tangent

# Tangent White Paper

## What is a Medical Grade Computer?

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# 1 Introduction

Within the Healthcare industry there are fundamental requirement differences when it comes to computers. Machines that are used for medical purposes, industrial purposes and private users all require a specific set of needs. Computers that are Medically Certified, built with an antimicrobial housing, are sealed from external pollutants, are fanless and all backed by 24/7 Engineering support, are the most important requirements for Healthcare "Medical Grade" use.

Often, companies manufacturing computers, claim to be suitable for the Healthcare market or simply labeled "Medical Grade", fail to meet the requirements necessary to function safely and efficiently. Although it may be appealing for healthcare facilities to follow the non-medical enterprise mindset of buying the same brand desktop or tablet computers as their servers, the concerns a Medical Grade computer addresses, unlike the non-medical, are patient and staff health and safety, liability, increased contamination protocols and 24/7 runtime in critical environments. Tangent's Medical Grade Computer White Paper details the requirements essential to be classified as a true Medical Grade Computer.

# 2 Industry Requirements

Computers face tough challenges in most settings, but none as demanding as that of the Healthcare Industry. **Medically Certified safety, Antimicrobial, Contamination Mitigation and Dust and Water Intrusion**, play a key role that must be addressed specifically for that workflow. It is imperative that Medical Grade computers are exclusively designed for those demanding conditions during the development stages of the computer. Viability in a healthcare setting, requires that their computers not only have a cleanable, anti-microbial and sealed casing, but that the internal components address the above-mentioned elements and maintain reliable 24/7 operability.

## 2.1 Medically Certified – 60601 Certification

The IEC (International Electrotechnical Commission) is the body responsible for the Medical Certification Safety protocol (60601 Certification) standards for the electromagnetic compatibility around other electrical equipment and for the safety of medical devices. When a medical device is 60601 Certified, it has met the highest requirements for that compatibility and safety.

When a product undergoes the certification process in a lab, it is tested for hazards, such as mechanical impact, electrical shock, radiation, ignition from flammable anesthetics, fire and excessive electrical energy output, that could interfere with other electrical devices in the vicinity. This certification testing is done to work to reduce the likelihood of those hazards, thus working to protect patients and end users. The process for certification is conducted by an approved independent lab, takes months to complete and costs upwards of $25,000 per device. Once certified, no changes can be made to the device or re-certification must take place.

## 2.2 Antimicrobial

HAI's or Hospital Acquired Infections are transferable from contact with humans or inert objects, such as medical equipment or devices, computers, phones, carts, doors or even walls, almost anything with a surface where microbes can live. Research has shown that these microbes live longer on plastics, such as those used in computer hardware.

Research has brought to light the shocking facts regarding HAIs:

- Over **1.7 million** contract a HAI each year resulting in a 38+ billion-dollar risk
- Over **94,000** deaths in the United States occur each year making HAIs in the Top 10 Causes of Death

## 2.2 Antimicrobial Continued

- **5%** of all hospital admission result in an HAI
- Average cost per infection: **$13,973.63+**
- Increased cost per surviving patient: **$40,189.00+**
- Average cost of 1 MRSA outbreak: **$37,367.81+**
- Surgical Site Infection (SSI) make up **24%** of all HAIs
- According to the CDC, Contact Transmission is the most important and frequent mode of transmission for HAIs in the Health Care Setting.

Not only are the economic issues apparent, with an annual cost to treat these infections around $38 billion, the health factors and impact to patients acquiring serious infections can be prolonged and even lead to death, which is just as appalling.

Although patient paperwork is always done prior to admission or surgery, doctors and hospitals also run the risk of being sued for damages, ultimately affecting the reputation of the doctor and hospital. Controlling the mitigation of infection is critical for the health, safety, and well-being of everyone in a healthcare setting, patients and staff alike. The antimicrobial technology has been developed for that reason. A computer hardware device, with antimicrobial casing can work in the maintenance of a germ-free environment. Every area within a healthcare setting where patients, visitors and staff can come in contact with, and potentially transfer germs from computer to patient, should utilize this antimicrobial technology.

