



Developing Next-Generation Fitness Consoles for Exercise Equipment

Cardio equipment vendors can satisfy demanding consumer expectations with a turnkey console platform from Advantech* with Intel technology and Android* OS support through Wind River*.

SOLUTION BRIEF

Intel® Celeron® Processor
Fitness Industry



Staying Connected During Workouts

Whether at health clubs or in their homes, people spend significant amounts of time on treadmills, exercise bikes, and cross trainers to reach their health and fitness goals. During workouts, the equipment's console plays an important role because it tracks progress, displays vitals, and entertains. But in an always-connected world, this is no longer enough. Consumers expect a more integrated partner that enables them to watch what they want when they want, answer phone calls and text messages, sync biometric data, post results on social media, and compete with others. The console should seamlessly connect their mobile devices and allow users to multi-task by performing multiple functions at the same time.

Fitness consoles extend
the mobile experience.

ADVANTECH

WIND RIVER

Equipment Manufacturer Challenges

Consumer expectations around fitness consoles are shaped by the rich experiences delivered by the latest tablets and smart phones. In fact, 76 percent¹ of club members bring a mobile device with them to the gym. Facing a high hurdle, cardio equipment vendors must design-in fitness consoles that provide high quality video and audio, connectivity to mobile devices, and easily integrate the applications consumers demand for their connected life.

For fitness console manufacturers, quickly delivering all this capability in a cost-effective solution presents a major challenge. The console needs a high-quality touch screen, TV tuner, and associated drivers to deliver high-definition (HD) video, as well as connect wirelessly to Bluetooth* devices. Consumers want to access the Internet for social media, entertainment content, or training programs, requiring Ethernet or Wi-Fi connectivity. They would also like consoles to seamlessly communicate with their wearable fitness devices, like heart rate monitors or GPS devices. Many of these devices require Android* support to run their applications.

Turnkey Platform

Addressing the challenges facing equipment manufacturers, the fitness console is the first integrated hardware and software fitness platform from Advantech* powered by Intel technology and Android OS support through Wind River*. It is an open frame (aka. no chassis), turnkey solution that can be customized through software and support, delivering a high-quality experience in a number of ways:

- **Robust connectivity:** The platform offers a wide range of connectivity options, including an Ethernet port, Wi-Fi, Bluetooth, and optional near-field communication (NFC), to meet diverse and changing user preferences.
- **Enhanced TV tuner support:** Wind River Android drivers and support reduce development effort and time to market.
- **Large open-frame solution:** The 15.6-inch touch screen provides an exceptional viewing and navigation experience.
- **Operating systems:** Support for Microsoft* Windows* and Android minimizes development and software maintenance costs.
- **Android support:** The Wind River Android board support package (BSP) and related customizations reduce development effort and offer a unique Android experience.
- **Graphics performance:** High-performance media and graphics processing delivers HD video, fast media conversions, stereoscopic 3D capabilities, and immersive web browsing, among other features.
- **Low power operation:** The platform's low power consumption promotes an efficient design and reduces energy cost, while enhancing the user experience.
- **Compelling functionality:** The user experience is enhanced through seamless transitions between applications, a highly responsive capacitive touch environment, fast boot, and multi-windowing functionality.

Low Power, High Performance

The fitness console is based on the quad-core Intel® Celeron® processor N2930, manufactured on Intel's industry-leading 22nm process technology. This system-on-chip (SoC) delivers impressive compute, graphical, and media performance while operating in a fanless environment.

▪ System-on-chip (SoC)

This highly-integrated, one-chip solution helps save on bill of materials (BOM) cost and allows for smaller form factor solutions over previous-generation, two-chip offerings.

