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**Application Note: AZD026**  
**Azoteq USB-dongles Overview**

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## 1 Azoteq USB-dongle usage

The Azoteq USB-dongles available for commercial use are listed in Table 1-1. The dongles are connected to a computer via a mini-USB cable and are used:

- As an interface to program OTP<sup>1</sup> bits which is available on certain ICs (to customize an IC for a certain design), see table Table 3-1 for pin assignment or
- To perform serial communication between computer and IC via
  - 1-wire Communication Protocol see Table 4-1,
  - SPI see Table 4-2,
  - I<sup>2</sup>C see Table 4-3.

Azoteq provides software used for programming OTP bits. This software is known as USBProg and is intended for prototyping purposes. More information regarding USBProg can be found in application note AZD007.

Azoteq provides software used for the serial streaming of data to a computer utilising the Azoteq USB-dongles. This software is known as VisualProxSense and is intended for prototyping purposes. For some IQS ICs there exists a separate GUI. More information regarding the VisualProxSense application can be found in application note AZD006.

**Table 1-1: Azoteq USB-dongles**

| Azoteq dongle      | Description   | Device Supported | Data Streaming | Programming   |
|--------------------|---|------------------|----------------|---|
| CT120 (EOL)        | 1 <sup>st</sup> Generation programmer and data streamer                       | IQS123           | ONLY IQS123    | X   |
| CT200 (EOL)        | 2 <sup>nd</sup> Generation programmer and data streamer                       | ALL-Streaming    | √*             | IQS121, IQS127 <sub>x</sub> , IQS128, IQS132, IQS133, IQS142, IQS143, IQS152, IQS156, IQS158, IQS221, IQS240, IQS904 <sub>x</sub> |
| CT210              | 3 <sup>rd</sup> Generation programmer and data streamer                       | ALL              | √*             | √   |
| DS100              | Data Streaming Dongle   | ALL              | √*             | X   |
| RS100 <sup>2</sup> | Wireless Data Streaming Dongle  | ALL              | √*             | X   |
| CT220 <sup>3</sup> | 3 <sup>rd</sup> Generation In-circuit production programmer and data streamer | ALL              | √*             | √   |

\* Excludes IQS904<sub>x</sub>

<sup>1</sup> One Time Programmable bit – Every bit is only programmable once

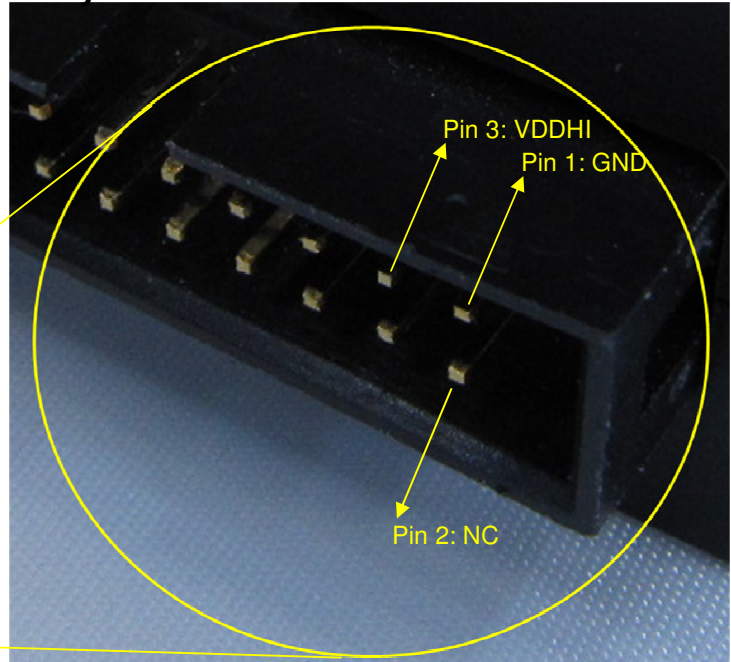
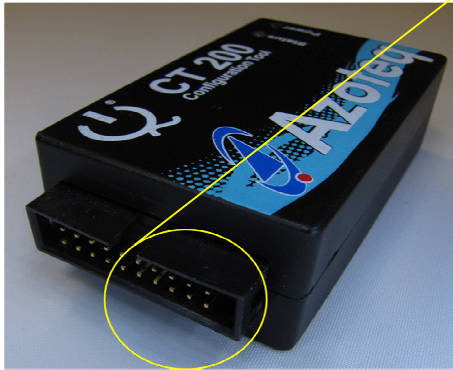
<sup>2</sup> To be used in conjunction with DS100, CT200, CT210 or CT220

<sup>3</sup> The CT220 is intended to be used for applications such as in-circuit programming on a production line.

For additional information and support, please contact [ProxSenseSupport@azoteq.com](mailto:ProxSenseSupport@azoteq.com).



