WINDOWING AN IMAGE

Images can be windowed in two ways: by altering the GA & GS, or by altering the S & L values. Because the S & L values of an image when it is first acquired are a basic indication of the dose, it is preferable to leave them unchanged.

For more information on S/L numbers refer to page 19

Altering the GA (Contrast) and GS (Density)

- Select 
- Place the cursor over the image
- click-&-hold the left mouse button. Drag the cursor side-to-side to adjust density/GS, or up-and-down to adjust contrast/GA.
- For finer adjustments, select  and use   to alter GA and GS.
- To Undo Click 

Altering the S values and L values

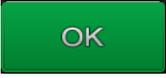
- Select 
- To alter the density increase or decrease the S-Number using  and 
- To alter the contrast increase or decrease the L-Number using  and 
- To Undo Click 
- Select  to exit the QA screen and return to the acquisition screen in an active Animal or  to exit the QA on a finished Animal.

IMAGE TRIMMING

- Trimming is automatically applied when the image is acquired

- Select  to change
- Select the desired size:

➤ Generally select the smallest frame to include the required information.



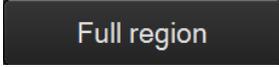
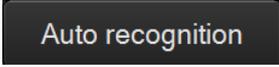
- To rotate the trimming frame select 
- To remove trimming select  Full region
- To return to automatic trimming setting select  Auto recognition
- Select  to exit the QA screen and return to the acquisition screen on an active Animal or  to exit the QA on a finished Animal

IMAGE ROTATION AND REVERSAL

- Select 
- Rotate or Flip image as required
- For free rotation select  (this function can also be selected directly from the trimming section)
 - Select  and move the cursor over the image
 - Left click and hold the mouse button and move the image as required
 - Point to Point Rotation is also available
- Select  to exit the QA screen and return to the acquisition screen in an active Animal or  to exit the QA on a finished Animal.

MAGNIFY AND EDGE ENHANCE THE IMAGE USING THE QUICK ACCESS

- "Double click" on the area of interest in the image in the Acquisition screen



- The magnified and edge enhanced image will be displayed.
- It is possible to Pan around the all of the image and change the magnification factors
- Edge Reinforcement can be turned on/off

CHANGING ANIMAL'S DETAILS DURING EXAMINATION

- Select  (top left in the study menu screen).
- Alter the necessary details.
- Click 

TO CORRECT ANIMAL'S DETAILS AFTER COMPLETING STUDY

- Select either the Finished QA, Today or All tab.
- If necessary search by typing the first part of the Animal's name into the top box in the Name column
- Double Click on the Animal's name to open the study

	Accession No.	Patient's Name	Patient ID	Sex	Birth Date	Study Date	Study Time	Number of Images
	5551-2	DUMPTY Humpty	5551	M	06.08.1966	26.05.2011	21:24:21	2
	2488-2	DEE Tweedle	2488	F	15.10.1972	26.05.2011	21:21:43	2
	4624-2	CASSIDY Butch	4624	M	02.05.1966	26.05.2011	21:16:04	2

- Select 
- Alter the necessary Animal details
- Click 

- Redeliver study to PACS by selecting 

MEASUREMENT TOOL

- Click 
- Click on the  Measure button
- For distance measurement
 - Click and drag to draw a line with the mouse
- For angle measurement
 - click on the measure button at the bottom right
 - choose 'Calculate Angle'
 - draw two intersecting lines and to calculate the angle.



TO ADD AN IMAGE TO A COMPLETED STUDY

- Click on the Animal's name so that it is highlighted
- Select  (towards the top right of the screen) to Restart the study
- Press  to select views to be performed
- Perform exposure and complete as per usual

IMAGE QUALITY TIPS FOR FDR

A SYSTEMATIC APPROACH

Using a systematic approach to review your images and complete image Quality Assurance before distribution ensures no vital requirements are overlooked.

For each and every Animal it is essential to double check the Animal demographics to ensure correct labelling on both hard and softcopy images.

Image Quality Assurance

A simple 7 Step checklist for each image ensures all aspects of image quality are covered:

- ✓ Has the correct Exposure Menu been used?
- ✓ Is the initial Sensitivity Value, Exposure Index (EI) and Deviation Index (DI) acceptable?
- ✓ Is my image orientated correctly?
- ✓ Is there a visible and correct Marker?
- ✓ Is there any white light distracting from the anatomy? (Shutters)
- ✓ Is my image the smallest possible and centred? (Trimming Function)
- ✓ Can I see everything necessary? (Windowing)

The Exposure Menu

The Exposure menu sets the image processing parameters for the imaged anatomy. When an incorrect menu is used the Sensitivity Value may also be inaccurate. This is because the initial S-number is determined by the exposure menu itself. Additional image processing and analysis (e.g. edge enhancement) is also applied based upon the exposure menu. It is essential that correct exposure menus are applied to achieve maximum image quality.

