MEMORAD PF06

Digital Memory for XRay equipments

PF06 PF06-S

INSTALLATION AND USER MANUAL

IASA ELECTRONICA

Model identification table:

Model	Pendrive	Rotation	DICOM	DVD Write
PF06-PD-DVD-DCM-ROT	YES	YES	YES	YES
PF06-PD-DVD	YES	NO	NO	YES
PF06-PD-DCM-ROT	YES	YES	YES	NO
PF06-PD-DCM	YES	NO	YES	NO
PF06-PD-DVD-ROT	YES	YES	NO	YES
PF06-PD-ROT	YES	YES	NO	NO
PF06-PD	YES	NO	NO	NO
PF06-ROT	NO	YES	NO	NO
PF06-S	NO	NO	NO	NO
PF06-S-PD	YES	NO	NO	NO
PF06-S-ROT	NO	YES	NO	NO
PF06-S-PD-ROT	YES	YES	NO	NO
PF06-S-PD-DCM	YES	NO	YES	NO
PF06-S-PD-DCM-ROT	YES	YES	YES	NO

Model: _____

ÍNDEX

MEMORAD PF06

INSTALLATION AND USER MANUAL

SYSTEM DESCRIPTION

MEMORAD PF06 is an advanced Capture and Digital Image Processing System for X-Ray Equipments with CCTV.

This equipment can work with composite video signals of 625 lines 50 Hz, 525 line 60 HZ, 1249 lines 50 HZ 1049 lines and 60 HZ. The capture matrix is 640 x 574 for 50 Hz and 640 x 480 at 60 Hz which allows cover all information of the camera. This matrix is the same for LR and HR.

It has a recursive filter which allows the average to 32 successive images in real time. The result of this operation is an image with less Gaussian noise, significantly improving the performance of all video system.

The intensity of this filter is selectable between x1 (no filter), x8, x16 y x32.

Through a HDMI output (digital) can directly see the filtered image and the image or the video captured on a single Wide monitor with aspect ratio 16:9.(MONITOR IS OPTIONAL).

You can save the still images or videos acquired at speeds of 25, 12.5 and 6 FPS. on pendrive or internal flash memory. *

The equipment can be provided with a USB pendrive memory can store up to 16000 or more images per study.*

The direct filtered output can also be frozen, achieving the effect of "Last-image hold" (LIH), when the fluoroscopy footswitch is released.

It includes a delay circuit for the X-Ray control exposure that keeps the fluoroscopy 100 ms after releasing the footswitch to allow properly capture the image in digital memory.

MEMORAD-PF06 has a function for Positive/negative Image Invert simulating a standard X-Ray Film.

An specular reflection function allows the mirror inversion of the image in horizontal and vertical directions.

It has a Image Rotating function in real time in both directions in steps of 3°. *

The system can acquire images and videos in continuous or pulsed mode.
Pulsed Module required).*

***:Optional available according to the model purchased.**

By editing of captured images, it is possible to implement the specular reflection, rotation, edge enhancement and contrast enhancement. These changes can be stored to generate a new image.*

It also has OSD that allows you to incorporate text on the screen with information on equipment status and characteristics of the acquired images.

The images and videos can be stored on a USB PenDrive allows even after switch off the equipment. The amount of these depends on the storage capacity of the PenDrive. Each image occupies about 380 KB.*

The images and videos are stored in individual folders for each patient, so that it is easy to retrieve.*

The system also allows you to generate a self-executing DVD that can be delivered to the patient for viewing and processing of the study.*

With the addition of a laser printer is possible to make a copy of the captured images on regular paper(printer is not included)*

Using Ethernet network with DICOM PACS, the device can send DICOM images to the server (DICOM SEND).The DICOM Print service is used to send images to a DICOM Printer, normally to print an X-Ray film. Also, the system can receive patient data via a worklist (WORKLIST DICOM).*

It can also be accessed to patients folders , their pictures and videos through a Windows network.*

MEMORAD PF06 has a wireless keyboard / mouse to control the functions of capture and digital processing.

The system includes significant additional features such as:

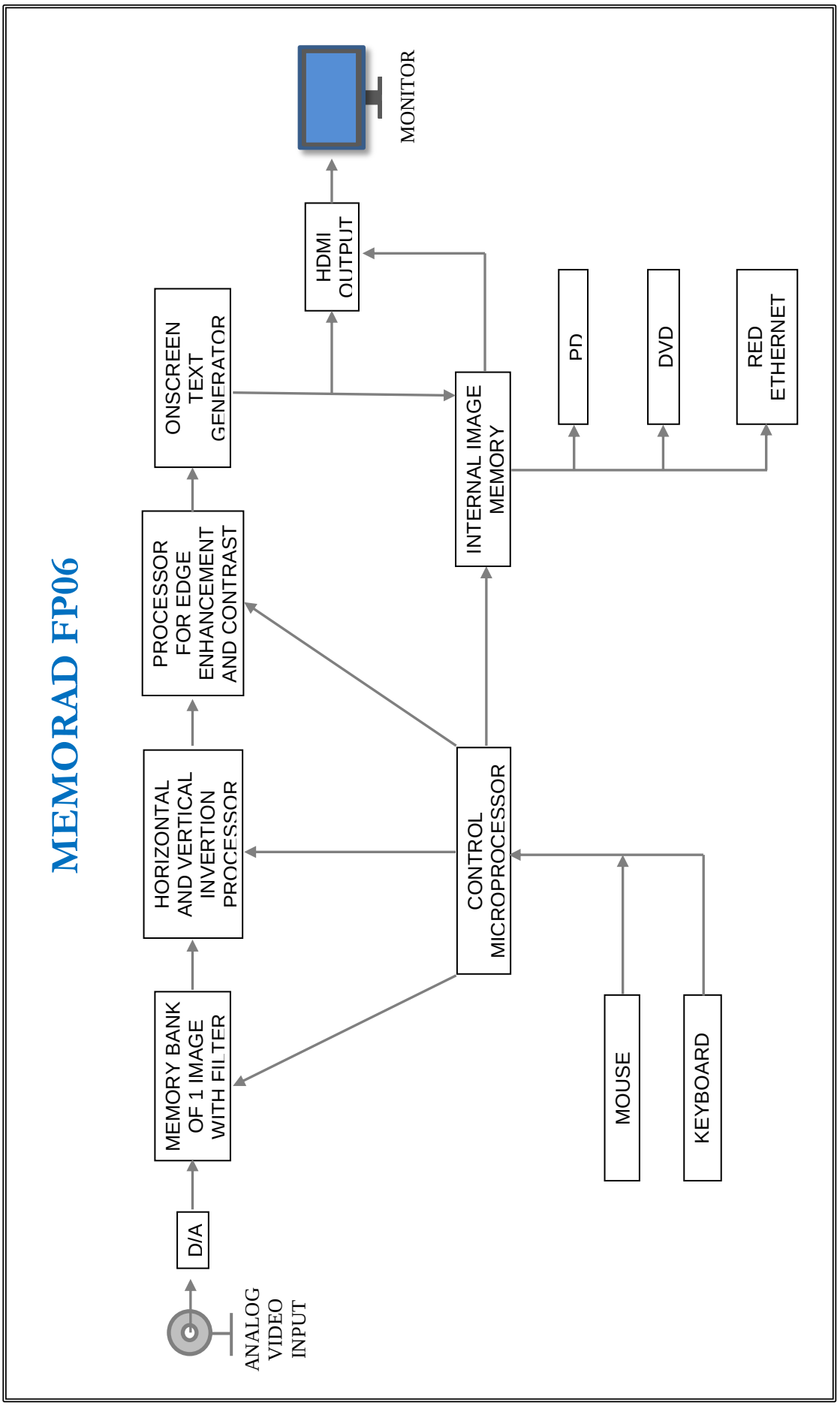
- ✓ Real Time Edge enhancement Filter.
- ✓ Real Time Contrast enhancement Filter.
- ✓ Road Map
- ✓ Loop acquisition and display of each serie with selectable speed between 25 im/seg, 12 im/seg, 6 im/se, 3 im/se y 1 im/seg.
- ✓ Image Snap acquisition from the keyboard.
- ✓ Keyboard selection of images and series.
- ✓ Functions Forward, Pause and Frame by Frame for the series.

The equipment is provided with case, power suply and wireless keyboard and mouse.

The upgrade to new versions of software, the capture parameters configuration and licensing can be performed remotely via the Internet.

***:Optional available according to the model purchased.**

MEMORAD PF06 Block Drawing:


MEMORAD FP06
MONITOR
HDMI OUTPUT
ONSCREEN TEXT GENERATOR
PROCESSOR FOR EDGE ENHANCEMENT AND CONTRAST
HORIZONTAL AND VERTICAL INVERTION PROCESSOR
MEMORY BANK OF 1 IMAGE WITH FILTER
D/A
ANALOG VIDEO INPUT
INTERNAL IMAGE MEMORY
CONTROL MICROPROCESSOR
PD
DVD
RED ETHERNET
MOUSE
KEYBOARD

MEMORAD PF06 SPECIFICATIONS:

Characteristic	Specification
Resolution:	8 bits, 256 levels of gray
Input type:	Analog Composite Video, 1Vpp
Conversion Maximum Rate:	50 MHz
Adquisition Maximum Speed:	30 fps
Input Interface:	CCIR, RS170, HR(composite video signals of 625 lines 50 Hz, 525 line 60 HZ, 1249 lines 50 HZ 1049 lines and 60 HZ) or user configurable mode
Adquisition Matrix:	640x574 pixels x 256 levels of gray (640x480 for 60 HZ) or user configurable up 0.5 MP
Video Output	1 HDMI digital output for 16:9 WIDE monitor. It allows to view on a single monitor the live direct image and the stored images and videos.
Storage Capacity	8GB PenDrive (16000 images), 1 GB Internal Flash Memory (2000 images without PenDrive), 4GB DVD (6000 images or video frames per disk without compression)
Recursive Filter:	x1, x8, x16 y x32
Edge Enhancement Filter:	3x3 convolution matrix in real time.
Positive/negative Image Invert:	Yes
Image Mirror:	Horizontal and Vertical
Image Rotating Function:	In real time in both directions in steps of 3°(OPTIONAL)*
Real time Sustraction Function:	Yes
RoadMap Function :	Yes
Real Time Contrast Enhancement:	Yes
Sustraction Function:	Yes
Capture Modes:	Snapshot or video. Video capture up to 18 seconds each at 25 img / sec
Video Capture Frame Rates:	Selectable between 3,6,12 y 25 im/sec
On Screen Display (OSD):	Yes
Electronic Circle:	User configurable
USB Ports:	3 USB 2.0 ports, 1 for keyboard and mouse, 1 for PenDrive and 1 for the printer
Ethernet Port:	10/100 Mbps RJ-45 connector
Last Image Hold Delay:	100 ms. with relay for X-Ray control
Command inputs:	2 Optocupled inputs for Radioscopy and image/video adquisition.
Video Loop visualization:	Selectable speed display between 25 im/sec, 12 im/sec, 6 im/sec, 3 im/sec y 1 im/sec.

Storing pictures and videos on PenDrive:	It is provided with a 8GB PenDrive (16000 images max.)(OPTIONAL)
Image Storage Capacity in the PenDrive:	2 images per MB, 16000 images/video frames with 8 GB PenDrive (OPTIONAL) *
DVD R/W Drive:	To generate a self-executing DVD for viewing and processing of the study (OPTIONAL) *
A single equipment can use several PenDrives and the same pendrive can be used by multiple equipments:	Yes
Patient data keyboard input:	Keyboard and mouse USB 2.0 are included.
Patient data DICOM WORKLIST input:	Yes (OPTIONAL with DICOM package) *
DICOM SEND:	Yes (OPTIONAL with DICOM package) *
DICOM PRINT:	Yes (OPTIONAL with DICOM package) *
Pulsed mode adquisition:	Yes (OPTIONAL). *
Real Time Clock (RTC):	Yes, with internal lithium battery.
Update, configuration and licensing:	Remotely by Internet.
Power:	5Vcc 900 mA. Switching Power Supply included.
Size:	250mm x 190mm x 60mm
Weight:	600 Gr.

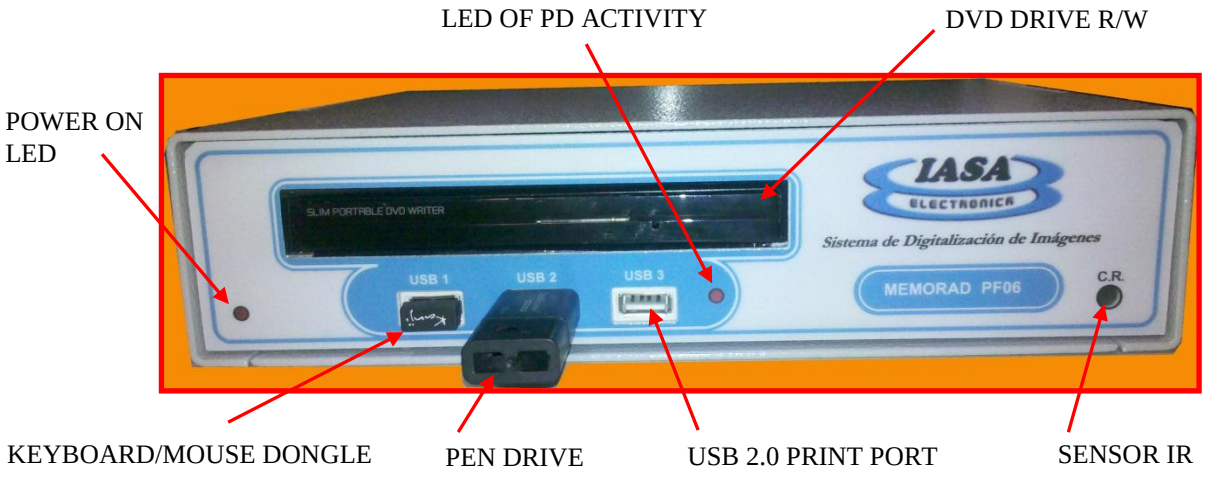
***:Optional available according to the model purchased.**

OPERATION

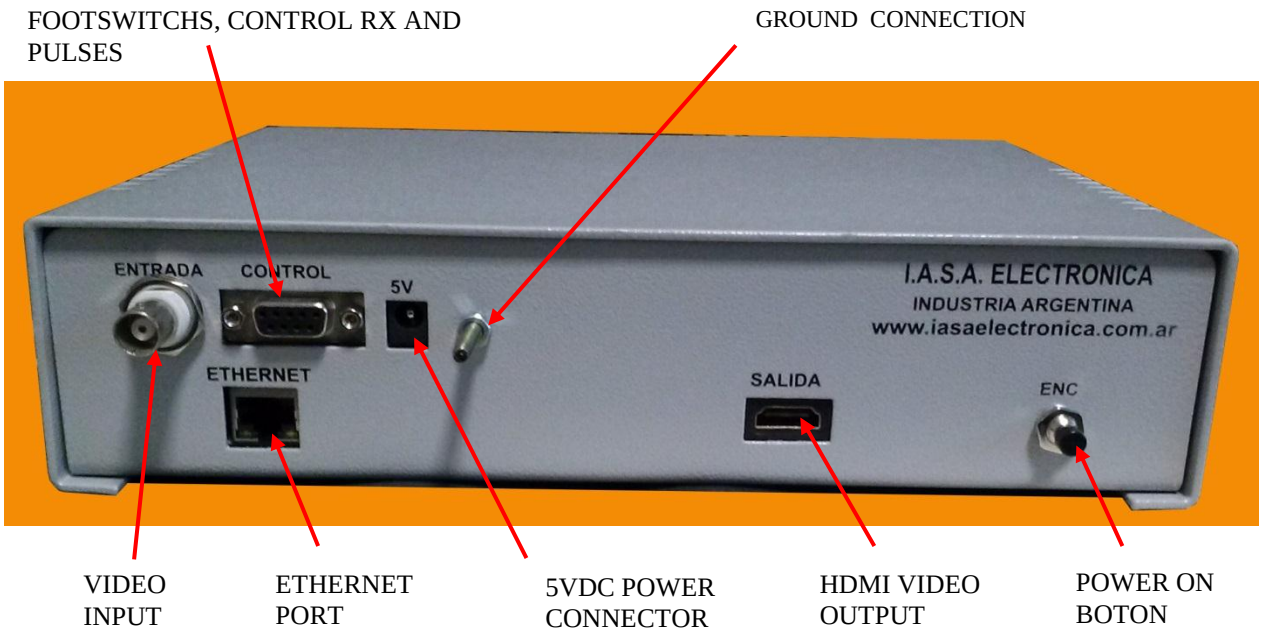
The following description assumes that the ***MEMORAD PF06*** digital memory is installed and calibrated on an Rx device according to the instructions contained in the **INSTALLATION** section of this manual.

The Rx equipment, your CCTV system and the digital memory output monitor should be on.

MEMORAD PF06-PD-DVD-DCM-ROT FRONT VIEW



PF06-PD-DVD-DCM-ROT REAR VIEW



PF06S-PD FRONT VIEW

PF06S-PD REAR VIEW

POWER ON

The power will turn on when the power supply is turned on or when you press the "ON" power button on the back of the equipment.

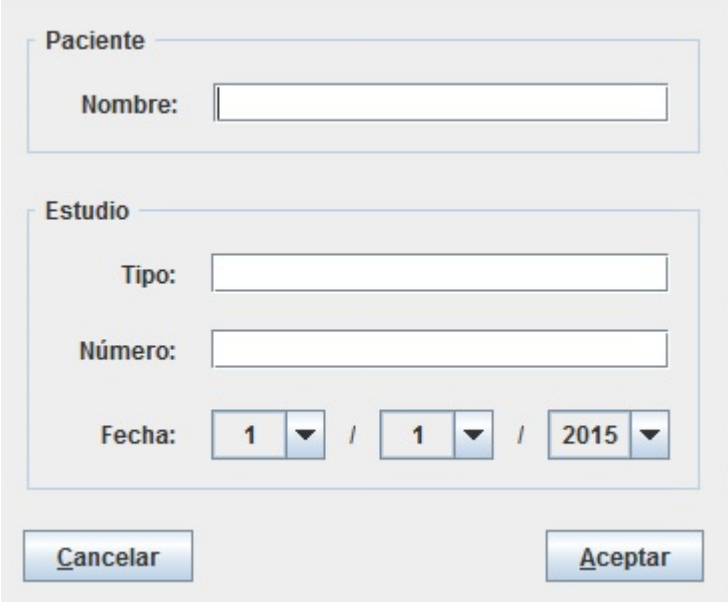
If the power supply is correct, a red led will be lit in the front and the system initialization will begin on the monitor.

At power-on, the machine will have the startup settings previously entered by the user. Using a sound code, it will inform if video signal is detected:

• One tone: no video signal.
• Two tones: video signal is detected.

*PATIENT DATA INPUT (WITHOUT WORKLIST)**

After the power is turned on, the patient entry window will appear on the monitor (only for computers with pendrive and without WorkList enabled):



After completing the information with valid data (there must be a patient name and a study number), press the 'OK' button. The patient's name can be up to 25 characters, the study type 20 characters and the study number up to 15 characters.

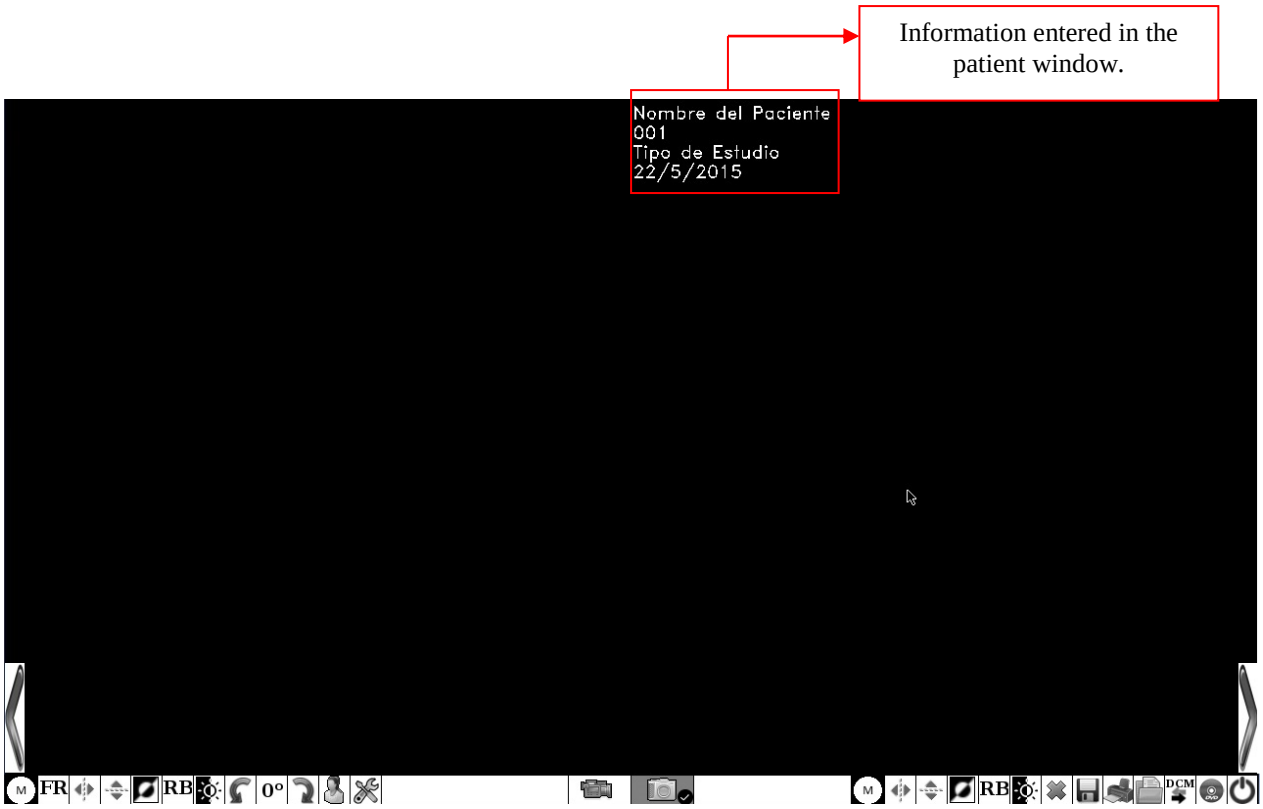
In case of not entering the type of study, it will appear with the sign '?'.

If the data entered were from an existing study, the equipment will ask you to enter a new study number.

In case you do not want to complete the information, by clicking on the 'Cancel' button, the computer will automatically open a temporary study, whose numbering will increase as

these studies are created, so that the user can access to the study information according its numbering.

When the patient's entry window is closed, the equipment is ready to begin the study.



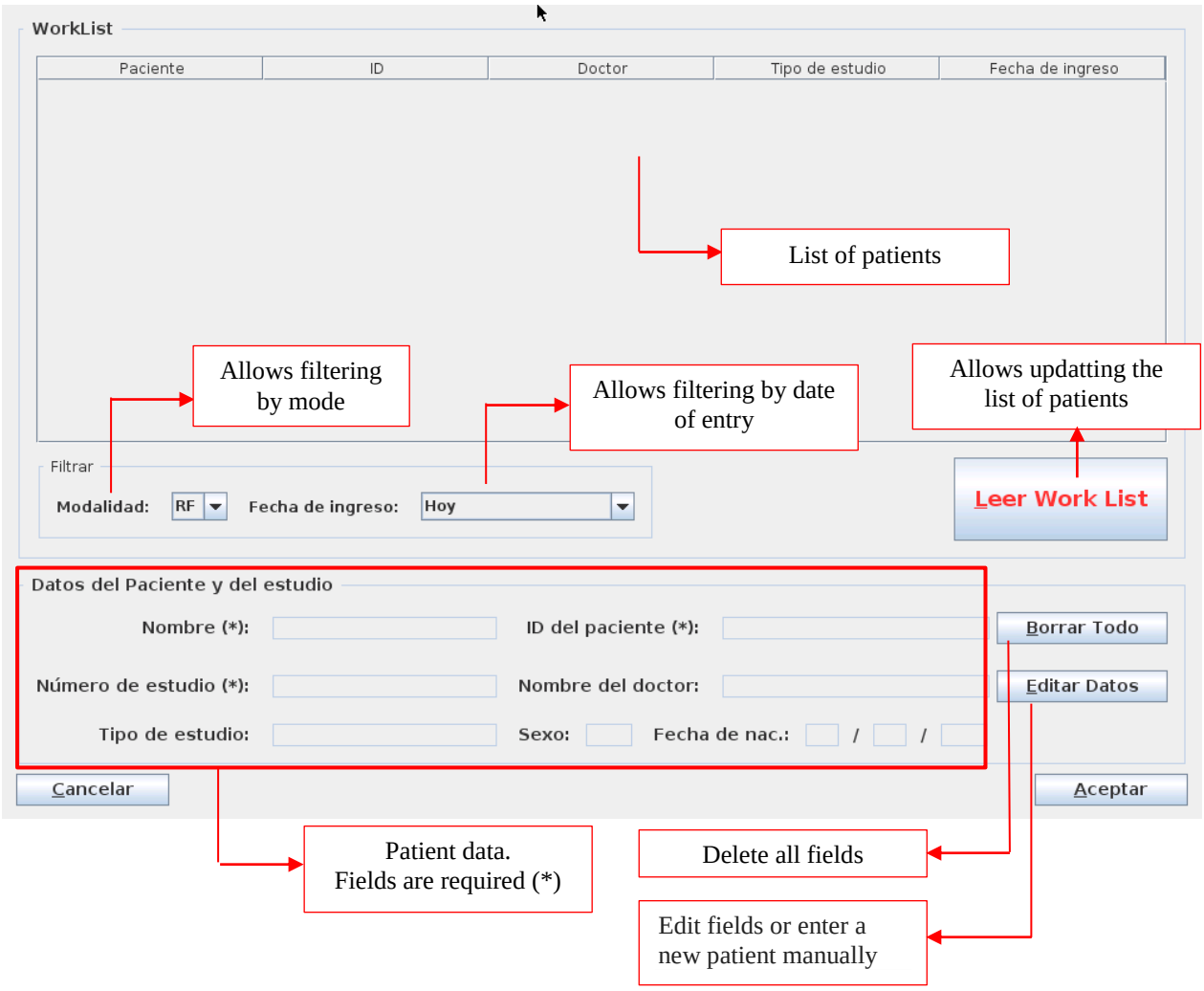
Both the keyboard and the mouse will be available to select the different options.

Important: (it will be necessary to configure the date and time of the system at the time of installation).

