

## AH01 – SHA-256 Hardware Encryption (ATECC508A/ATECC508)

### Technical Reference (PDFs)

XinaBox Rapid Prototyping Range [generic, Bjarke preparing draft]

XinaBox Getting Started [generic, Bjarke preparing draft]

AH01 Datasheet [pdf of Wiki product page]

ATECC508A Datasheet [pdf from the manufacturer, same you have been using]

### Product Details

#### Overview

This xChip is a core encryption module which forms part of the Crypto module range, running a security algorithm based on SHA-256.

#### Important

This xChip forms part of the XinaBox Rapid Prototyping Range. Check out the above PDF on “XinaBox Rapid Prototyping Range” for buyer guidance and other necessary parts.

xChips connect to each other using custom connectors, also sold by RS. Please click on the link(s) below to add the appropriate connectors.

This xChip needs an xBus connector (RS Product Codes:123-4567 xxx) to connect to other xChips. [relevant for this AH01].

#### Description

This xChip is a core encryption module which forms part of the Crypto module range, running a security algorithm based on SHA-256.

This xChip includes the ATECC508A from Atmel, which is a secure CryptoAuthentication device. It is equipped with an EEPROM array that can be used for storing of up to 16 key, certificates, consumption logging, security configurations and other types of secure data. Access to the various sections of memory can be restricted in several different ways and then the configuration can be locked permanently, to prevent changes.

The ATECC508A features a wide array of defense mechanisms specifically designed to prevent physical attacks on the device itself, or logical attacks on the data transmitted between the device and the system. Hardware restrictions on the ways in which keys are used or generated provide further defense against certain styles of attack.

Access to the device is made through a standard I<sup>2</sup>C interface at speeds of up to 1 Mb/s.

#### Product Highlights

- Cryptographic co-processor with secure hardware-based key storage
- SHA-256 hash algorithm with HMAC option
- 256-bit key length
- Storage for up to 16 keys
- Guaranteed unique 72-bit serial number

#### Applications

- IoT node security and ID
- Secure download and boot
- Ecosystem control
- Message security
- Anti-cloning

## Specifications

- Performs high-speed Public Key (PKI) algorithms:
  - ECDSA: FIPS186-3 Elliptic Curve Digital Signature Algorithm
  - ECDH: FIPS SP800-56A Elliptic Curve Diffie-Hellman Algorithm
- NIST standard P256 elliptic curve support
- Host and client operations
- Two high-endurance monotonic counters
- Internal high-quality FPS Random Number Generator (RNG)
- 10 Kb EEPROM memory for keys, certificates, and data
- Operating temperature range: -40°C to 85°C
- <150 nA sleep current

## AI01 – I2C MultiPlexer (PCA9548A/PCA9548)

### Technical Reference (PDFs)

XinaBox Rapid Prototyping Range [generic, Bjarke preparing draft]

XinaBox Getting Started [generic, Bjarke preparing draft]

AI01 Datasheet [pdf of Wiki product page]

PCA9548A Datasheet [pdf from the manufacturer, same you have been using]

### Product Details

#### Overview

This xChip is an interface module, based on the PCA9548A by NXP Semiconductors, which enables users to add more than one xChip with the same physical I<sup>2</sup>C address to a circuit.

#### Important

This xChip forms part of the XinaBox Rapid Prototyping Range. Check out the above PDF on “XinaBox Rapid Prototyping Range” for buyer guidance and other necessary parts.

xChips connect to each other using custom connectors, also sold by RS. Please click on the link(s) below to add the appropriate connectors.

This xChip needs an xBus connector (RS Product Codes:123-4567 xxx) to connect to other xChips. [relevant for this AI01].

#### Description

This xChip is an interface module, based on the PCA9548A by NXP Semiconductors, which enables users to add more than one xChip with the same physical I<sup>2</sup>C address to a circuit.

The PCA9548A operates as an I<sup>2</sup>C channel selector, this functionality is what enables communication with multiple I<sup>2</sup>C devices that have the same address. The channel selector ability is achieved through an octal bidirectional translating switch controlled by the I<sup>2</sup>C-bus.

