



Healthcare

Solutions Guide



Contents



Introduction	1	
	2	Challenges for Solution Implementers
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Trends in Smart Healthcare	3	IoT and Connected, Integrated Smart Healthcare Systems
	4	Increasing Demand for High-precision Medical Imaging
	4	Digitization Driving Demand for Increased Security
<hr/>		
ATEN Solutions for Healthcare	5	
<hr/>		
ATEN Advantages	6	
<hr/>		
Case Study 01	7	Medical Imaging for Live Surgery, Remote Monitoring, and MRI Diagnostics
Case Study 02	9	Control Room for Healthcare Equipment Monitoring and Remote Observation
Case Study 03	11	Media Distribution Solution for Medical and Surgical Training
Case Study 04	13	Centralized Management for Laboratory Automation and Medical Diagnostics



Introduction

As life expectancy continues to climb across the globe and the traditional healthcare market transitions to a digital future, it is no surprise that global healthcare spending continues to dramatically increase beyond all expectations. To illustrate: the healthcare technology sector was expected to reach USD\$280 billion by 2021, based on a five-year CAGR of 15.9% since 2016, according to Deloitte¹. But more recently, the latest market research by Technavio (2019)² suggests that the global smart healthcare market is in fact expected to post a CAGR of over 24% during the period 2018-2022. The growth is exponential and the opportunities are endless.

Driving Change towards Automation and Connected, Integrated Systems

Healthcare is one industry that has a direct impact on quality of life, and clinical and technological advances as key drivers of sales work in tandem with aging and growing populations in both current and developing markets, as well as with increasingly converging industries. Researchers at Technavio expect more nations to make key investments in supporting technologies and migrate to the digital health business model over the next few years, driving an increasing need for smart healthcare solutions in both the public and private healthcare markets.

Embracing new technologies for healthcare IT infrastructures can help bring a better, healthier future to everyone. Healthcare is transforming, and the prognosis is bright, and smart.

1. Deloitte, 2020 Global Health Care Outlook Analysis

2. Technavio, Global Smart Healthcare Market 2018-2022 Report



Challenges for Solution Implementers

For vendors that supply AV delivery and control signal solutions as part of these wider, more integrated healthcare systems, adapting to changing consumer needs, demands, and expectations means finding ways to provide solutions that not only increase access and efficiency, but also drive innovation in intelligent control systems and consistently improve AV quality.

In light of this, those in charge of implementing AV and control systems for healthcare applications face numerous pain points and challenges. These are summarized, as follows:

- Must integrate with healthcare equipment
- Must provide pristine video in real time with support for HDR and grayscale
- Must provide long-distance transmission
- Must provide critical reliability
- Should include control signal transmission
- Should provide access to analytic data in real time
- Should provide remote access to database on Cloud-based platforms / hospital intranet
- Must be secure and meet stringent healthcare data security protocols

ATEN provides a full range of AV and control signal transmission solutions for healthcare use. These are specifically focused on providing the high-precision video quality and control accuracy that meet the high demands of critical medical and healthcare applications.

Trends in Smart Healthcare

IoMT and Connected, Integrated Smart Healthcare Systems

The Internet of Medical Things (IoMT) is a connected infrastructure of medical devices, software applications, and health systems and services, and this move toward integration of different healthcare delivery systems into one mechanism has created the concept of Smart Healthcare. Not only has this pushed the focus from just caring for the sick to promoting the general health and well-being of people, but it has also driven technological advances, especially in the realm of solutions that connect various health IT systems for ease of control and communication.

As a broader trend, smart technologies such as virtual health, wearables, sensors, and biometrics are already driving this transition to new healthcare delivery models, ones that focus on streamlining processes and make use of the most cutting-edge digital innovations and information systems. For example, VR systems help train residents as well as assist surgeons in the operating room by guiding them in 3D. Such developments, including those in AI, cognitive technology, and robotics are accelerating automation, while telehealth, digital medicine and remote monitoring are already part of larger connected, integrated smart healthcare systems.





Increasing Demand for High-precision Medical Imaging

Reliable video has always been an important component to healthcare IT, predominantly related to the exponential growth in the use of picture archiving and communication systems (PACS) that are used to securely store and digitally transmit electronic images and clinically-relevant reports. As the volume of digital medical images grows throughout the healthcare industry, and data analytics of those images becomes more prevalent, the demand for video at the highest possible resolutions for the most detailed images continues to increase.

