Application Development Kit for Android™

www.digi.com
Overview

• The first kit for Android embedded application development

• Kit will be launched at Embedded World 2012
  Nurnberg, Germany 3 March 2012
  – Part number is CC-WMX53-ANDRD
  – Also available: CC-WMX53-LX, CC-WMX53-CE
  – All kits available to order 9 March 2012 or sooner

• Android Application Kit released for ConnectCore Wi-i.MX53
  – Support for ConnectCore Wi-i.MX51 available for download now
    http://www.digi.com/support/productdetail?pid=5341&osvid=62&type=documentation

• Kit is not intended to support:
  – Low-level BSP or driver development
  – Mobile handset development
Overview

- **Android Application Kit for Android includes:**
  - Complete Eclipse-based development environment for use on both Linux and Windows workstations
  - BSP for the ConnectCore Wi-i.MX53 and Wi-i.MX51 families with support for most interfaces
  - Android APIs extensions for embedded interfaces not supported natively by Android
  - Samples demonstrating how to access the ConnectCore hardware
  - iDigi™ Device Cloud for creating connected devices *(Beta on first release)*
Android background

• Android is Linux-based
• Android is a software stack for mobile devices that includes an operating system, middleware and key applications
• Android is open-source, most source code is released under the Apache license
• Google leads development through the Android Open Source project
• More information available at website: source.android.com
Android background

- Rapid release schedule supports consumer product launch cycles
- Embedded developers require stability in software releases and long-term support
- Digi will leverage Android version support from processor companies
- Digi will prioritize adding features required by embedded developers to our Application kits

<table>
<thead>
<tr>
<th>Launch Date</th>
<th>Version</th>
<th>Code Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 2009</td>
<td>1.5</td>
<td>Cupcake</td>
</tr>
<tr>
<td>September 2009</td>
<td>1.6</td>
<td>Donut</td>
</tr>
<tr>
<td>October 2009</td>
<td>2.0</td>
<td>Éclair</td>
</tr>
<tr>
<td>May 2010</td>
<td>2.2</td>
<td>Froyo</td>
</tr>
<tr>
<td>December 2010</td>
<td>2.3</td>
<td>Gingerbread</td>
</tr>
<tr>
<td>February 2011</td>
<td>3.x</td>
<td>Honeycomb</td>
</tr>
<tr>
<td>October 2011</td>
<td>4.x</td>
<td>Ice cream sandwich</td>
</tr>
<tr>
<td>2012</td>
<td>5.x</td>
<td>Jelly Bean</td>
</tr>
</tbody>
</table>

www.digi.com
Android background

Usage share – January 2012

- Cupcake: 0.6%
- Donut: 1.1%
- Éclair: 8.5%
- Froyo: 30.4%
- Gingerbread: 55.5%
- Honeycomb: 3.3%
- Ice Cream Sandwich: 0.6%
Android background
ARM: Android Development Kit Roadmap

Android Application Development Kit
- Out-of-box Android application development
- Microsoft Windows based Android development tools
- Android 2.3 (Gingerbread) with ConnectCore specific extensions
  - iDigi, I2C API, SPI API, GPIO API, Ethernet integration, etc.
- Module target platform support
  - ConnectCore for i.MX51, ConnectCore for i.MX53
- New target platform support
  - Connect Card for i.MX28

February 2012

Android Platform Development Kit
- Development kit for Android platform customization
- Linux development environment with Eclipse support

CY2012

Android Application Development Kit
- Android 2.3 (Gingerbread)
- Additional API extensions
- New target platform support
  - Connect Card for i.MX28

CY2012

Android Platform Maintenance
- Support for Ice Cream Sandwich

CY2012
Android for Embedded

- Digi’s Application Kit changes EVERYTHING
- Provides everything needed to get to products to market using Android
- Provides ready-to-use framework for application development with display requirements
- Java application development begins before hardware is available
- Many resources available for Java/Android application development
- Low-level device driver development required only for custom hardware features
Android for Embedded

Classic Embedded Development Process

- Embedded Development
- Create custom hardware
- Create low-level drivers
- Write firmware using C and assembly
Android for Embedded

**Current Embedded Development Process**

1. **Hardware Development**
   - Create custom baseboard based on Digi JSK

2. **Environment Development**
   - Use Digi JSK and C to create custom software environment for application development

3. **Application Development**
   - Use Digi JSK and C/C++ or C# to create applications
Android for Embedded

Current Embedded Development Process

- Android Application Development
  - Develop Application in Java using JSK or Emulator
- Hardware Development
  - Create custom baseboard starting with Digi JSK
Android for Embedded

- Samsung RF4289HARS
- $3,499 USD MSRP
- WLAN-enabled LCD
- Closed Android system
- Apps included:
  - Memos
  - Picasa
  - Epicurious
  - Calendar
  - Weatherbug
  - AP News
  - Pandora
  - Twitter
  - Control Settings
Android Application Kit

• Out-of-the-box Support included for i.MX53 peripherals:
  – 802.11abgn WLAN
  – Ethernet
  – iDigi™ Device Cloud (Beta)
  – Camera
  – Video display (LCD/HDMI/VGA)
  – 2D/3D graphics with HW acceleration (GPU)
  – Video decoding with HW acceleration (VPU)
  – Audio recording and playback
  – Touch controller on modules
  – Basic power management
  – Power button to suspend/resume
  – Battery power
  – USB Host (Keyboard and mouse)
  – USB OTG
  – SD/μSD memory cards
  – Accelerometer
  – SPI
  – GPIO
  – I²C
  – Serial interfaces
  – Serial console (for system logging)
Android Application Kit