***:Optional available according to the model purchased.**

PATIENT DATA INPUT (WITH WORKLIST)*

After the power is turned on, the patient entry window will appear on the monitor (only for equipments with WorkList enabled):

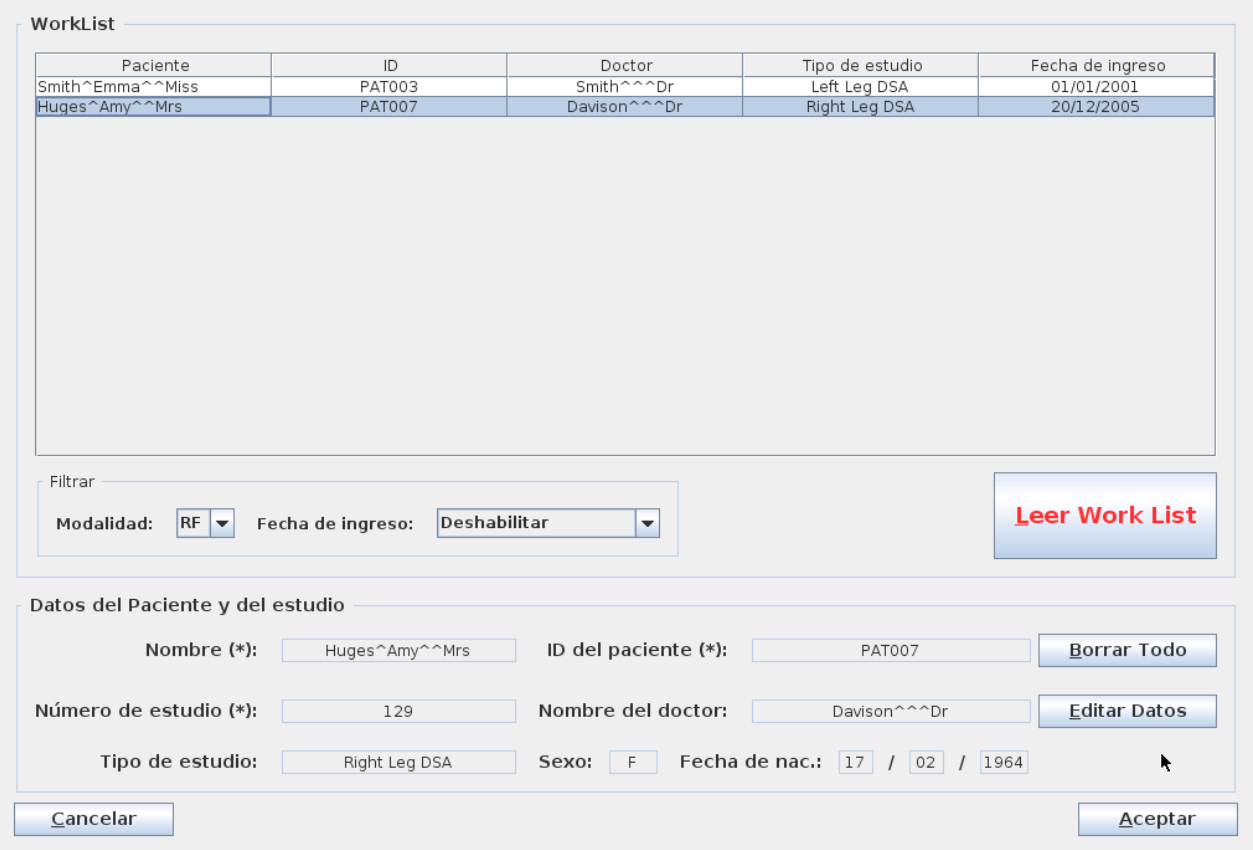


You must choose the type of filtering:

• By modality:
- **XA**: X-ray angiography.
- **RF**: Radio fluoroscopy.
- **DX**: Digital radiography.

• By date of entry:
- **Today**: Only read the studies entered in the day.
- **For a week ago**: Just read the studies admitted a week ago.
- **Disabled**: does not filter by date.

By clicking on the "Read Work List" button, the device will access the list of available patients according to the filtered fields entered:



When you select a patient from the list, the patient's data is automatically copied into the data fields at the bottom of the window.

By clicking on the button "Edit Data", you can modify the fields manually.

If the patient is not available in the WorkList, the patient data can be entered by manual editing ("Edit Data"). It will be mandatory to complete the following fields:

- **Name of patient**
- **Patient ID**
- **Study number (related to the Access Number)**

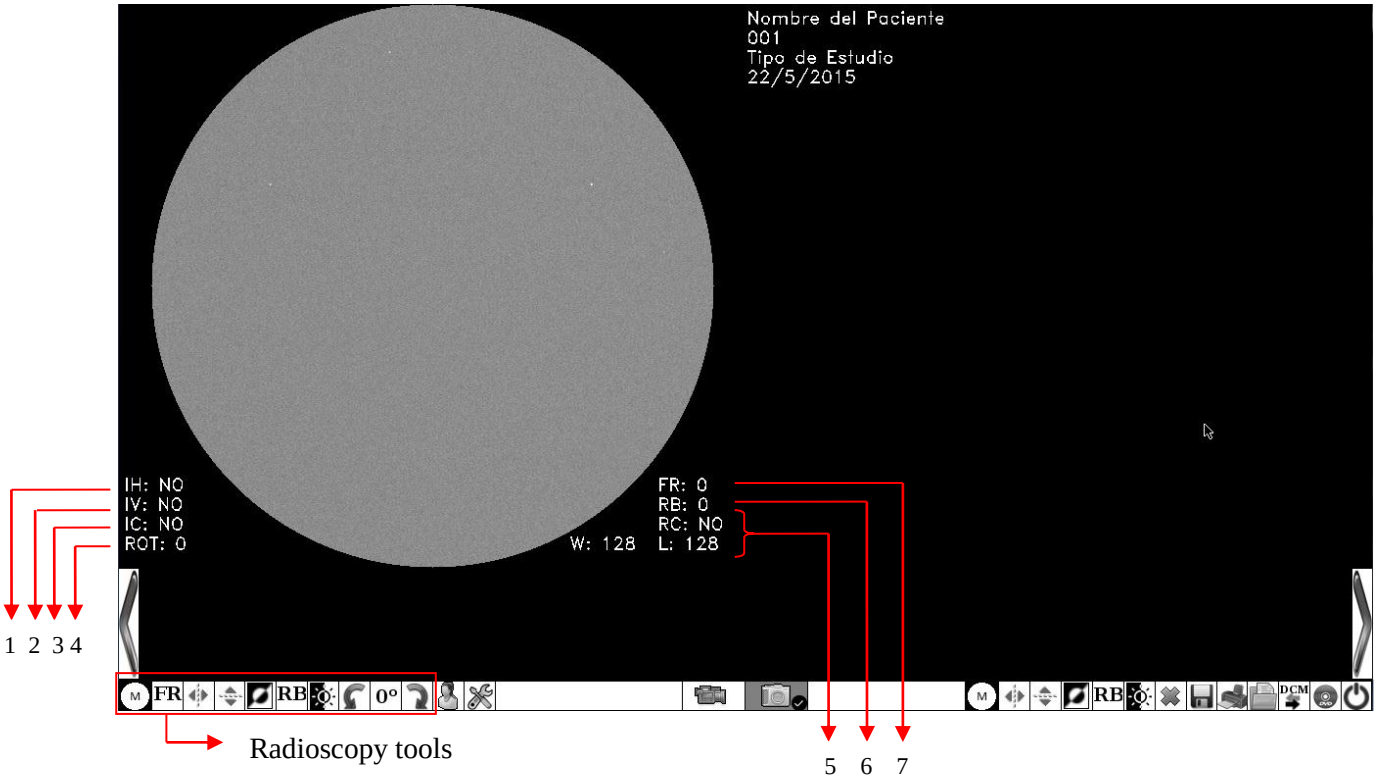
In case you do not want to complete the information, by clicking on the 'Cancel' button, the computer will automatically open a temporary study, whose numbering will increase as these studies are created, so that the user can access to the atudy information using its numbering.

When the patient's entry window is closed, the equipmentis ready to begin the study.

***:Optional available according to the model purchased.**

RADIOSCOPY IMAGE DISPLAY

Pressing the radioscopy footswitch will be able to see the live image generated by the RX camera on the left side of the monitor. The right side will remain in black.



The indicators on the screen (OSD) have the following meaning:

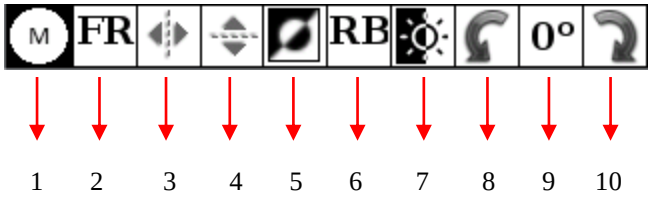
1. **Horizontal specular invertion(Yes / No).**
2. **Vertical specular invertion (Yes / No).**
3. **Color inversion (Yes / No).**
4. **Rotation angle (0 ° to 355 °).**
5. **Contrast enhancement. W: window, L: level.**
6. **Edge enhancement factor (0, 1, 2, 3, 4, 5, 6, 7).**
7. **Recursive filter enhancement factor (0, 2, 4, 8, 16, 32)**

The initial values of the Recursive Filter, Edge Enhancement Filter, the monitor in which the texts will appear and the working mode at power up can be changed from the Setup menu as shown below.

Releasing the radioscopy footswitch will freeze the image on the left side of the screen.

You can access the various digital processing functions in real time using the mouse.

Radioscopy tools:



1. **Enable / Disable Circle Mask.**
2. **Set the recursive filter factor.**
3. **Enable / Disable horizontal inversion.**
4. **Enable / Disable vertical inversion.**
5. **Enable / Disable color inversion.**
6. **Set the edge enhancement factor.**
7. **Enable / Disable contrast enhancement.**
8. **Rotate 5º counterclockwise.**
9. **Cancel rotation, set 0º.**
10. **Rotate 5th clockwise.**

FILTER LEVEL CHANGING

The mouse or keyboard allows you to change the Recursive filter and Edge Enhancement Filter factor.

Methods to change the recursive filter factor:

- **Mouse:** Press the left button on the icon FR (radioscopy tools).
- **Keypad:** Press the '*' key of the keypad to access the filter mode followed by the '4' key to reduce the factor or '6' to increase it.

Recursive Filter Mode access: * ⇨ Increasing the filter factor: 4 ⇨ Reducing the filter factor: 6

Methods to change the Edge Enhancement filter factor:

- **Mouse:** Press the left button on the icon RB (radioscopy tools).
- **Keypad:** Press the '*' key of the keypad to access the filter mode followed by the '2' key to reduce the factor or '8' to increase it.

Edge Filter Mode access: * ⇨ Increasing the filter factor: 2 ⇨ Reducing the filter factor: 8

Pressing the '5' key on the keypad ( ) will cancel all the filters.

Each time you press one of these buttons the OSD indicators will be updated

WINDOW LEVEL CHANGING

Changing the window level will affect the distribution of gray levels of the image by transforming them by a table, in which each new input gray level value will be assigned a new output gray level value.

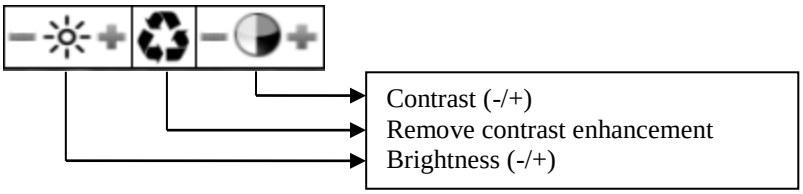
In this equipment this assignment is linear through a transfer line. The values that will indicate the equipment will be the size of the window or contrast (W) and the level of brightness (L).

Increasing or decreasing the window will increase or decrease the apparent contrast of the image and moving the line to the left or right will increase or decrease the brightness.

The value for a linear transfer table without correction is of Brightness = 128 and Contrast = 128.

Methods for changing contrast enhancement values:

- **Mouse:**To enable/disable the mode you must press the left button (radioscopy tools). The control icons will appear:



- **Keypad:** Press the 'Num Lock' / Num Lock key on the keypad to access the contrast enhancement mode followed by the '4' key to reduce the contrast (increase window size), '6' to increase the contrast ; '2' to decrease the brightness u '8' to increase it.

Contrast enhancement mode Access: 

- ⇨ Reduce contrast. 
- ⇨ Increase contrast 
- ⇨ Reduce brightness. 
- ⇨ Increase brightness 

Pressing the '5' key on the keypad () returns to the initial setting W = 256 and L = 128.

IMAGE SPECULAR REFLECTION

It can be performed on the live image on the left side. If the change is made when the image is frozen, the indicators **(1)** and **(2)** will mark the change, but this will only be seen when acquiring live images again by pressing the radioscopy footswitch.

Methods to enable / disable horizontal inversion:

• **Mouse:** Press the left button on the icon  (radioscopy tools).

• **Keypad:** Press the '3' key () on the keypad.

Methods to enable / disable vertical inversion:

• **Mouse:** Press the left button on the icon  (radioscopy tools).

• **Keypad:** Press the '9' key () on the keypad.

REAL TIME IMAGE ROTATION*

You can rotate the live image on the left side of the screen in steps of 5 degrees to 360 degrees.

Methods to rotate the live image:

- **Mouse:** Press the left button on the icons   (radioscopy tools) according to the direction of rotation.
- **Keypad:** the 'F10' ( clockwise) or 'F11' ( counterclockwise) keys must be pressed.

Methods for nullifying rotation:

- **Mouse:** Press the left button on the icon  (radioscopy tools).
- **Keypad:** Press the 'F12' () keys.

***:Optional available according to the model purchased.**

POSITIVE/NEGATIVE IMAGE SELECTION

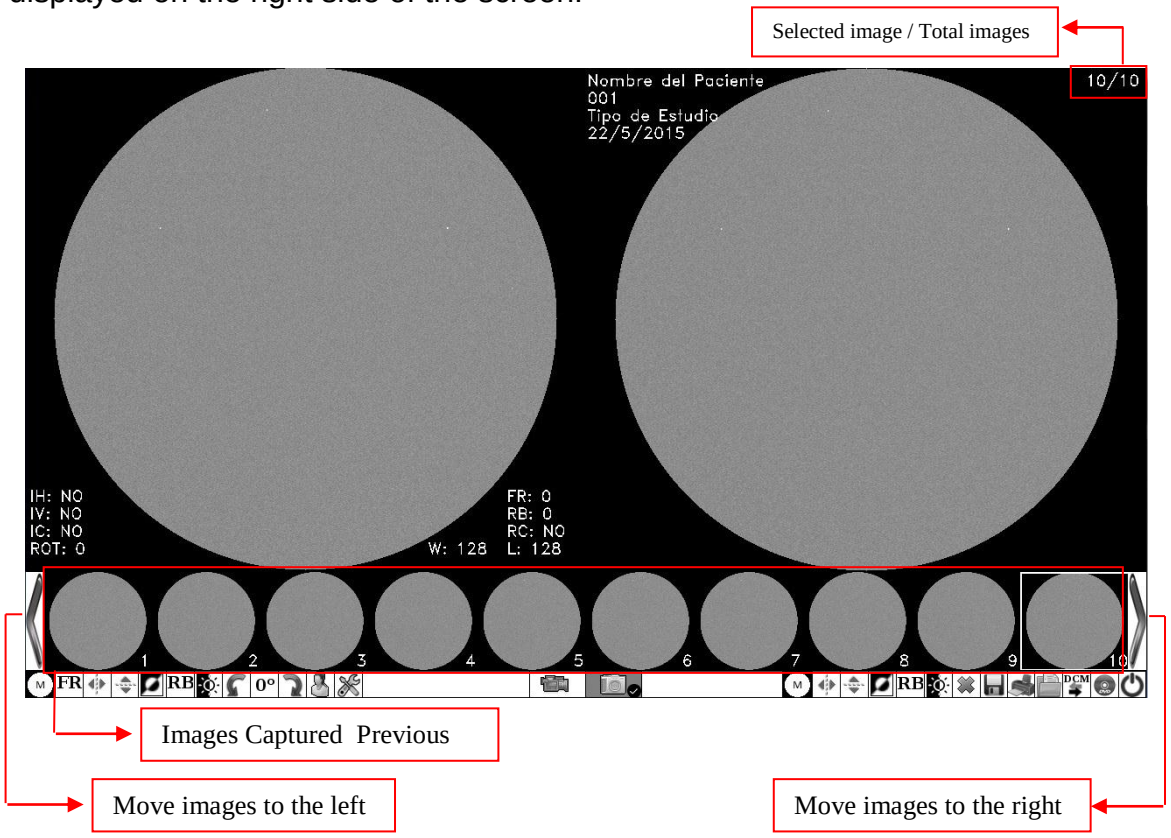
Also known as the reversal color, will allow you to get the negative image live on the left side of the screen.

Methods to enable / disable color inversion:

- **Mouse:** Press the left button on the icon  (radioscopy tools).
- **Keypad:** Press the '7' key () on the keypad.

RECORDING IMAGES IN THE STUDY.*

The equipment will store the images captured during the radioscopy in the Pen Drive. Images that will appear on the left side of the screen will be automatically stored in the study by pressing the recording foot switch or the 'F' key (F). The captured image can be displayed on the right side of the screen.



Images will be stored inside the Pen Drive in a folder whose name will consist of the patient's name plus the study number (Patient's Name - Study Number). The names of the images will increase as new images are added (Image_1.bmp, Image_2.bmp, etc.).

***:Optional available according to the model purchased.**

EXPLORING IMAGES IN STUDY

By using the previous images that are at the bottom of the screen, you can see the different images stored in the study on the right side of the screen.

Methods of exploration:

- **Mouse:** Press the left button on the previous image you want to open. If there are more than 10 images in the study, to access the images that are not on the screen of the previous images, it will be necessary to move the images to the right / left as appropriate (❮or ❯).

- **Keyboard:** Press the 'Left Arrow' / 'Right Arrow' (or) keys to move the cursor and choose the different images. If the study has a large number of images, by using the 'Up Arrow' / 'Down Arrow' (or) keys you can move up to 10 images, which will allow fast scrolling.

EDITING ACQUIRED IMAGES

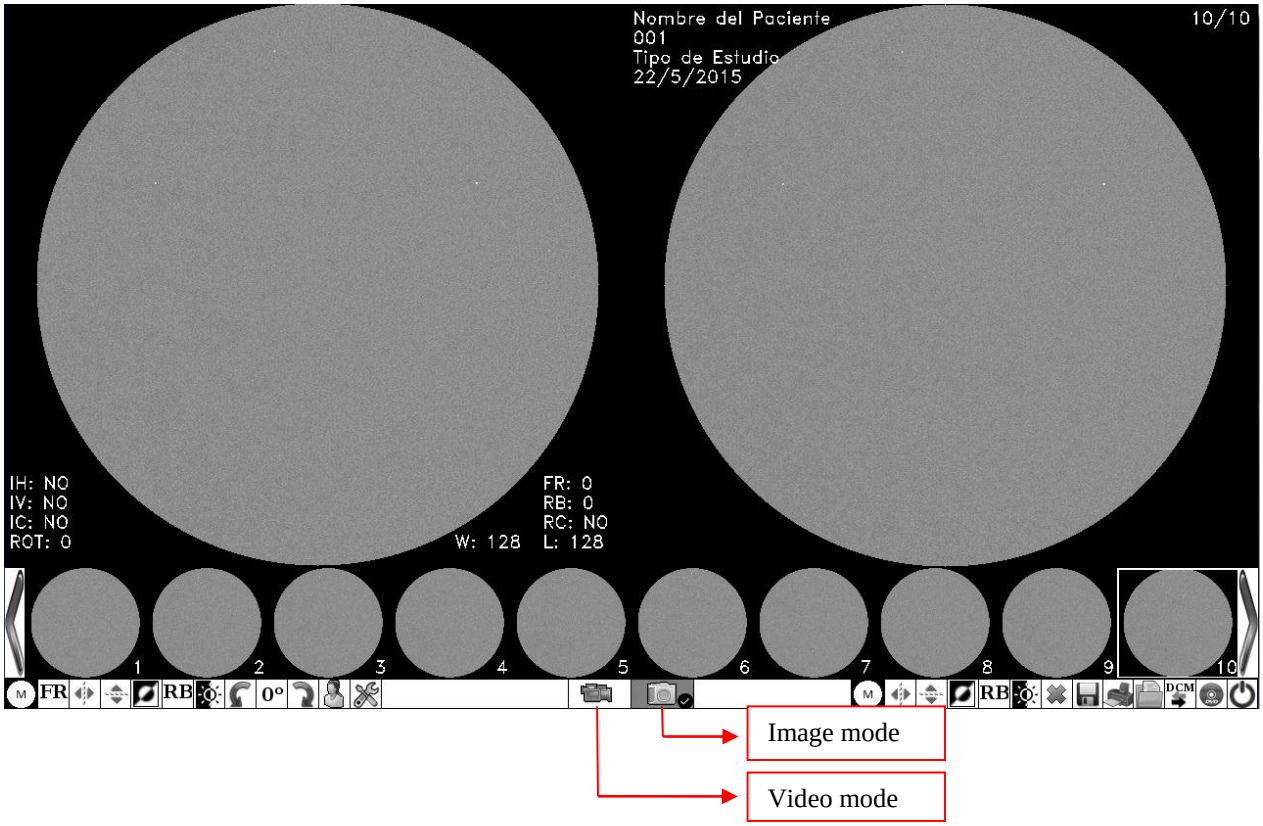
It will allow to make modifications to the images already captured and will be able to store those cases where the edited image is wanted to keep in the study.

- Circle Mask on/off
- Horizontal Invertion
- Vertical Invertion
- Color Invertion
- Edge Enhancement
- Contrast Enhancement
- Cancel all modifications
- Save edited image

The tools only can be used with the mouse.

ACQUISITION MODES.*

The capture mode allows you to select whether to acquire images or videos.



To change the mode, it will be necessary to press the desired mode icon.

 → Image Mode

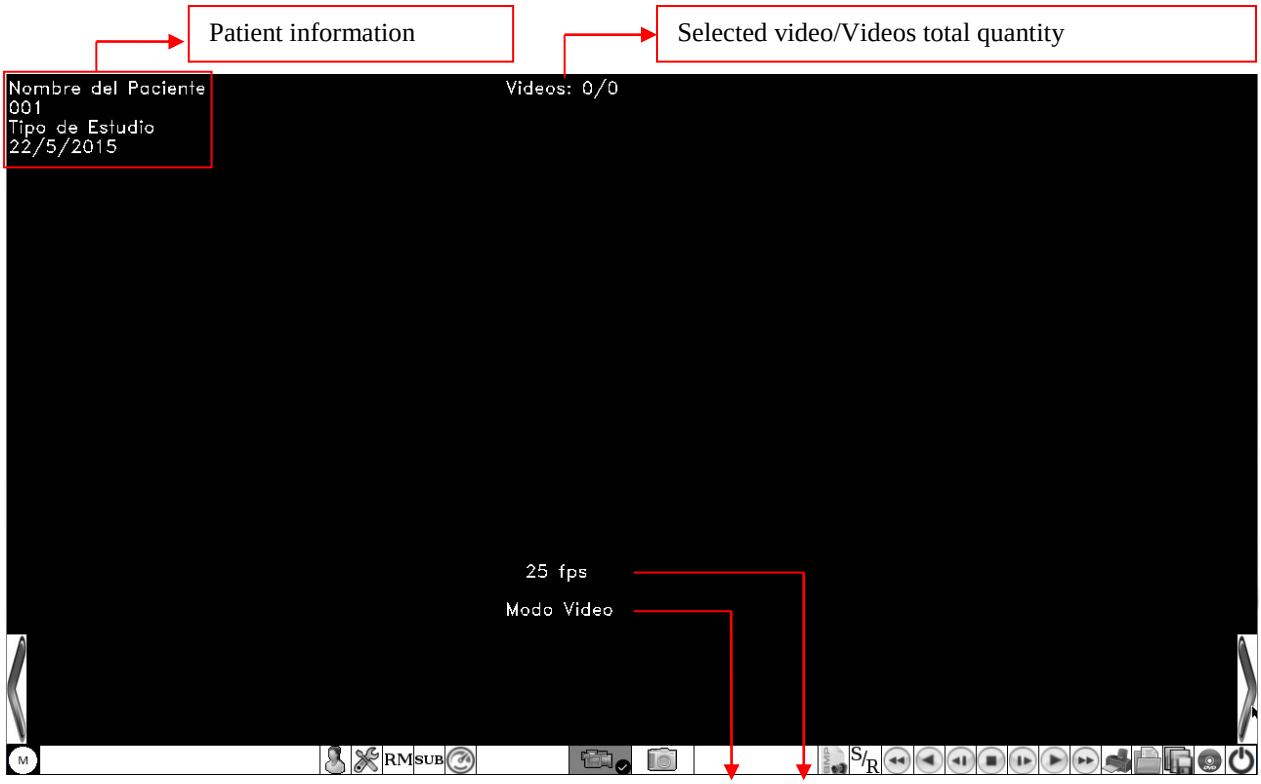
 → Video Mode

The background of the icon will turn gray indicating the selected mode.

***:Optional available according to the model purchased.**

VIDEO MODE STARTING SCREEN.*

When you switch to video mode for the first time in the study, the computer screen will appear in black.



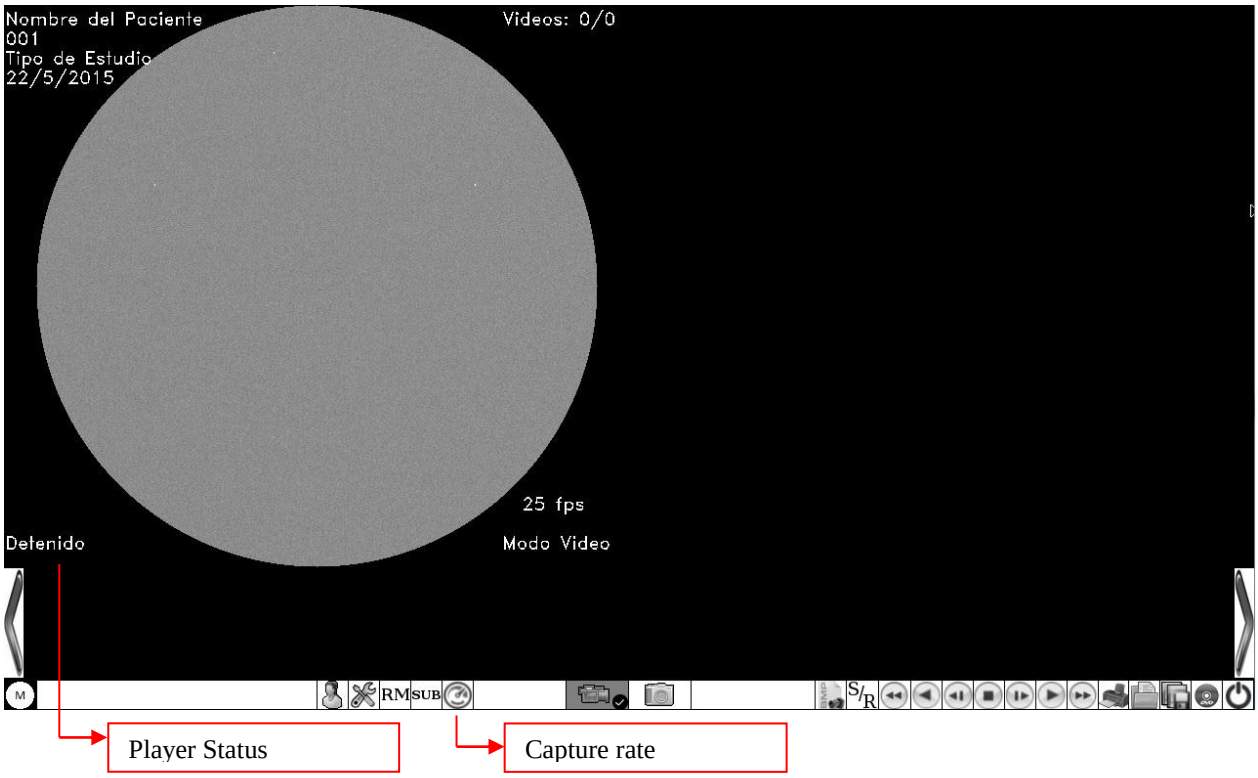
1 2

1. Indicates that the equipment is in video mode.
2. Video capture speed.

***:Optional available according to the model purchased.**

RADIOSCOPY MODE SCREEN.*

By using the radioscopy footswitch, the device will display the live image on the left side of the screen.



VIDEO CAPTURE SPEEDS AND MAXIMUM RECORDING TIME.*

At the moment of capturing the video it will be necessary to previously select the capture speed by the icon . Clicking in it with the mouse left button, the capture speed will change.

The available capture speeds are: 25 fps, 12.5 fps and 6 fps.