▪ Graphics Turbo Capability

Intel® HD Graphics 4000 delivers amazing and vibrant multimedia experiences with support for:

- DX11, OpenGL 4.0, OpenCL1.2
- HDMI 1.4a, DP1.1 with max resolution of 2560x1600 @ 60Hz
- Decode acceleration for: H.264, MVC, VP8, JPEG/mJPEG, VC1/WMV9, MPEG2
- Up to 1.7 GB of video memory

▪ Integrated I/O Interfaces

The SoC integrates a wide range of I/O, including:

- Memory: Up to 8 GB of DDR3L-1066
- Display: embedded DisplayPort*, DisplayPort, HDMI, and VGA
- Storage: SATA Gen2, eMMC, SD card
- Legacy I/O: SDIO, SIO
- Audio: low power and high definition versions
- High-speed I/O: PCI Express* Gen 2.0 and USB 2.0/3.0

▪ Hardware-based Virtualization

Intel® Virtualization Technology² (Intel® VT-x) provides near-native performance of virtualized workloads for greater reliability, security, investment protection, and flexible resource management.

Fitness Devices and the Connected World

The world is in the midst of a dramatic transformation from isolated systems to Internet-enabled devices that can network and communicate with each other and the cloud.

Commonly referred to as the Internet of Things (IoT), this shift is generating unprecedented opportunities for companies looking to develop new services, increase efficiency, and deliver better user experiences.

The fitness console is a perfect example of the IoT evolution, because what used to be a stand-alone device is now highly-connected, giving users seamless access to entertainment, social media, training applications, and more.



Wind River* Android* Solutions

Android has become one of the most popular and fastest-growing operating systems due to its openness, highly-customizable features, and robust ecosystem. Wind River provides key features on top of the standard Android Open Source Project (AOSP) to fill real-world requirements in building next-generation Android devices. These features include:

- **Apple* iOS Device Connectivity**

Enables access and playback of multimedia content from iOS devices when connected to fitness consoles via USB or Bluetooth.

- **Firmware Management**

Provides a secure, firmware-over-the-air (FOTA) solution for updating firmware and applications on Android devices.

- **Multi-windowing**

Allows multiple applications to be displayed simultaneously in different user-experience styles, including split screen, picture-in-picture, and desktop windows.

- **Fast Boot**

Reduces device startup time through several optimization methods, including Android Package Manager customizations, resume from suspended system state, and driver performance optimizations.

- **Media Center**

Implements basic media sharing based on the Digital Living Network Alliance (DLNA) standard, allowing users to easily find, store, view, and play digital content.

- **Security-Enhanced Android**

Removes vulnerabilities and adds more specialized policy control to SE Android released by the National Security Agency (NSA).

- **Data/Application Persona Separation**

Isolates and encrypts application and user data to provide additional security for environments with multiple domains and personas.

- **Secure Boot**

Verifies each stage of the boot process through a chain of trust and only allows authenticated software to be executed, thus preventing malicious code from being run without impacting performance.

Amazing Next-Generation Fitness Consoles

Advantech partnered with Intel and Wind River to deliver the fitness console, a standard, open frame, integrated platform that offers industry-leading performance, low power, robust connectivity, and fully-validated TV tuners for the Android OS. Supporting Windows, Linux, and Android OSes, the fitness console is the basis for the next generation of the Internet-ready fitness consoles.

Powered by the high-performance, low-power Intel Celeron processor N2930, the fitness console offers the quality and performance headroom required to meet today's and tomorrow's user expectations, including the flexibility to sync with a variety of user devices.

The fitness console market segment is undergoing a paradigm shift away from hardware development to software development. By using this turnkey platform, cardio equipment manufacturers can focus on developing software-based features that create greater value and differentiation.

For more information about the fitness console platform from Advantech, visit www.advantechUSA.com/fitness.

Information about Android solution from Wind River can be found at <http://www.windriver.com/products/mobile>.

For more information about Intel solutions for healthcare, visit <http://www.intel.com/fitness>.



¹ Source: Health Strategy Solutions

² Intel® Virtualization Technology requires a computer system with an enabled Intel® processor, BIOS, and virtual machine monitor (VMM). Functionality, performance or other benefits will vary depending on hardware and software configurations. Software applications may not be compatible with all operating systems. Consult your PC manufacturer. For more information, visit <http://www.intel.com/go/virtualization>.

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