The seamless and stable transmission of such high-resolution video has become such a prerequisite that medical imaging systems are expected to be able to handle up to 4K, and delivery must also be low-latency across long distances with no signal degradation. This means that in addition to high-precision AV signal extension devices, other infrastructure equipment, such as KVM switches, must also be able to support the required resolutions and refresh rates.

Digitization Driving Demand for Increased Security

As we move toward patient-centered healthcare models and medical information systems, this is requiring new levels of security and data protection that are unprecedented. Alongside the digitization of healthcare records in electronic medical record (EMR) systems in the push for paperless hospitals are the ever-increasing government regulations surrounding data management and patient privacy in this field. Patients not only expect their medical data to be secure, but it is also a stringent legal requirement that solution providers must contend with.

Furthermore, there are unexpected opportunities as hospitals continue to update their IT systems and infrastructure. Secure KVM switches, for example, that are commonly seen in government and military environments to provide safe and secure switching between computers on different security level networks, are now finding innovative uses in healthcare systems, due to these aforementioned privacy concerns, by allowing medical staff to easily switch between sensitive patient data and non-private applications on the hospital network.

ATEN Solutions for Healthcare

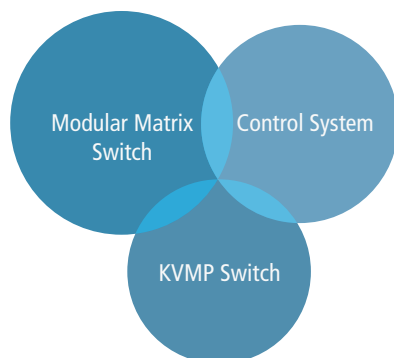
ATEN provides a full range of AV and control signal transmission solutions that provide the high-precision video quality and control accuracy that meet the demands of critical medical and healthcare applications. These solutions can be categorized as follows:

- Control Room Video Walls for Remote Health Monitoring / Management
- Video Extension for Real-time Data Analysis and Image Access
- Control Signal Distribution and Extension for Equipment Operation

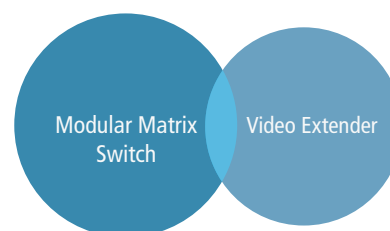
Example Applications

ATEN's Solutions

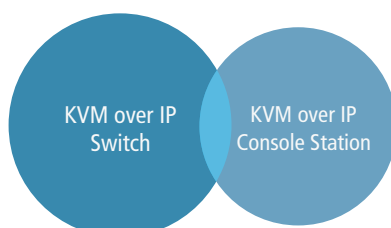
- 1** Control room / video wall for observation / remote health management



- 2** • PACS / vital signs medical data transmission
• Media distribution for keyhole surgery training videos



- 3** Control solution for APS / medical testing stations



- 4** High-precision signal extension for critical healthcare applications / real-time monitoring





ATEN Advantages

ATEN AV Signal Extension and Control Solutions for Healthcare Applications have the following advantages:



Seamless AV and Control Signal Transmission Extended over Long Distances

ATEN Seamless Switch™ solutions deliver fast, reliable, and continuous video streams with instant real-time source switching and control without delays, while control solutions utilize HDBaseT™ or over IP access to meet the demands of both critical healthcare applications and media distribution systems.



Smooth Integration with Medical and Surveillance Equipment

ATEN solutions are EMI certified and can integrate with most network-based healthcare equipment, including PACS and ECG equipment, MRI/CT scanners, remote monitoring systems, APS systems, EMR systems, and more, increasing interoperability among medical devices and healthcare IT systems.



Imaging Excellence, Custom Video Walls, with Superior Video up to True 4K

ATEN solutions provide the highest resolutions and high-precision video quality and accuracy required by medical imaging applications and custom video walls for monitoring, with resolutions up to 4K @ 60Hz (4:4:4), HDR, and grayscale imaging support.



High Level of Security and Remote Access Management

ATEN solutions provide secure, reliable, remote access to analytical data for health monitoring of multiple patients from one location in real-time while also providing the highest levels of security and adjustable authority levels.