## 2.3 Contamination Mitigation

Contamination Mitigation is a key element in the determination of a true Medical Grade Computer. Antimicrobial casing and Medical Certification are only a few steps in the defining of a device that can genuinely be labeled Medical Grade.

Additional components, such as a **Fanless Operation, Sealed Fronts, and IP Certification,** as well as **24/7 Operability**, take a mere "Medically Certified" computer to a "Medical Grade Computer", designed and engineered specifically for the Healthcare environment.

### 2.3.1 Fanless

A fanless computer is optimal for increased contamination mitigation, especially in environments that must maintain the highest level of sterilization, such as an operating room, ICU, clean room for pharmacies or the SPD. Although ideal for those sterile settings, in contrast, the control of contaminants should be paramount throughout a healthcare environment. A fanless computer works to eliminate the circulation of dust, microscopic germs or other particles that could comprise sterile settings. The use of a fanless computer is an added step in the fight to implement and maintain infection control and ultimately patient and staff safety.

Tangent's Medical Grade Computers are engineered from concept to completion with health and safety as key components of design. Designing our devices using CPUs with low power consumption, generates less heat and voltage, versus today's consumer devices, eliminating the need for a fan.

### 2.3.2 Sealed Fronts and IP Certification

Tangent Medical Grade Computers are designed with sealed fronts and are all "IP Rated". The seal and IP rating are both additional key elements in infection control, and key facets of what makes a truly Medical Grade Computer.

Sealing the front of our computers allows the device to be cleaned with water or CDC/FDC approved healthcare cleaners without worry of damaging any of the internal components. The level or degree of that protection is its "IP Rating".

The International Electrotechnical Commission (IEC) established IP codes to specify the degree of protection against water, dust and solid object intrusion into the electrical enclosure or hardware of a computer. The "IP" letters are followed by 2 numbers and an optional letter. For example: for an "IP65 Rated" device, the "6" signifies that the enclosure is tight and offers complete protection against dust intrusion. The second digit, "5", indicates that the enclosure is protected against water, being sprayed by a nozzle or jet, at a rate of almost 3.5 gallons per minute from a distance of almost 10 feet.

### 2.3.3 24/7 Operability

**Having a Medical Grade Computer that encompasses Medically Certified safety, Antimicrobial, Contamination Mitigation and Dust and Water Intrusion abilities** is nothing without **24/7 Operability**.

Hospitals and other Healthcare Facilities do not have the ability to put critical work on hold, there is no down time, and they must be able to rely on their computer systems operating 24/7. Hospitals function on an uninterrupted, continuous operation cycle, from diagnostic analysis, EMR software like EPIC and Cerner to immediate lab results, everything must have a 24/7 uptime.

Tangent's devices, both computers and tablets, are designed to address this critical concern.

# 3 Market Workflows and Current Market

Medical Grade Computers specifically designed for the Healthcare sectors can be seen in multiple workflows across many market sectors, including:

- **Operating Rooms**
- **Patient Bedside/Electronic Signature**
- **Nurses Stations**
- **Nursing/Physician Rounding**
- **Medication Administration**
- **Sterile Processing Depts**
- **White Board**
- **Welcome/Patient Check-in**
- **Pharmacy/Clean Rooms**
- **Hospital Cafeteria/Kitchen**

Depending on the end-user, Tangent's Medical Grade Computers can be customized to fit the workflow, from hand-held devices for obtaining electronic signature or bedside Patient Charting, to medical cart mounted with hot-swap batteries for critical care areas where reliability and adaptability are paramount like the ER, OR and ICU. Devices can be customized with RFID or SSO verification, or a Barcode Scanner for ease in patient identification, and increased encryption in ensuring security of data. PCAP, multi-touch screens, glove-touch enabled for high – resolution visibility.