#### Product Highlights

- Octal bidirectional translating switch
- I<sup>2</sup>C-bus interface logic; compatible with SMBus standards
- No glitch on power-up
- Supports hot insertion

#### Applications

- Communication systems
- Multiplexing of sensor devices

#### Specifications

- Active LOW reset input
- Three address pins allowing up to eight devices on the I<sup>2</sup>C-bus
- Channel selection via I<sup>2</sup>C-bus, in any combination
- Power-up with all switch channels deselected
- Low R<sub>ON</sub> switches
- Low standby current
- 0 Hz to 400 kHz clock frequency

## AI04 – I2C Extender (P82B715DR/P82B715)

### Technical Reference (PDFs)

XinaBox Rapid Prototyping Range [generic, Bjarke preparing draft]

XinaBox Getting Started [generic, Bjarke preparing draft]

AI04 Datasheet [pdf of Wiki product page]

P82B715DR Datasheet [pdf from the manufacturer, same you have been using]

### Product Details

#### Overview

This xChip is an interface module, based on the P82B715DR by Texas Instruments, that is a bipolar device intended for I<sup>2</sup>C bus systems applications and supports bidirectional data transfer via the I<sup>2</sup>C bus.

#### Important

This xChip forms part of the XinaBox Rapid Prototyping Range. Check out the above PDF on “XinaBox Rapid Prototyping Range” for buyer guidance and other necessary parts.

xChips connect to each other using custom connectors, also sold by RS. Please click on the link(s) below to add the appropriate connectors.

This xChip needs an xBus connector (RS Product Codes:123-4567 xxx) to connect to other xChips. [relevant for this AI04].

#### Description

This xChip is an interface module, based on the P82B715DR by Texas Instruments, that is a bipolar device intended for I<sup>2</sup>C bus systems applications and supports bidirectional data transfer via the I<sup>2</sup>C bus. The P82B715DR buffers both the serial data (SDA) and serial clock (SCL) signals on the I<sup>2</sup>C bus and allows expansion of the I<sup>2</sup>C bus, while retaining all the operating modes and features of the I<sup>2</sup>C system.

3.3 volt from are also transmitted from one AI04 to another AI04, eliminating the need for separate power on the receiving end.

No specific coding is required to use a pair of AI04 as the I<sup>2</sup>C signal is transmitted transparently between the 2 sides.

A pair of AI04 are interconnected using patch cable (straight) version of the well-known RJ11 telephone style cable and plug points.

#### Product Highlights

- Supports bidirectional data transfer of I<sup>2</sup>C bus signals and 3.3 volt power.

#### Applications

- Long I<sup>2</sup>C communications
- Industrial communications
- Specific location or facing of sensors of other xChips

#### Specifications

- Dual bidirectional unity-voltage-gain buffer with no external directional control required.
- Drives 10x lower-impedance bus wiring for improvised noise immunity
- Multi-drop distance of I<sup>2</sup>C signals using low-cost twisted-pair cables
- I<sup>2</sup>C bus operation over 50 meters of twisted-pair wire



## AS02 – 1 Mbit Memory (CAT24M01)

### Technical Reference (PDFs)

XinaBox Rapid Prototyping Range [generic, Bjarke preparing draft]

XinaBox Getting Started [generic, Bjarke preparing draft]

AS02 Datasheet [pdf of Wiki product page]

CAT24M01 Datasheet [pdf from the manufacturer, same you have been using]

### Product Details

#### Overview

This xChip forms part of the memory modules, based on the CAT24M01 by ON Semiconductor, offering 1 Mb storage capacity for storing program configurations, data logs and other files.

#### Important

This xChip forms part of the XinaBox Rapid Prototyping Range. Check out the above PDF on “XinaBox Rapid Prototyping Range” for buyer guidance and other necessary parts.

xChips connect to each other using custom connectors, also sold by RS. Please click on the link(s) below to add the appropriate connectors.

This xChip needs an xBus connector (RS Product Codes:123-4567 xxx) to connect to other xChips. [relevant for this AS02].

