HotKnot™ Wireless Data Transfer

MediaTek White Paper

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Introducing HotKnot™

HotKnot, a MediaTek innovative data and file transfer mechanism, utilizes the physics of a capacitive touch screen to enable the exchange of data between two HotKnot-enabled devices. This technology takes advantage of the characteristics of a capacitive touch screen, such that the transmitting grid in the screen of one phone can interact with the receiver grid in a second when they are in close proximity (less than 1 centimeter).

HotKnot Sharing

For the user, HotKnot offers tap and send/share data exchange features similar to NFC (near field communication). Unlike NFC, however, there is much less danger of snooping or hacking, as the devices need to be in very close proximity.

A capacitive touch sensor, constructed from the transparent conductive compound ITO (Indium Tin Oxide) and laminated under the smartphone glass cover, detects touch information through capacitance measurements between ITO-Tx and ITO-Rx.

The MediaTek API for HotKnot[1] enables the user to make full use of this technology by detecting the presence of a HotKnot-enabled device touching the user's phone, setting up a connection between the two phones, and transferring data between the phones.

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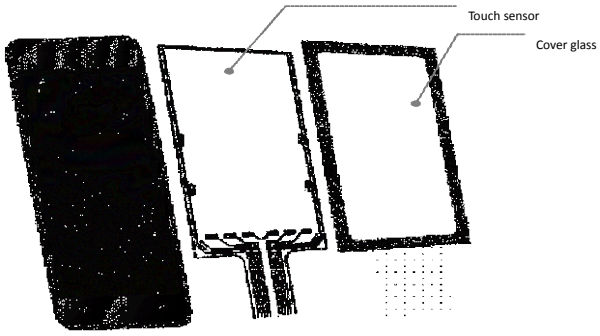
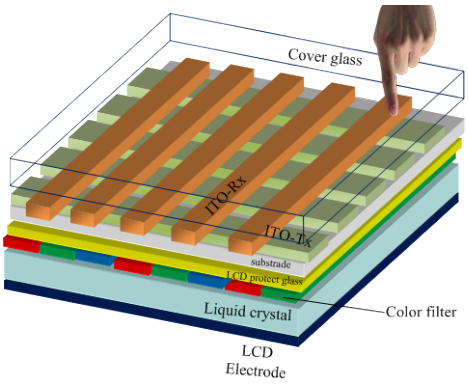
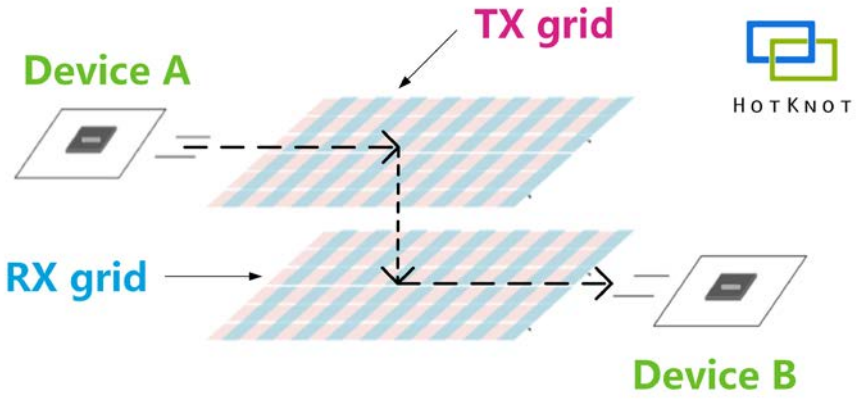
1 http://labs.mediatek.com/site/global/developer_tools/mediatek_android/api_references/mediatek-sdk3/reference/com/mediatek/hotknot/package-summary.gsp

Capacitive Touch Sensor



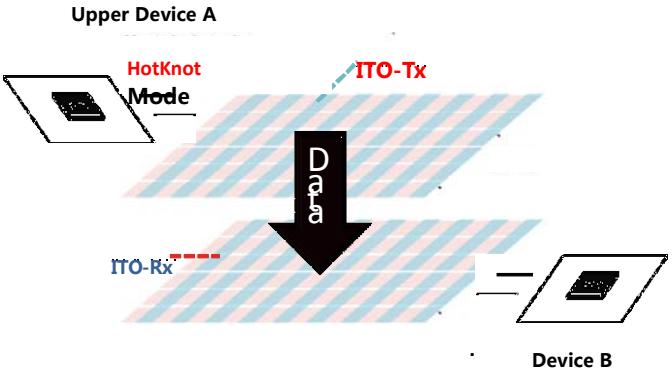


ITO-Tx sends signal out while ITO-Rx receives for touch detection. Finger touching disturbs ITO-Rx receiving, creating the touch event. The graphic below shows the interaction between the TX and RX grids on separate screens during HotKnot mode.

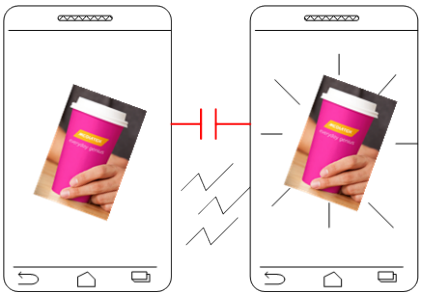


Expanding Capacitive Touch

HotKnot expands the capacitive touch concept from ITO-Tx, ITO-Rx on single devices to dual devices. Data transfers through this capacitive channel. In contrast to, which communicates through magnetic field back-to-back, HotKnot communicates through electric field face-to-face.



