



# DFI

## *Reliable Mini-ITX Motherboard Optimized for Medical Imaging Solution*

DFI's Industrial-Grade Board Powers up  
Well-Connected Medical Video Recorder for Smart Healthcare

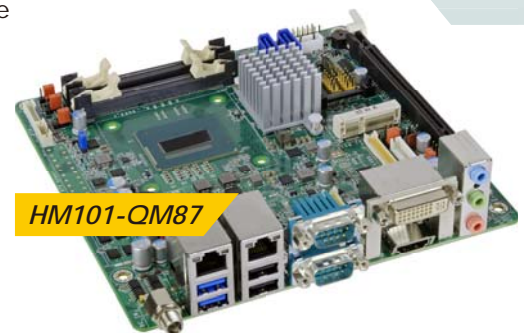
A total healthcare solution provider based in the U.S. was looking to build a medical video recorder equipment to be integrated into their overall medical data management system that could capture detailed medical images/videos and enable real-time connectivity with the enterprise IT infrastructure. The equipment should demonstrate outstanding graphics capabilities, be able to connect to the database instantly, and conform to strict regulations imposed by government entities. Considering these requirements, DFI suggested the use our Mini-ITX HM101-QM87 motherboard to power this medical imaging device.

**Country: U.S.**

**Industry: Healthcare**

**Employees: 13,000**

**Application: Medical Video Recorder**





## The Challenge

Medical device manufacturers, including those from the diagnostics and imaging segments, are constantly seeking novel ways to address some of healthcare's most pressing issues while improving patients' lives. In addition to enhancing the resolution of medical images and videos, which lead to more accurate diagnosis, studies show that establishing a sound medical image management system is also crucial for healthcare facilities to improve productivity and service quality, and hence, the overall business outcome.

One major challenge that the medical device/technology industry faces is regulatory compliance. Given that faulty medical devices would put patients' lives at risk, almost all governments around the world exert strict regulatory controls over medical devices. For instance, the US Food and Drug Administration mandates that medical equipment must pass several radio frequency and electromagnetic capability tests, ensuring that the equipment will not cause harmful interferences with other devices in vicinity, and thus disrupt important medical procedures. Even though regulatory compliance is often perceived as a challenge;

nevertheless, seasoned market leaders sees it as a market differentiator. The second challenge is noise reduction; to help maintain a tranquil and quiet healing environment, the equipment used in healthcare facilities should not make too much noise while still capable of delivering powerful performance. Lastly, with more and more patients' private information being stored in enterprise electronic health record (EHR) or departmental specialty system, it becomes imperative for device makers to guarantee that their medical devices are free of security risk exposure.

**“ Given that faulty medical devices would put patients' lives at risk, almost all governments around the world exert strict regulatory controls over medical devices. ”**

## The Requirements

Based on the aforementioned challenges, our client outlined the following requirements:

- Quiet operation  
To maintain a quiet healthcare environment, the device should adopt a processor with low power consumption to prevent a fan from operating intensively, and thereby generating lots of noise.
- Excellent graphics performance  
The recorder is meant to capture high resolution images/video clips from a wide range of modalities, and then send the files to EHR to assist medical professionals in making more informed decisions. Hence, it needs to support outstanding graphic capabilities.
- Regulatory compliance  
In order to allow the final medical device to be legally marketed in various countries, all built-in components of the device must meet essential regulations set out by FCC and CE.
- Expansion capabilities  
Our client required instant connection between the equipment and overall IT infrastructure. The equipment should thus be equipped with connectors that support real-time and stable data transmission.
- Data security  
With greater emphasis placed on the security of patients' electronic healthcare information, medical device producers are charged with the responsibility to help healthcare facilities protect patients' personal and healthcare data.

HM101-QM87



## DFI Solution

Upon learning our client's requirements, DFI considered its Mini-ITX motherboard HM101-QM87 the ideal option for our client to embed in the equipment. HM101-QM87, empowered by 4th Gen Intel® Core™ processor and Intel® QM87 Express mobile chipset, consumes low level of power. Such eliminates the need for a high speed fan to cool off the device and ensures quieter operation.

HM101-QM87 adopts Intel® HD Graphics 4600 and Intel® Clear Video Technology which support high resolution images and video clips. In addition, HM101-QM87 adopts DirectX Video Acceleration (DXVA) that enables accelerated video processing. These graphics features make the device perfect for use in x-ray fluorography, ultrasound, and vascular imaging systems.