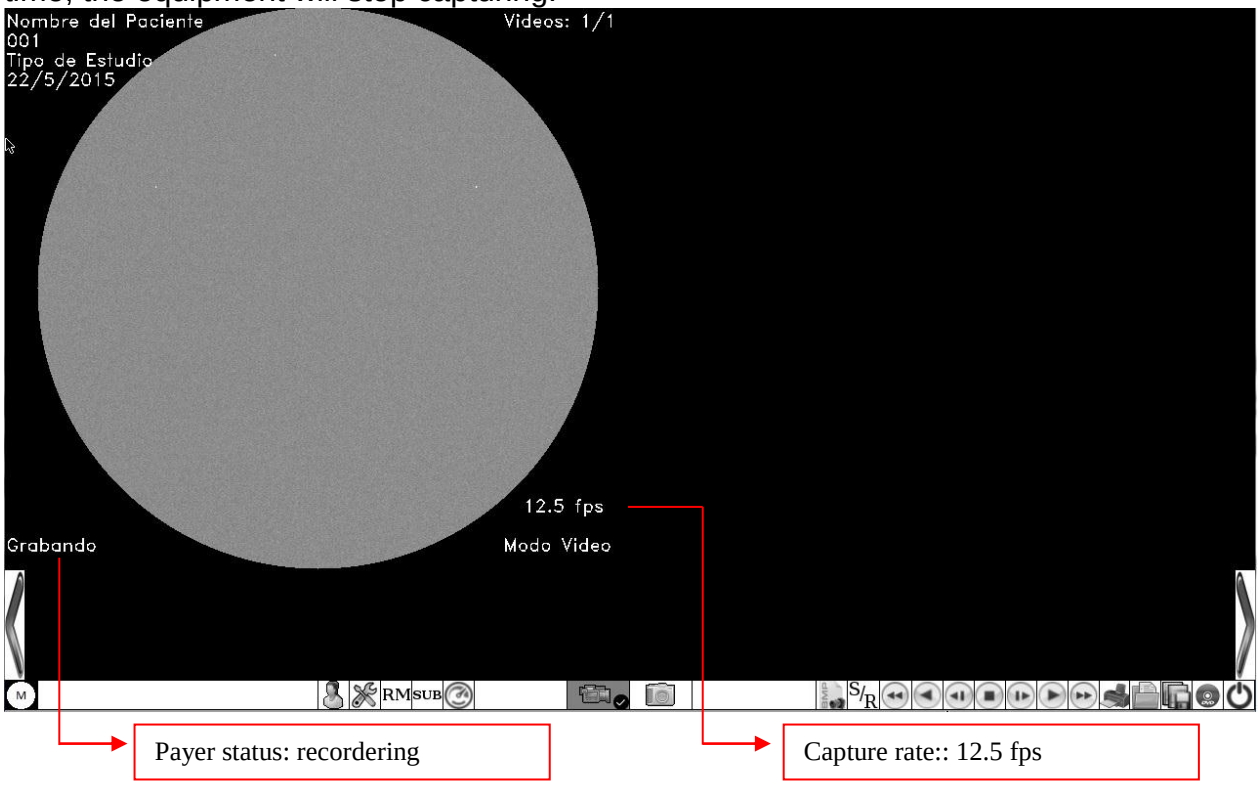
The maximum recording times change according to the capture speed:

Cuadros por segundos [fps]	Tiempos máximos de grabación [seg]
25	13
12.5	26
6	52

***:Optional available according to the model purchased.**

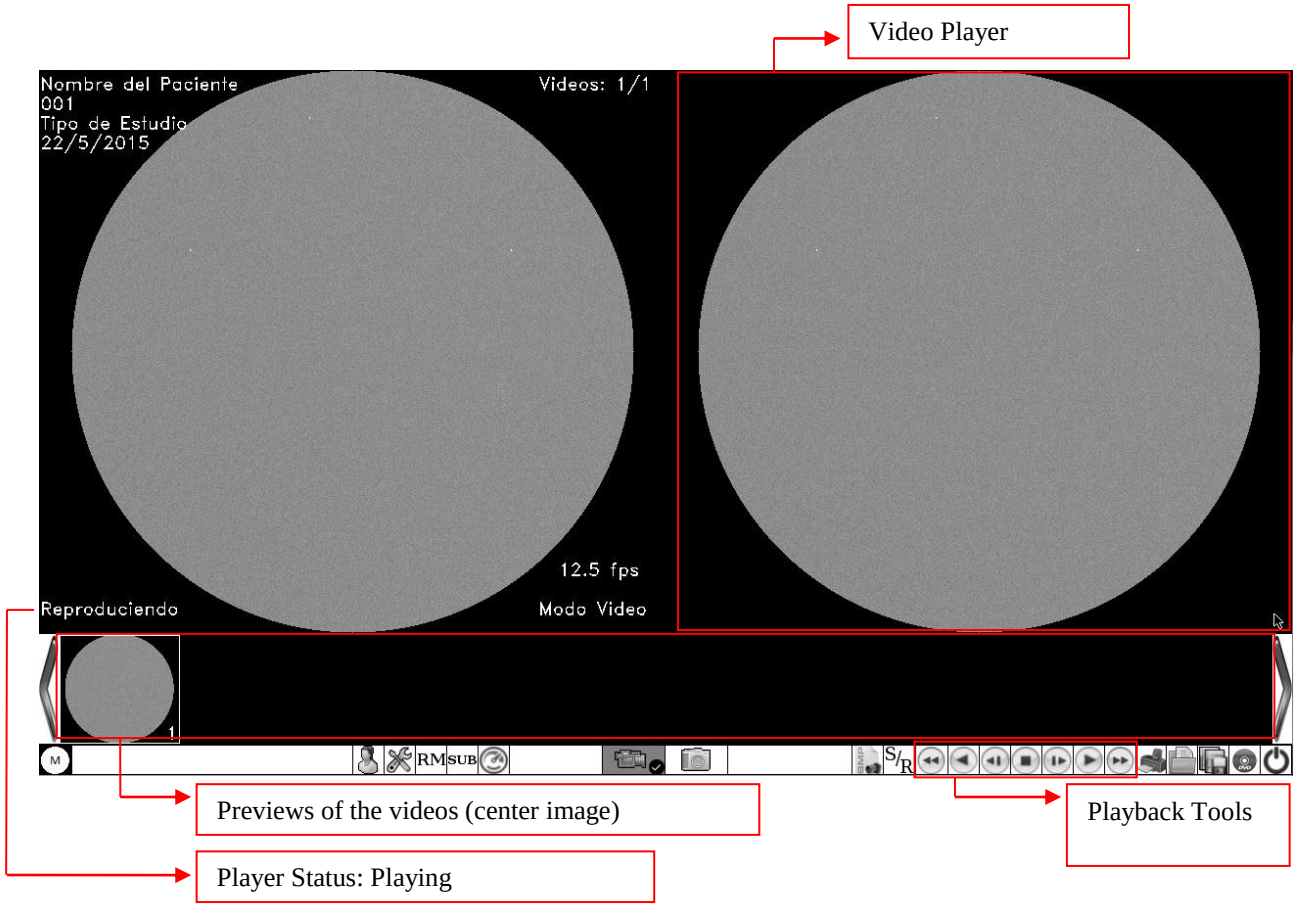
STANDARD VIDEO ACQUISITION.*

With the capture speed selected, the equipment will be able to start the capture. To begin the capture you will need to press both the radioscopy and recording footswitch and hold the two footswitchs until the end of the capture. In case of exceeding the maximum limit of time, the equipment will stop capturing.



When the capture is finished, the computer will generate the video. This process will take a few seconds depending on the time of the captured video. During this time on the right side of the screen you can watch the captured video as the process is performed.

At the end, the last image of the radioscopy will appear on the left side of the screen and on the right side the looped reproduction of the captured video.



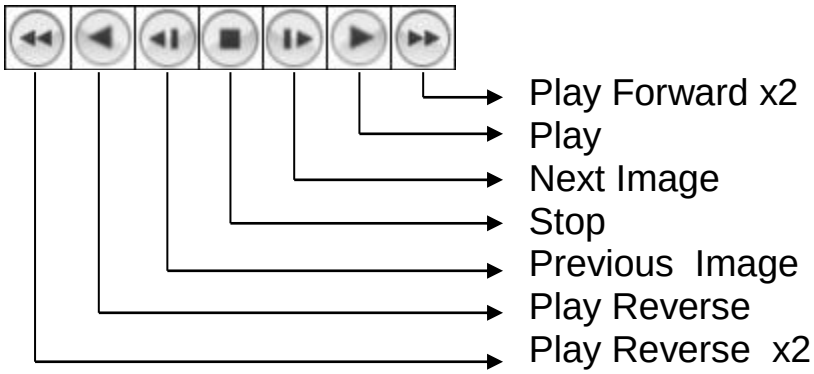
Important (1): *In this instance the computer* ***only generated the video by storing it in a temporary memory.***

Important (2): *Before closing the study, the videos that are useful,* ***must be stored in the PEN DRIVE*** *in AVI format, in order to preserve and reproduce them in the future.*

Important (3): The equipment in a study can only generate up to 8 temporary videos in the maximum recording time. *Once the limit is reached, it will be necessary to save the generated videos of the study in AVI format, close study and finally reopen it without reconverting the previous videos (see later "* ***reconversion of videos****").*

***:Optional available according to the model purchased.**

VIDEO VISUALIZATION TOOLS.



The tools will be able to play the video at different speeds and sense. The states of the player will be as follows:

- **Playback:** Normal playback speed in forward direction.
- **Playback x2**: Fast playback speed in forward direction.
- **Reverse**: Normal playback speed in reverse direction.
- **Reverse x2**: Fast playback speed in the reverse direction.
- **Stopped**: Playback stopped.
- **Recording**: In process of capture.

Methods for using the playback tools:

- **Mouse**: Press the left button on the desired icon (playback tools).
- **Keypad:** you must enter the playback mode according to the speed.
  - Step by step: press the 'Insert' key (

).
  - Normal speed: press the 'Start' / 'Home' key (

).
  - Speed x 2: Press the 'RePag' / 'Page Up' (

) key.

By using the 'Left Arrow' / 'Right Arrow' ( or ) keys you can choose the playback direction.

Note: To return to the video browsing mode using the arrows, press the 'Del' / 'Del' (

) key.

STUDY VIDEOS EXPLORATION

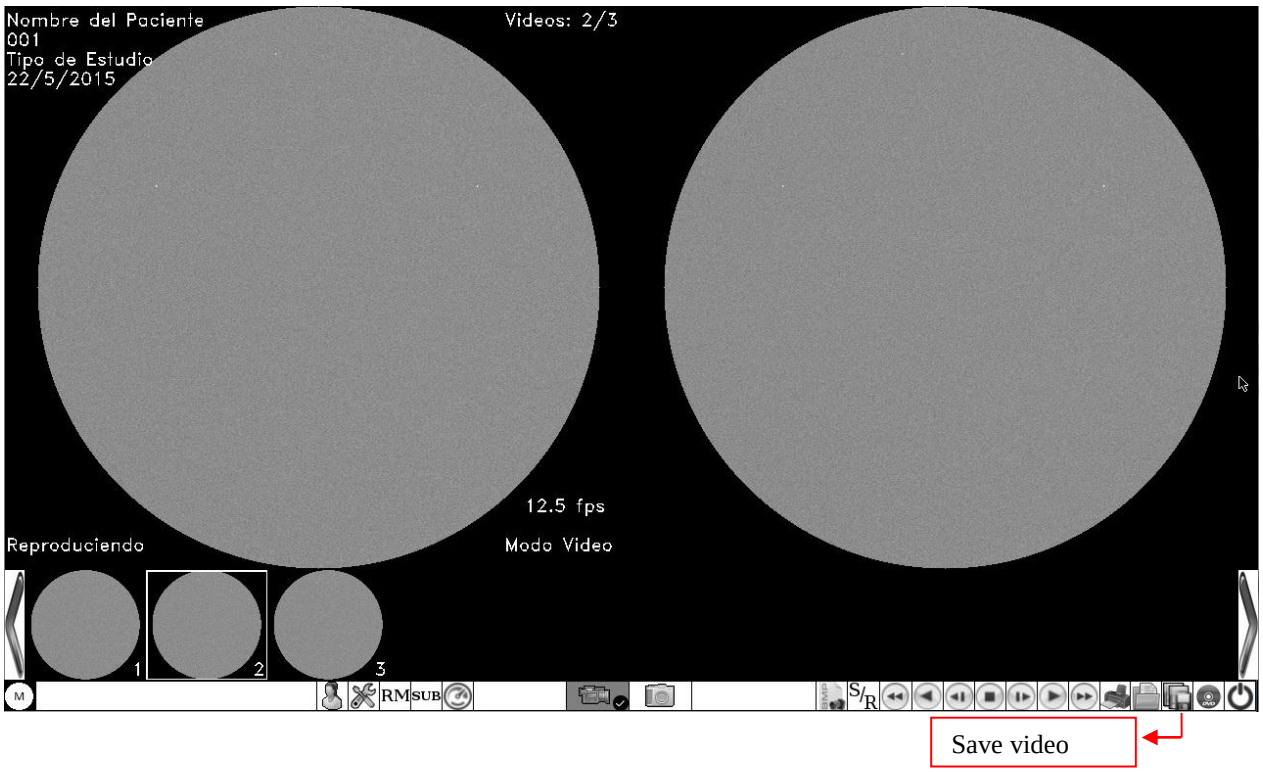
By using the previous images (center box) at the bottom of the screen, you can play the study videos on the right side of the screen.

Methods of exploration:

- **Mouse:** Press the left button on the previous image of the video to be played. In case there are more than 10 videos generated in the study, to access videos that are not on the screen of the previous images, it will be necessary to move the previous images to the right / left as appropriate (❮ or ❯).
- **Keypad:** Press the 'Delete' / 'Delete' key (DELETE) to enter scan mode. Finally it will be necessary to press the 'Left Arrow' / 'Right Arrow' (< or >) keys to move the cursor and choose the different videos.

SAVING AVI FORMAT VIDEOS

You can store the videos in PEN DRIVE in AVI format so that you can reproduce them when you open the study.



You must press the left mouse button on the icon ( ), accessing the following screen:

To save the video in AVI format, it will be necessary to press the lowercase 'a' key () (check that the uppercase function of the keyboard is disabled), then select the videos that will be stored in the study:

To select the videos you will need to click the left mouse button on the thumbnail of each video. In each one, a tilde will appear indicating that it is selected. To cancel the selection you must click again on the video to be deselected.

With the videos selected, it will be necessary to press the lowercase 'g' key() (verify that the uppercase function is disabled) to begin the conversion. In case you want to cancel the operation, press the 'c' key () (verify that the uppercase function is disabled).

As the process is performed, a message will appear indicating the video that will be converting.

At the end of the conversion of all selected videos, the videos in AVI format will be stored in the PEN DRIVE. The video names will be numbered based on the number of converted videos. Based on the example, it will be Video001.avi and Video002.avi.

Important: The numbering of the videos will be done according to the converted videos, leaving aside the numbering of the generated videos.

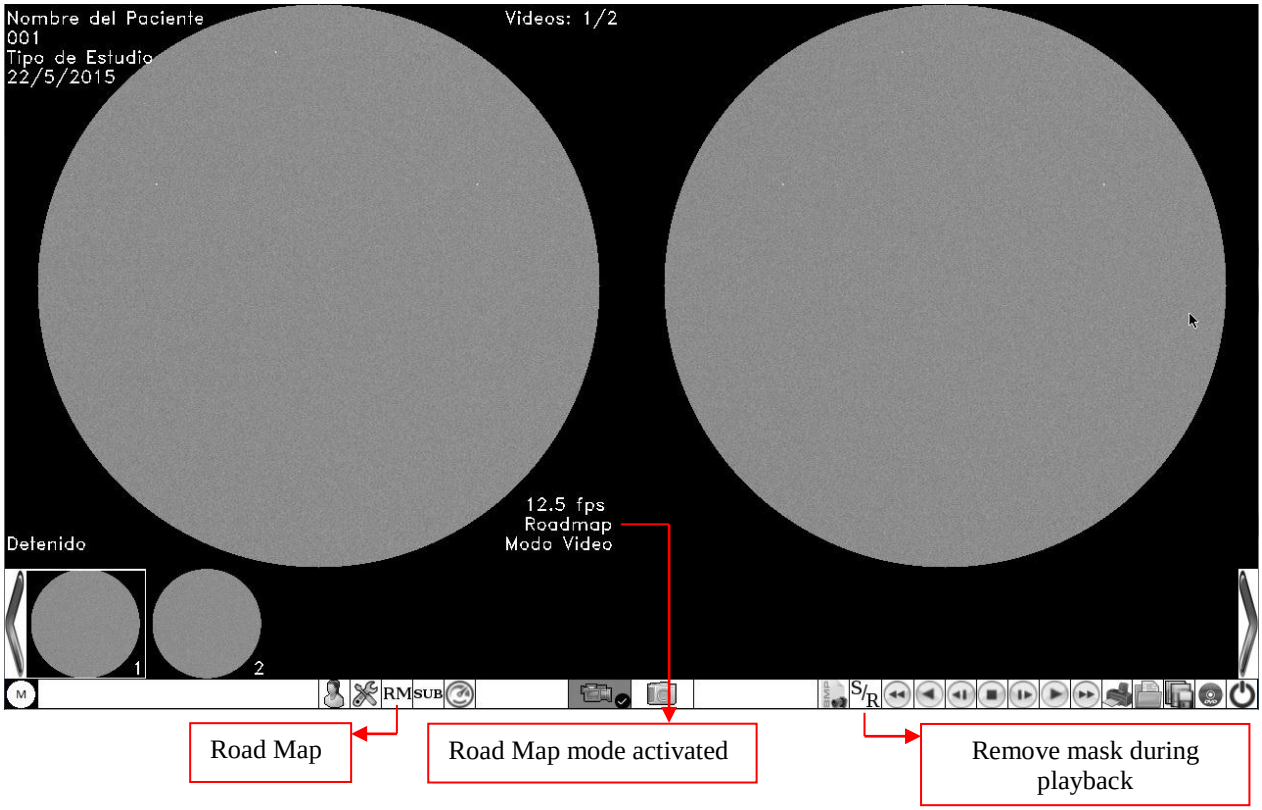
ROAD MAP MODE

With the radioscopy footswitch pressed, the contrast should be injected. When the artery becomes full, the radioscopy footswitch must be released to set the Road Map reference. Then you must enter the Road Map mode.

To enter Road Map mode:

- **Mouse:** Press the left button on the icon (RM).
- **Keypad:** Press the 'Del' / 'Del' key on the keypad (

).



With Road Map mode enabled, the machine will be able to work with the on-screen route map.
Each time the radioscopy footswitch is pressed, the subtraction between the live image and the stored route map is displayed, facilitating the introduction of catheters.

To capture the video of this sequence, you must press the footswitchs for radioscopy and recording at the same time.

To exit the Road Map mode, press the (RM) or 'Del' key on the keypad (

) again.

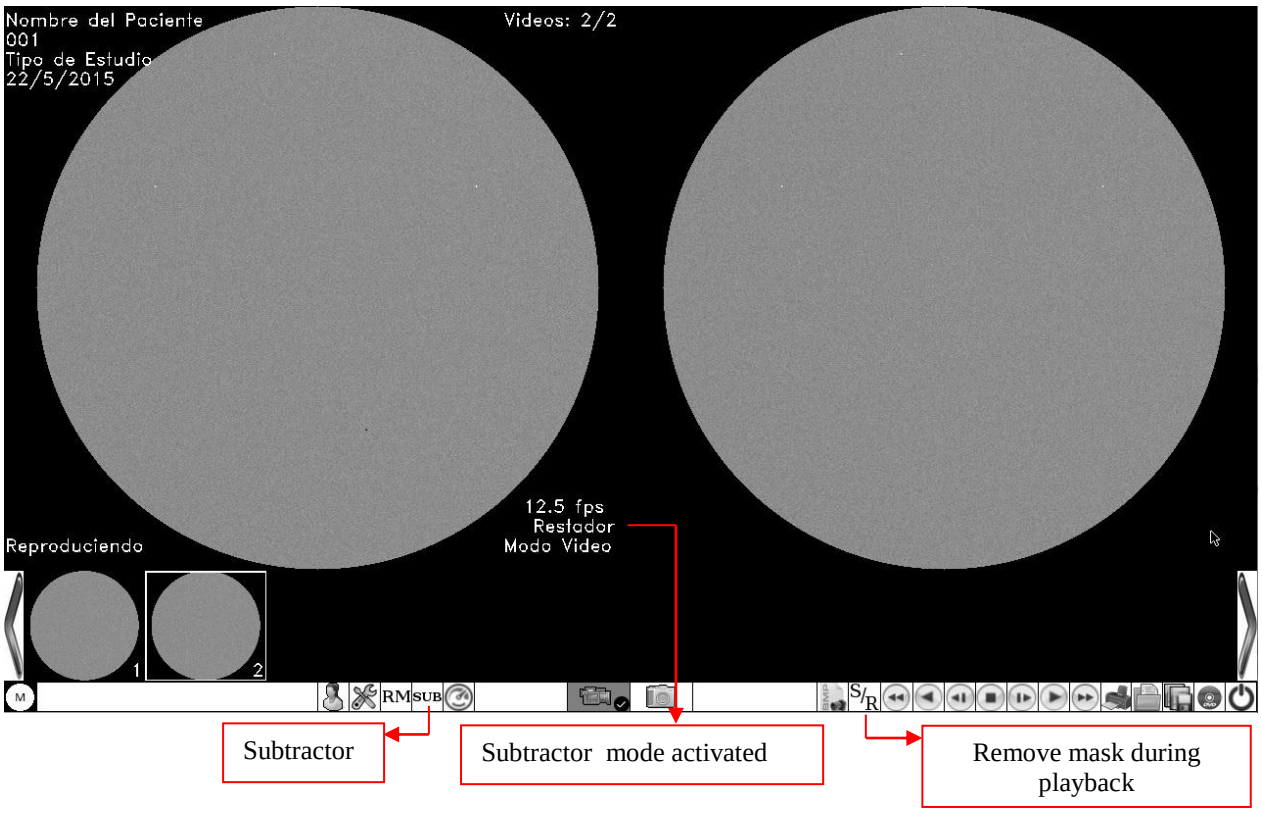
The reproduction will include the Road Map mask, which can be removed by using the icon (S/R).

SUBTRACTION MODE

While in Video mode, you can enter in Subtraction mode..

To enter Subtraction mode:

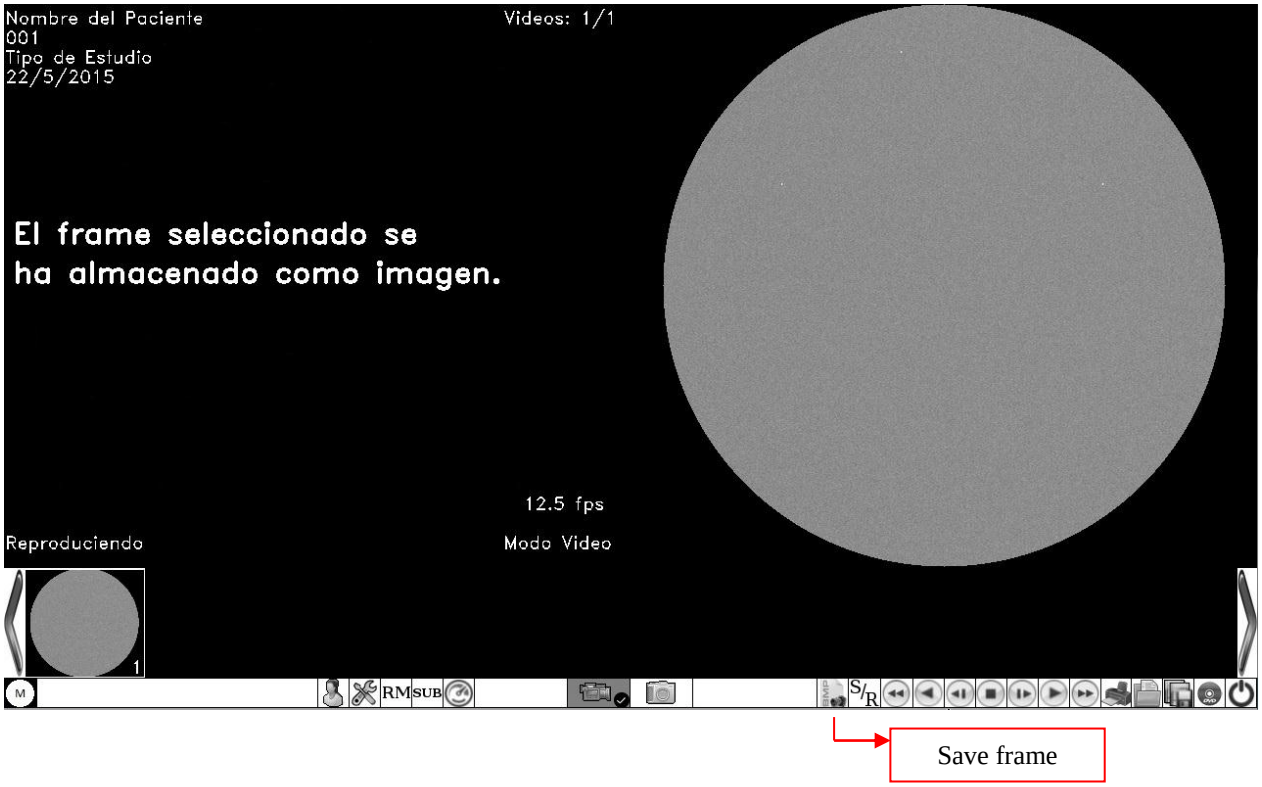
- **Mouse:** Press the left button on the icon (RST).
- **Keypad:** Press the '-' key on the keypad (-).



With the Subtractor mode enabled, it will be necessary to press the Radioscopy footswitch and after a few moments, to allow the equipment to acquire the mask, you must press the Recording footswitch while holding down the Radioscopy simultaneously.
Under these conditions you can see on the left side of the monitor the subtraction of the live image with the acquired mask.
When you inject the contrast substance you can see the path of it on a white background.
When you release the recording footswitch or both at once, the subtracted video will pass to the right side of the screen and will be displayed in a loop.
You can press the Radioscopy footswitch at any time and continue with normal use of the equipment.
If further subtraction acquisition is desired, the Radioscopy and Recording footswitchs must be pressed again as indicated above, repeating the cycle as many times as necessary.
To exit the Subtractor mode, press the same key or icon.
The reproduction will include the Subtraction mask, which can be removed by using the ic S/R ( ).