Ergonomic Approach to Design for Optimized Operation

ATEN solutions are designed to merge into operator-focused environments with flexible control methods to maximize performance and improve workflows that drive efficiency and innovation in patient-centric healthcare development.



Flexible, Scalable, Customizable Solutions

ATEN solutions provide a level of flexibility that is future-proof, scalable, and implementable across a wide range of healthcare applications, helping IT infrastructures grow in step with advances in medical technology.



01

Medical Imaging

Live Surgery, Remote Monitoring, and MRI Diagnostics

A hospital decided to implement a state-of-the-art medical imaging transmission system to enable doctors to perform surgeries and real-time diagnoses more effectively. The solution needed to transmit content, such as live surgery video from the doctors' head-mounted cameras, patient vitals, medical records, MRI equipment, and a picture archiving and communication system (PACS), accessible from various locations inside the hospital. The hospital also implemented a new, cutting-edge MRI-guided radiation therapy as part of their ongoing development of leading treatments for cancer and brain disorders.

Challenges

- Essential medical imaging needed to be instantly accessible from various locations throughout the hospital
- Required clear and stable video images for monitoring
- Compatibility with a wide range of medical equipment in critical hospital environments
- A tailored solution for medical-grade applications with easy-to-use media distribution management software

The ATEN Solution

Seamless switching delivers instant and stable video over long distances over a single cable, while the solution converts various resolutions to ensure top quality. This flexible and cost-effective solution is tailored for medical-grade applications with easy-to-use media distribution management software. Furthermore, by adopting ATEN's HDBaseT KVM Extenders, MRI equipment is accessed and operated with zero latency while uncompressed video with pixel-to-pixel quality is reliably delivered to the operator's room for real-time diagnosis.

VM5404H 4 x 4 HDMI Matrix Switch with Scaler	VE812 HDMI HD
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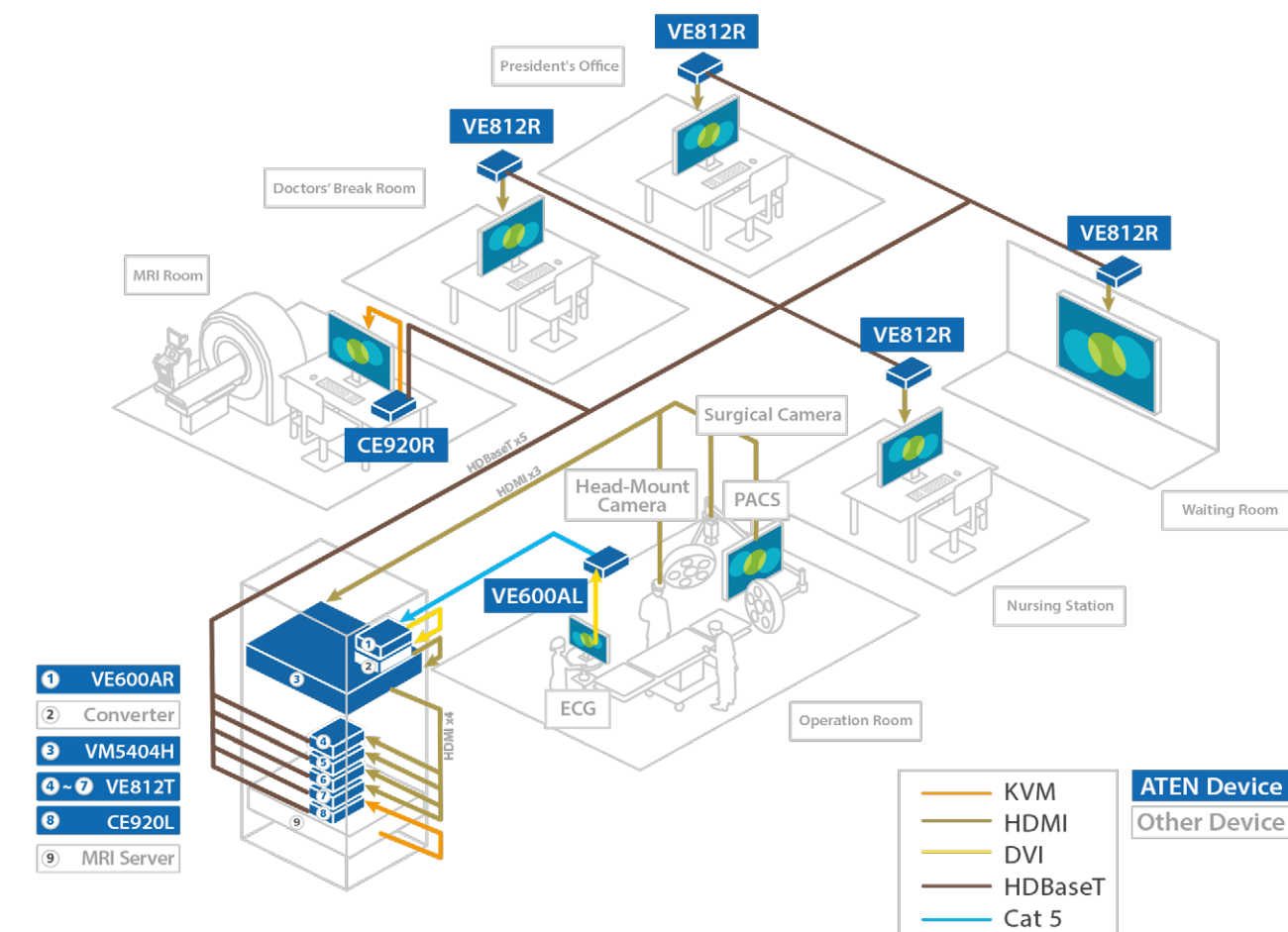


