

WaRP7 Wearable Reference Platform

The Wearables Reference Platform (WaRP7) provides wearable device designers the opportunity to innovate and take a differentiated product to market faster.

TARGET APPLICATIONS

- ▶ Activity trackers
- ▶ Sports/heart rate monitors
- ▶ Smart watches
- ▶ ECG monitoring
- ▶ Smart glasses
- ▶ Smart clothing
- ▶ Wearable imaging devices
- ▶ Augmented reality headsets
- ▶ Wearable computing
- ▶ Wearable healthcare devices

OVERVIEW

Wearables are not a new product category. Watches, hearing aids and headsets have been utilized and innovated for generations. However, with the continual focus on smaller, lighter and more powerful components, wearables now encompass multiple market segments from consumers to industrial, medical and military.

WaRP7 shortens time-to-market by delivering a wearable form-factor platform based on a heterogeneous architecture to address various usage models. In addition, WaRP7 has been architected and designed from the ground up to address key challenges faced in the wearables market like battery life, connectivity, usability (user experience) and miniaturization (small form factors). The open source design allows developers to take the platform as a starting point and innovate without licensing restrictions.

THE PLATFORM

WaRP7 speeds and eases development of wearable devices by addressing technology challenges and freeing developers to focus on creating differentiated features. The platform consists of a main board and a daughter card. The main board is based on the NXP i.MX 7Solo applications processor that features an advanced implementation of the ARM® Cortex®-A7 core, as well as the ARM® Cortex®-M4 core. This unique heterogeneous multicore architecture enables low-power modes critical for most wearable designs, but also provides the power to drive a higher level operating system and a rich user interface. The daughter card is based on a flexible design with sensors to collect a range of data and the MikroBus™ expansion socket opens users to over 200 Click Boards™, allowing rapid prototyping across all potential wearable usage models. All components included in this system were selected based on low power, small form factor and cost.

The i.MX 7Solo applications processor is designed for devices that require high-performance processing with low-power requirements and a high degree of functional integration. The i.MX 7Solo processor features an advanced implementation of the ARM® Cortex®-A7 core, which operates at speeds of up to 1 GHz, as well as the ARM® Cortex®-M4 core. The i.MX 7Solo

enhanced by



provides up to 32-bit DDR3L/LPDDR2/ LPDDR3-1066 memory interface and a number of other interfaces for connecting peripherals, such as WLAN, Bluetooth®, GPS, displays, and camera sensors— ideal for wearable devices for today and tomorrow.

The power management of wearable devices based on WaRP7 is also enhanced by the inclusion of the power management IC (PMIC), the PF3001 and the battery charger BC3700. The PF3001 PMIC was designed specifically for use with the i.MX 7Solo processor with up to four buck converters, six linear regulators, RTC supply and a coin-cell charger. In addition to these features, the PF3001 also supports the i.MX 7Solo processor's low-power state retention mode for enhanced power performance.