SAVED OF A VIDEO FRAME AS IMAGE

By using the playback tools (Forward, Step by Step, Reverse and Reverse Step by Step), you must position on the desired frame and click on the icon ( ):



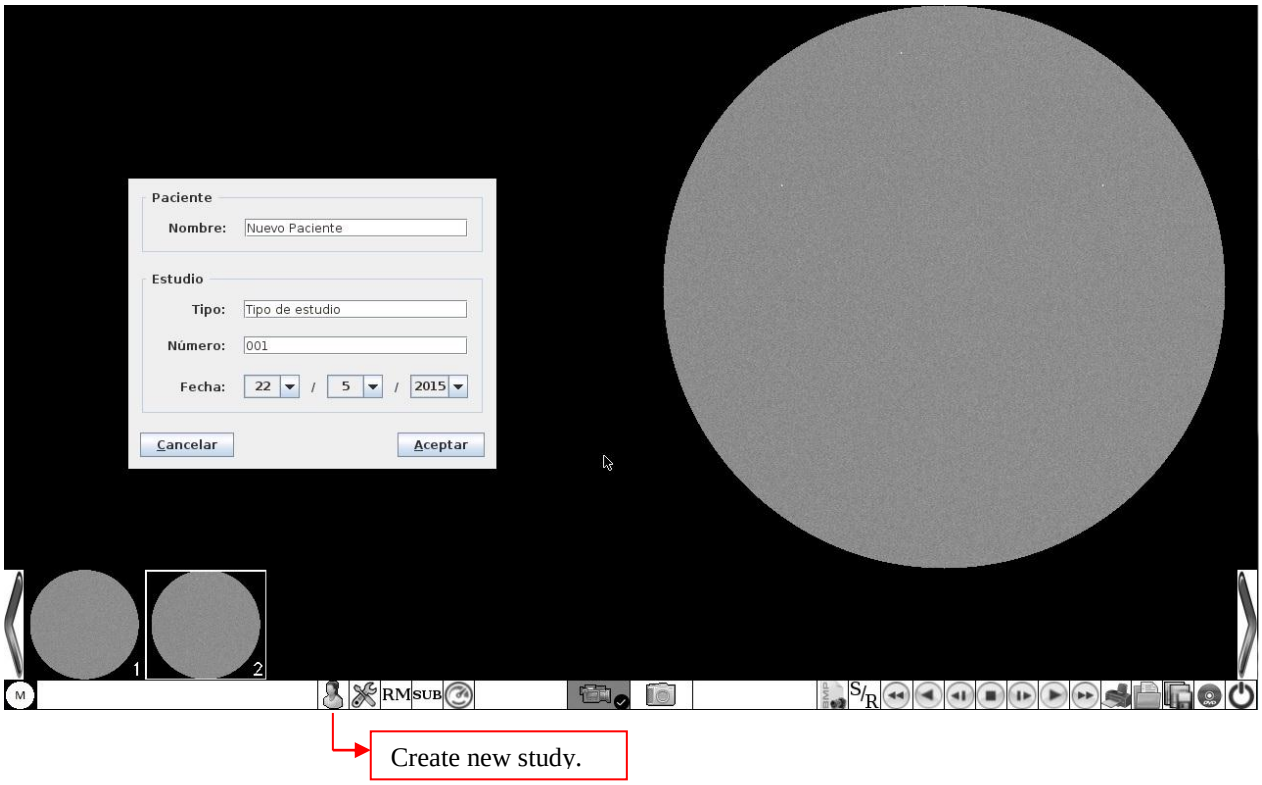
The stored frame will be added to the images captured in the study.

CREATION OF A NEW STUDY. (WITHOUT WORKLIST)*

To create a new study whether the computer is in image mode or video mode:

- **Mouse:** Press the left button on the icon ( ).
- **Keypad:** Press the 'F3' key ( ).

The following screen will appear:



After completing the information with valid data (there must be a username and a study number), press the 'OK' button.

In case you do not want to complete the information, pressing the 'Cancel' button, the equipment will return to the previous study.

If the data entered were from an existing study, the equipment will ask you to enter a new study number.

When the patient's entry window is closed, the system is ready to begin the study.

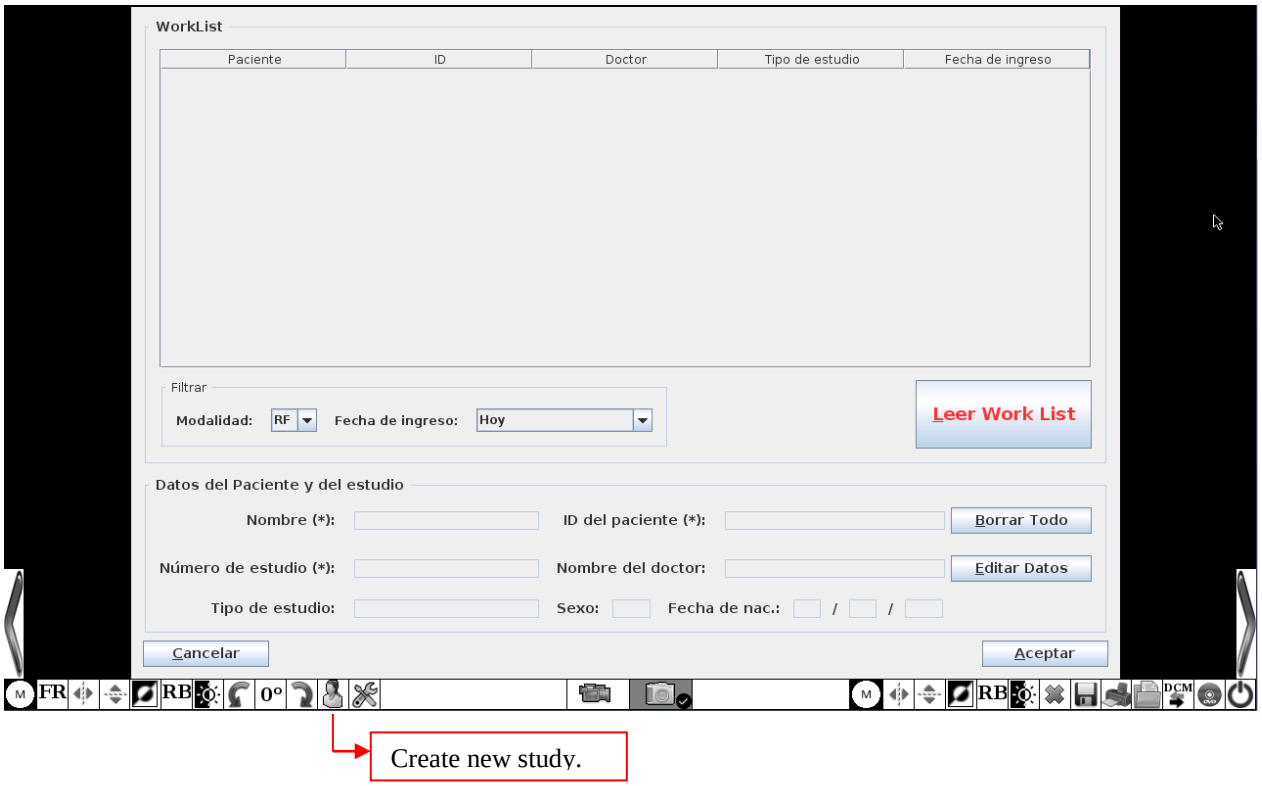
***:Optional available according to the model purchased.**

CREATION OF A NEW STUDY. (WITH WORKLIST)*

To create a new study, whether the computer is in image mode or video mode:

- **Mouse:** Press the left button on the icon ( ).
- **Keypad:** Press the 'F3' key ( ).

The following screen will appear:



After completing the information with valid data (there must be a username and a study number), press the 'OK' button.

In case you do not want to complete the information, pressing the 'Cancel' button, the equipment will return to the previous study.

If the data entered were from an existing study, the equipment will ask you to enter a new study number.

When the patient's entry window is closed, the system is ready to begin the study.

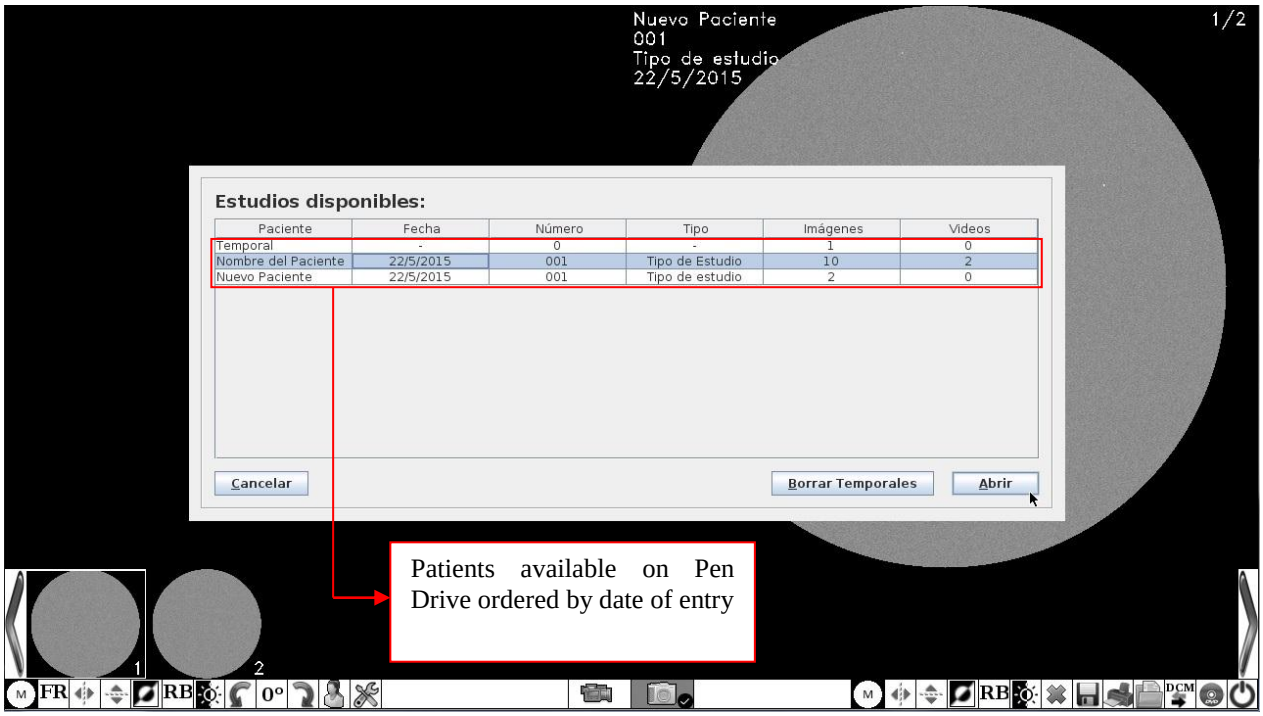
***:Optional available according to the model purchased.**

OPEN EXISTING STUDY

To open an existing study, whether the computer is in image mode or video mode:

- **Mouse:** Press the left button on the icon ( ).
- **Keypad:** press the 'F4' key ( ).

The following screen will appear with the studies sorted by date of entry:



You must select the study and then press the 'Open' button. To cancel the opening of a previous study, it will be necessary to press the 'Cancel' button.

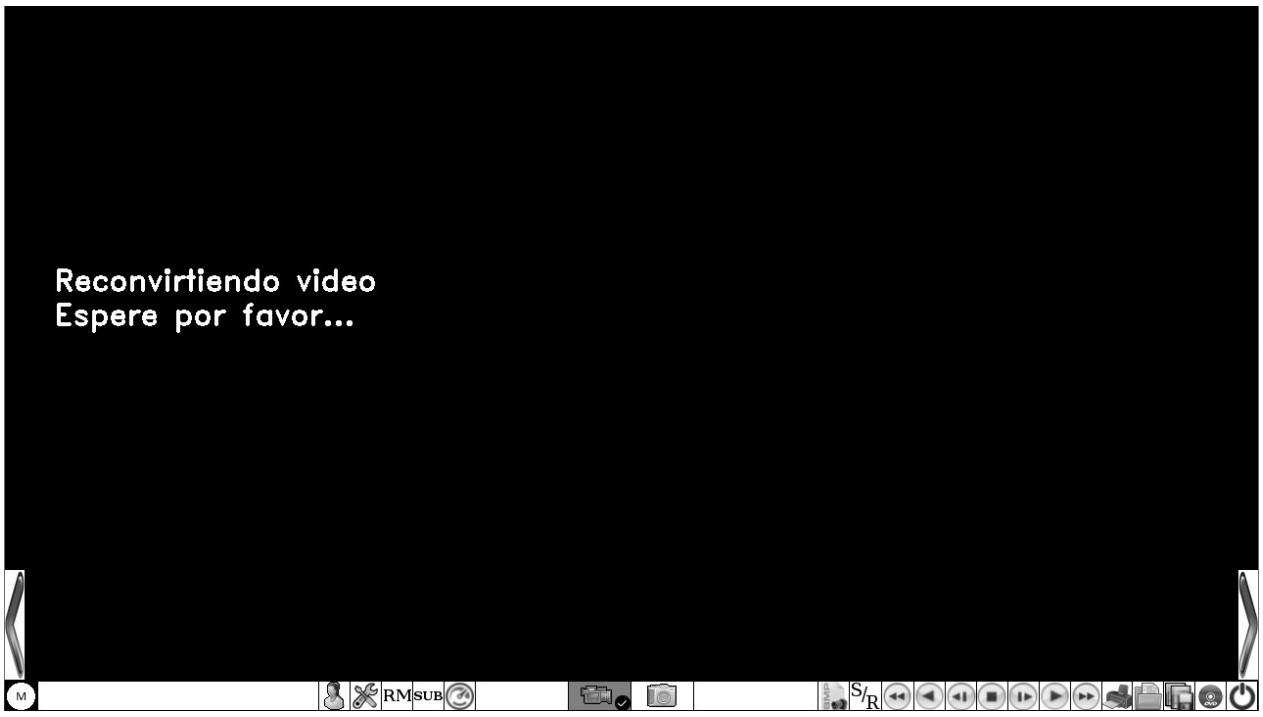
You can delete all temporary studies by pressing the 'Delete Temporary' button, which will free space on the Pen Drive.

When you open the study in image mode, all captured images will be displayed. In video mode, if the study contains stored videos.
It will be necessary to reconvert the videos and transfer them to the temporary memory. This process will take a few seconds, so the user will be asked if they want to convert certain videos.

When going to video mode in those studies that have videos, the following screen will appear:

It will be necessary to press the lowercase 's' key (S) (verify that the uppercase function of the keyboard is disabled) to confirm the conversion of video number one. If you want to cancel the operation, press the 'n' key (N) (check that the uppercase function is disabled).

When you confirm, the following screen appears:



At the end of conversion, the video will start to play on the right side of the screen.

To convert the rest of the videos, simply click the left mouse button on the previous image of the video.

Important: The number of videos in temporary memory will be limited to 9 videos in the maximum recording time. Once the limit is reached, the equipmentwill display a warning sign.

ADD NEW IMAGES TO A PREVIOUS STUDY

It will be enough to open the previous study, make new captures or even edit previous images.

ADD NEW VIDEOS TO A PREVIOUS STUDY

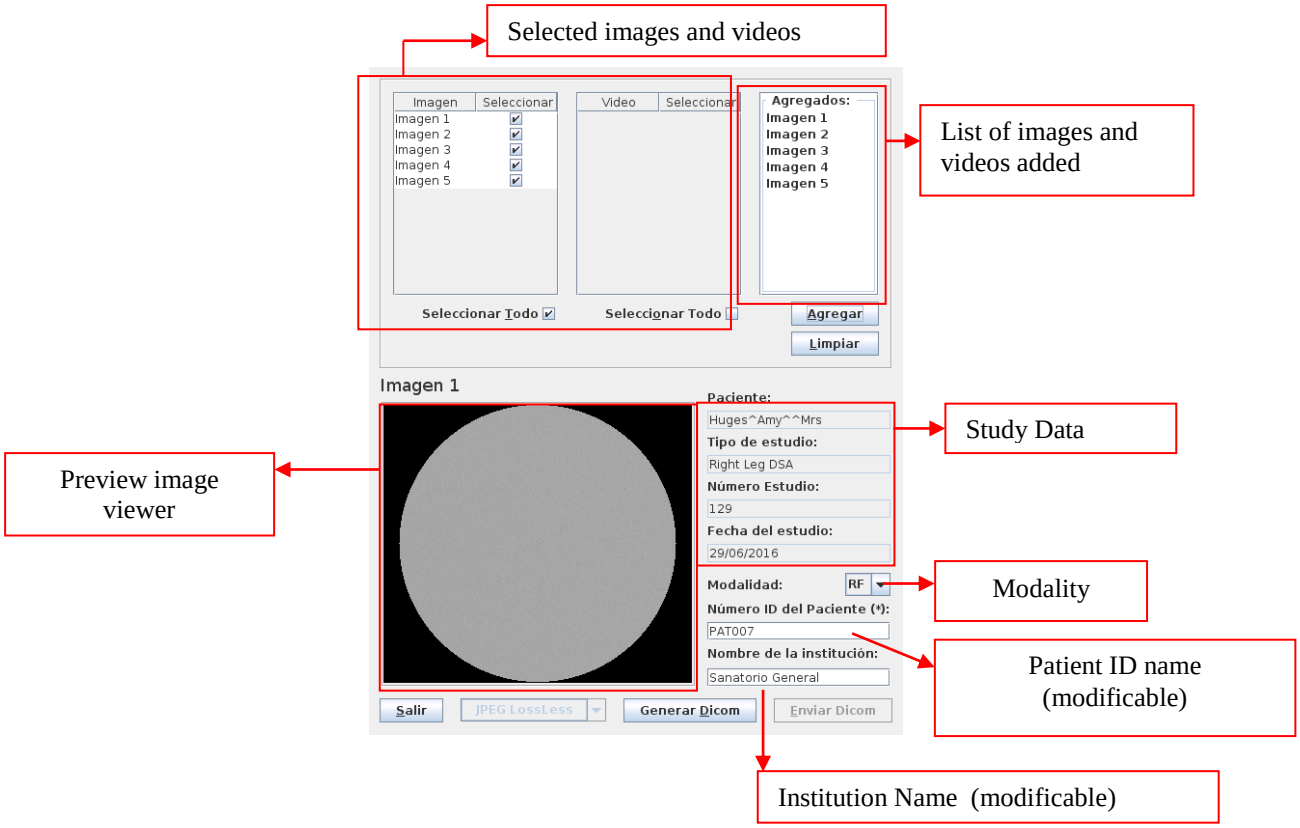
It will be enough to open the previous study and make new catches. It will not be necessary to reconvert the previous videos, which will allow to exceed the limit of temporary videos by study.

The new videos will be stored in the temporary memory, for that reason, at the end it will be necessary to save new videos added.

DICOM IMAGES AND VIDEOS GENERATION.*

You must click the left mouse button on the icon (DCM), accessing the following window:

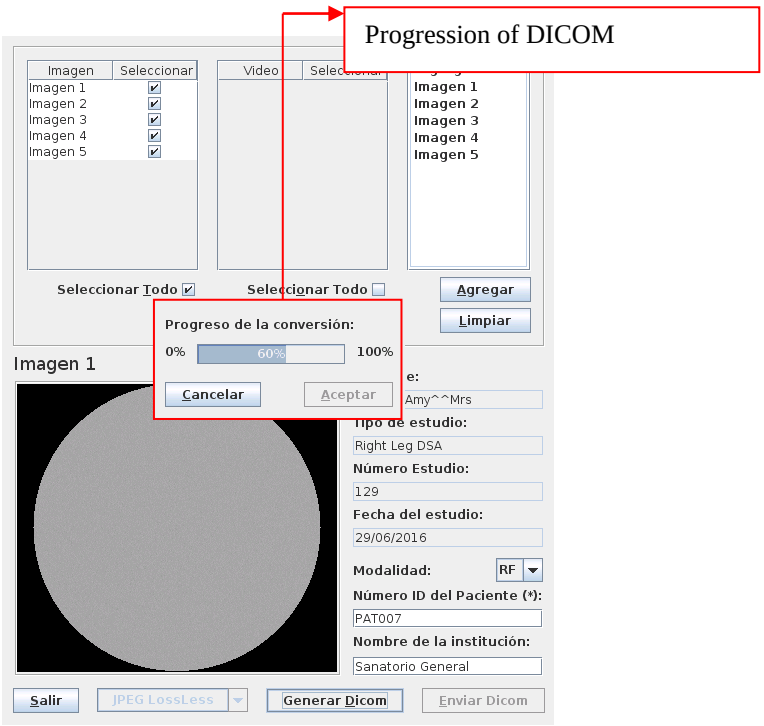
Clicking the "Convert / Send Dicom" button will open the following window:



Important (1): The patient ID number must be completed.

By using the tildes, you must select the images and videos that you want to convert to DICOM. At the end of the selection, they must be added in the conversion list by pressing the 'Add' button (the 'Clear' button will delete the entire list), the list of 'Added' will immediately be updated with the selected items.

Once the list is finished, the button 'Generate Dicom' must be clicked in order to start generating the files:



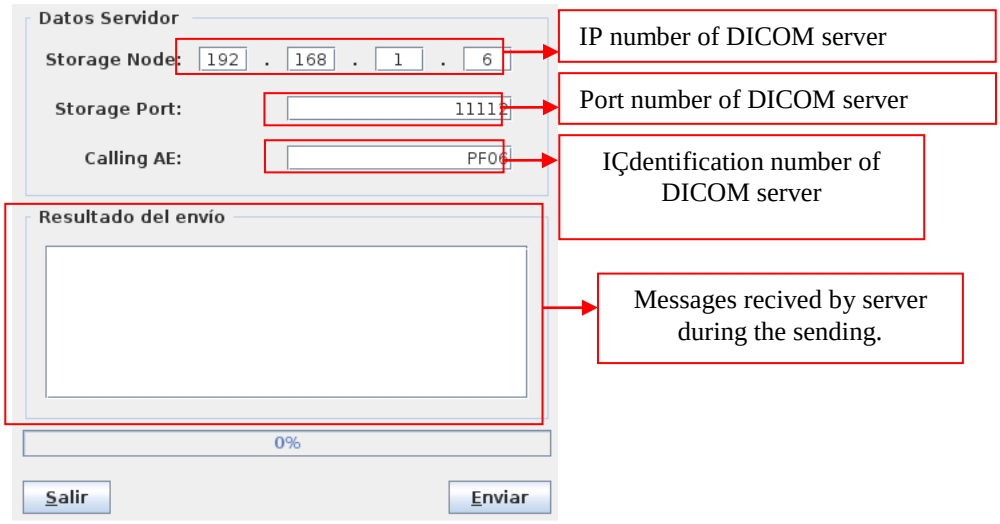
At the end of the conversion, the DICOM files will already be available on the Pen Drive in the study directory. In addition the 'Send Dicom' button will be enabled.

Important (2): If you open a previous study, until you have not converted all the videos, the equipment will not be able to convert the videos to DICOM.

***:Optional available according to the model purchased.**

SEND DICOM IMAGES.*

You must click the left mouse button on the button 'Send Dicom', accessing the following screen:

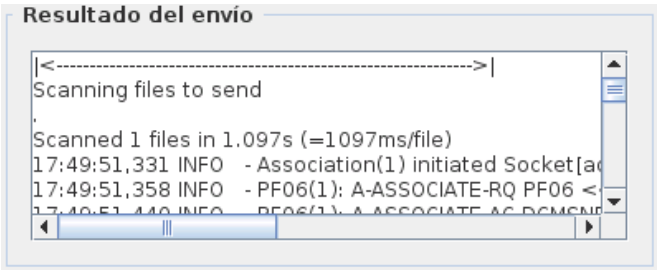


At first, all data in the window will depend on the initial configuration set, which can be modified temporarily.

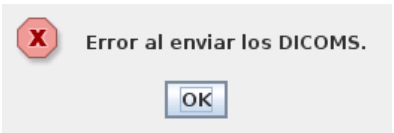
With the correct data, it will be necessary to press the 'Send' button to send the DICOM images through the Ethernet network.

If the sent could be completed, the following warning will appear:

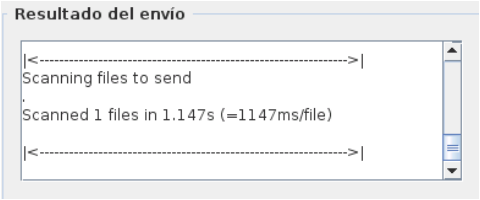
You can check the messages received by the server:



If the sent could not be completed, the following warning will appear:



Error messages can be checked:



The image shows that the DICOMS files are found, but there was no possible connection to the server.

Important (1): Each time you open a previous study, it will be necessary to convert the images to DICOM.

Important (2): You can not send videos in DICOM format.

***:Optional available according to the model purchased.**

CREATE DICOM VIDEOS (ALTERNATIVE) *

When you save a video, the system will ask if you want to do it in AVI or DICOM format. In case of saving the video in DICOM, the conversion will be exactly the same as the DICOM generation previously mentioned.

To save the video in DICOM format, it will be necessary to press the 'd' lowercase key (D) (verify that the uppercase function of the keyboard is disabled).

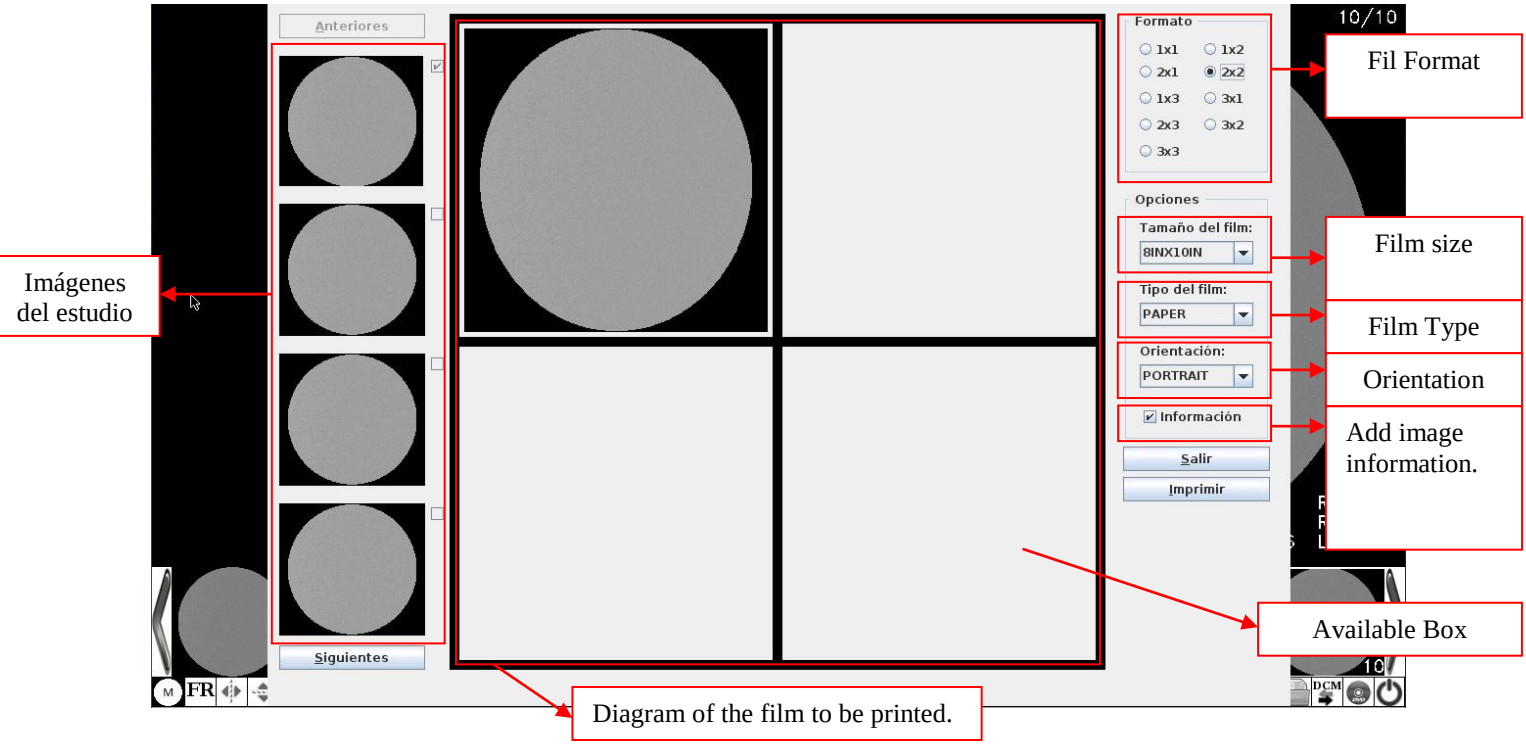
Important: saving only one video in DICOM format, will not allow you to open it in a studio, it can only be viewed with a DICOM viewer.

*:Optional available according to the model purchased.

PRINTING IMAGES WITH DICOM PRINTER*

You must click the left mouse button on the icon (DCM), accessing the following window:

Pressing the "Print Dicom" button will open the following window:



On the left you can see the images of the study. By using the "previous" / "next" button, all available images can be scanned. Clicking the left mouse button on an image will be selected (it will be marked with the check on the right side), then clicking the left button on any of the available boxes of the Film model will add that image. The images of the boxes used, can be replaced using the same method.

It will be necessary to select the correct size and type of Film to use, as well as the orientation of the printing.

The images can be printed with the information of the study or in case this information is not necessary, it can be discarded by unchecking the "Information" box.