• Digi ESP for Android
  – Custom version of Eclipse (version 3.5.1)
  – Android Development Tool (version 14.0)
  – Android Gingerbread (version 2.3.4)

• Integrated documentation to begin development

• Android code samples
  – GPIO
  – Audio Player
  – Video Player
  – Open GL demo
  – Serial port
  – Ethernet

• Fully customized rootfs support
Android Application Kit
Android Application Kit
Configure a remote target and set it as the current configuration

Device Manager allows the creation of configurations for different remote devices and associates each configuration with a symbolic name.

Name: New_configuration

Connection settings
- Device IP Address: 10.101.1.128
- Use default connection port.
  - Port: 5555

Debug Connection Status
- Debug connection status: - Connected
  - Disconnect
  - Connect

Validate Connection on Apply

Apply  Revert  Set Current  Close
Android Application Kit

- User LED 1 corresponds to LED 1 in the development board
- User Button 1 corresponds to BUTTON 1 in the development board
Android Application Kit
iDigi™ Device Cloud Support

- iDigi Service Manager for Android
- iDigi Service custom application used to connect device
- Provides instant iDigi connectivity
- Data sent to iDigi (upload file) specifying file name and content in one line of code
- iDigi instant send file app also included
```java
package com.android.idigi.project;

import com.digi.android.idigi.library.core.IDoCommandListener;

public class OneLineActivity extends Activity implements IDoCommandListener {

    private IDigiServiceManager iDigiServiceManager;

    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.main);

        iDigiServiceManager = new IDigiServiceManager(this);

        // Upload a file to iDigi:
        iDigiServiceManager.sendFile("hello.txt", "Hello iDigi World!");
    }

    /**
     * iDigi service manager instance */
    private IDigiServiceManager iDigiServiceManager;

    /**
     * (non-Javadoc)
     * @see android.app.Activity#onCreate(android.os.Bundle)
     */
}
Write the text to send to iDigi:
Hello iDigi!
18 characters left.
ConnectCore for i.MX53
Overview

• High performance System-on-Module solution
  - Freescale i.MX53 @ up to 1 GHz
  - Up to 1 GB on-module DDR2 @ 400 MHz

• ConnectCore for i.MX51 form factor compatible
  - Pinout similar, allowing common carrier board designs
  - Digi will provide guidance in White Paper outlining design approach for common carrier boards – December 2011

• Improved video performance
  - Up to 1080p video decode, up to 720p video encode

• On-chip LVDS and parallel LCD interfaces

• 802.11abgn Wi-Fi and Bluetooth 4.0 option
  - Initial release with 802.11abgn (65 MBps)
  - Up to 150 Mbps data rate (MCS 7) + BT via future release (TBD)

• Dual Ethernet MAC option
  - On-chip Ethernet MAC provides IEEE1588 support

• IEEE1588 and dual-CAN bus controller
  - Engage with local partners such as IXXAT to enable IA customers with respect to IEEE1588 and CAN
ARM: Digi Embedded Linux
Development Kit Roadmap

**DEL 5.2 Feature Packs**
- Qt 4.5.3 w/LGPL option
- Platform support for Digi Connect ME 9210 8/16
- PWM driver for CC 9M 2443
- FIM SPI driver for NS921x based platforms
- Sharp LQ070Y3DG3B (WVGA) LCD support for CC 9M 2443
  - Digi LCD Application Kit P/N CC-ACC-LCDW-70
- Package Manager distribution only

**January 2011**

**DEL 5.8 (2.6.35)**
- Linux kernel and component updates
- New target platform support
  - ConnectCore for i.MX53

**February 2012**

**DEL 5.7 (2.6.35)**
- Linux kernel and component updates
- Common platform release
  - Digi Connect ME 9210, Digi Connect Wi-ME 9210
  - ConnectCore 9P 9215 / Wi-9P 9215, ConnectCore 9M,
  - ConnectCore Wi-9M 2443, ConnectCore for i.MX51
- Initial kitting with Digi Connect Wi-ME 9210

**CY2012**

**DEL 6.0 (3.0 [2.6.40])**
- Linux kernel and component updates
- New target platforms
JumpStart Development Environment 2.0 for Windows Embedded CE 6.0
- Windows Embedded CE 6.0 R3
- iDigi Integration
- C# API
  - ZigBee, Power Management, Peripherals
- Common platform release
  - ConnectCore for i.MX51, ConnectCore 9M 2443, ConnectCore 9P 9360, ConnectCore 9C Family

JumpStart Development Environment 3.0 for Windows Embedded Compact
- Windows Embedded Compact 7
- Platform support for ConnectCore i.MX51 only

Feature Pack for Windows Embedded CE 6.0 R3
- Sharp LQ070Y3DG3B (WVGA) LCD support for CC 9M 2443
  - Digi LCD Application Kit P/N CC-ACC-LCDW-70
- Maintenance release
- See Digi tech support website for details

JumpStart Development Environment 3.1 for Windows Embedded Compact
- Windows Embedded Compact 7
- New platform support for ConnectCore i.MX53
Q & A