VE812

HDMI HDBaseT Extender



CE920
USB DisplayPort HDBaseT 2.0 KVM Extender





02 Control Room

Healthcare Equipment Monitoring and Remote Observation

In order to continue providing the best possible care for its patients, a hospital in Europe decided to redesign its wards into a mix of group and individual patient rooms that could be conveniently monitored 24/7 from a single, central control room. The healthcare monitoring system needed to integrate ECG equipment, medical records access, surveillance equipment, and more. This involved the installation of a 3x3 video wall to flexibly display a wide variety of inputs.

Challenges

- Long-distance 4K HDMI distribution solution for a 3x3 video wall
- Various medical, surveillance and other input sources need to be centrally controlled and easily managed
- Need flexible control methods for mobility and convenience
- Required an improved and highly integrable healthcare monitoring solution that was also set up for fast responses

The ATEN Solution

Provided long-distance 4K HDMI distribution for a 3x3 video wall to flexibly display ECG and surveillance output as well as PC, TV, and microscope/camera AV content, while allowing a wide range of inputs and other controls to be easily accessed via a handheld device. Doctors are able to multitask and monitor patient health remotely via the video wall for efficient daily operations, in addition to having instant access to current readouts and patient medical records. The ATEN solution integrates smoothly with the existing video conference system so that medical records and current status of patients can be transmitted to other hospitals for immediate discussion.