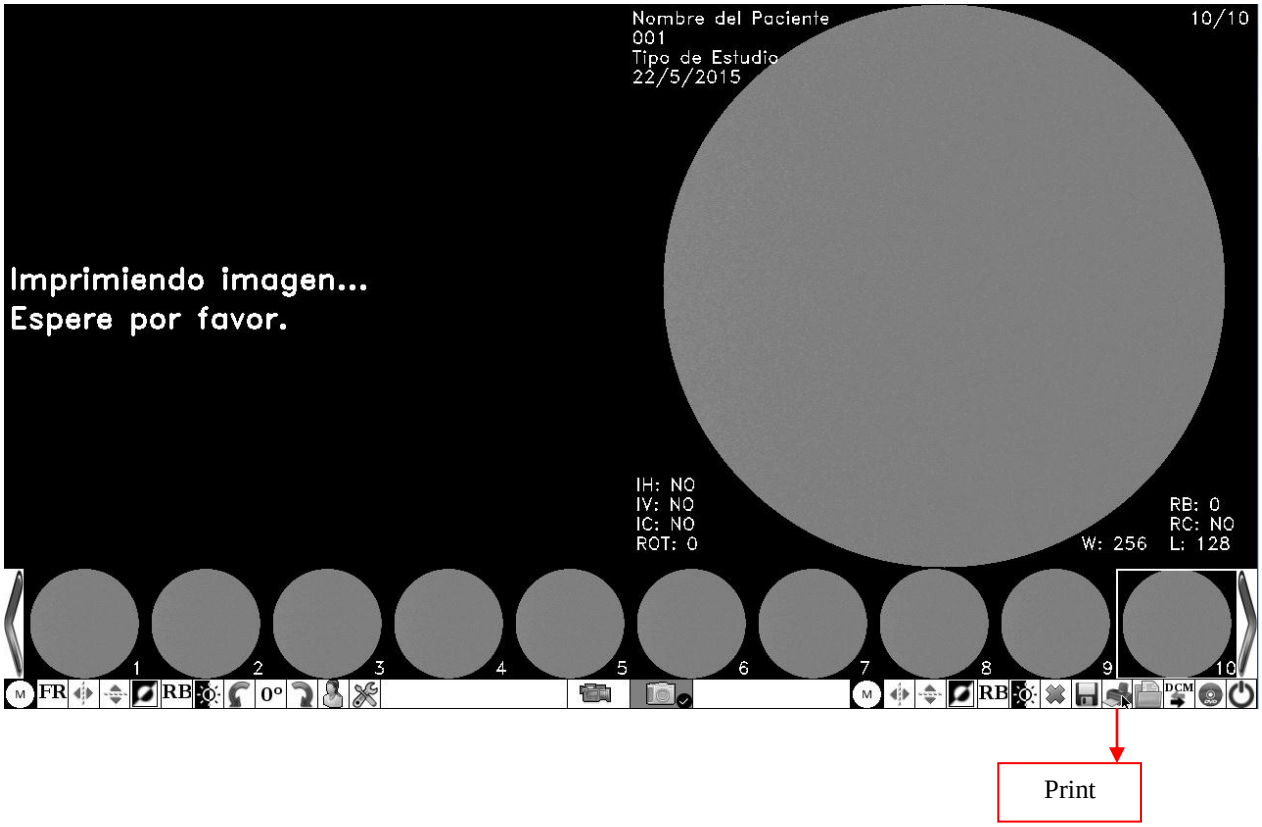
By pressing the "Print" button, the machine will perform a previous conversion and finally give the print order.

***:Optional available according to the model purchased.**

PRINTING IMAGES WITH STÁNDARD PRINTER

The computer will allow you to print captured images using an **LASER JET PRO M12W** USB printer.

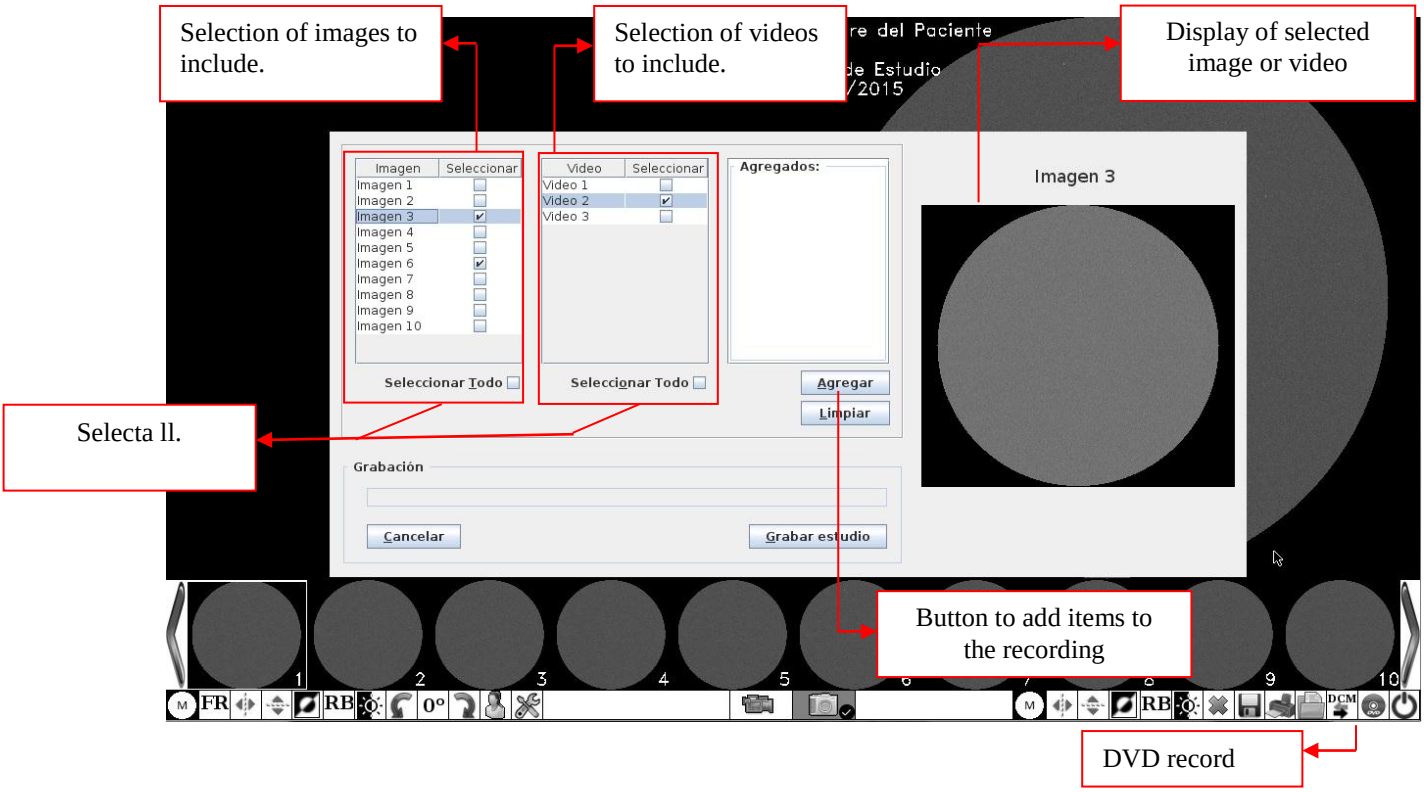
In image mode, you can print the selected image by clicking on the icon ( ):



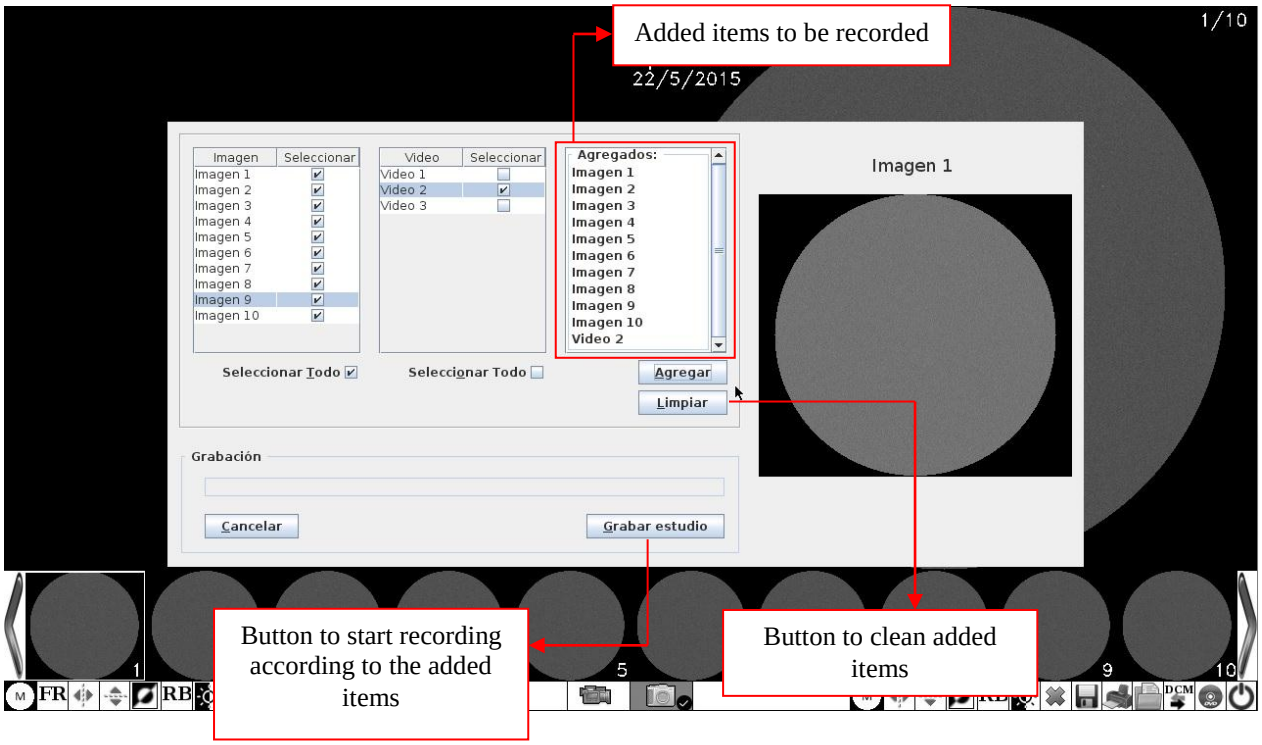
In video mode it will print the selected frame by pressing the icon ( ).

DVD WRITE*

The computer will allow you to record the BMP images, AVI and DICOM videos created in the study. You must press the mouse left button on the icon ( ), either in image or video mode, accessing the following screen:



By clicking on the 'Add' button, the selected images and videos will be added:



If previously DICOM files of the images and videos were generated, they will be added automatically with the selected images and videos. In case the study does not contain videos in AVI format, the user will have the option to add the videos in DICOM format. In the following example the video 4 is not in AVI format, but if in DICOM format, pressing the 'Record Studio' button will show the following window:

You must select the DICOM videos to be recorded. This last window will only appear if certain videos have not been saved in AVI format, but in DICOM format. With the selected DICOMS videos, the user will be asked to confirm the recording:

The message will indicate the files to be recorded, images (BMP), videos (AVI) and DICOM (images and / or videos, with the DICVIEW viewer added to the DVD). Pressing the 'Ok' button will start recording.

Important (1): the computer will not burn CDs, you can only burn DVDs.

Important (2): the equipment will not be able to differentiate CDs from DVD's.

*:**Optional available according to the model purchased.**

USING VARIOUS PEN DRIVE

Several Pen Drives can be used on the same computer.

The Pen Drive will need to be formatted in FAT32 with the name MEMORAD.

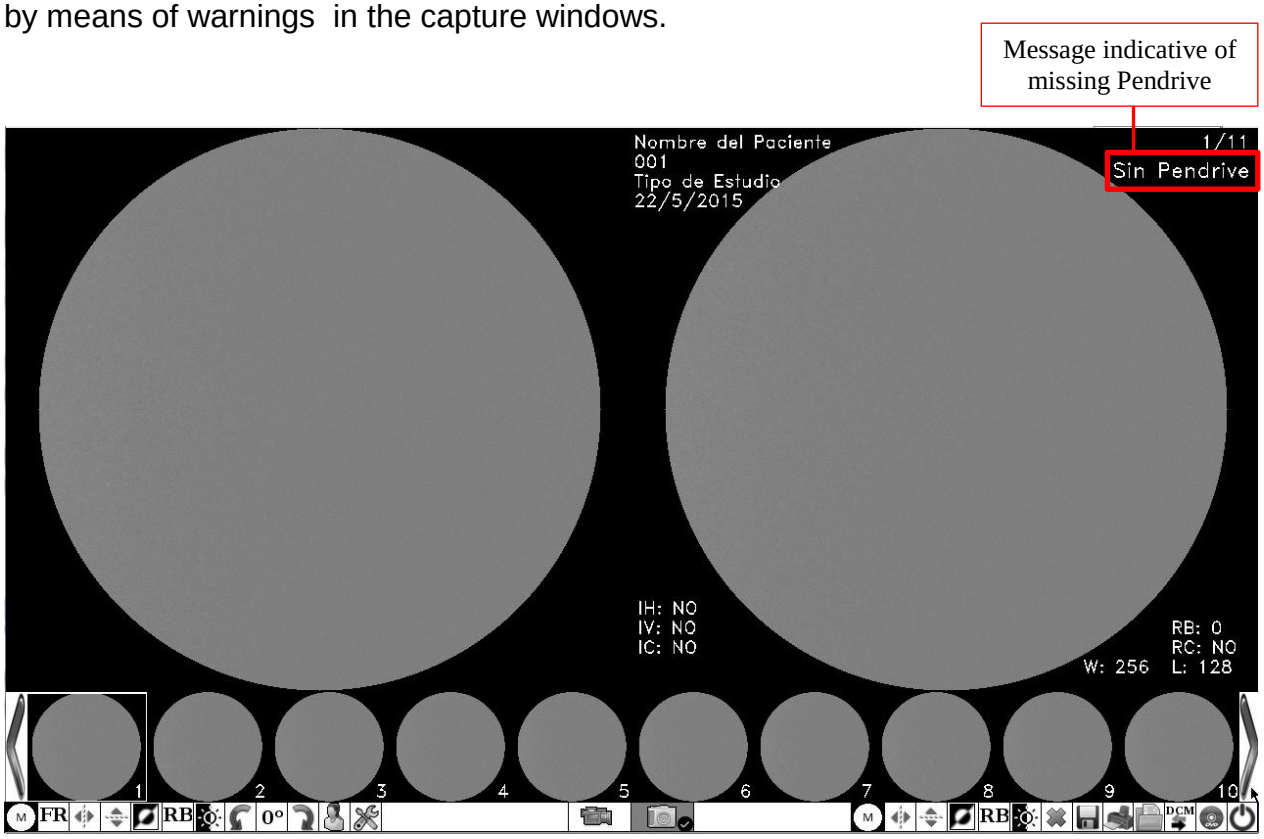
Important: To exchange the Pen Drive it will be necessary to turn off the computer.

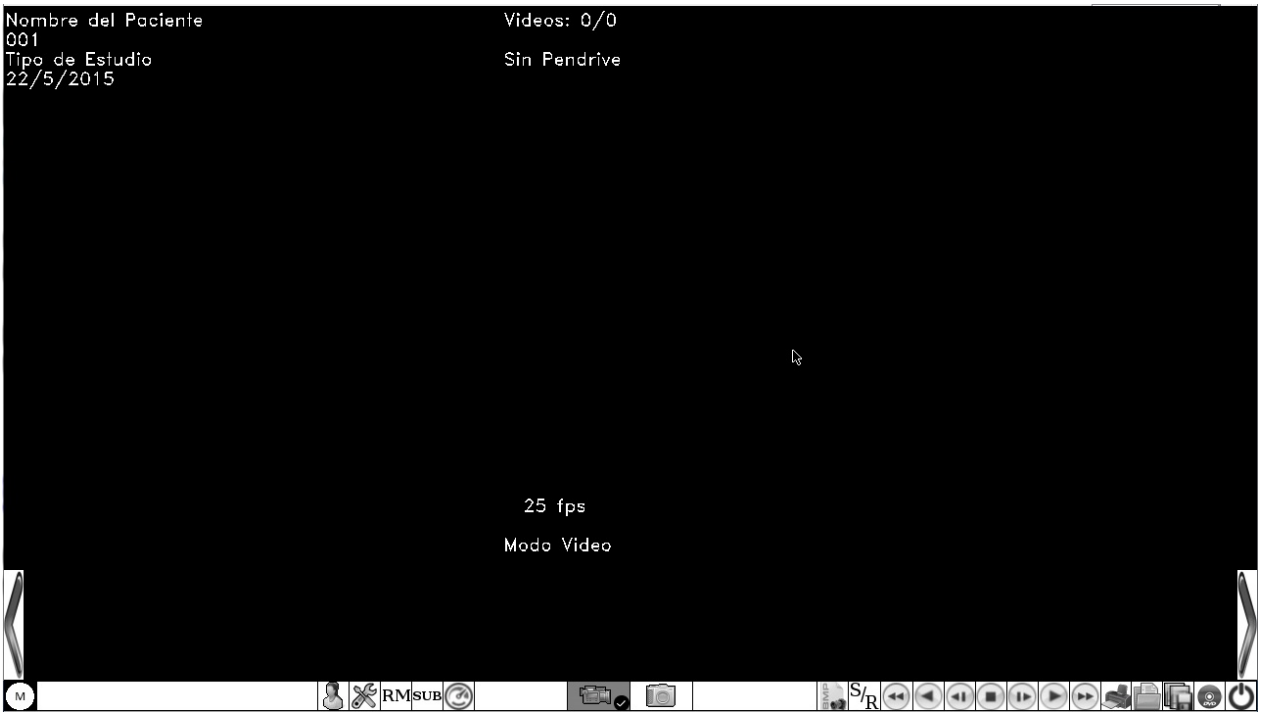
SESSION WITHOUT PENDRIVE

The equipment will be able to work without Pen drive, allowing only the capture of images. Can not save the captured videos or generate Dicoms files.

On the other hand, all studies performed in this condition, will be eliminated in the next session, can only be saved through network transfer.

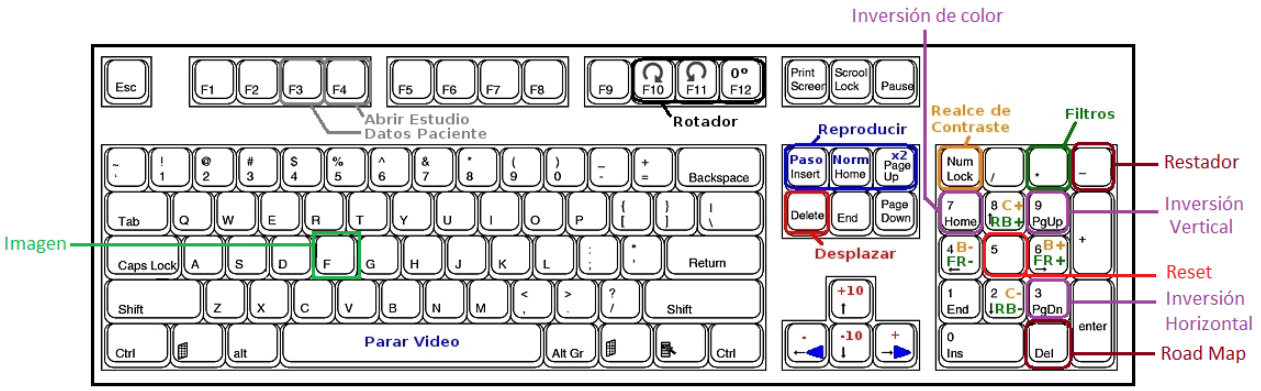
The equipment, in this situation will warn the user during the beginning of the session and by means of warnings in the capture windows.





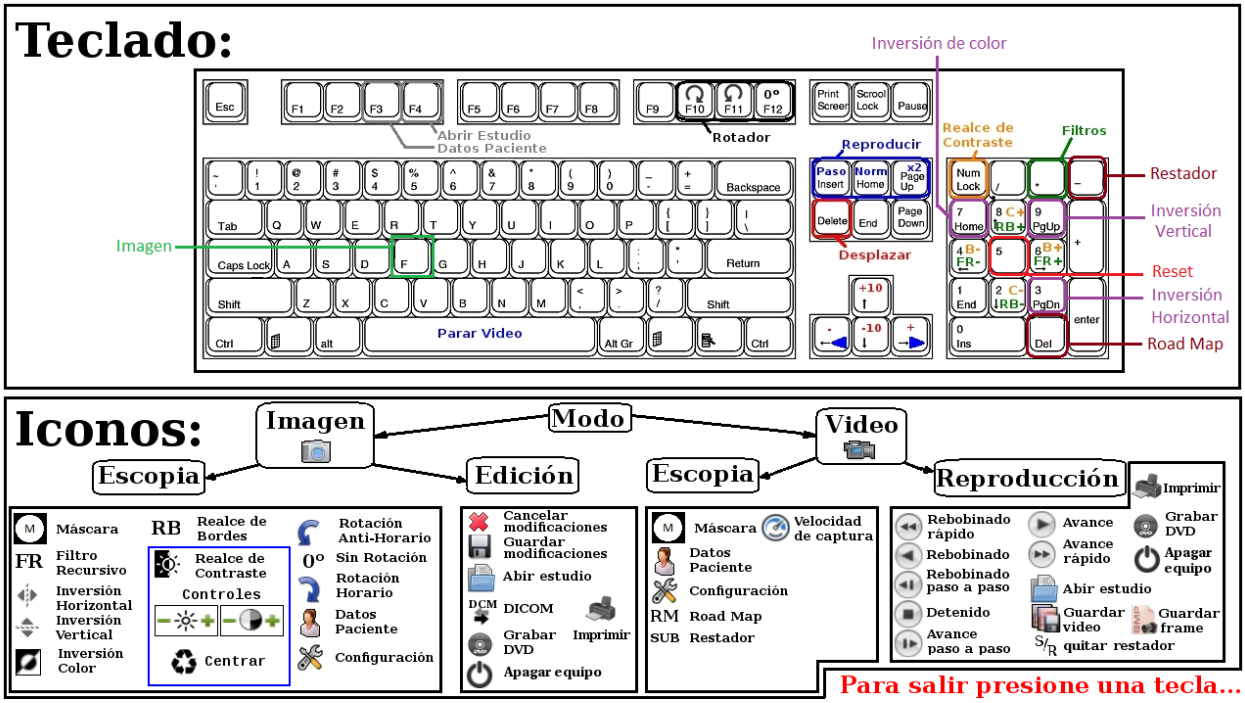
Important: All studies saved during the session will be deleted in the next one.

KEYS USED ON THE USB KEYBOARD



ACCESS TO KEYMAP INFORMATION AND ICONS

Pressing the 'F1' key () will access the following screen:



VIDEO SIGNAL DETECTION

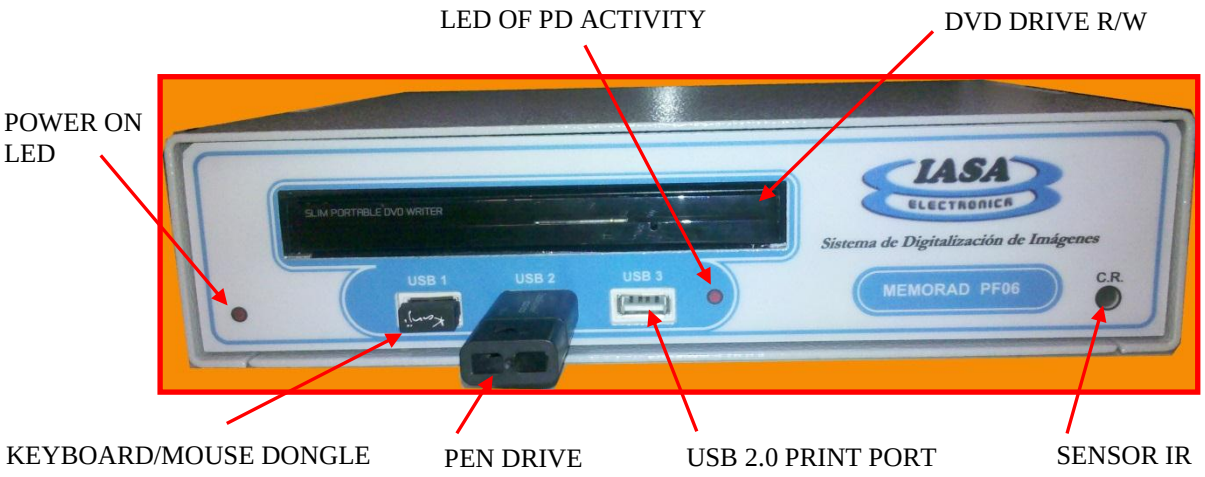
During the start up, the unit will emit two tones in case of having a video signal or a single tone in the absence of video.

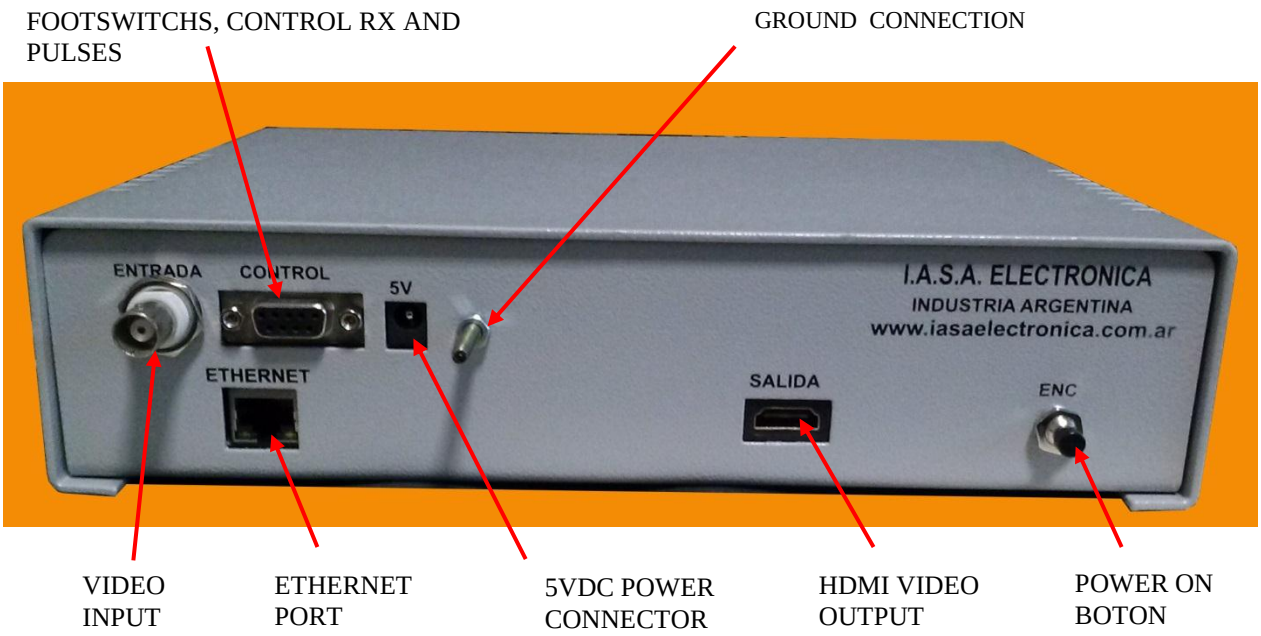
SYSTEM SHUTDOWN

To turn the computer off, press the left mouse button on the icon () and confirm using the lowercase 's' key( (verify that the uppercase function is disabled).or press the ENC push switch located on the back of the computer.