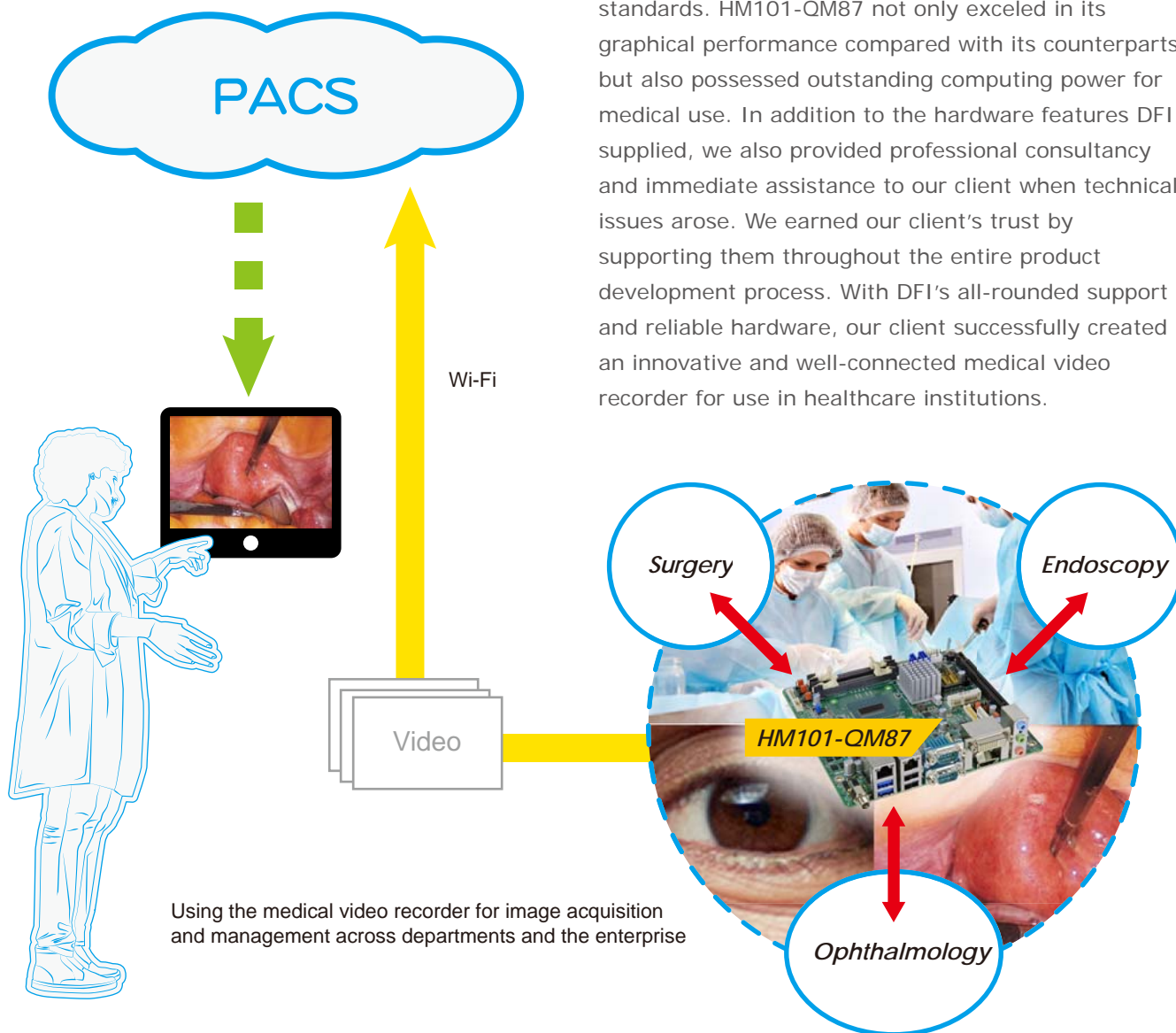
To satisfy our client's requirement for regulatory compliance, HM101-QM87 has been tested and found to comply with the CE and FCC Class B Digital Device Part 15 standards, which specify that the board does not generate any harmful electrical interference. The finished device met the standards for UL MDAF.E484517, EU's Medical Devices Directive (90/385/EEC, 93/42/EEC), Canada ICES-001 Issue 4, and FCC 47 CFR Part 18. The fact that the recorder, with HM101-QM87 as its backbone, was able to meet these stringent global standards serves as an evident proof that DFI's products are safe, reliable, of the highest quality. These certifications give our client a dominant competitive advantage in the marketplace.

With Intel® Active Management Technology that came with QM87 chipset (Intel® AMT) we were able to meet our client's requirement on information security. Intel® AMT utilizes management and security applications as well as its platform capabilities to secure and repair database.

“ We also provided professional consultancy and immediate assistance to our client when technical issues arose. We earned our client’s trust by supporting them throughout the entire product development process. ”

Regarding real-time connectivity, HM101-QM87 is equipped with a Mini PCIe slot which can be used to install Wi-Fi module. It is then convenient for the medical device to transmit captured images and videos to doctor’s laptop or central EHR system instantly. This feature enables device users to efficiently apply different formats of images/videos /audios to support the various medical procedures.