**Wherever safety and security are Industry Requirements, Tangent has you covered.**

## The Current Market for Medical Grade Computers

Current and past trends from the consumer market have worked to influence the healthcare sector. Many healthcare enterprises, due to the high-cost pressure, started prioritizing low prices over all other factors. This tendency has dramatic consequences, as outlined above with the cost of HAIs.

Breakdowns started prematurely, causing trouble, and frequently resulted in the time-consuming, re-qualification measures, as the non-Medical Grade, or merely "Medically Certified" computers that had been used were already off the market after just a few years. Many Tier 1 manufacturers use a "mass production" development cycle, instead of a specialized testing and certification process, resulting in the release of new models every six months, adding burden to the technology team and staff confidence in reliability. Your organization’s return on investment is also as important as the features that make Medical Grade.

# 4 ROI and Cost of Medical Grade Computers

## Understanding the Cost of a Medical Grade Computer

With the increasing demand for safety, cybersecurity, and reliability of computers within the Healthcare market, the educated shift has been toward Medical Grade Computers designed specifically for those needs.

Placing a common consumer device that is not prepared for the rigors needed to maintain the sophisticated infrastructure of the healthcare market can be dangerous and costly.

Computers are essential in running every aspect of operations within a hospital and are an integral part of the infrastructure. The investment for computers, although not nearly close to the amount spent on the refined top-notch medical equipment hospitals purchase, their reliability and quantities need to be considered when establishing your ROI or Return on Investment. Although not always a part of that financial equation, the need for those computers purchased be Medical Grade computers can play an important role.

As Medical Grade computers are designed for their safety and reliability in any patient area, use of non-medical grade devices in those spaces can become a financial concern, if hospitals are sued for damages arising from the increased protection Medical Grade Computers provide.

Although Medical Grade computers may have a slightly higher initial cost, the increased safety they provide, as well as the reduction of potential risks, works to reconcile those costs. As Tangent definition of a true Medical Grade computers also encompasses their reliability, this likewise works to reduce costs associated with maintenance, providing a greater long-term ROI.

## 5 Conclusion

As essential as the Medical Grade computer market is, it is important to remember that many computers advertised to be suitable for healthcare application do not meet all the corresponding requirements.

Many manufacturers have varied definitions of a "Medical Grade Computer", but with Tangent, we set the standard. Medical staff and hospitals should not settle for computers that put their staff and their patients at risk or do not meet the rigorous demands of the industry.

If all the information provided is taken into consideration, unpleasant missteps and costly consequences can work to be avoided.

**Tangent Sets the Standard for Medical Grade Computing**.

| Tangent Model | Antimicrobial | Fanless | 60601 Certified | IP Rated | Mounting | Hot-Swap |
|---|---|---|---|---|---|---|
| **Medix 24/Medix 22** | ✓ | ✓ | ✓ | ✓ | ✓ | |
| **Medix E24B/ E22B** | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **Medix M24T** | ✓ | ✓ | ✓ | ✓ | ✓ | |
| **Medix T13 Tablet** | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| **Medix M8 Tablet** | ✓ | ✓ | ✓ | ✓ | ✓ | |

## About Tangent

Tangent is a leader in building specialized computers for the Healthcare, Industrial and Government markets. Our purpose-built computers are specifically engineered for industries and applications not served by traditional computer manufacturers. Products include Medical Grade and Industrial Grade all-in-one and Rugged Mini computers.

Our staff of Certified Microsoft Cloud engineers provide expert professional services ranging from simple Office 365 migrations and deployments to the design and implementation of complex Azure solutions for high-security hybrid network environments.

Our computers and Cloud Solutions are supported 24/7 real-time with certified engineers to support the most complex and critical 24/7 work environments.

Corporate offices are in Burlingame, California. Other offices are located throughout the United States, Canada, Europe, Taiwan, and China.

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