INSTALLATIÓN

REAR AND FRONT CONNECTORS ON DVD CASE PF06





REAR AND FRONT CONNECTORS ON SMALL CASE PF06S

POWER ON LED

ACTIVITY LED

KEYBOARD/MOUSE DONGLE

HDMI VIDEO OUTPUT

PEDALS, CONTROL RX AND PULSES

VIDEO INPUT

ETHERNET PORT

5VDC POWER CONNECTOR

The installation procedure is as follows:

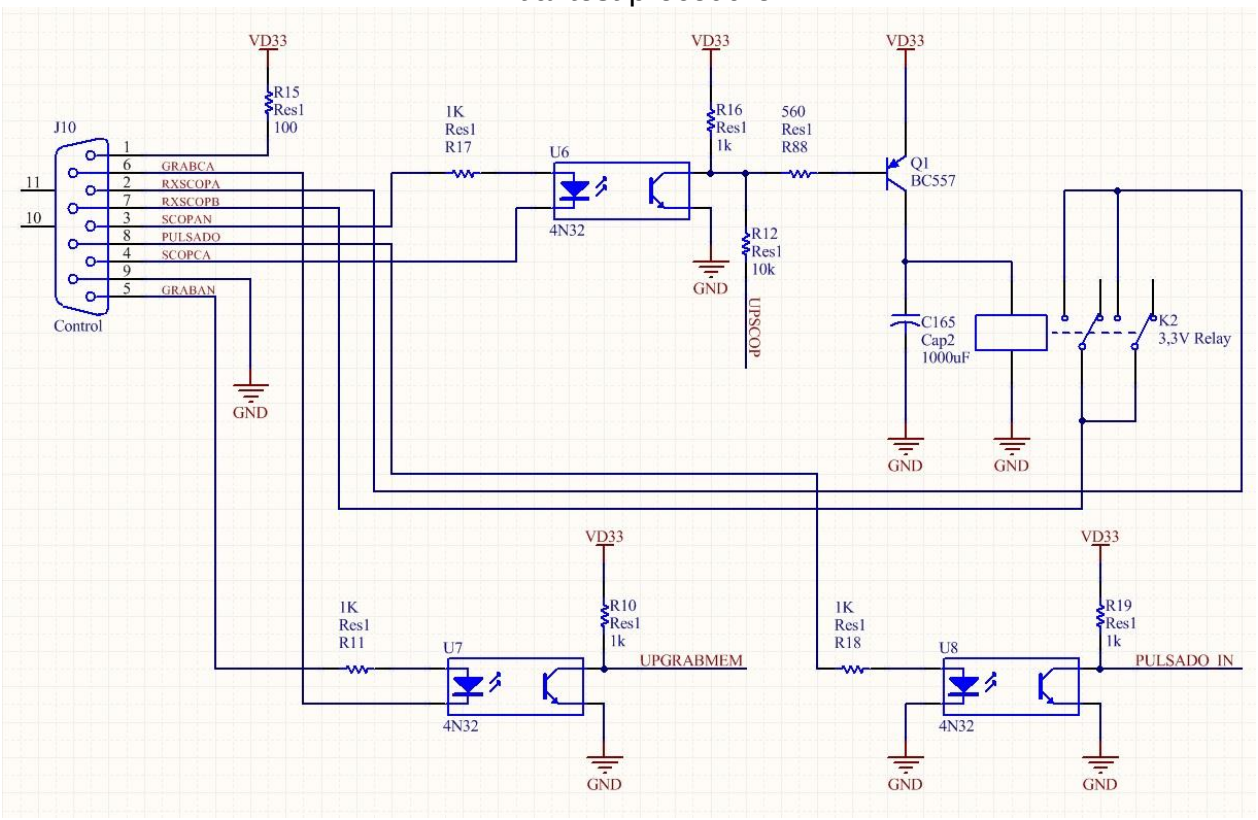
a) Interrupt the coaxial line from the TV camera to the monitor. Connect the camera to the BNC input of the memory (INPUT).

b) Connect the monitor to the connector marked (OUT) on the HDMI1 connector and set the monitor to that input (Input HDMI1).

c) The equipment has a DB9 control connector that must receive the scoping signal and the memory recording signal. These signals are handled by opto couplers that can be used to isolate the Rx equipment from digital memory.

The following is the circuit of this interface:

Initial test procedure



d) For the initial ignition test, connect pins 1,3 and 5 to feed the optocouplers anodes, placing two keys or buttons that simulate the footswitches. One between pin 4 (SCOPAN) and pin 9 (GND) to simulate the scoped footswitch and another between pin 6 (GRABMAN) and pin 9 (GND), to control the recording of still images and videos. For the definitive connection, the opto coupler can be activated independently of GND and + 3.3V from the digitizer, to achieve an adequate isolation from the RX equipment.

The card has a built-in delay circuit of 100 ms to allow the last image to be retained. The output of this circuit is the contacts of a normal relay open on pins 2 and 7 of the DB9 connector. These contacts close when the opto-scopia coupler circuit is closed and are opened 100 ms after the power of this opto coupler is de-energized so that the

RX equipment continues to light during that time in order to allow the memory Capture the last image correctly.

For the initial test it is not necessary that these pins are connected.

e) Turn on the RX equipment, your TV camera and the monitor. The digitizer turned off does not drive the video signal, so the monitors will not see the image.

f) Connect a power line of 5V 2.5A (provided with the equipment) to the digitizer with the positive in the center.

In the case of using a power supply other than that provided with the equipment, it is very important to verify that it is regulated and does not exceed 5Vdc.

g) Turn on the Digital Memory with its power switch on the front.

If the power supply is correct, a red LED on the control panel lights up.

When the power is on, the device will start with the preset configuration.

After this, the equipment will request the patient's data and once entered will be enabled with the OSD referring to the patient.

When the **pin 4 (SCOPCA)** with **pin 9 (GND)** of the DB9 control connector is connected for this first test, the image coming from the camera on the left side of the screen will be displayed. Radioscopy can be done to appreciate an RX image and freeze it by disconnecting **pin 4** from **pin 9**.

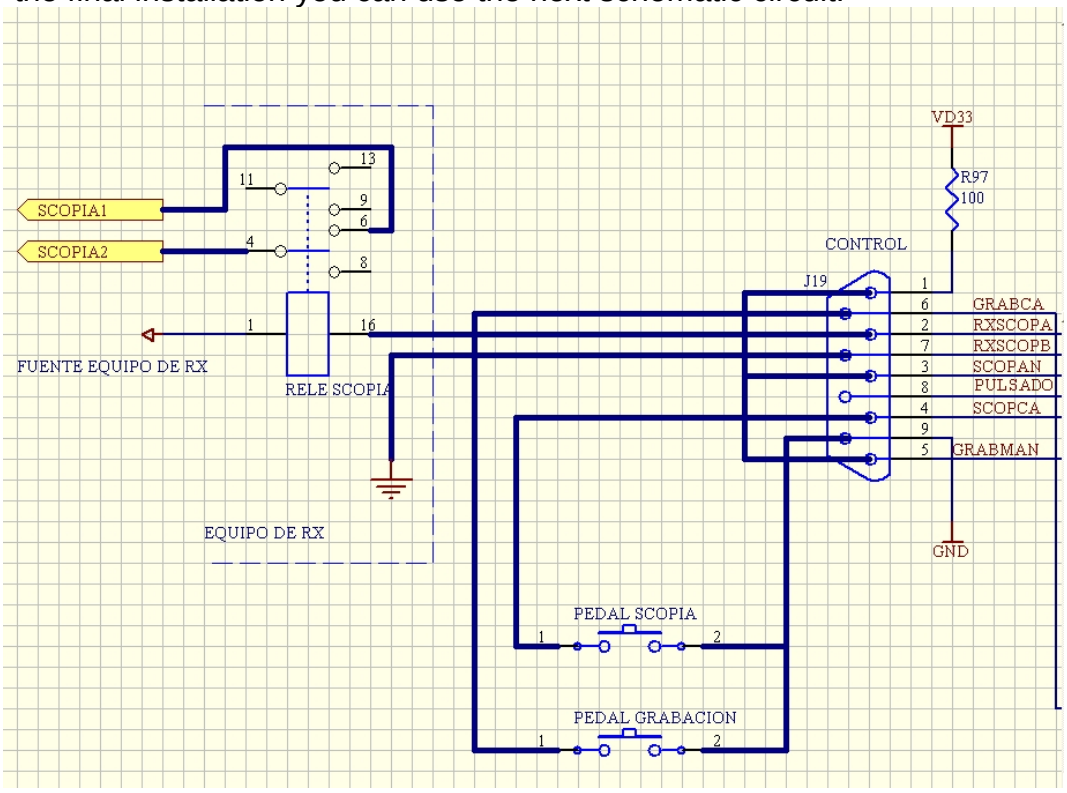
h) With the live image **(pin 4 and 9 attached)**, check the keyboard operation as indicated in the **OPERATION** section of this manual.

Momentarily connecting the **pin 6 (GRABCA)** with **pin 9 (GND),** will record the image being displayed on the left side of the screen, on the right side of the screen. If these pins are held together, images will be recorded sequentially at one frame per second while held together.

When the last available image is reached, it will continue to be recorded from the first one.

The images are recorded as they are seen on the left side of the monitor.
For more detail, refer to the **RECORDING OF IMAGES IN THE STUDY** section of this manual.

i) For the final installation you can use the next schematic circuit:



Important: In order to achieve better isolation between the RX equipment and the memory, an external source for the optocouplers can be used by disconnecting pins 1 and 9 from the DB9 connector, which will separate GND and VCC from the digitizer of the control part of the RX equipment.

j) To achieve the "last frozen image" effect, **pin 9 (GND)** and **pin 4 (SCOPCA)** must be connected to a normal open relay that is closed when the radioscopy footswitch is pressed, independent of the rest of the circuit and free of All external voltage. These contacts will be closed when the footswitch is pressed by activating the digital acquisition, and will open when the footswitch is released, freezing the last image. If the board's own delay circuit is used, the Scopia's footswitch can be connected directly to the DB9 connector as indicated on the circuit, but it must be ensured that it is completely free and independent of the circuit of the RX equipment.

The card has a built-in delay circuit of 100 ms to allow the last image to be retained. The output of this circuit is the contacts of a normal relay open on pins 2 and 7 of the DB9 connector. These contacts close when the opto-scopia coupler circuit is closed and are opened 100 ms after the power of this opto coupler is deactivated so that the RX equipment continues to light during that time in order to allow the memory Capture the last image correctly.
The optocoupler can also be used without using the own power supply, using an external source. Note that in series with the photodiode there is a resistance of 1K. Do not exceed 20 mA.

The monitor must be connected to the video output connector using an HDMI cable version 1.0 onwards.

k) To complete the installation, configuration settings must be made. These include gain and offset settings of the input amplifier, selection of video circuit bandwidth, adjustment of the dimensions and position of the electronic circle, etc.

To make these adjustments, it is necessary to enter the configuration mode in the **INITIAL CONFIGURATION OF THE EQUIPMENT** section.

VERY IMPORTANT: The video signal must be free of parasitic noise, for example from high frequency generators, motors etc. These parasitic signals can seriously affect the operation of the memory in the separation of synchronisms and generation of clock causing disturbances in the image. These noises can also enter through the power line. The purity of the video signal and the 5V power supply must be checked to be an oscilloscope.
In case the parasitic signals appear, they can be filtered through the use of ferrite toroids. In the case of the power line, a toroid of about 3 or 4 cm in diameter can be used, giving about 10 turns of both cables (5V and gnd) on it, securing it with seals so that a filter for high frequencies is configured. In the case of the video line, the same can be done with a slightly larger toroid using thin coaxial cable, giving it about 10 turns around the body of the toroid fixing these turns with plastic seals. At the ends of the coaxial cable, a pair of male-female coaxial connectors can be assembled so that a filter is configured that can be put in series with the video signal. This filter can be placed directly in series with the input connector of the memory card or at the output of the TV camera.

DB9 CONTROL CONNECTOR PINOUT

PIN 9: GND
Common point for control signals.
PIN 1: +3.3V
Voltage output from the power supply through a 100 ohm resistor.

PIN 4: SCOPCA
Optocoupler cathode that controls recursive filter memory recording that is seen on the left side of the monitor. It can be connected to GND to pins 7 or 8 or used in isolation together with the anode to activate the circuit.

PIN 3: SCOPAN
Anode of the opto coupler that controls recursive conflation recording that is seen on the left side of the monitor. It can be connected to pin 1 and 2 or used in isolation together with the cathode to activate the circuit. It has in series a resistance of 1K.

By activating the opto coupler, the live image can be visualized through the recursive filter. If the opto coupler is not activated, the filter memory is not recorded, leaving the image frozen.

PIN 6: GRABMCA
Opto coupler cathode that controls the recording of still images and videos to be viewed on the right side of the monitor. It can be connected to GND to pins 7 or 8 or used in isolation together with the anode to activate the circuit. If there is no expansion module installed this line has no use and should be disconnected.

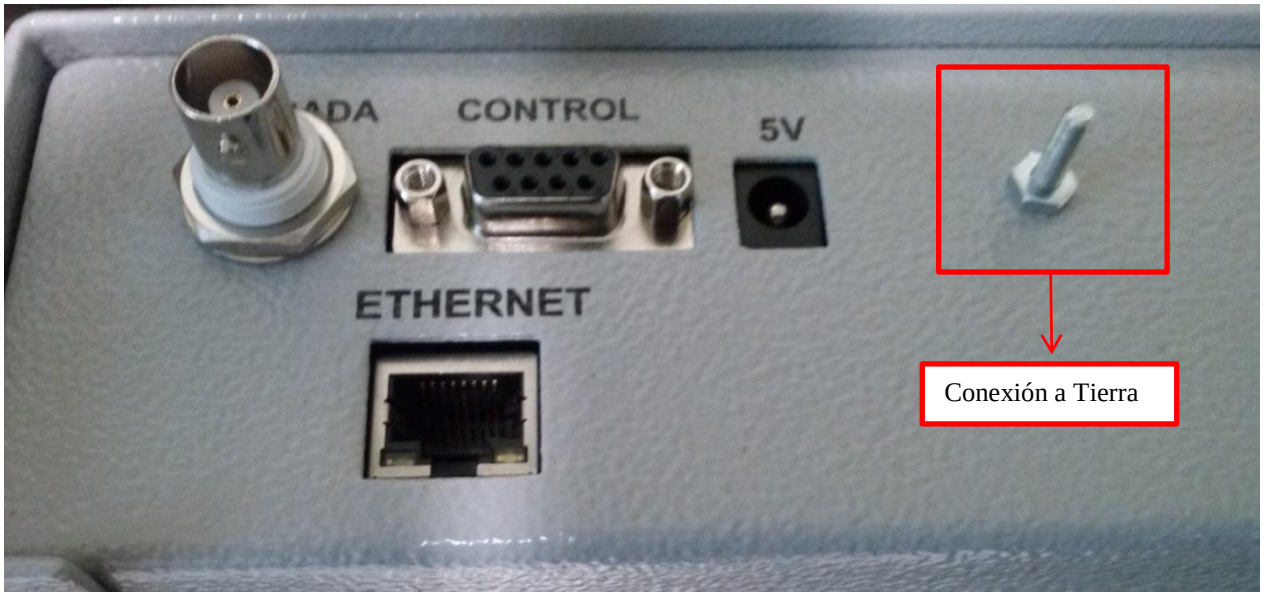
PIN 5: GRABMAN
Ánodo del opto acoplador que controla la grabación de las imágenes fijas y videos que se verán en el lado derecho del monitor. Puede conectarse al pin 1 y 2 o utilizarse en forma aislada junto con el cátodo para activar el circuito. Para su utilización, referirse al manual del módulo de expansión de memoria instalado. Si no hay módulo de expansión instalado esta línea no tiene uso y debe quedar desconectada. Tiene en serie una resistencia de 1K.

PIN 8: ENTRADA ESCOPIA PULSADA *(only for pulsed equipments)*
Optocoupler anode that controls the pulse mode scoping. It has in series a resistance of 1K.

When the opto-coupler is activated, the live image can be displayed. If the opto coupler is not activated, the image will be frozen.

PIN 2,7: RXSCOPA, RXSCOPB
Output relay contacts for delayed control of RX equipment

GROUND CONNECTOR

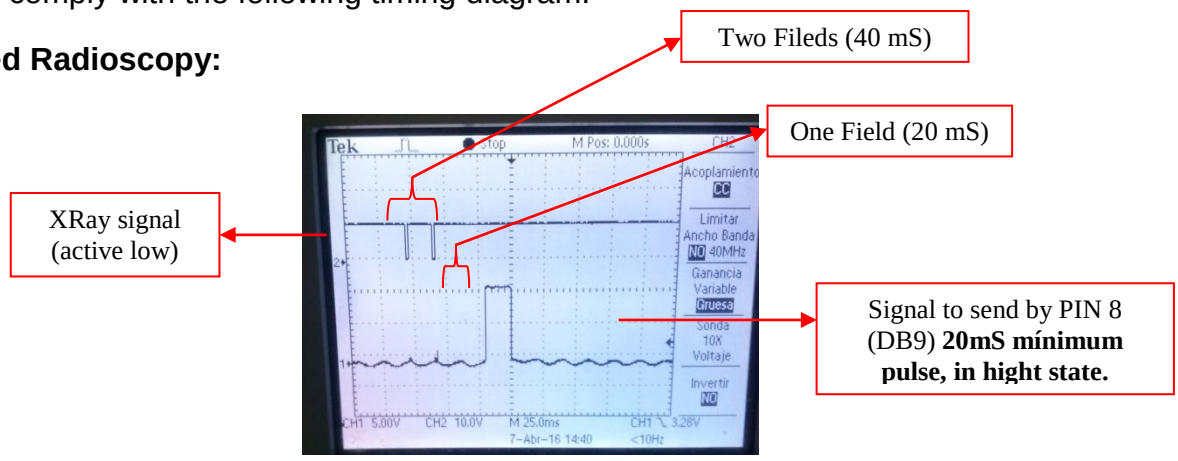


It is recommended to connect the equipment to the ground that owns the electrical installation in conjunction with the monitor or TV to be used.

PULSED SIGNALS (ONLY FOR PULSED EQUIPMENTS)

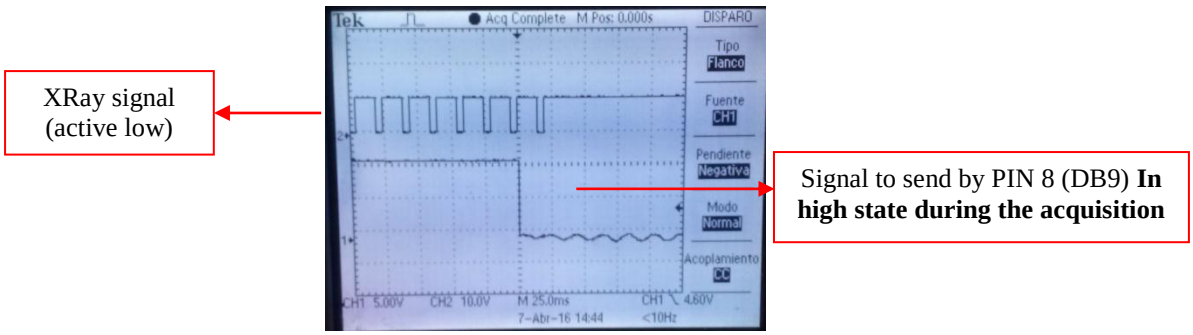
In the pulsed equipment with interlaced video, the signals to be received by PIN 8 of the DB9 must comply with the following timing diagram:

- **Pulsed Radioscopy:**

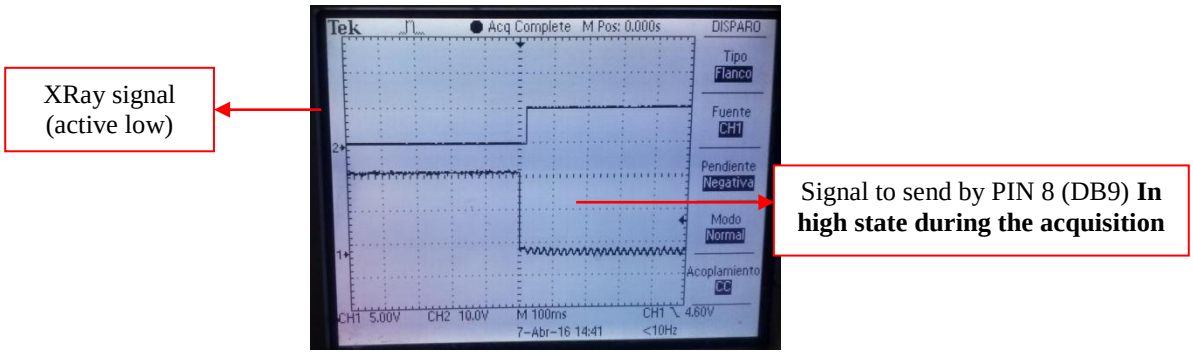


The pulse of PIN 8 must be synchronized with the field (low state) of the video signal. It is recommended that this synchronization can be performed in both low and high state.

- **Pulsed Radioscopy at 25 frames per second:**



- **Continuous Radioscopy:**



SYSTEM CONFIGURATION

The device will allow you to define the boot configuration such as:

- Type of video signal.
- Gain and offset of input video amplifier.
- Mask Enable:
- Recursive filter level on power on.
- Edge Enhancement Filter level on power on.
- Antiflicker.
- Gamma curve.
- Horizontal Invertion.
- Vertical Invertion.
- Color Invertion.
- DICOM server, DICOM printer data, DICOM WorkList.
- Network.
- Version.

To enter the menu you must press the left button with the mouse on the icon ( ), either in image or video mode.

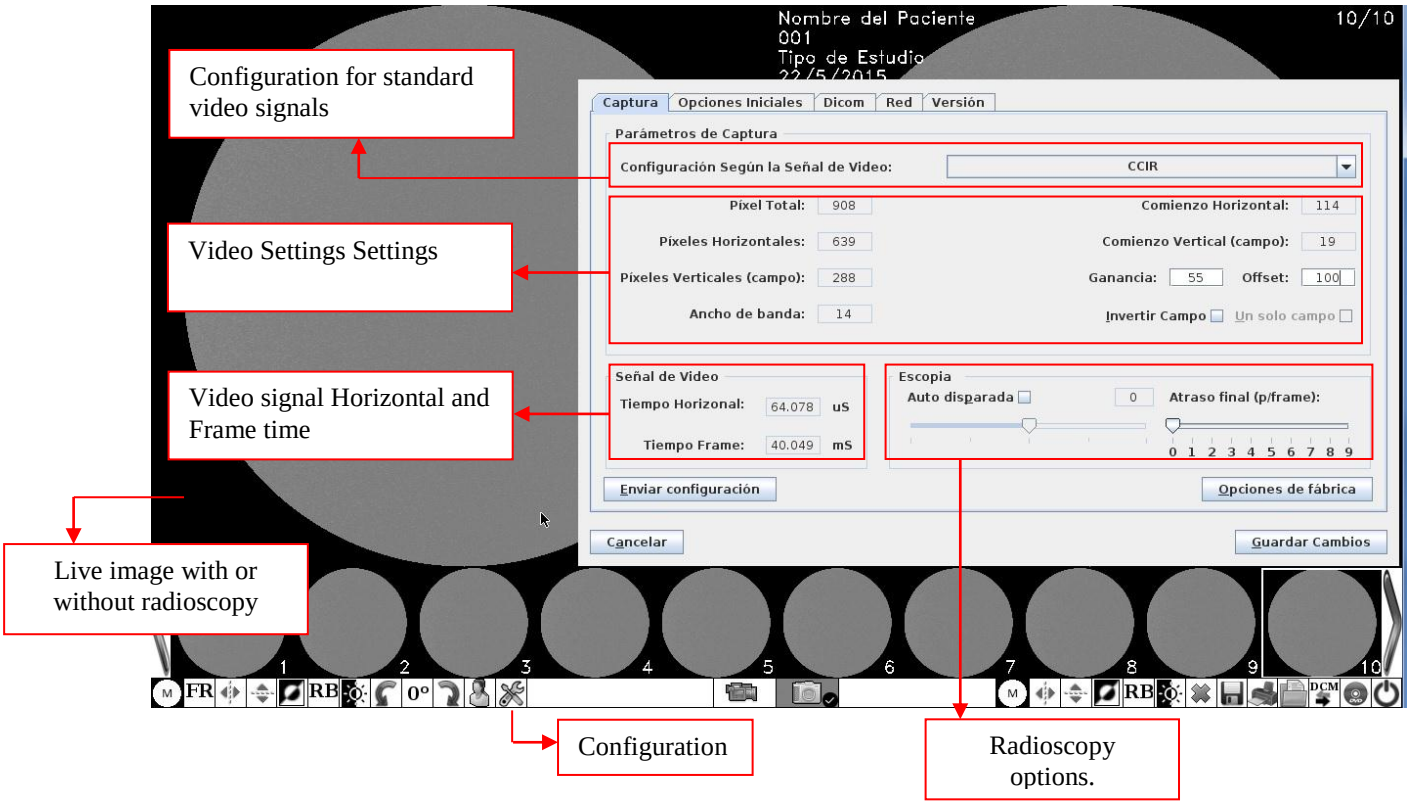
CONFIGURATION PASSWORD

To avoid access to the configuration menu ( ) of the untrained personnel, a password was implemented:

Password: “**servicio**” (lowercase).

ACQUISITION CONFIGURATION

To enter the configuration menu you must press the left button with the mouse on the icon ( ), either in image or video mode:



You can configure the video using preset options of standard video signals (except gain and offset) or a user defined one. This last option will allow you to modify the values of the video configuration.

You can modify the number of pixels per line, the active line portion, the beginning of the active zone within the line, the number of total lines, the number of active lines and the start line of the active zone. This will allow you to adjust the geometry and position of the digitized image.

Another possible setting in this initial setup is the Bandwidth ranging from 14 (maximum) to 1 (minimum). A high value will allow you to obtain an image with more defined edges. If there is noise or interference bands in the live image, this value can be lowered until these interferences disappear.

You can also reverse the initial field of acquisition and use a single field (antiflicker).

Within this window there is a horizontal and field time meter (every two vertical pulses) to help identify the type of incoming video and verify its presence.

Radioscopy options will allow you to configure your equipment behavior during the acquisition. (See AUTO-ESCOPIA and ESCOPIA WITH DELAY ON FINISHING).

When using the 'Send Configuration' button, the equipment will show on the left side of the screen the live video with the changes made.

When you press the 'Factory Options' button, the unit will return to the factory settings in the 'Capture' window.

The 'Save Changes' button will allow you to save the changes made to all windows.

Important: The changes that will be made in this window, must be carried out by trained personnel since they may cause equipment malfunction.

TYPICAL TIMING ACCORDING TO THE VIDEO SIGNAL

Video signal	Horizontal time (uS)	Field time (Vs x 2) (mS)
CCIR	64	40
RS170	63,5	33,33
VideoMed	63,5	33,33
HR1249E	32	40

ACQUISITION CONFIGURATION (USER DEFINED)

From the setup menu (), in the capture window and selecting the "According to the Video Signal Settings" in "User Defined":

- **Total Pixel:** As its value increases, the image will widen and vice versa.
- **Horizontal Pixels:** Sets the number of horizontal pixels the image will have (0 to 640).
- **Vertical Pixels (field):** sets the number of vertical pixels per field that the image will have.
- **Bandwidth:** Limits the bandwidth of the video signal (0 to 14). The lower the value, the lower the bandwidth.
- **Horizontal Start:** sets the horizontal start of the active window of the video signal.
- **Vertical Start:** sets the vertical start of the active window of the video signal.
- **Gain:** sets the gain of the analog-to-digital (contrast) converter.
- **Offset:** sets the offset of the analog-to-digital converter (brightness).

