Summary

TrueTouch® Multi-Touch All-Points Touchscreen Controller

Features

- Multi-touch capacitive touchscreen controller
  - 32-bit ARM Cortex™ CPU
  - Register configurable
  - Noise suppression technologies for battery charger and display
    - Effective 28-V TX drive for higher signal-to-noise ratio (SNR)
    - ChargerArmor™ for charger noise immunity
    - External display synchronization
  - Water rejection and wet-finger tracking using DualSense™
  - Multi-touch glove with automatic mode switching
    - 10 fingers with thin glove (≤1-mm thickness)
    - 2 fingers with thick glove (≤5-mm thickness)
  - Fingernail tracking
  - Large object rejection
  - Automatic baseline tracking to environmental changes
  - Low-power look-for-touch mode
  - Field upgrades via bootloader
  - Android™ driver support
  - Cypress Manufacturing Test Kit (MTK)
  - Touchscreen sensor self-test and Panel ID reporting

- System performance (configuration dependent)
  - Screen sizes up to 8.3-inch diagonal
    - 5-mm sensor pitch, 16:9 aspect ratio
  - Screen sizes up to 5.3-inch diagonal
    - 3.2-mm sensor pitch, 16:9 aspect ratio
  - Up to 58 sense pins
    - 777 intersections (21 × 37)
  - Reports up to 10 fingers
  - Small finger support down to 4 mm
  - Large finger support up to 30 mm
  - Refresh rate up to 230 Hz
  - TX frequency up to 500 kHz
  - Fast first-touch response (≤13 ms)
  - Best-in-class charger noise immunity
    - Immunity up to 20 volts peak-to-peak (V_{pp})
    - Immunity to AT&T Zero charger noise

- Power (configuration dependent)
  - 1.71-V to 5.5-V digital and I/O supply
  - 2.65-V to 5.5-V analog supply
  - 8.5-mW average power
  - 15-μW typical deep-sleep power

- Sensor and system design (configuration dependent)
  - Supports a variety of touchscreen sensors and stackups
    - Manhattan, Diamond, Single Layer Independent Multi-touch (SLIM®), and Totem-pole patterns
    - Sensor-on-lens (SOL)
    - Touch-integrated display modules (on-cell, in-cell)
    - Plastic (PET) and glass sensor substrates
    - LCD, AMOLED, and IPS displays
    - Metal mesh
  - Single-layer flexible printed circuit (FPC) routing enabled by flexible TX/RX configurations

- Communication interface
  - I²C slave at all standard bit rates
    - 100 kbps, 400 kbps, 1 Mbps, and 3.4 Mbps
  - SPI slave bit rates up to 8 Mbps

- Package options
  - 56-pin 6 × 6 × 0.6-mm QFN (0.35-mm lead pitch)
  - 70-ball 5.5 × 5.5 × 0.6-mm BGA (0.5-mm ball pitch)
Ordering Information

Table 1 lists the CYTMA448 TrueTouch touchscreen controllers. For information on other TrueTouch families, visit http://www.cypress.com/truetouch.

Table 1. Device Ordering Information[1]

<table>
<thead>
<tr>
<th>Segmentation</th>
<th>Part Number</th>
<th>Ext</th>
<th>Sense I/O</th>
<th>Typ Screen Size (inches)</th>
<th>Charger Armor</th>
<th>Configurable TX Slew rate</th>
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</thead>
<tbody>
<tr>
<td>Base Part (Mutual Capacitance Only)</td>
<td>CYTMA448-56LQI</td>
<td>44AA(T)</td>
<td>44</td>
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<td>✔</td>
<td>✔</td>
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<tr>
<td></td>
<td>CYTMA448-70BU</td>
<td>58AA(T)</td>
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<td>✔</td>
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<tr>
<td>Water Rejection (DualSense)</td>
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<td>44AB(T)</td>
<td>44</td>
<td>6.0</td>
<td>✔</td>
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<tr>
<td></td>
<td>CYTMA448-70BU</td>
<td>48AB(T)</td>
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<td>6.5</td>
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<td>✔</td>
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<tr>
<td></td>
<td>CYTMA448-70BU</td>
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<tr>
<td></td>
<td>CYTMA448-70BU</td>
<td>58AB(T)</td>
<td>58</td>
<td>7.9</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td></td>
<td>CYTMA448-56LQI</td>
<td>44AW(T)</td>
<td>44</td>
<td>6.0</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td></td>
<td>CYTMA448-70BU</td>
<td>48AW(T)</td>
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<td>6.5</td>
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<td>✔</td>
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<tr>
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<td>CYTMA448-70BU</td>
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<tr>
<td></td>
<td>CYTMA448-70BU</td>
<td>58AW(T)</td>
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<td>7.9</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td>Glove and Water Rejection (DualSense)</td>
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<td>✔</td>
</tr>
<tr>
<td></td>
<td>CYTMA448-70BU</td>
<td>54AE(T)</td>
<td>54</td>
<td>7.2</td>
<td>✔</td>
<td>✔</td>
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<tr>
<td></td>
<td>CYTMA448-70BU</td>
<td>58AE(T)</td>
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<td>7.9</td>
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<td>✔</td>
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<tr>
<td>Custom / Kits</td>
<td>CYTMA448-56LQI</td>
<td>44ZX(T)</td>
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<tr>
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<td>CYTMA448-70BU</td>
<td>58ZX(T)</td>
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<td>✔</td>
<td>✔</td>
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</table>

Ordering Code Definitions

- **T**: Tape and Reel
- **Extension**:
  - **AA**: 20-V Charger Armor + Mutual Only
  - **AB/AW**: 20-V Charger Armor + DualSense
  - **AE**: 20-V Charger Armor + DualSense + Glove
  - **ZX**: Custom Development

- **Number of Sense I/O**: 44, 48, 54, or 58
- **Temperature Range**: I = Industrial
- **Pins/Package Type**: 56LQ = 56-pin QFN
  - 70BU = 70-ball BGA
- **Part Number**: 448
- **Family Code**: TMA = Multi-Touch All-Points Controller
- **Company ID**: CY = Cypress

Notes

1. All devices have the following base features: 10-V TX, CapSense Buttons, Large Object Detection and Rejection, and Grip Suppression.
**SUMMARY**

**CYTMA448**

**Document History Page**

<table>
<thead>
<tr>
<th>Document Title: CYTMA448, TrueTouch® Multi-Touch All-Points Touchscreen Controller</th>
<th>Document Number: 001-90890</th>
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<table>
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<tr>
<th>Rev.</th>
<th>ECN</th>
<th>Orig. of Change</th>
<th>Submission Date</th>
<th>Description of Change</th>
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<tr>
<td>**</td>
<td>4256331</td>
<td>KXX</td>
<td>01/30/2014</td>
<td>New datasheet.</td>
</tr>
<tr>
<td>*A</td>
<td>4392605</td>
<td>SWU</td>
<td>05/28/2014</td>
<td>Updated average power from 12 mW to 8.5 mW to match validated active power.</td>
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<td>*B</td>
<td>4398204</td>
<td>SWU</td>
<td>06/04/2014</td>
<td>Added AB MPN.</td>
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<tr>
<td>*C</td>
<td>5284373</td>
<td>ELG</td>
<td>05/26/2016</td>
<td>Removed Windows Phone Support. Revised grammar for charger noise. Aligned charger noise support in order information table with features list. Updated template.</td>
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</tbody>
</table>

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