ANI Monitor V1

Technical datas

Mdoloris Medical Systems

Specifications

General

Parameter	Specification
Power Requirements	100-240 VAC through AC power adapter
Mains Frequency	50/60 Hz
AC Power consumption	
Battery Type	Litium-ion
DC Input	12V+/- 5% 60W
Battery Charge / Discharge	About 6 hours / 1 hour 30 minutes
Patient Leakage Current	<5µA @ 220V and 50 Hz

Environmental

Parameter	Specification
Cooling Method	Convection. Fan less
Temperature Operating Storage	5°C to 40°C -20°C to 60°C
Temperature Operating Storage	>15% and <95% non-condensing >15% and <95% non-condensing
Altitude Operating Storage	360 to 800 mmHg 360 to 800 mmHg
Dimensions Monitor Acquisition Device	265 x 247 x 79.5 mm 157 x 103 x 68.5 mm
Weight Monitor Acquisition Device	3.17 Kg 0.4 Kg
Finish Monitor Acquisition Device	Front : white and orange Back : white White

Display

Parameter	Specification
Type	Color Liquid Crystal
Size	200 mm (8 inches)
Resolution	800 x 600 pixels
Active Viewing Area	173 x 130 mm
Pixel pitch	0.216 x 0.217 mm

Output

| Parameter	Specification
Export Protocol	UART interface
Data Export	USB interface

Connector

Parameter	Specification
AC Input (monitor)	3-pin power connector
Acquisition Device (monitor)	4-pin female connector to provide power and communication to Acquisition Device
Export (monitor)	Sub-D9 connector to export data in real time
Data Export (Monitor)	USB connector to export data and snapshot to USB stick
Sensor cable (Acquisition Device)	6-pin female connector
	6-pin male connector
	4-pin male connector
Sensor (Acquisition Device)	5-pin female connector for sensor

Export data

The ANI™ monitoring system is equipped with a RS-232 serial port located on the back side of the monitor. This port allows extracting raw ANI™ data by external devices in order to store, display or print large amounts of data. It provides access to data through a universal interface connection. The ANI monitor serial port operates with ASCII protocol.

Connector pin outs

The ANI monitor serial port is an asynchronous serial communications port with signals equivalent to RS-232 levels. This port provides a DB-9 male connector wirednas a DCE, with pin outs as defined below:
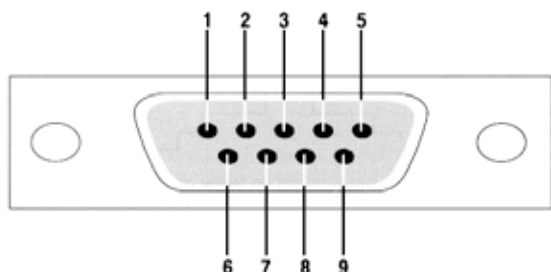
Pin Signal	
1	Data Carrier Detect (DCD)
2	Received Data (RxD)
3	Transmitted Data (TxD)
4	Data Terminal Ready (DTR)
5	Signal Ground (GND)
6	Data Set Ready (DSR)
7	Request to Send (RTS)
8	Clear to Send (CTS)
9	Ring Indicator (RI)

A RS-232 crossover cable female-to-female connection is required to be plugged to the ANI monitor RS-232 serial port.

ASCII Protocol

The ASCII protocol is intended as a simple method for acquiring processed ANI data from the ANI monitor. This section describes the format of the ASCII protocol data records and commands. Each record starts with a unique string of characters, and ends with a Carriage Return (<CR>), followed by a Line Feed (<LF>) character. The data represented in the string of characters are:

Data	In the MM/DD/YYYY format
Time	In the HH:MM:SS format
SQI	Signal quality. Contains one ASCII characters '1' or '0'. - 1 = good signal quality, - 0 = bad signal quality.
ANI	Instantaneous ANI value; between 0 and 100. Contains three ASCII characters when SQI = 1 and two ASCII characters when SQI = 0
ANIm	Mean ANI value; between 0 and 100. Contains three ASCII characters when SQI = 1 and two ASCII characters when SQI = 0
Energy	Signal energy. Contains four ASCII characters
Event	String of ASCII characters representing an event entered in the monitor interface by the clinician. If no event is entered, event string is null.
Each Data is separated by the '|' character. Data sets are sent each second.	

Example:

If SQI = 1:

- 11/27/2014|12:34:55|1|100|100|0.21|<CR><LF>
- 11/27/2014|12:34:58|1| 86| 75|0.21|<CR><LF>
- 11/27/2014|12:35:23|1| 9| 7|0.21|incision<CR><LF>

If SQI = 0:

- 11/27/2014|11:39:12|0|00|00|0.00|<CR><LF>

Maintenance

Cleaning

ANI Monitor can support a thousand cleaning cycles.