## 2 Azoteq USB-dongle pin-layout



## 3 Connecting USB-dongle for Programming

Table 3-1: Azoteq USB-dongle pin assignment for programming

| CT pin # | IQS127/128        | IQS904            | IQS240/221        | IQS142/152        | IQS132/133        | IQS232/233        | IQS242/252        |
|----------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| 1        | V <sub>SS</sub>   | V <sub>SS</sub>   | V <sub>SS</sub>   | V <sub>SS</sub>   | V <sub>SS</sub>   | V <sub>SS</sub>   | V <sub>SS</sub>   |
| 2        |                   |                   |                   |                   |                   |                   |                   |
| 3        | V <sub>DDHI</sub> | V <sub>DDHI</sub> | V <sub>DDHI</sub> | V <sub>DDHI</sub> | V <sub>DDHI</sub> | V <sub>DDHI</sub> | V <sub>DDHI</sub> |
| 4        |                   |                   | VDD               |                   |                   |                   |                   |
| 5        | SHLD/<br>POUT     | LOAD              | ZC                |                   |                   | POUT/RF&<br>RDY   | PO0               |
| 6        | Cx                | Cx                | MOSI              |                   |                   |                   |                   |
| 7        |                   |                   | SOMI              | TO0/DATA          | TO0/DATA          | TO0/SDA           | PO1               |
| 8        |                   |                   | RDY               |                   |                   |                   |                   |
| 9        |                   |                   | SCK               | PO1               | TO1               | TO1/SCL           | TO1               |
| 10       |                   |                   | /SS               |                   |                   |                   |                   |

Only devices with OTP bits are shown



## 4 Connecting USB-dongle for Serial Communication

Please refer to the data sheet and communication interface of the specific device for information regarding the communication protocol supported.

### 4.1 1-wire protocol

| USB-dongle pin # | Azoteq 1-wire device |
|------------------|----------------------|
| 1                | V <sub>SS</sub>      |
| 2                |                      |
| 3 <sup>4</sup>   | V <sub>DDHI</sub>    |
| 4                |                      |
| 5                |                      |
| 6                |                      |
| 7                |                      |
| 8                |                      |
| 9                |                      |
| 10               | DATA                 |

Table 4-1: Azoteq USB-dongle pin assignment for 1-wire protocol

### 4.2 SPI

| USB-dongle pin # | Azoteq SPI Device |
|------------------|-------------------|
| 1                | V <sub>SS</sub>   |
| 2                |                   |
| 3                | V <sub>DDHI</sub> |
| 4                |                   |
| 5                |                   |
| 6                | MOSI              |
| 7                | SOMI              |
| 8                | RDY               |
| 9                | SCK               |
| 10               | /SS               |

Table 4-2: Azoteq USB-dongle pin assignment for SPI

<sup>4</sup> VDDHI can be supplied by an external source, please ensure the same voltage levels as USB-dongle are followed



### 4.3 I<sup>2</sup>C

| USB-dongle pin # | Azoteq I <sup>2</sup> C Device |
|------------------|--------------------------------|
| 1                | V <sub>SS</sub>                |
| 2                |                                |
| 3                | V <sub>DDHI</sub>              |
| 4                |                                |
| 5                |                                |
| 6                |                                |
| 7                | SDA                            |
| 8                |                                |
| 9                | SCL                            |
| 10               | RDY                            |

Table 4-3: Azoteq USB-dongle pin assignment for I<sup>2</sup>C

## 5 Flash Programming (CT220/CT210 only)

The CT210 supports a programming protocol used to program certain flash MCUs (e.g. IQS550, IQS643 & IQS659). The software used for this purpose is Azoteq Flash Programmer. The pinout to perform flash programming can be seen in Table 5-1.

| CT pin # | Flash MCU         |
|----------|-------------------|
| 1        | V <sub>SS</sub>   |
| 2        |                   |
| 3        | V <sub>DDHI</sub> |
| ..       |                   |
| ..       |                   |
| ..       |                   |
| 17       | RESET             |
| 18       | DATA              |
| 19       |                   |
| 20       |                   |

Table 5-1: Azoteq USB-dongle pin assignment for Flash Programming



**The following patents relate to the device or usage of the device:**

US 6,249,089 B1, US 6,621,225 B2, US 6,650,066 B2, US 6,952,084 B2, US 6,984,900 B1, US 7,084,526 B2, US 7,084,531 B2, US 7,119,459 B2, US 7,265,494 B2, US 7,291,940 B2, US 7,329,970 B2, US 7,336,037 B2, US 7,443,101 B2, US 7,466,040 B2, US 7,498,749 B2, US 7,528,508 B2, US 7,755,219 B2, US 7,772,781, US 7,781,980 B2, EP 1 120 018 B1, EP 1 206 168 B1, EP 1 308 913 B1, EP 1 530 178 B1, ZL 99 8 14357.X, AUS 761094

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