With the powerful HM101-QM87 Mini-ITX motherboard based on 4th Generation Intel® Core™ processor that we offered, our client was able to build a remarkable medical device that complied with CE, FCC, and UL standards. HM101-QM87 not only exceeded in its graphical performance compared with its counterparts, but also possessed outstanding computing power for medical use. In addition to the hardware features DFI supplied, we also provided professional consultancy and immediate assistance to our client when technical issues arose. We earned our client’s trust by supporting them throughout the entire product development process. With DFI’s all-rounded support and reliable hardware, our client successfully created an innovative and well-connected medical video recorder for use in healthcare institutions.



**HM101-QM87**



4th Gen Intel® Core™ Processors  
Intel® QM87 Chipset  
2 DDR3L SODIMM up to 16GB  
1 HDMI, 1 DP, 1 LVDS, 1 DVI-I  
2 GbE, 2 COM, 8 USB  
1 PCIe x16, 1 Mini PCIe

**KU171**

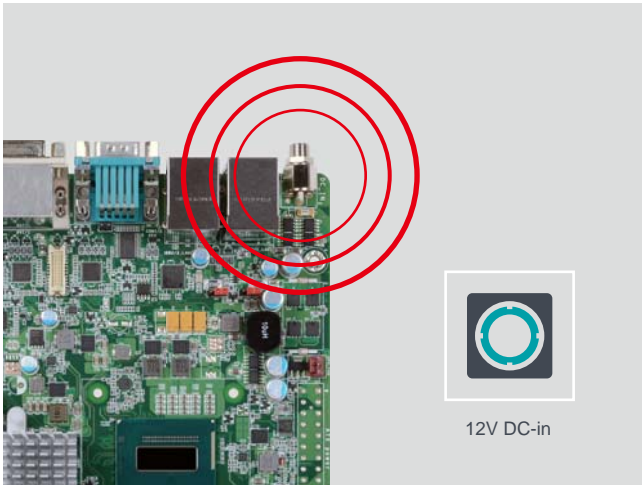


7th Gen Intel® Core™ Processors  
2 DDR4 SODIMM up to 32GB  
1 LVDS/eDP, 2 DP++  
2 GbE, 2 COM, 8 USB  
1 PCIe x4, 1 Mini PCIe, 1 M.2

**AL171**



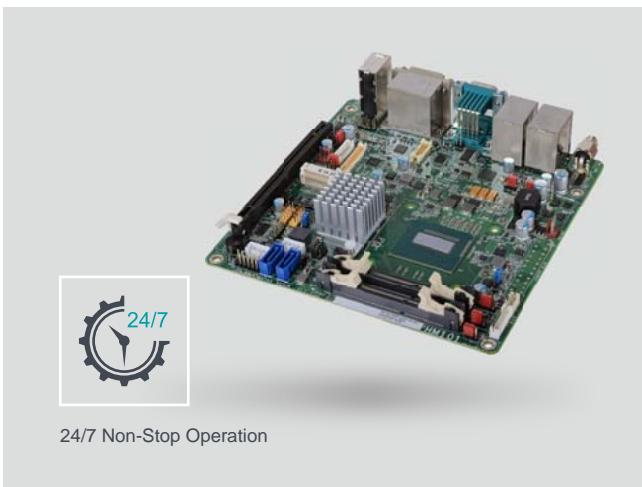
Intel® Atom™ Processors E3900  
2 DDR3L SODIMM up to 16GB  
1 LVDS/eDP, 1 HDMI/DP++, 1 VGA/DP++  
2 GbE, 6 COM, 9 USB  
1 PCIe x1, 1 Mini PCIe, 1 M.2



12V DC-in

### DFI Mini-ITX

DFI's embedded Mini-ITX motherboard is designed with a variety of I/O connectors, passive cooling option, and DC input features in a small form factor measuring to only 170 x 170 mm. This compact and highly integrated platform delivers low power consumption of less than 100 Watts and provides the reserved expansion slot; which makes it an ideal solution for the computing-intensive markets such as POS, gaming, medical and digital signage, etc.



24/7 Non-Stop Operation

# DFI

Founded in 1981, DFI is a global leading provider of high-performance computing technology across multiple embedded industries. With its innovative design and premium quality management system, DFI's industrial-grade solutions enable customers to optimize their equipment and ensure high reliability, long-term life cycle, and 24/7 durability in a breadth of markets including factory automation, medical, gaming, transportation, smart energy, defense, and intelligent retail.

Website: [www.dfi.com](http://www.dfi.com)

eStore: [estore.dfi.com](http://estore.dfi.com)



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