



FISH BEHAVIOR PATTERNS REFLECT WATER QUALITY

A SINGAPOREAN WATER SECURITY SOLUTION PROVIDER USES
KONTRON'S BOX PC TO BUILD A BIO-MONITORING SYSTEM



BIO-MONITORING IS A RELIABLE METHOD USED TO ASSESS WATER QUALITY, WHICH FUSES THE TECHNIQUES OF ENVIRONMENTAL PHYSICO-CHEMICAL CHARACTERISTICS AND BIOLOGICAL BEHAVIOR OBSERVATION. VIDEO ANALYSIS TECHNOLOGY IS THE IMPORTANT ENABLER TO IDENTIFY THE BEHAVIORAL PATTERNS OF BIO-INDICATORS.



// WATER QUALITY MONITORING USES FISH BEHAVIORS AS BIO-INDICATORS

Real-time bio-monitoring is a reliable method used to assess water quality since it incorporates living organisms, such as fish and crayfish, into the aquatic sample as bio-sensors. Combining the physicochemical characteristics of aquatic environments and physiological observation on the behavioral patterns of living organisms, the status of water quality characteristics can be determined by relative comparisons. To realize such a bio-monitoring, video analytics is an important enabler.

A Singaporean water security solution provider develops an intelligent water quality bio-monitoring system for their governmental or corporate clients to real-time monitor the quality of water resource and to early detect any contamination accidents.

First of all, the client has their own video analysis techniques developed based on Windows OS and thus needs a powerful enough x86-based computing system to process the video image captured from the cameras. Within the enclosure, the bio-monitoring system already accommodates an aquarium tank, two video cameras, a PLC, a relay module, sensors and automated devices. Available space is insufficient. A small footprint is a must for easy integration. Though there are IP55-rated air vents positioned on the enclosure, power consumption and thermal dissipation should be taken into account as well to prevent temperature increase so as to maintain the stability of the aquatic ecosystem suitable for fishes. In addition, the system is intended to operate based on 24/7 real-time monitoring. Reliability and thermal performance are important purchasing criteria as well.

Finally, this equipment is a significant facility investment for any public sector or corporate organization. It is intentionally designed to use for years. Thus, the box computing system the client plans to procure must have excellent quality for durable usage. The supplier must be capable of good quality control on key components as well to avoid frequent replacement.

SYSTEM REQUIREMENTS

- ▶ x86 architecture
- ▶ Windows OS
- ▶ Small form factor
- ▶ Sufficient video processing capability with low power consumption
- ▶ High reliability and good thermal dissipation
- ▶ Long lifetime and excellent quality control on key components

SOLUTION

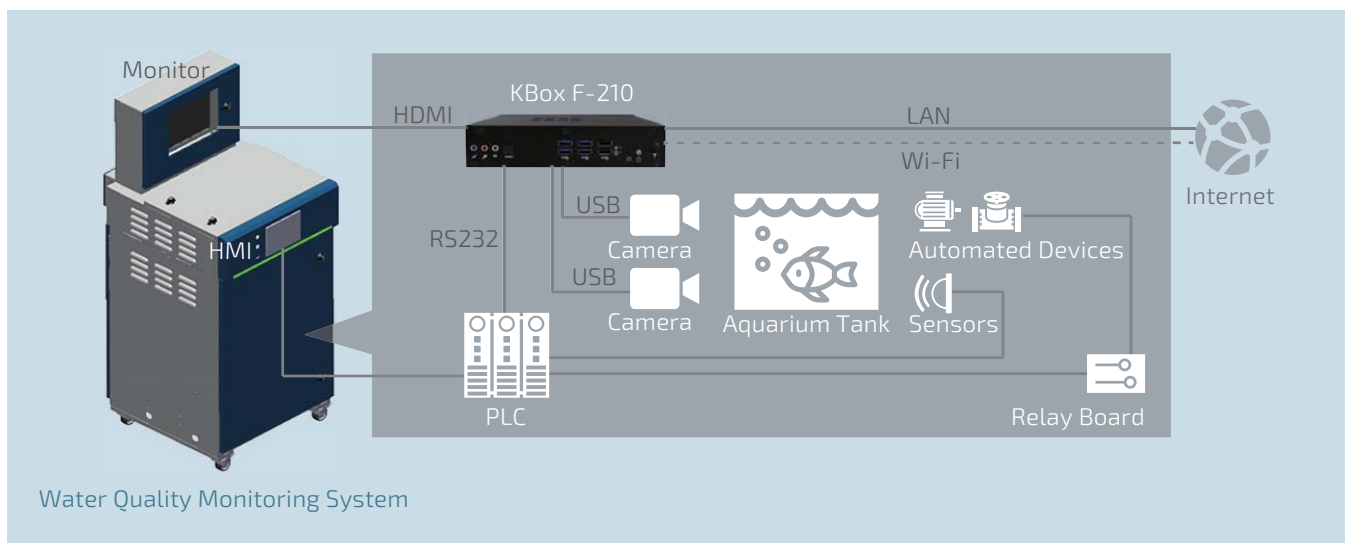
In consideration of sufficient processing capability for video surveillance and analysis, the client integrates Kontron's KBox F-210, a graphics performance oriented box PC powered by 6th-generation Intel® Core™ i processors, to their bio-monitoring system. At the same time they choose to house a power-optimized processor, Core™ i7-6700TE, into the box PC to prevent high heat release from elevating the water temperature to a level that could kill the fishes. It is an adaptive trade-off to balance processing performance and power consumption. In addition, the active cooling design can speed up air circulation to remove the heat from the enclosure. With the compact design of only 1.2 liters, it doesn't disturb the

installation of the other devices and reserves enough space for air flow within the equipment.

KBox F-210 undergoes a rigorous inspection process which includes a minimum 72-hour burn-in test to screen out those with inherent defects or defects resulting from manufacturing aberrations. In fact, all Kontron's products are subject to this stringent control process in the in-house laboratory. It can prevent possible time- and stress-dependent failures after release to the market to ensure daily 24-hour operation.

Life cycle management is another important part of Kontron's total quality management. Kontron conducts appropriate material and vendor control measures to ensure long-term support from key component suppliers with strict revision control, which delivers a more tangible promise to the client in their equipment development.

Finally, KBox F-210 offers a variety of I/O interfaces and expansion slots to satisfy this water quality monitoring system for peripheral application and wireless connection, including USB for two cameras to capture fish behaviors; HDMI for a monitor to display videos captured and information detected; RS232 COM port for PLC (Programmable Logic Controller) which controls HMI, sensors and automated devices; GbE LAN and mPCIe socket for wired Ethernet and Wi-Fi wireless expansion.



// SYSTEM DIAGRAM

About Kontron

Kontron, a global leader in embedded computing technology and trusted advisor in IoT, works closely with its customers, allowing them to focus on their core competencies by offering a complete and integrated portfolio of hardware, software and services designed to help them make the most of their applications.

With a significant percentage of employees in research and development, Kontron creates many of the standards that drive the world's embedded computing platforms; bringing to life numerous technologies and applications that touch millions of lives. The result is an accelerated time-to-market, reduced total-cost-of-ownership, product longevity and the best possible overall application with leading-edge, highest reliability embedded technology.

Kontron is a listed company. Its shares are traded in the Prime Standard segment of the Frankfurt Stock Exchange and on other exchanges under the symbol "KBC". For more information, please visit: www.kontron.com



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