HotKnot transfers data through capacitive touch panel between two devices.



HotKnot duplicates photos just like stamp.

HotKnot Offers New Features

- **Easy Operation:** With HotKnot, you transfer what you see. And, you don't have to worry the antenna's location, a typical problem with other NFC applications.
- **Lower Signal Leakage, Better Security:** HotKnot sharing is built on panel-to-panel touch. Data signal fading to nothing within 1cm. With HotKnot, no one hears your whisper.

- **Fast transfer:** For large files, HotKnot passes paring information and smartphone access key through WiFi Direct[2] connection automatically. Sharing is fast, safe and easy.
- **Zero Hardware Cost:** The capacitive touch panel is the antenna for HotKnot. No copper coil or ferrite sheet is needed, another freedom from the standard NFC application.

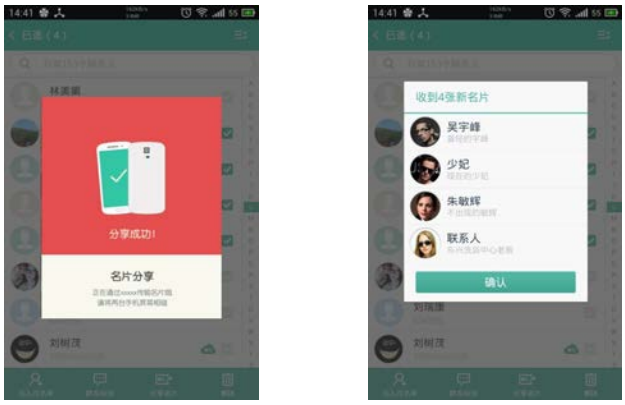
With HotKnot users can do what's typically available with NFC for phone-to-phone data transfer, such as:

- Exchange web addresses, contact data, photos, and videos
- Exchange game play moves
- Exchange any discrete data between app
- Exchange device capability data to enable Bluetooth pairing, WiFi connectivity, or other service hookup
- Facilitate mobile payments

Use examples are shown here:

Exchanging Information

[2] WiFi Direct is a technology that enables WiFi devices to connect directly without joining a tradtional network.



Exchange contact lists or personal information immediately, easily and accurately.

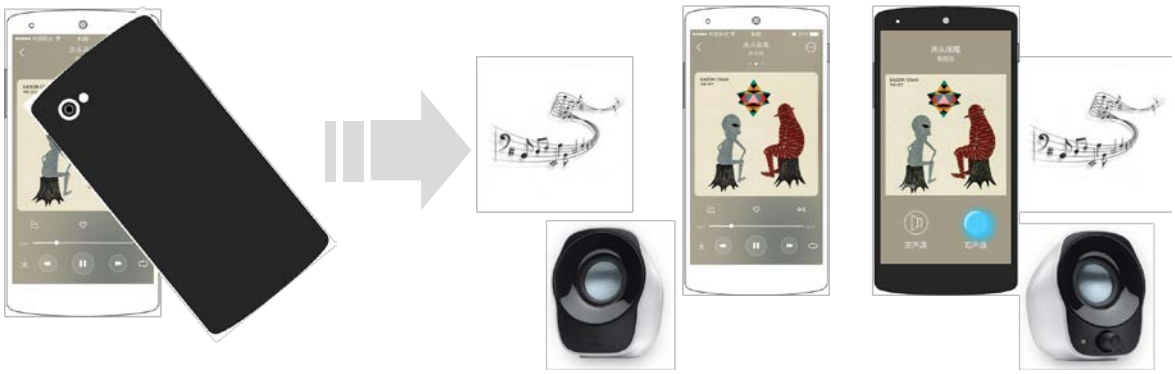
Paring Smartwatch

This is the simplest paring way to synchronize between a smartwatch and a smartphone.

Unlocking a Smartphone from a Smartwatch

The smartphone access key is stored in the smartwatch. HotKnot transfers the smartphone key to unlock the phone.

Creating Stereo Music



With HotKnot pairing two users can enjoy the stereo effect.

Why the Best Solution in the Market

NFC has several limitations. As shown here, NFC sharing requires back-to-back because the display shields NFC signals. Aligning the NFC's antenna's correctly to insure pairing poses difficulties for the users, resulting frequent in pairing failure.

Misalignment results in failed sharing.	The Touch screen is the antenna for HotKnot, Sharing is easy.

Cost

The appeal of this technology to device manufacturers is that, unlike NFC where they have to add radio functionality and antenna (NFC chip) to their BOM, HotKnot works with the phone's screen, a component that is already in the BOM. HotKnot does not require additional space for an antenna. And it eliminates the need to design a multimode and multiband antenna. Additionally, the NFC antenna module requires more space. So HotKnot, by leveraging the original touch panel and touch controller offers zero hardware cost and space.[3]

Lower Signal Leakage

The effective range for NFC may be up to 20cm, while HotKnot's range which is longer than HotKnot which operation is panel to panel contact.

Conclusion

HotKnot share is easy operating, internet access free, zero hardware cost, fast transfer and good security.

[3] This requires modifying the touch controller firmware and software driver..