VM1600A

16 x 16 Modular Matrix Switch



VK2100

Control Box



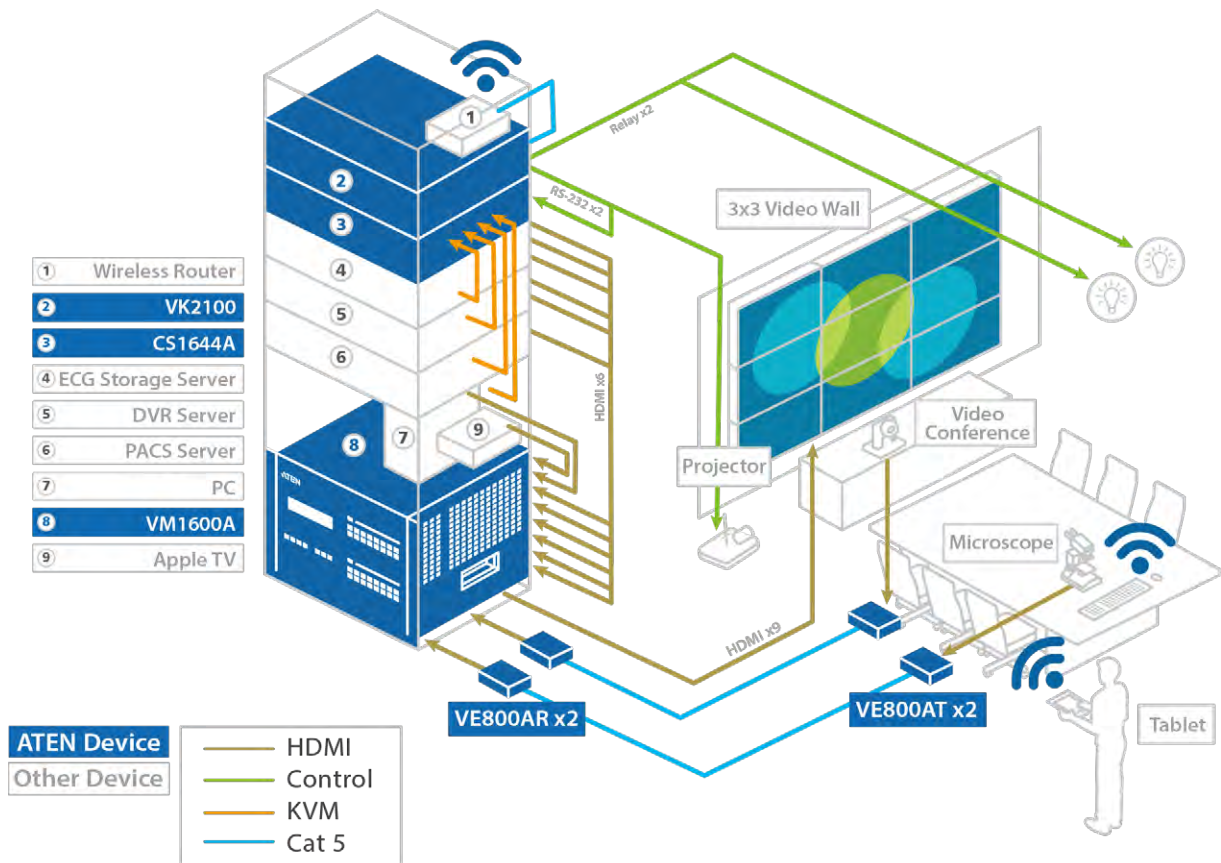
CS1644A

4-Port USB DVI Dual Link Dual Display/Audio KVMP™ Switch



VE800A

HDMI Cat 5 Extender





03

Media Distribution

Medical and Surgical Training

In order to offer physicians and trainees the ability to achieve and assess proficiency through simulation and pace-appropriate, structured supervision, an advanced training center for minimally invasive surgery (MIS) was established to instruct doctors using real-time observation of surgical procedures, instructional demonstrations, virtual reality stations, and other interactive simulations and lecture halls. These are all connected to monitors in remote classrooms and seminar rooms which are dispersed across an area of a couple hundred meters.

Lecture Area



Challenges

- Video distribution system for keyhole surgery procedures and more
- Highest possible resolutions and no breaks in the video feed
- A modular, easily upgradeable, latency-free switching system that would connect the operating room and simulation centers to multiple output destinations
- Hardware output includes DVI and HDMI channels

The ATEN Solution

The ATEN solution with Seamless Switch™ delivers low-latency feeds across long distances at the highest resolutions with no signal degradation, while ATEN FrameSync technology synchronizes output for VR systems, helping to provide an ideal learning environment while protecting against early obsolescence and minimizing the complexity of the media distribution video network. DVI and HDMI are integrated into one system, and students and lecturers are able to smoothly switch to alternate video feeds as required.