#### Description

This xChip forms part of the memory modules, based on the CAT24M01 by ON Semiconductor, offering 1 Mb storage capacity for storing program configurations, data logs and other files.

The CAT24M01 is an EEPROM Serial 1-Mb I<sup>2</sup>C, internally organized as 131,072 words of 8 bits each. It features a 256-byte page write buffer and supports the Standard (100 kHz), Fast (400 kHz) and Fast-Plus (1 MHz) I<sup>2</sup>C protocol.

Up to four AS02 can be connected on in the same circuit. On-Chip ECC (Error Correction Code) makes the device suitable for high reliability applications.

#### Product Highlights

- 1 Mb (128 kb) memory
- Simple interface protocol / industry standard; 1 MHz clock enables faster operation.

#### Applications

- File storage
- Program configuration storage
- Data logging

#### Specifications

- Supports Standard, Fast and Fast-Plus I<sup>2</sup>C protocol
- 256-byte page write buffer
- Hardware write protection for entire memory
- Schmitt triggers and noise suppression filters on I<sup>2</sup>C bus inputs (SCL and SDA).
- Low power CMOS technology
- 1,000,000 program/erase cycles
- 100 year data retention

- Industrial and extended temperature range

## **B901 – 96 Board Bridge**

### **Technical Reference (PDFs)**

XinaBox Rapid Prototyping Range [generic, Bjarke preparing draft]

XinaBox Getting Started [generic, Bjarke preparing draft]

B901 Datasheet [pdf of Wiki product page]

### **Product Details**

#### Overview

This xChip is designed to interface with the 96 Boards specification, such as the Dragonboard 410c.

#### Important

This xChip forms part of the XinaBox Rapid Prototyping Range. Check out the above PDF on “XinaBox Rapid Prototyping Range” for buyer guidance and other necessary parts.

xChips connect to each other using custom connectors, also sold by RS. Please click on the link(s) below to add the appropriate connectors.

This xChip needs an xBus connector (RS Product Codes:123-4567 xxx) to connect to other xChips. [relevant for this B901].

#### Description

This xChip is designed to interface with the 96 Boards specification, such as the Dragonboard 410c. This provides a bridge into the xChip ecosystem, adding support for many additional sensors, etc.

This xChip has on-board voltage conversion and level shifting for the I<sup>2</sup>C bus. A power LED is provided to ensure that the bridge has been connected correctly.

#### Product Highlights

- 2 x xBus connections to interface with xChips

## **BB01 – Beaglebone Black Bridge**

### **Technical Reference (PDFs)**

XinaBox Rapid Prototyping Range [generic, Bjarke preparing draft]

XinaBox Getting Started [generic, Bjarke preparing draft]

BB01 Datasheet [pdf of Wiki product page]

### **Product Details**

#### Overview

This xChip is designed to interface with the Beaglebone Black and Green.

#### Important

This xChip forms part of the XinaBox Rapid Prototyping Range. Check out the above PDF on “XinaBox Rapid Prototyping Range” for buyer guidance and other necessary parts.

xChips connect to each other using custom connectors, also sold by RS. Please click on the link(s) below to add the appropriate connectors.

This xChip needs an xBus connector (RS Product Codes:123-4567 xxx) to connect to other xChips. [relevant for this BB01].

#### Description

This xChip is designed to interface with the Beaglebone Black and Green. This provides a bridge into the xChip ecosystem, adding support for many additional sensors, etc. A power LED is provided to ensure that the bridge has been connected correctly.

### **Product Highlights**

- One xBus connection to interface with xChips

## **BD01 – Pixhawk Bridge**

### **Technical Reference (PDFs)**

XinaBox Rapid Prototyping Range [generic, Bjarke preparing draft]

XinaBox Getting Started [generic, Bjarke preparing draft]

BD01 Datasheet [pdf of Wiki product page]

### **Product Details**

#### Overview

This xChip is designed to interface with the Pixhawk Bridge.