WARNING: UNIVERSAL PRECAUTIONS SHALL BE OBSERVED TO PREVENT CONTACT WITH BLOOD OR OTHER POTENTIALLY INFECTIOUS MATERIALS. PUT CONTAMINATED MATERIALS IN REGULATED WASTE CONTAINER.

Cleaning the monitor and acquisition box:
Clean any spillage of blood or solutions on either the monitor or acquisition box as soon as possible because dried blood is very difficult to remove. Use lint-free absorbent towels to clean spillage. Dampen the towel with detergent and lukewarm water to aid in cleaning. After cleaning, wipe the connector ends with alcohol and allow it to dry completely. Residual moisture inside the connector may affect the monitoring performance.

Cleaning the monitor display:
Clean the monitor display screen with a mild solution of detergent and warm water or a commercial display screen cleaner, available through personal computer dealers. To avoid scratching the screen, never use abrasive cleaners.

Disinfecting the Monitor and acquisition box:
Use lint-free absorbent towels dampened with a 10% bleach solution, or a commercial disinfectant. After cleaning, dry all areas except the monitor display screen with a lint-free absorbent paper towel. Wipe the connector ends with alcohol and allow it to dry completely.

WARNING: WHENEVER AN EVENT SUCH AS SPILLAGE OF BLOOD OR SOLUTIONS OCCURS, RE-TEST LEAKAGE CURRENT BEFORE FURTHER USE. DO NOT MIX DISINFECTING SOLUTIONS AS HAZARDOUS GASES MAY RESULT.

CAUTION: do not autoclave the acquisition box or monitor. Autoclaving will seriously damage both components. Avoid liquid ingress with the connection cables. Contact of fluids with the connections cables can interfere with the acquisition performance.

Preventive

The ANI monitor is designed so that no periodic maintenance is required. Suggested routine maintenance includes: periodic checking of cable and label integrity, system checkout and checking leakage current. Instructions on checking leakage current are included in the next chapter.

System checkout:

Action to do	Action to have
Connect the acquisition box	A flat ECG signal appears
Connect the box at sensors or stimulator	A good ECG signal appears
Wait the end of calibration	The ANI is calculated and the curse begin
Insert an event	The event appears on the ANI window
Insert a threshold	The threshold appears on the ANI window
Change on classic mode	Energy and respiratory pattern disappears
Change on expert mode	Energy and respiratory pattern appears
Do a screenshot	A window of confirmation of screenshot appears
Quit the monitoring	Access to the main menu
Access to the demo	The demo beginning
Do an export data on the USB stick	A confirmation of the export appears. Verify the export on the USB stick (export and screenshot)
Delete the data	A confirmation of the delete appears
Change the hour and the date	A message to restart appears. After the restart, the hour and the date have changed

Troubleshooting

	Causes	Solutions
The screen doesn't light	Check if the green LED above the screen is lit.	Check the operation of fuses
	Check if the button of the battery is on.	Check contact to the output power of the filter.
	Check the power connection of the monitor	Check proper connection to the input and the output of the battery
The screen remains on calibration task	Check if the signal quality is green	Check the electrode placement, plugged cable
	Check if there's no bad signal on the ECG window	-
	Check if there's no flat signal on the ECG window	-
	Check if there's no signal on the ECG window	-
Flat ECG signal	Check the proper cable connection to the monitor	Check the integrity of the patient cable and RS232 cable
	Check the proper cable connection to the patient	Check connection between the base and LEMO connector RS232
	Check correct placement of electrodes on the patient	-
No ECG signal	Check the proper cable connection to the monitor	Check the integrity of the patient cable and RS232 cable
	Check the proper cable connection to the patient	Check connection between the base and LEMO connector RS232
	Check correct placement of electrodes on the patient	-
Bad ECG signal	Check correct placement of electrodes on the patient	-
	Diathermy knife use	-
	Check the proper cable connection to the monitor	Check the integrity of the patient cable and RS232 cable
Export not performed		Check proper connection of the USB port on the panel pc
Battery nonfunctional	-	Check the USB connection from the battery to the panel pc
	-	Check the progress of the battery (green LED on the battery)
Blue screen	Check if an USB stick is plug on the monitor	Reboot the monitor without the USB stick
	-	Reprogram the monitor
Corrupt file	-	Reprogram the monitor
	-	Check the connection of RS232 connectors on COM ports