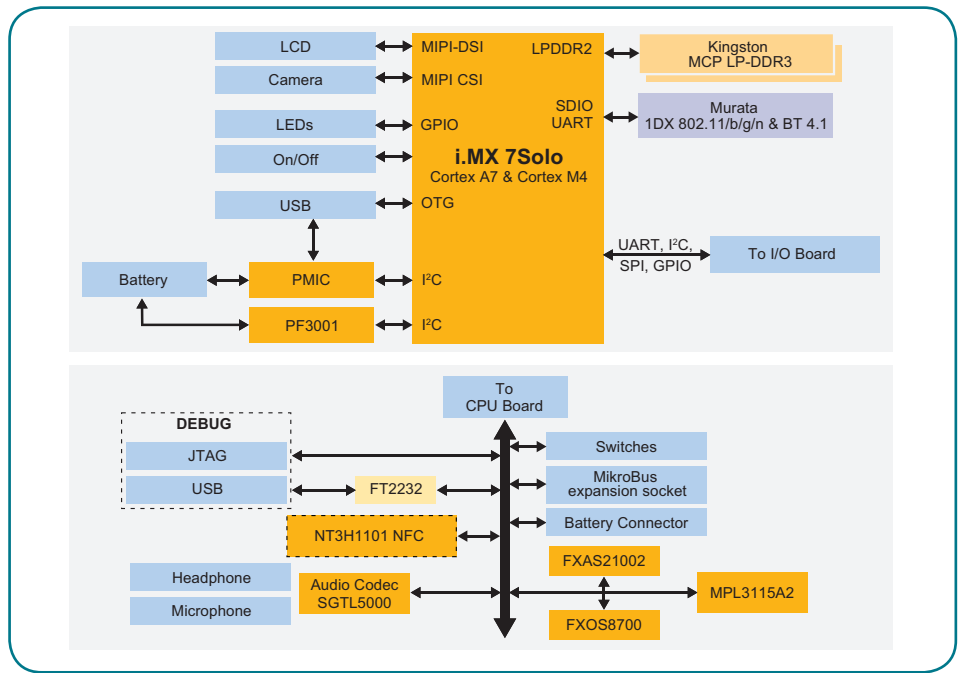
The BC3770 is a 2A Switching Li-Ion Battery Charger with intelligent power path management and USB OTG boost supply. The intelligent power path management allows the battery to be charged while supplying power to the system load and the OTG boost, switching efficiency to greater than 90% at full load currents.

Sensor technology is a critical component of wearable devices. WaRP7 incorporates the following NXP sensors: MPL3115A2, a high precision barometer; FXOS8700, a six-axis sensor combining an industry-leading accelerometer and magnetometer; and FXAS21002, a 3-axis gyroscope with extremely low-power operation and advanced embedded features enabling significant system-level power savings.

WaRP7 offers a variety of connectivity options enabling a wide range of usage models. For near field communications, the NXP NFC NT3H1101 offers both contactless and contact interfaces. The Murata-type 1DX multi-radio module offers 802.11b/g/n + Bluetooth 4.1, classic and low energy.

Another key component in the platform is a multi-chip memory module with 8 GB of managed NAND with eMMC 5.0 interface for storage and 4 GB LP-DDR3 for application code. Its compact size and low power make it ideal for wearable devices.

WaRP7 BLOCK DIAGRAM



WaRP7: ENABLEMENT AND ECOSYSTEM

In addition to the hardware platform, both Linux® and Android™ operating systems will be offered pre-installed or available via download. The implementation on WaRP7 of both Linux and Android will be based on NXP-standard BSPs without modifications to the standard frameworks of both distributions. WaRP7 hardware and software will be open source and support will be primarily community driven via the dedicated website at www.element14.com/warp7.

A WaRP7 kit will include the main CPU board, the I/O daughter card and a battery. A touch-screen LCD will be an optional choice.

WaRP7 FEATURES AND BENEFITS

Feature	Benefit
WaRP7 platform consists of a main CPU board and an I/O daughter card	Provides a rapid prototyping vehicle, reducing time-to-market and freeing resources to focus on differentiation
Prevalidated connectivity with USB, NFC, Bluetooth®, Bluetooth Smart and Wi-Fi®	Allows for the wearable device to connect to a gateway such as a smartphone or directly to the cloud so that the data collected can provide value to the user
Component selection and board design optimized for low power and reduced form factor	Hardware schematics and Bill of Materials provided at no additional cost
Full-featured Android™ and Linux® operating systems	Eases development effort for software developers; supports extensive UI capabilities and connectivity stacks

WaRP7: KEY TECHNOLOGY INSIDE

- ▶ NXP i.MX7 Solo applications processor, Cortex®-A7 and Cortex®-M4 core
- ▶ NXP PF3001 power management IC and BC3770 battery charger
- ▶ NXP MPL3115A2, FXOS8700, FXAS21002 sensors
- ▶ NXP NT3H1101 Near Field Communication IC
- ▶ Murata LBEE5KL1DX-TEMP-DS-SD Wi-Fi (802.11/b/g/n) and Bluetooth (4.1 Bluetooth Smart + EDR)
- ▶ Kingston 08EMCP04-EL3AV100-C50U MCP with 8 GB managed NAND Flash and 4 GB LP-DDR3