VM1600A

16 x 16 Modular Matrix Switch



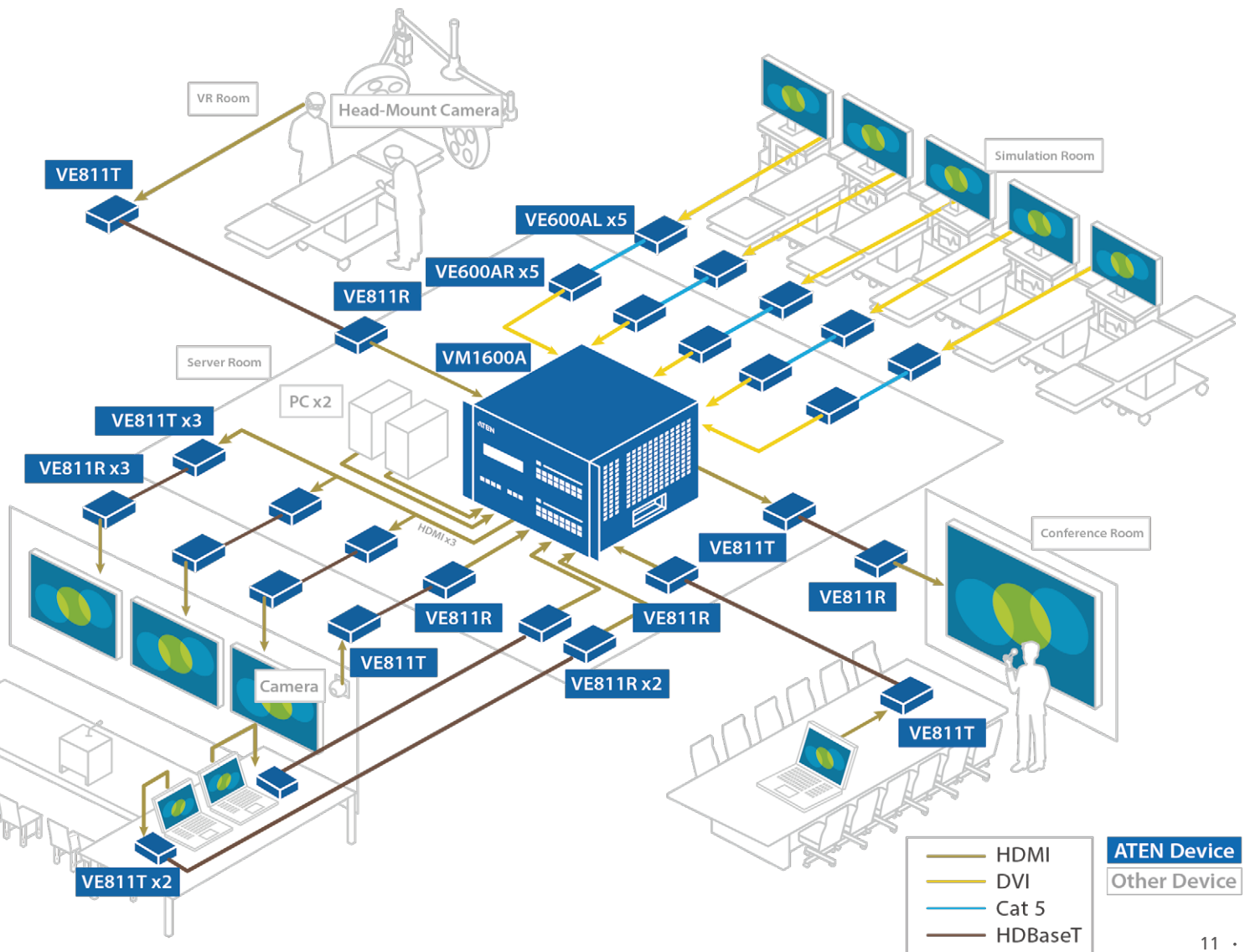
VE600A

DVI/Audio Extender



VE811

HDMI HDBaseT Extender





04

Centralized Management

Laboratory Automation and Medical Diagnostics

A biotech company was looking for a centralized control solution to integrate with its automatic laboratory processing system (APS) for medical testing stations. This pre- and post-analytic APS manages blood test machines and computers, and the control solution needed to increase efficiency by enabling operators to manipulate the target computers without having to walk the length of the testing station lab, which can exceed 100 ft, just to perform simple input operations.

Challenges

- Needs to integrate with client's own modular APS system for diagnostics
- Increase management and control efficiency across multiple testing stations while reducing the amount of operators to keep costs down
- Operators need to run multiple testing stations from one screen
- Ensure system security by providing a non software-based centralized management solution
- Install multiple desktop PCs or NBs in a confined space

The ATEN Solution

The ATEN solution is hardware based, so no third-party software can be loaded onto the APS, while an operator can easily access and run all stations through KN instead of going to each station and running them individually. Panel Array Mode's automated tiling allows a remote operator to view up to 64 targets on one monitor. The operator can then easily access servers by clicking on the corresponding window in the Panel Array. Dual display console stations enable users to multitask across two displays with a single keyboard and mouse, while their OU design saves space at the station.