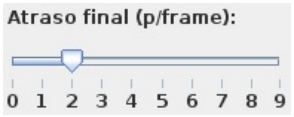
SELF-SHOT RADIOSCOPY

The equipment allows to perform automatic radioscopy (without the use of the footswitch of radioscopy) to avoid a direct connection with the ray equipment, facilitating the installation. In the configuration menu ( ), from the capture window, you can enable this feature:

The bar will be used to set the minimum brightness tolerance at which the equipment will perform radioscopy. You can set values from 0 to 100% of brightness, as the tolerance increases, the image should have a higher brightness for the equipment to capture, so the tolerance should have a margin of commitment to avoid false shots and take Images with a certain minimum level of brightness.

RADIOSCOPY WITH DELAYED END

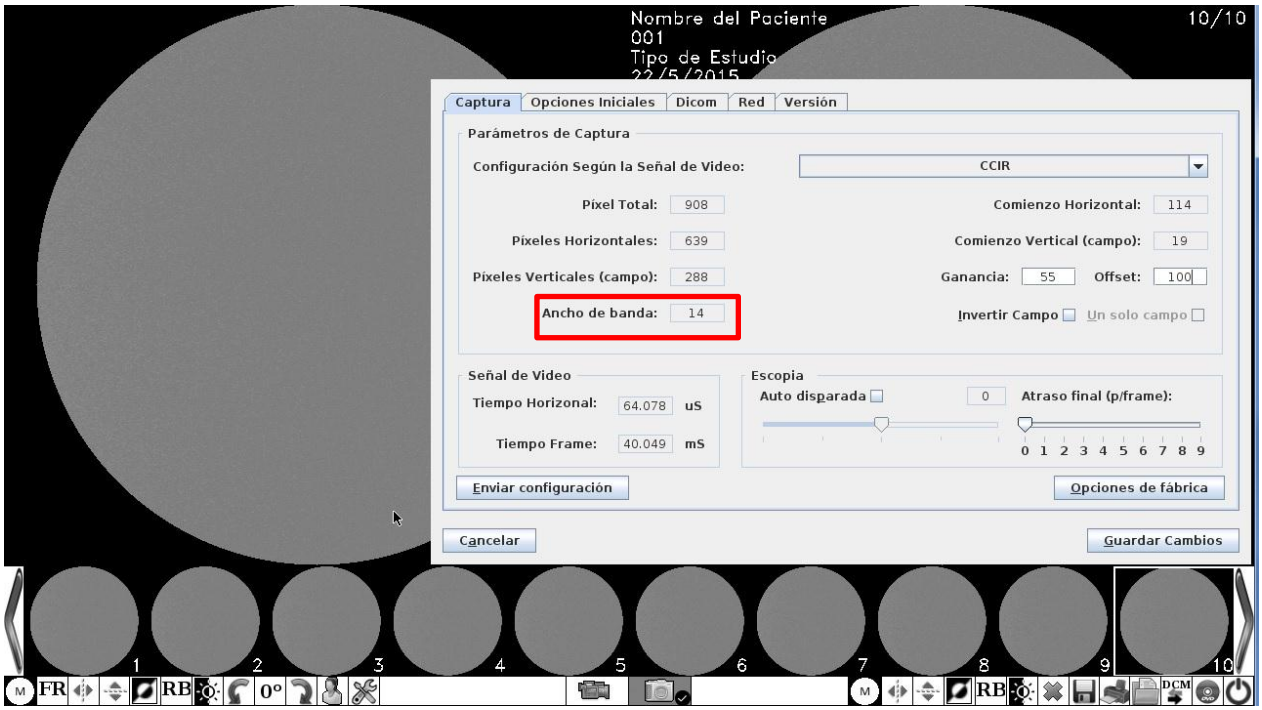
Al finalizar la radioscopia (al levantar el footswitch), el equipo permite atrasar por cuadros la radioscopia congelada en pantalla. Esta característica permite evitar posibles ruidos en la imagen debido a contactores o una posible reducción de brillo a causa de un corte de rayos demasiado pronto. En el menú de configuración ( ), desde la ventana de captura, se podrá configurar está característica:



Según la imagen, si la señal fuera CCIR (40mS por cuadro), el equipo al finalizar la captura, atrasaría dos cuadros (u 80mS).

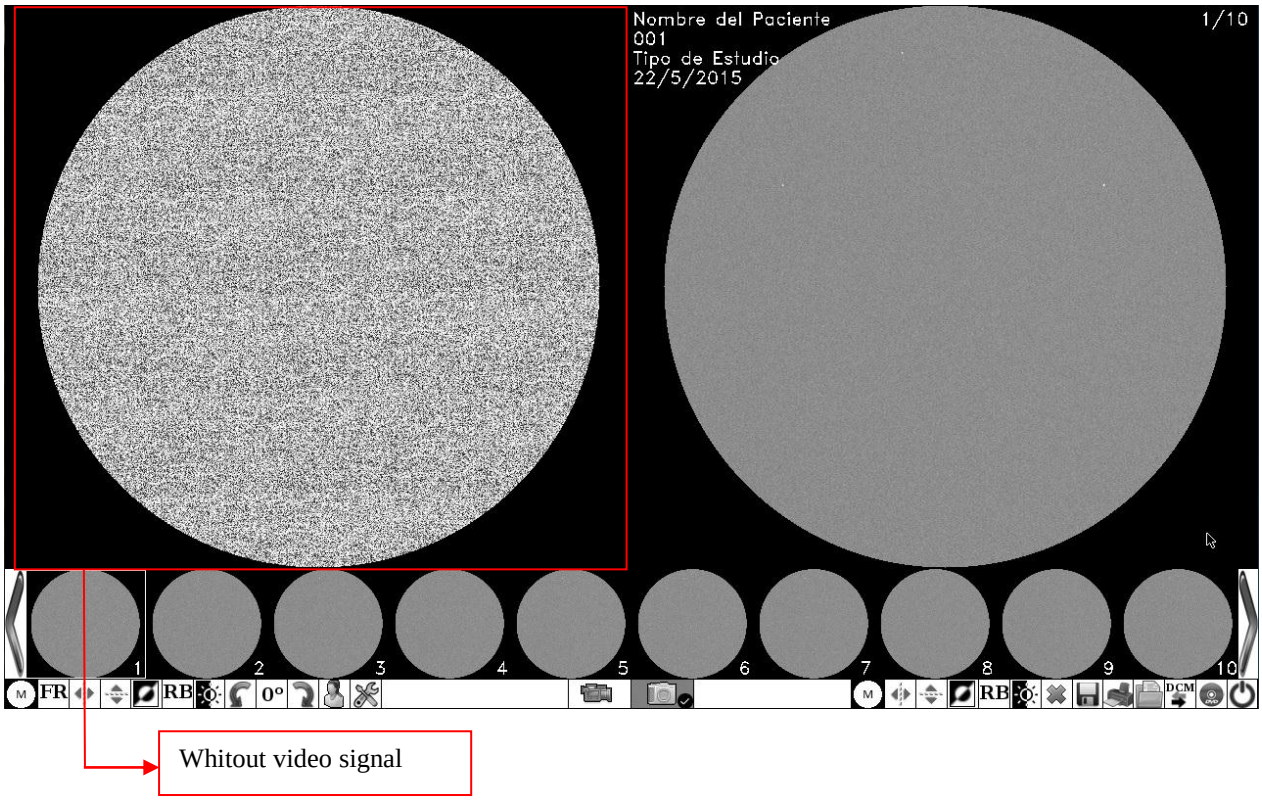
REDUCCIÓN DE RUIDOS (ANCHO DE BANDA)

To reduce possible noise in the video signal, the equipment offers the possibility of reducing the bandwidth of the video signal, with factors ranging from 0 to 14. At lower value, lower bandwidth and consequently lower noise in the signal.

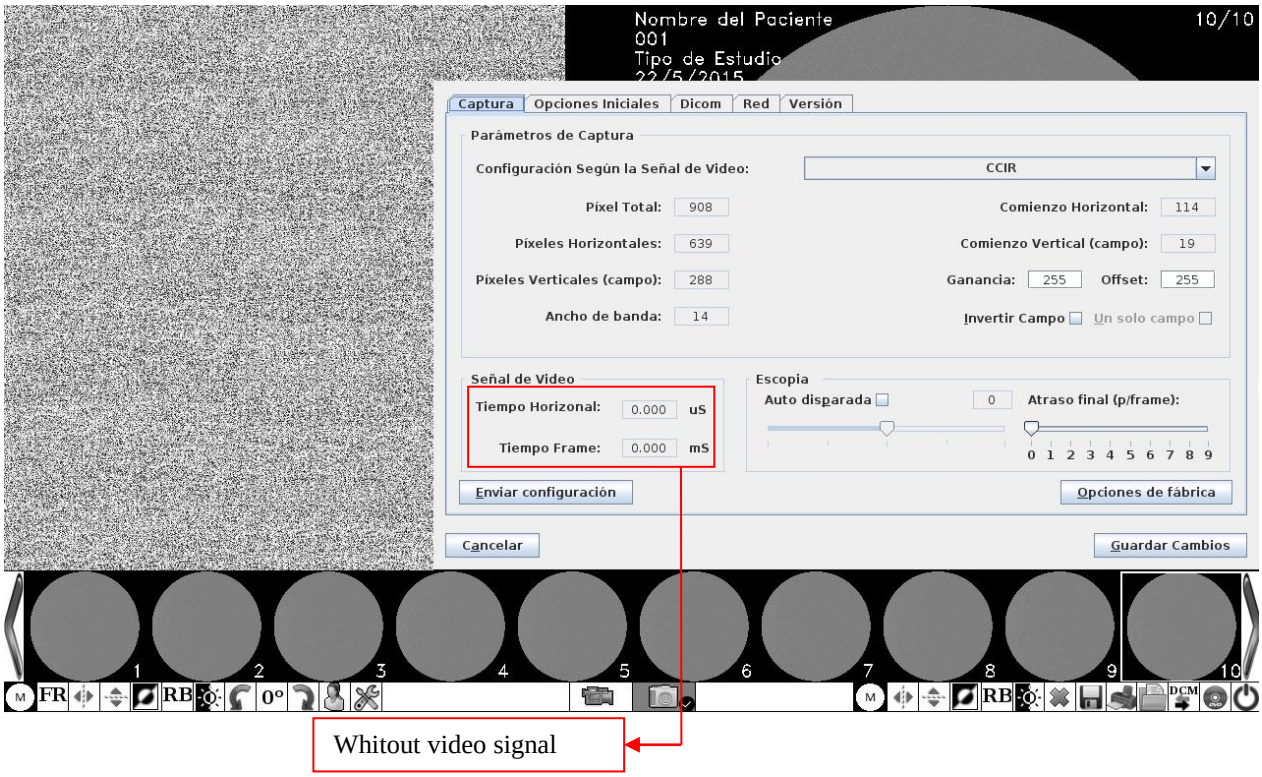


MISSING VIDEO SIGNAL

When there is no video present during the start up, the unit will only emit a tone informing about this situation. The equipment output will be as follows:

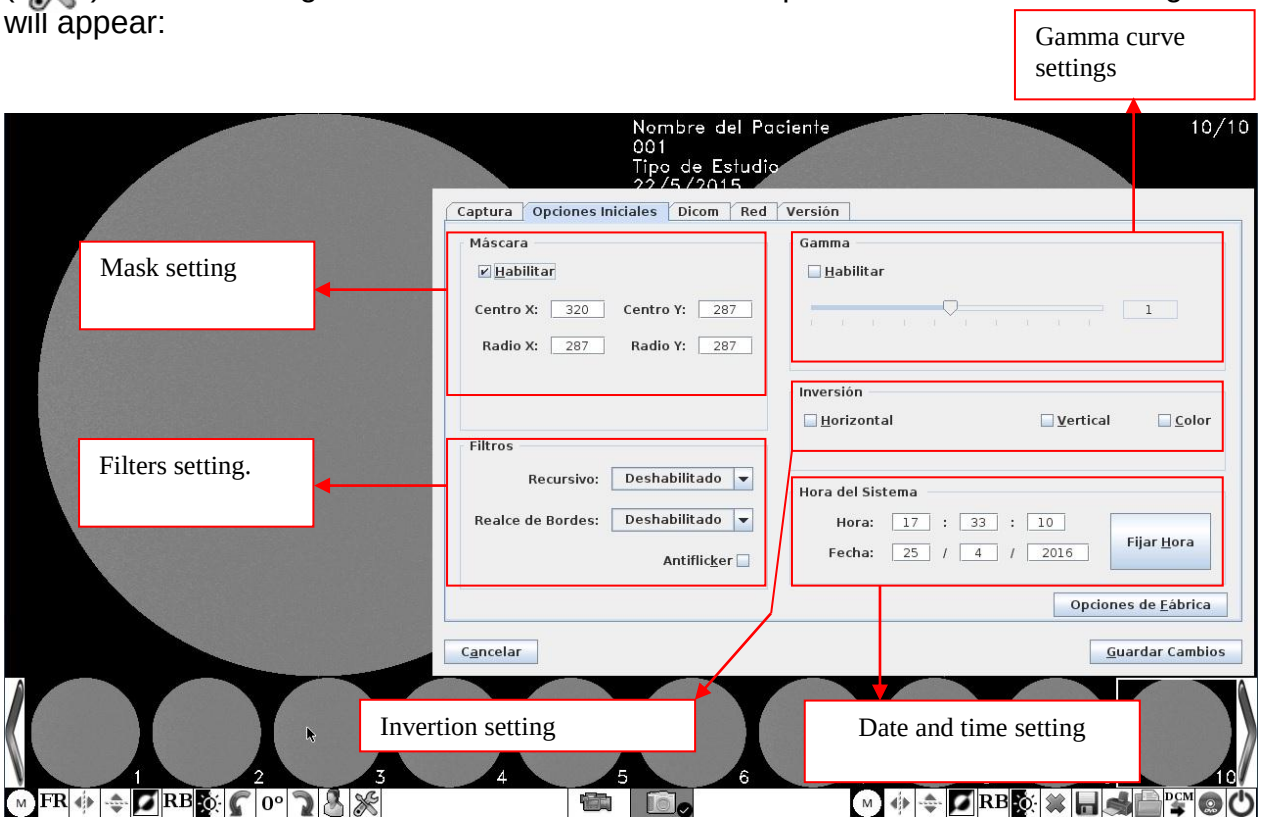


When entering the configuration menu, it will be possible to verify the lack of video signal:



INITIAL OPTIONS CONFIGURATION

To enter the configuration menu you must press the left button with the mouse on the icon ( ), either in image or video mode. In the 'Initial Options' window the following screen will appear:



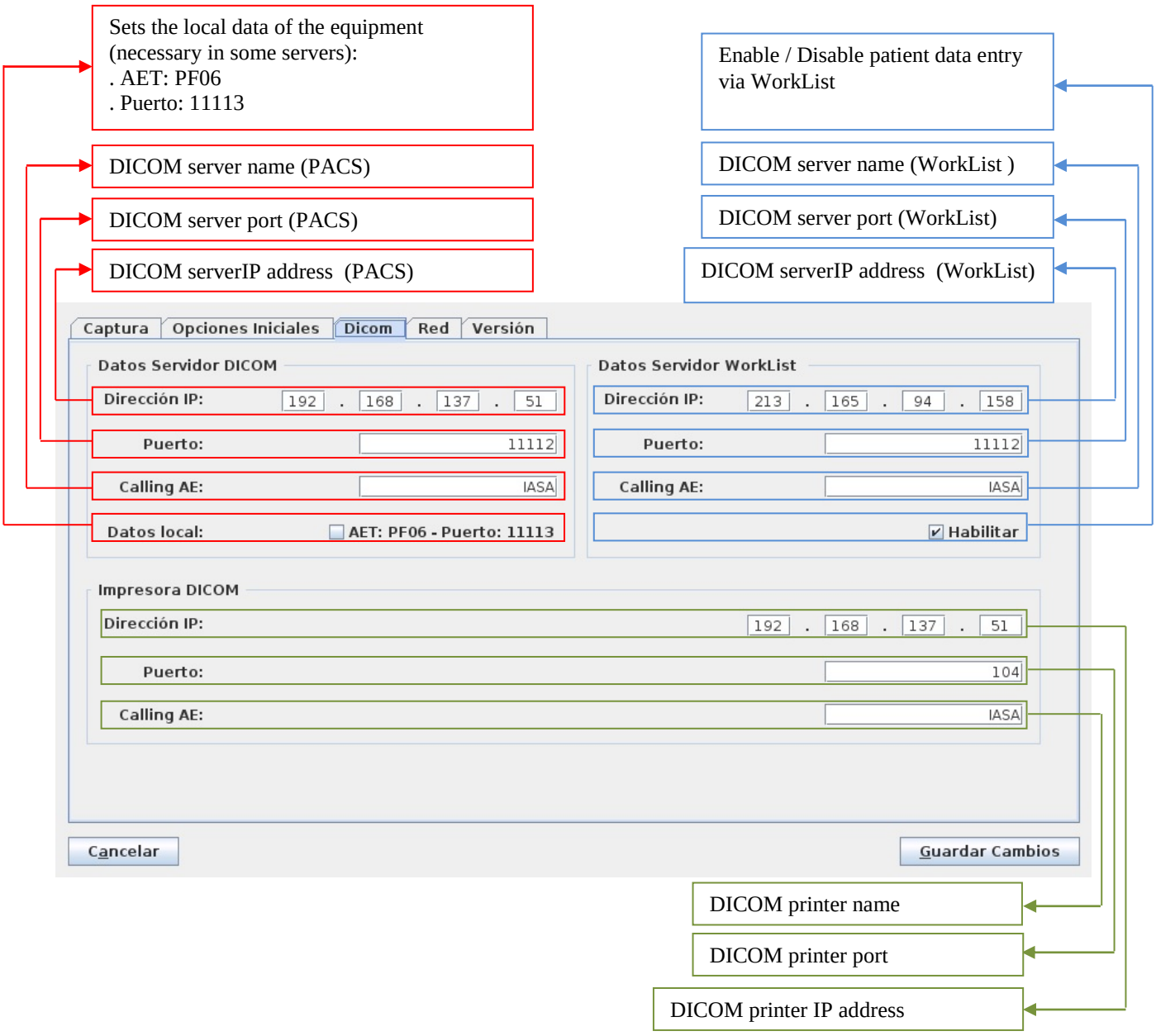
You can configure the size and position of the mask, recursive filter level, edge enhancement filter level, gamma curve, enablement of horizontal, vertical, color reversal, and finally the system time (24Hs format).

When you press the 'Factory Options' button, the unit will return to the factory settings in the 'Options' window.

The 'Save Changes' button will allow you to save the changes made to all windows.

DICOM CONFIGURATION

To enter the configuration menu you must click the mouse left button on the icon ( ), either in image or video mode. In the 'Dicom' window the following screen will appear:



The 'Save Changes' button will allow you to save the changes made to all windows.

NETWORK CONNECTION

Use a CAT 5 (or higher) Ethernet cable in the "Ethernet" connector, depending on the type of network to which the equipment belongs.

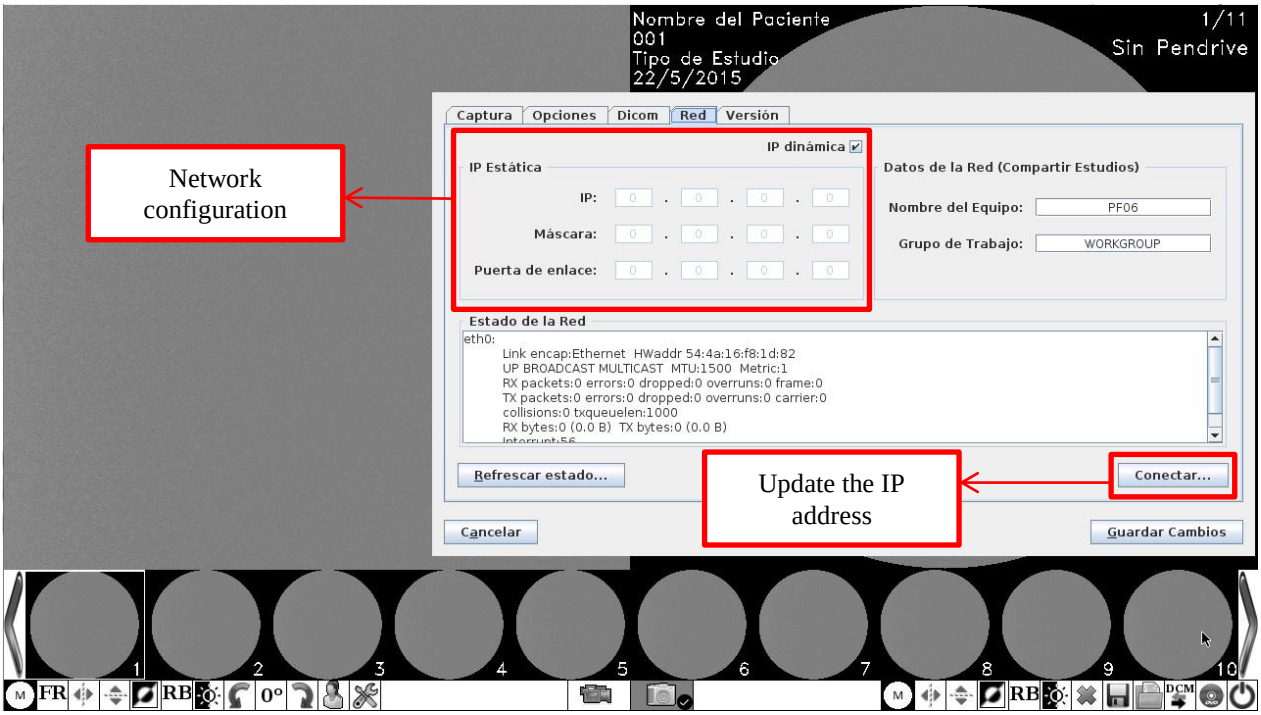
The equipment upon power-up will attempt to obtain an IP address in a dynamic or static way depending on the configuration of the equipment.

NETWORK CONFIGURATION

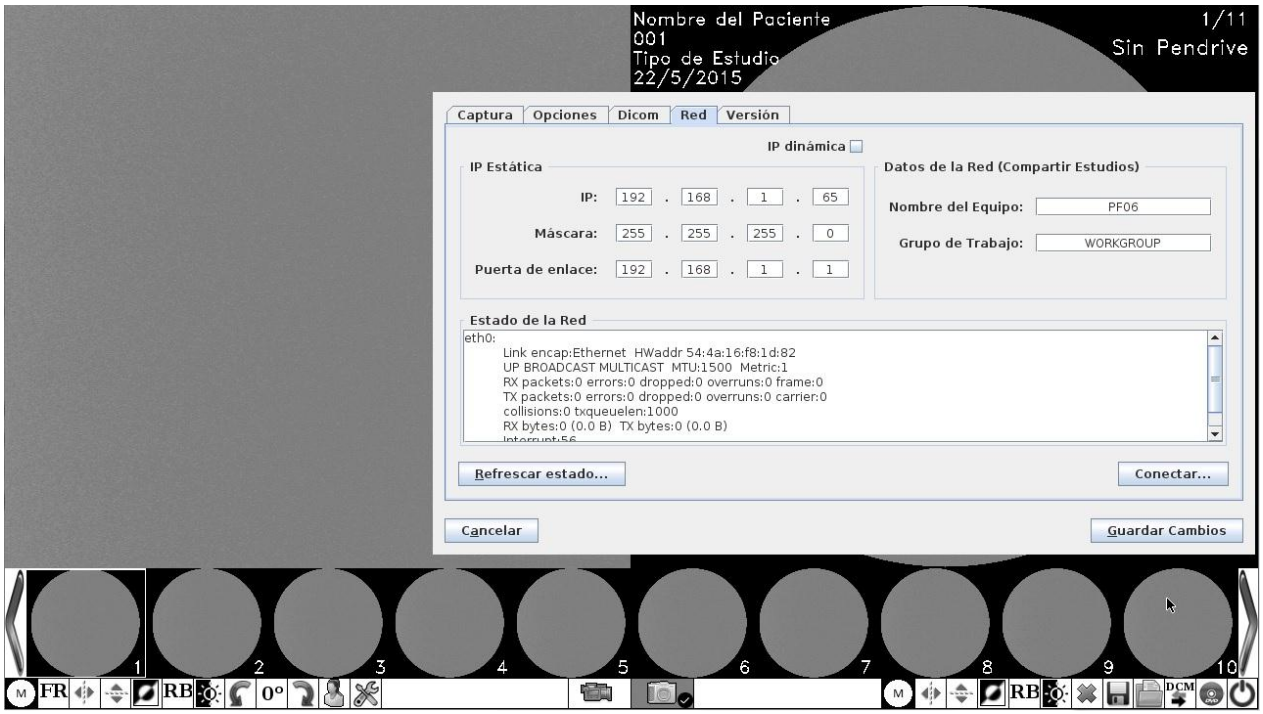
The device will allow you to adjust the Ethernet connection according to the available network:

- Dynamic IP
- Static IP
  - -IP adress
  - -Subnet mask
  - -Gateway

To enter the menu, click the mouse left button on the icon ( ), either in image or video mode, finally select the "Network" window with the left mouse button, accessing the following screen:

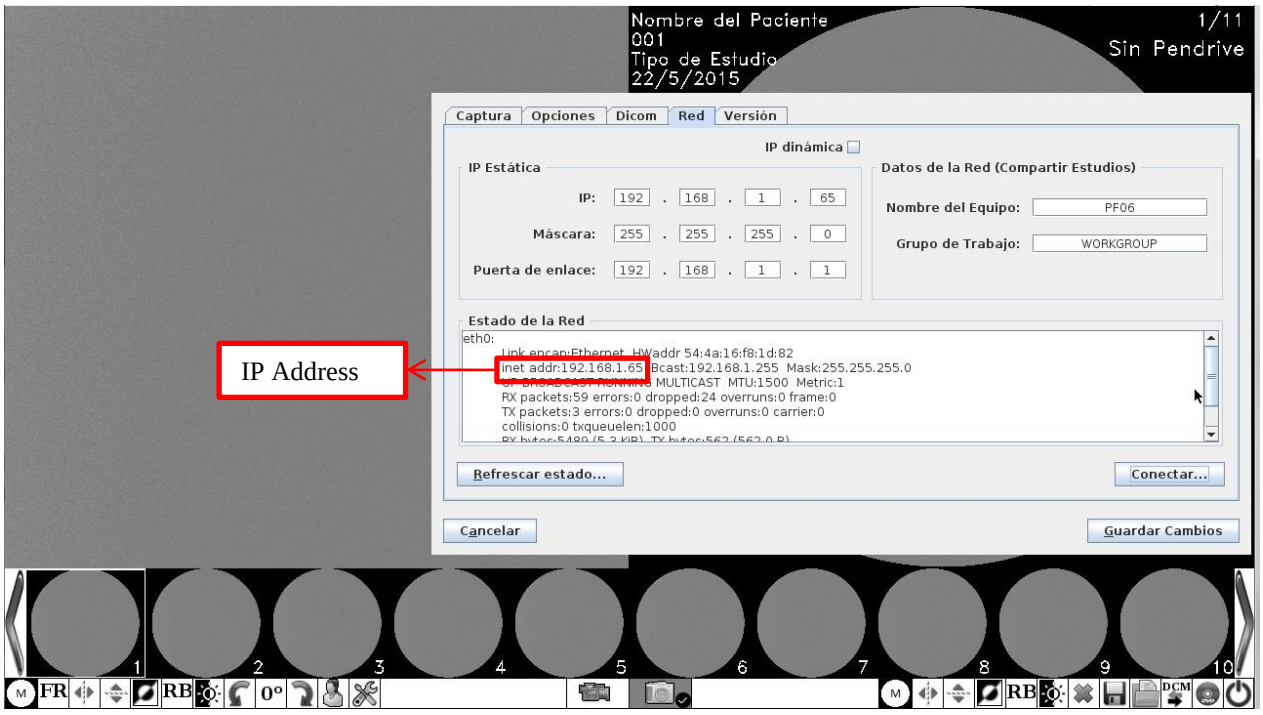


When selecting the option "Dynamic IP", the equipment will automatically try to obtain the IP address that will provide the network, this type of configuration is useful in networks that usually have hubs (eg a router) and it is not necessary to have a IP on the computer.
When deselecting the "Dynamic IP" option, you must enter the network data including the fixed IP address to be taken by the equipment, this type of configuration is useful in networks where it is necessary for the equipment to have a pre-set IP address.