PEAS (Position, Exposure, Anatomical menu, Sensitivity)

PEAS is an acronym designed to remind you of basic things to check as you x-ray Animals. Thinking about positioning, exposure used, anatomical menu and sensitivity value used will give you a basis for good DR imaging and help you understand why an image may be suboptimal.

Position- Was the image positioning good? Was it in the centre of the detector?

Exposure- Was the correct exposure used? What is the EI/DI for the image?

Remember exposure no longer controls image density.

Anatomical Menu- Was the correct Exposure Menu used? Remember it is the Exposure Menu that sets the optimisation and image appearance.

Sensitivity value- Was the initial "S" number within the acceptable range for this examination?

TROUBLESHOOTING IMAGE QUALITY

<u>Problem</u>	<u>Suggestion</u>
Image contrast is too low (image is flat & grey)	Check PEAS. High kVp and lots of scatter give low contrast. Using the wrong anatomical menu and inclusion of extra anatomy in the image (e.g. abdomen in a chest image) gives low contrast. If all images using a specific menu have low contrast change image processing Decrease L-Number to increase contrast
Image contrast is too high (image is very black & white, detail in certain density areas is saturated)	Check PEAS. Bad positioning and wrong anatomical menu can give high contrast If all images using a specific menu have high contrast change image processing Increase L-Number to decrease contrast
Image is noisy (grainy or mottled)	Check PEAS. This is normally exposure or scatter related but check the image processing Decrease L-number (high contrast can make the image look grainy)
Image is too dark	Check PEAS. The wrong anatomical menu or bad positioning can cause dark images. If all images using a specific menu are dark change the image processing Decrease S-number (density)
Image is too light	Check PEAS. The wrong anatomical menu or bad positioning can cause light images. If all images using a specific menu are light change the image processing Increase S-number (density)
Workstation monitor images are dark/light	Get the monitor brightness checked

TECHNICAL TIPS

Select the proper menu for the image being done, and remember to add additional menus prior to making further exposures.

X-ray beam only has to be centred if using a grid. If NO grid is used region of interest can be placed anywhere on a Detector.

If using FCR Imaging plates always place the anatomy in the centre of the cassette if not using a grid

Collimate to the proper field size: avoid having extra anatomy in the image.

The green stripe refers to the viewing protocol of the image and is generally oriented to the top (head)

When part thickness is greater than 10cm a grid is recommended.

The Fuji DR and CR are able to compensate in density for over and underexposure:

Underexposure is indicated by a noisy or mottled appearance on the image and a low EI. It is also signified by a high initial "S" number. Please refer to S Number Guide

Overexposure is indicated by a high EI. It is also signified by a very low "S" number. Please refer to S Number Guide

S-NUMBERS AND EXPOSURE

INFORMATION ON S-NUMBERS

The “S” number is an indication of the amount of light output by the detector at the time of exposure. The range of “S” numbers is 0-20,045. The value is inversely proportional to the amount of radiation that strikes the detector.

It is important to remember that exposure is not the only factor that can affect the “S” number values. The “S” number values can also be affected during Animal examination.

Other factors contributing to the initial “S” number are:

- Scatter (more scatter – higher “S” number)
- Distance – SID and OFD (dose and scatter)
- Collimation (good collimation reduces scatter)
- Examination selected at the Console Advance (due to histogram analysis)

When an image is windowed and the Contrast and Density are altered the S-number is also changed. This means that only the initial S-Number can be used as an indication of the dose.

HINT: A good way to remember an estimate of an acceptable “S” number for each region of anatomy is to relate it back to the speed of the film/screen combination used previously.

A Regular cassette has an approximate speed of 400 so anything that previously used a regular cassette will fall within the range of 400 +/- 200

An Extremity cassette has an approximate speed of 150 so anything that previously used an extremity cassette will fall within the range of 150 +/- 100

NOTE. It is the responsibility of each facility to establish exposure ranges that employ the lowest dose and apply ALARA, based on the image quality desired per exam.

RECOMMENDED S-NUMBER RANGES

	Fuji S-Value Range	Fuji L-Value Range
LIMBS & TAILS	65 - 325	1.4 - 2.5
HEAD	195 - 650	1.6 - 2.5
CHEST & ABDOMEN	260 - 780	1.8 - 2.6
SPINE & PELVIS	260 - 780	1.5 - 2.5
EQUINE STIFLE	260 - 780	1.5 - 2.5
CONTRAST	260 - 910	1.5 - 2.5

S Number is **INVERSELY PROPORTIONAL** to radiation dose received by image plate

i.e. to **DOUBLE** the S number **HALVE** the radiation exposure
(minus 10kVp OR halve mAs)

to **HALVE** the S number **DOUBLE** the radiation exposure
(plus 10kVp OR double mAs)