KN8132V

32-Port Cat 5 KVM over IP Switch with Virtual Media



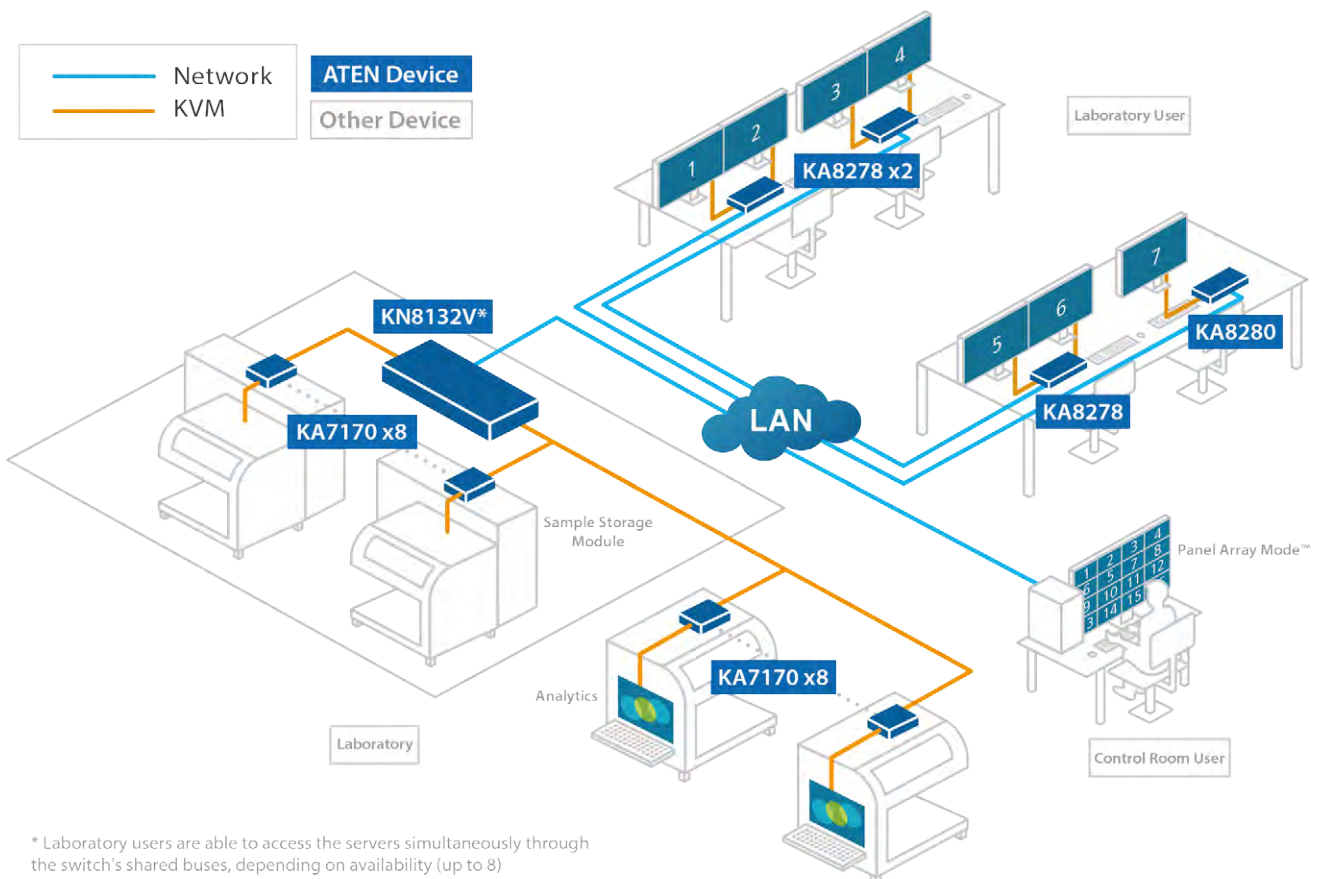
KA8278 / KA8280

KVM over IP Console Station



KA7170

USB KVM Adapter





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About ATEN

ATEN International Co., Ltd., established in 1979, is the leading provider of AV/IT connectivity and management solutions. Offering integrated KVM, professional AV, and intelligent power solutions, ATEN products connect, manage, and optimize AV/IT equipment in corporate, government, education, broadcasting and media, and transportation environments. ATEN has 570+ issued international patents and a global R&D team that produces a constant stream of innovative solutions, resulting in a comprehensive portfolio of products available worldwide.