In both cases, pressing the "Connect ..." button will attempt to connect to the network. If "Dynamic IP" is selected, it will take some time for the network to supply the IP address.

Once the equipment has an assigned IP address, in the "Network Status" window, the data of that connection will appear:



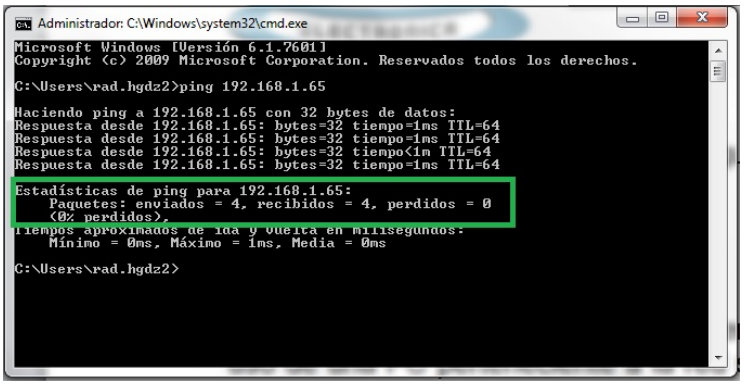
To view the status of the network at any time, it will be necessary to press the "Refresh Status ..." button.

Useful Windows Tools:

To verify that the computer is actually connected to the network, by using a PC belonging to the network you can use the command "ping" from the Windows command line, the steps to follow are as follows:

1. Go to the start menu and in the box "Search programs and files" (in Windows XP it will be necessary to go to the "Run ..." option) enter "cmd.exe".
2. In the new window, enter "ping IP of the equipment", ex. "Ping 192.168.1.65"

As a result, all packets sent must be received.

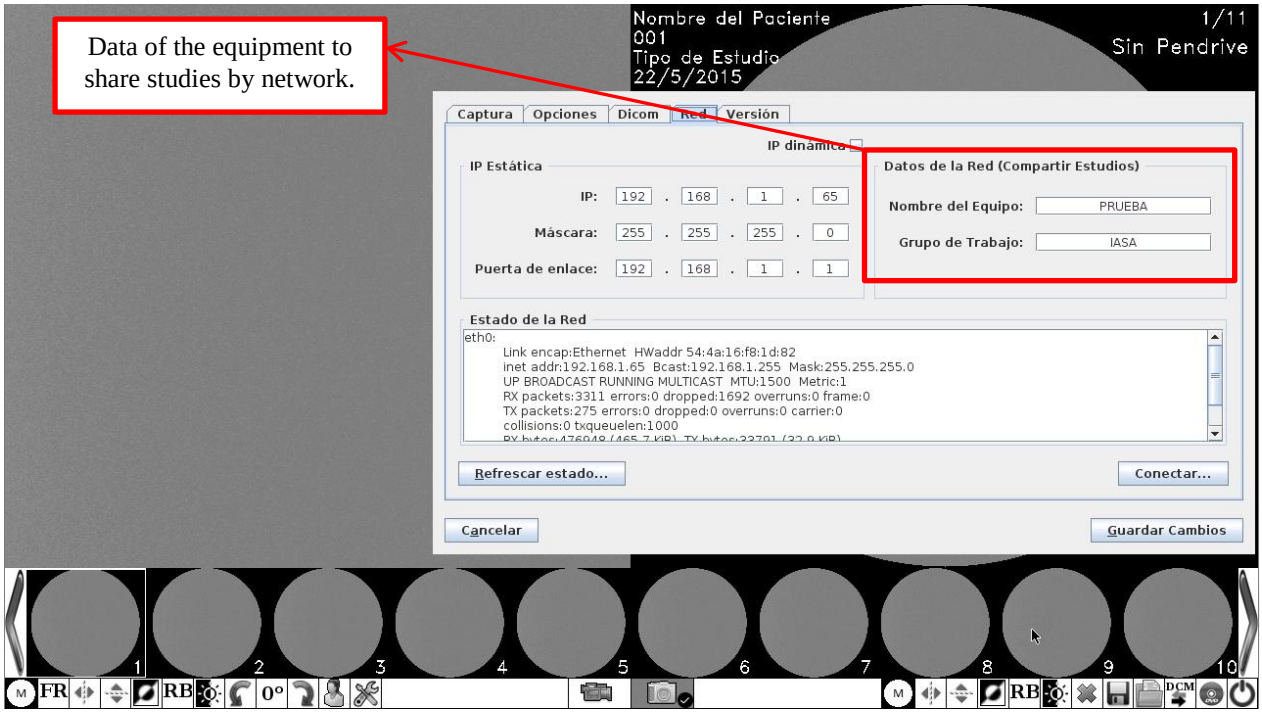


In case of connection problems, the response will show that 100% of the packets sent have been lost.

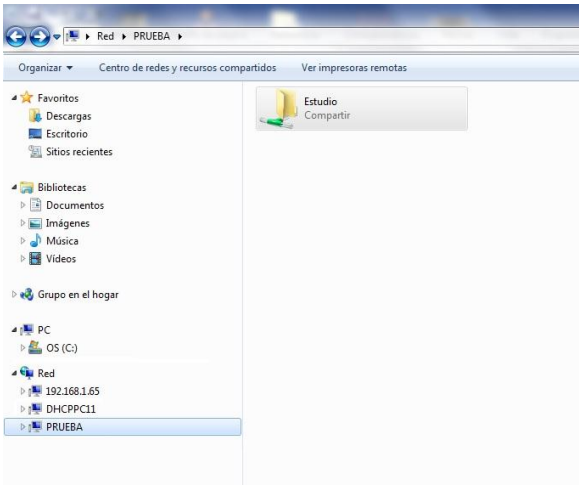
Other tools that can be useful are the IP search engines according to the name of the computer (eg "Advanced IP Scanner"), which allow remotely obtaining the IP address that the computer took and if it is actually connected.

CONFIGURATION TO SHARE NETWORK STUDIES

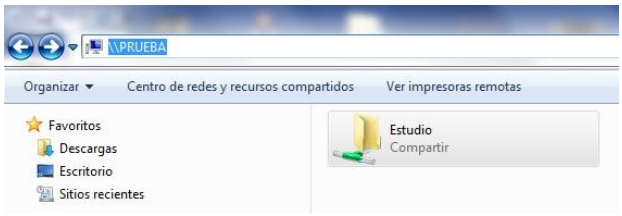
The equipment will allow you to share the studies acquired in the Pen drive through a network of Windows. You can define the name of the computer with which it will appear on the network and the workgroup to which it will belong:

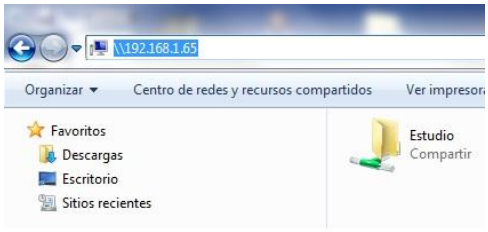


From Windows you can access from the browser:



As an alternative in case the equipment is not listed in the Network options (it may take some time until it appears on the network), the name of the computer can be entered in the address bar ("\\ Name of the computer") Or your IP address ("\\ ip"):

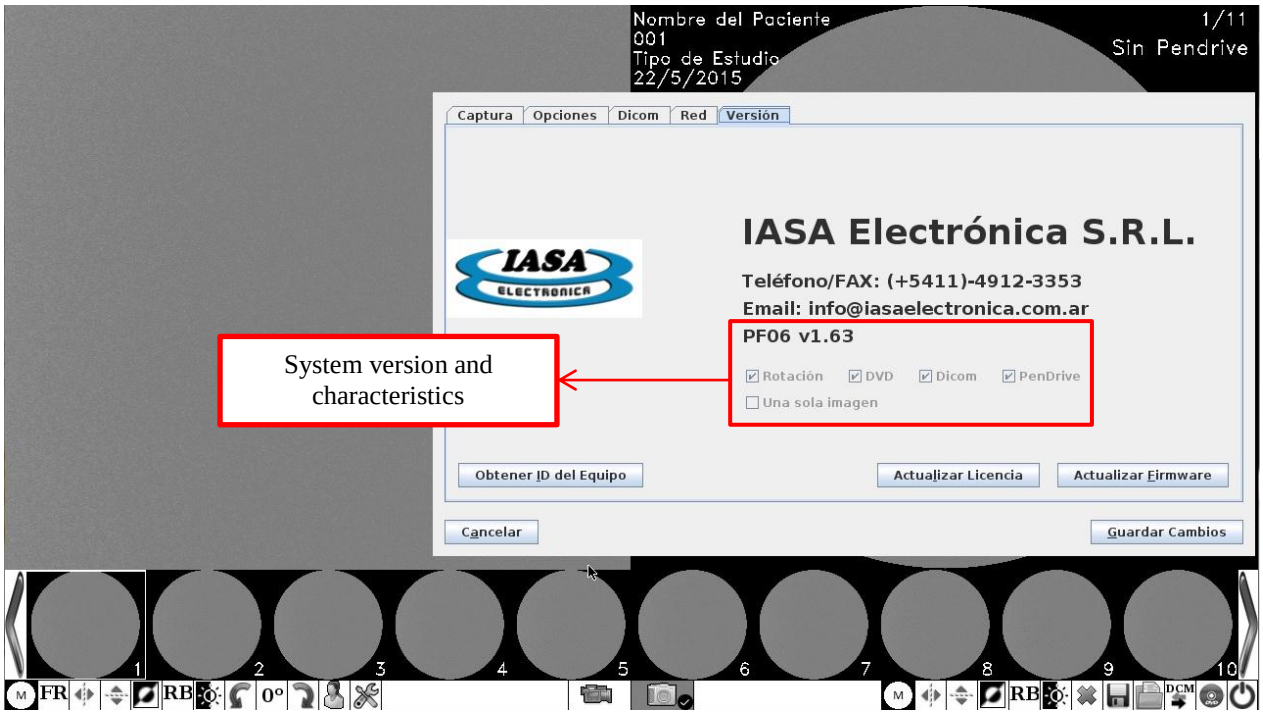




Important: During the transfer of studies through the use of the network, it is recommended not to use the equipment until the transfer is completed.

SYSTEM VERSION

The device version can be found in the "Version" tab in the configuration window.



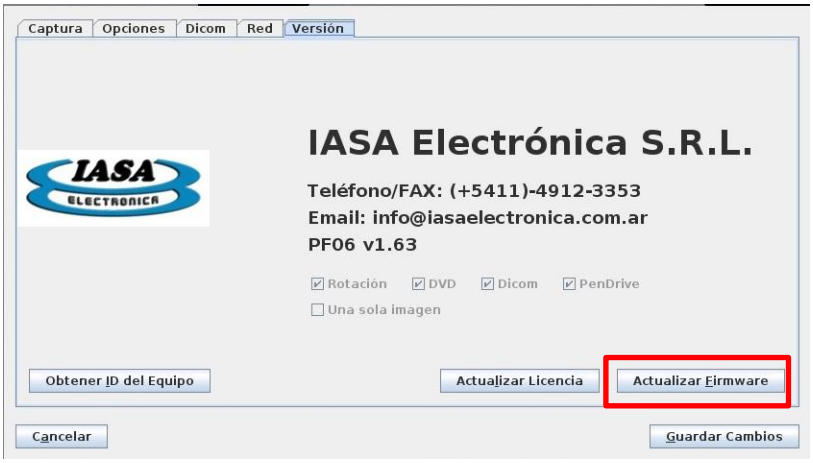
Depending on the options purchased, the enabled features will be displayed.

SYSTEM UPGRADING USING PENDRIVE

To update the computer from the pen drive, it must be recorded in the main directory of the Pen drive files previously supplied by the manufacturer:

- Fimware.bin
- Checksum.txt

Finally from the computer you must enter the configuration menu ( ), go to the "Version" window and press the "Update Firmware" button.



At the end of the update it will confirm if the operation was successful. In case the operation is not successful, the equipment will inform you and there will be no changes in it.

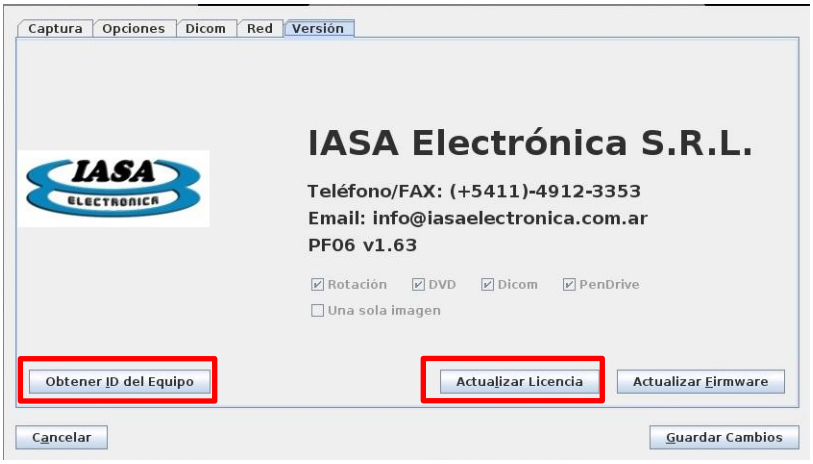
Important: The update must have the same characteristics requested as in the original equipment, in case of an update with equipment of other characteristics, the equipment upon restarting will not allow its use due to license problems.

LICENSE UPDATE FOR ADD NEW FEATURES

In case of updating the equipment to a version with new features, it will be necessary to supply the equipment ID to the manufacturer, the ID can be obtained by using the Pen drive by pressing the button "Obtain Equipment ID" in the "Version "Of the configuration window.

The computer will confirm that the ID was saved to the Pen drive. This ID will be available in the Pen drive with the name of "id.dat", which must be supplied to the manufacturer.

With the license update file supplied by the manufacturer ("License.dat"), you will have to copy it in the Pen drive and finally click on the "Update License" button.



Important: The license update must be done at the same time as the firmware update for that license.

REMOTE ASSISTANCE

Use a CAT 5 (or higher) Ethernet cable in the "Ethernet" connector, depending on the type of network to which the equipment belongs.

It will be necessary for the equipment to have external access through ports 22 and range 5900 to 5910.

REMOTE UPGRADING

As an alternative to the aforementioned methods, the equipment can be upgraded, through remote access using the internet.

SELECTING THE MOST SUITABLE MONITOR TYPE

1) It is recommended to use the 27" **DELL S2715H** monitor with HDMI input or other higher quality monitor.

2) A TV as a monitor can be used, for example the **LG 32LB550B / 32LB560B** or similar that can work at resolutions of **1280x720 @ 50Hz**. It will not guarantee the correct functioning with other televisions that do not fulfill this characteristic.

3) Connect the monitor only with the supplied HDMI cables.

4) The monitors are delivered precalibrated for a WATEK CCIR type CCD camera and configured on the HDMI1 input with an 'Original' aspect ratio.

5) In case of installing new unadjusted monitors or in case of accidental de-calibration the following procedure must be used:

- Connect the monitor to the computer and turn it on. The video signal must be provided by a WATEK type camera or similar.
- Go to the settings menu and, based on the type of video signal, modify the values of the 'Capture' tab using the standard video signals according to the INITIAL SETUP section of the equipment.

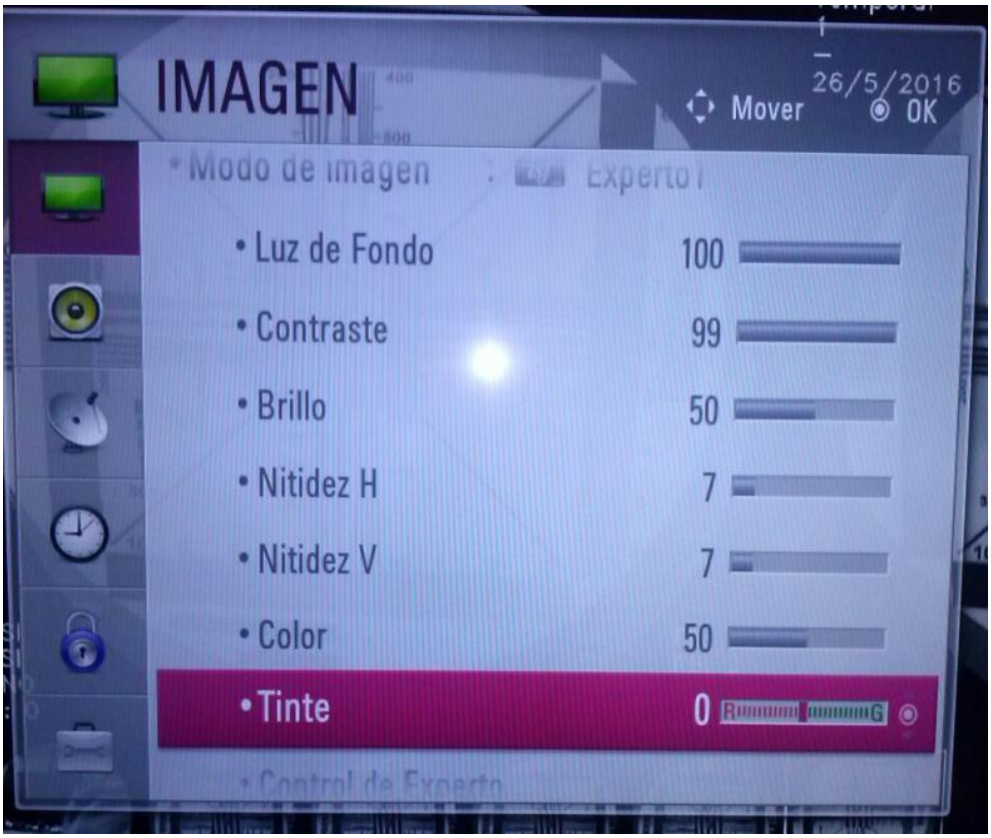
EMERGENCY MODE

If necessary, the camera can be connected directly to the monitor on the VIDEO / Y composite video input (green and yellow). The monitor input must be set to AV1 (Input AV1). (Only for televisions used as a monitor or with monitors with composite video input).

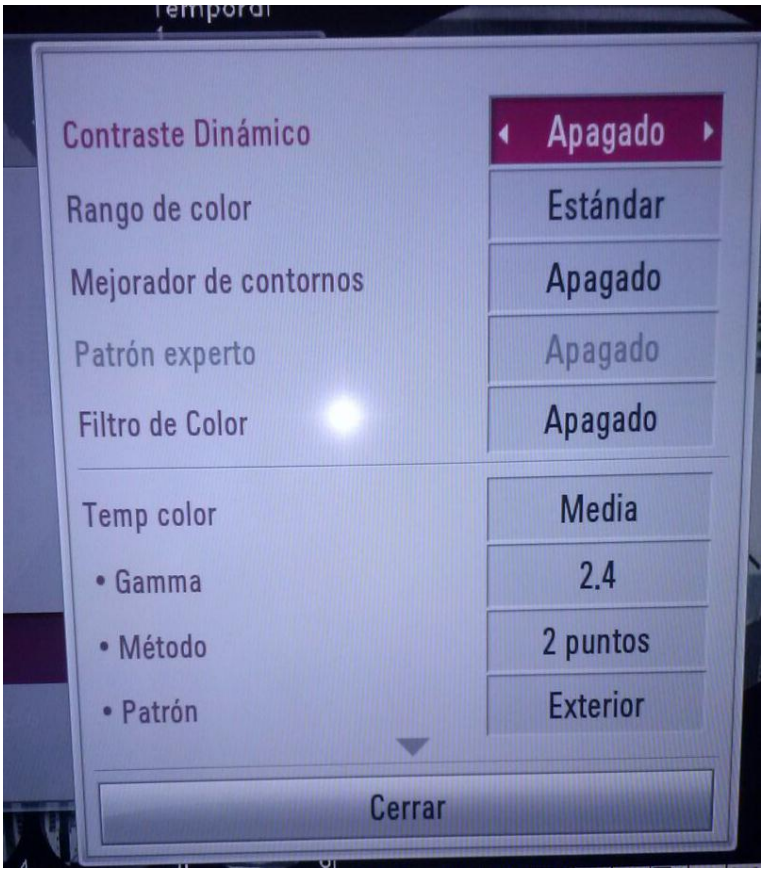
CONFIGURATION ON TV MONITORS

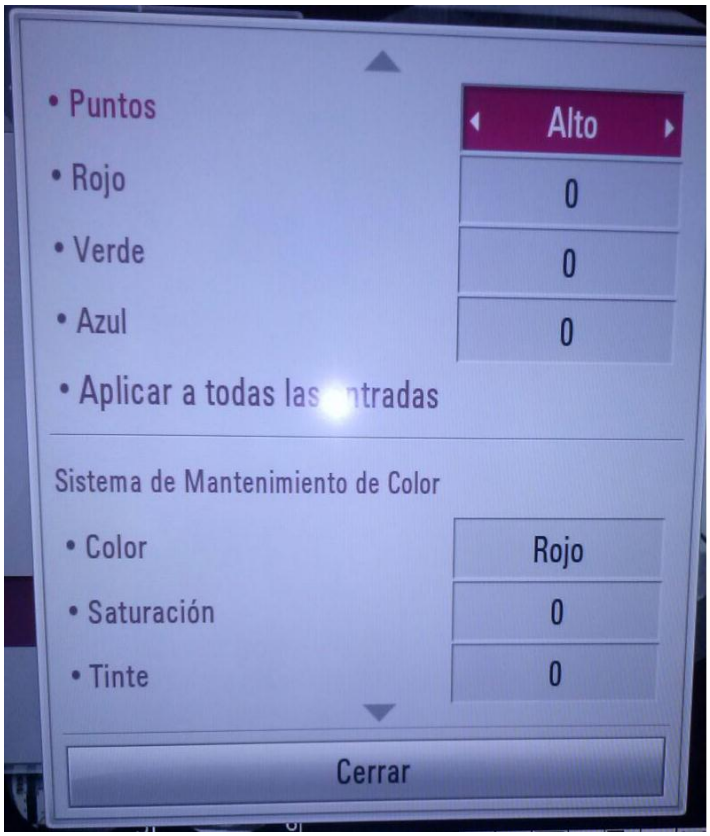
A TV can be used as a monitor. On LG models similar to the **LG32LF550 / LG32LF560**, to access the image setup menu, press the "Settings" button on the remote control and select "Image" from the menu displayed.

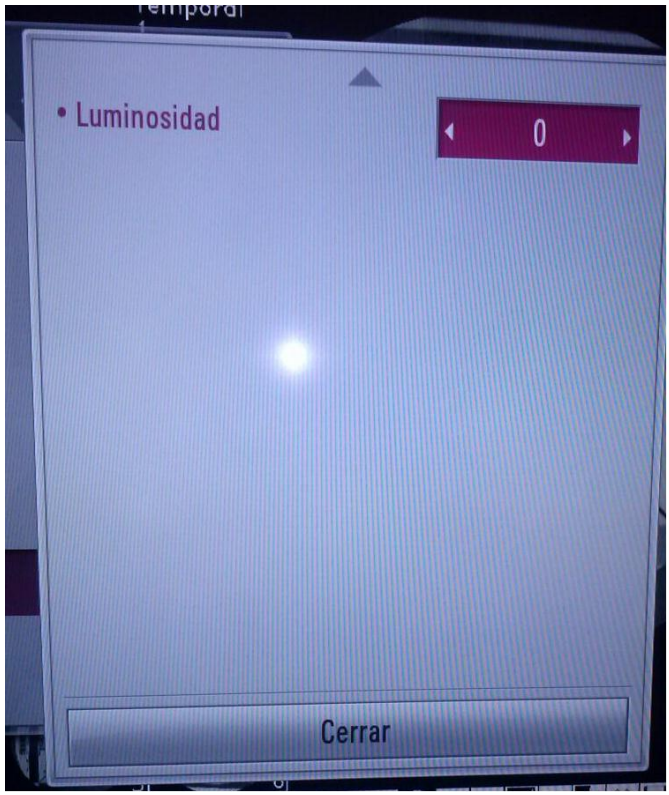
The following settings are recommended:



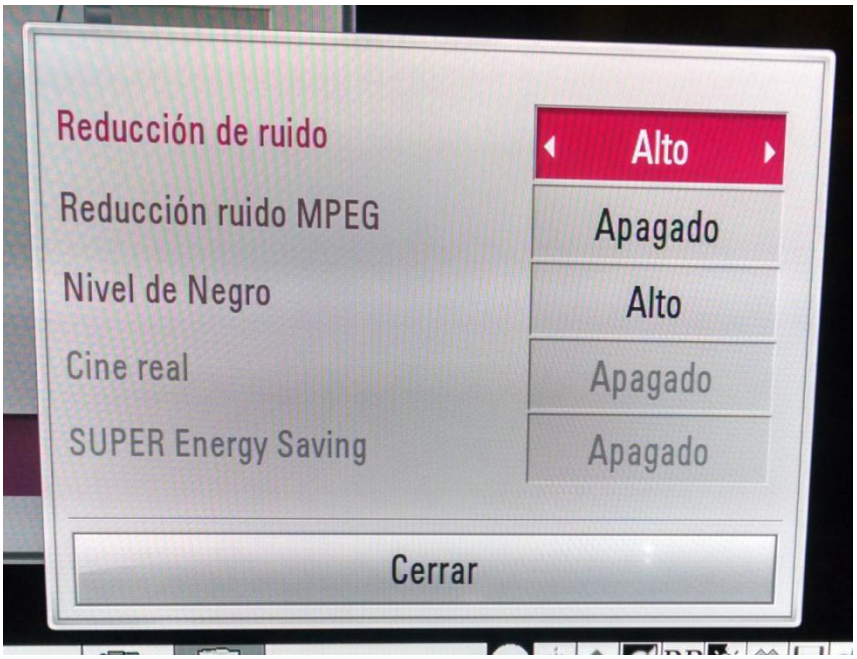
In "Expert Control":




• Puntos
Alto
• Rojo
0
• Verde
0
• Azul
0
• Aplicar a todas las entradas
Sistema de Mantenimiento de Color
• Color
Rojo
• Saturación
0
• Tinte
0
Cerrar


• Luminosidad
0
Cerrar

Under "Picture Options":



In "Aspect Ratio":

NOISE REDUCTION ON TV MONITORS

It will be necessary to reduce the values of "H and V sharpness" according to the desired level of noise / edge compromise. With lower values of sharpness, the edges will be more diffuse.

SERIAL COMMUNICATION PROTOCOL

The equipment offers the possibility of receiving and sending commands through an RS-232 communication. These commands allow to enable or to modify the different tools available in radioscopy..

Data reception (hexadecimal):

0x55	0x44	0x49	Command	Data	0x4B

ACK - Data repeat (hexadecimal):

0x55	0x44	0x49	Command	Data	0x4B

When you change the status of a radioscopy tool from the computer, a frame will be sent informing its new status using the following string:

Data transmission (hexadecimal):

0x75	0x64	0x69	Command	Data	0x4B

Command	Code	Valid data
Next image/video	0x01	No care
Previous image/video	0x02	No care
Save image	0x03	No care
Recursive filter	0x04	x0: 0 - x2: 1 - x4: 2 - x8: 3 - x16: 4 - x32: 5
Color negate	0x05	No: 0 - Yes: 1
Vertical invertion	0x07	No: 0 - Yes: 1
Horizontal invertion	0x08	No: 0 - Yes: 1
RoadMap	0x09	No: 0 - Yes: 1
Clockwise rotation +5º	0x0B	No care
Rotation off	0x0C	No care
Substraction	0x0E	No: 0 - Yes: 1
Counterclockwise rot. +5º	0x0F	No care

RS-232 port configuration::

- 9600 bps
- 8 bits de datos
- no parity
- 1 bit de stop