#### Important

This xChip forms part of the XinaBox Rapid Prototyping Range. Check out the above PDF on “XinaBox Rapid Prototyping Range” for buyer guidance and other necessary parts.

xChips connect to each other using custom connectors, also sold by RS. Please click on the link(s) below to add the appropriate connectors.

This xChip needs an xBus connector (RS Product Codes:123-4567 xxx) to connect to other xChips. [relevant for this BD01].

#### Description

This xChip is designed to interface with the Pixhawk Bridge. This provides bridge into the xChip ecosystem, adding support for many additional sensors, etc.

This xChip has on-board voltage conversion. A power LED is provided to ensure that the bridge has been connected correctly.

#### Product Highlights

- 4 x xBus connections to interface with xChips

## **BL01 – Minnowboard LSE Bridge**

### **Technical Reference (PDFs)**

XinaBox Rapid Prototyping Range [generic, Bjarke preparing draft]

XinaBox Getting Started [generic, Bjarke preparing draft]

BL01 Datasheet [pdf of Wiki product page]

### **Product Details**

#### Overview

This xChip is designed to interface using the Minnowboard LSE Bridge.

#### Important

This xChip forms part of the XinaBox Rapid Prototyping Range. Check out the above PDF on “XinaBox Rapid Prototyping Range” for buyer guidance and other necessary parts.

xChips connect to each other using custom connectors, also sold by RS. Please click on the link(s) below to add the appropriate connectors.

[depending on the chip, one or more of the following:]

This xChip needs an xBus connector (RS Product Codes:123-4567 xxx) to connect to other xChips. [relevant for this BL01].

#### Description

This xChip is designed to interface using the Minnowboard LSE Bridge. This provides a bridge into the xChip ecosystem, adding support for many additional sensors, etc.

A power LED is provided to ensure that the bridge has been connected correctly.

#### Product Highlights

- 1 x xBus connections to interface with xChips
- Low speed expansion on the Minnowboard

## **BM01 – micro:bit Bridge**

### **Technical Reference (PDFs)**

XinaBox Rapid Prototyping Range [generic, Bjarke preparing draft]

XinaBox Getting Started [generic, Bjarke preparing draft]

BM01 Datasheet [pdf of Wiki product page]

### **Product Details**

#### Overview

This xChip is designed to interface with the BBC micro:bit single board computer.

#### Important

This xChip forms part of the XinaBox Rapid Prototyping Range. Check out the above PDF on “XinaBox Rapid Prototyping Range” for buyer guidance and other necessary parts.

xChips connect to each other using custom connectors, also sold by RS. Please click on the link(s) below to add the appropriate connectors.

This xChip needs an xBus connector (RS Product Codes:123-4567 xxx) to connect to other xChips. [relevant for this BM01].

#### Description

This xChip is designed to interface with the BBC micro:bit single board computer. This provides bridge into the xChip ecosystem, adding support for many additional sensors.

#### Product Highlights

- 2 x xBus connections to interface with xChips

## **BM02 – Advanced micro:bit Bridge**

### **Technical Reference (PDFs)**

XinaBox Rapid Prototyping Range [generic, Bjarke preparing draft]

XinaBox Getting Started [generic, Bjarke preparing draft]

BM02 Datasheet [pdf of Wiki product page]

### **Product Details**

#### Overview

This xChip is designed to interface with a micro:bit single board computer and includes additional xBus connection ports as compared to BM01.

#### Important

This xChip forms part of the XinaBox Rapid Prototyping Range. Check out the above PDF on “XinaBox Rapid Prototyping Range” for buyer guidance and other necessary parts.

xChips connect to each other using custom connectors, also sold by RS. Please click on the link(s) below to add the appropriate connectors.

This xChip needs an xBus connector (RS Product Codes:123-4567 xxx) to connect to other xChips. [relevant for this BM02].

#### Description

This xChip is designed to interface with a micro:bit single board computer and includes additional xBus connection ports as compared to BM01. This provides a bridge into xChip ecosystem, adding support for many additional sensors, etc.

#### Product Highlights

- 5 x xBus connection to interface with xChips