

# SecureFPGA™

GW1NSE SecureFPGA products provide a Root of Trust based on SRAM PUF technology. Each device is factory provisioned with a unique key pair that is never exposed outside of the device. This widely applicable feature can be used for a variety of consumer and industrial IoT, edge and server management applications.

## GW1NSE SecureFPGA Resource Table

Parameter	GW1NSE-2C / GW1NSER-2C	GW1NSE-4C / GW1NSER-4C
LUT4	1728	3456
FF	1296	4606
B-SRAM (Kbits)	72	180K
B-SRAM (#)	4	10
S-SRAM (bits)	4608	0
User Flash (Kbits)	1024	256
User RAM (Kbits)		256
pSRAM (Mbits, Optional)	32	32
Additional Flash (Mbits, Optional)		32
18X18 Multiplier		16
PLLs + DLLs	1 +2	2 + 2
OSC	1, +/- 5% accuracy	1, +/- 5% accuracy
Hard Core Processor	Cortex-M3	Cortex-M3
USB 2.0 PHY	1	0
ADC Channels	8	0
Audio Processor		1
I/O Banks	4	3
Max. User I/O	95	82
Core Voltage	1.2V	1.2V

Package	Ptich (mm)	Size (mm)	GW1NSE-2C / GW1NSER-2C
CS36	0.4	2.5 x 2.5	30(6)
QN32	0.5	5 x 5	25(4)
QN32U	0.5	5 x 5	16(2)
QN48	0.4	6 x 6	38(7)
LQ144	0.5	22 x 22	95(12)

Package	Ptich (mm)	Size (mm)	GW1NSE-4C / GW1NSER-4C
CS49	0.4	3.0 x 3.0	43(6)
QN32	0.5	5 x 5	25(4)



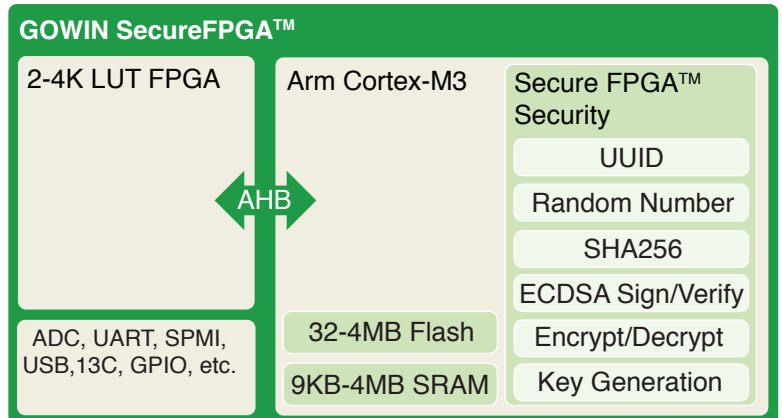
How To Secure Devices Using GOWIN SecureFPGA

Introduction to GOWIN SecureFPGA



## Features

- SRAM Based PUF
  - ▲ No private key storage
  - ▲ Device keys recovered on power-up
- Factory Provisioning
  - ▲ Activation, UUID, Certificate
- Low Cost, Small Form Factor Packaging
  - ▲ As small as 2.5 x 2.5 mm<sup>2</sup>



Uncontrollable nano-scale process variations make ICs unique

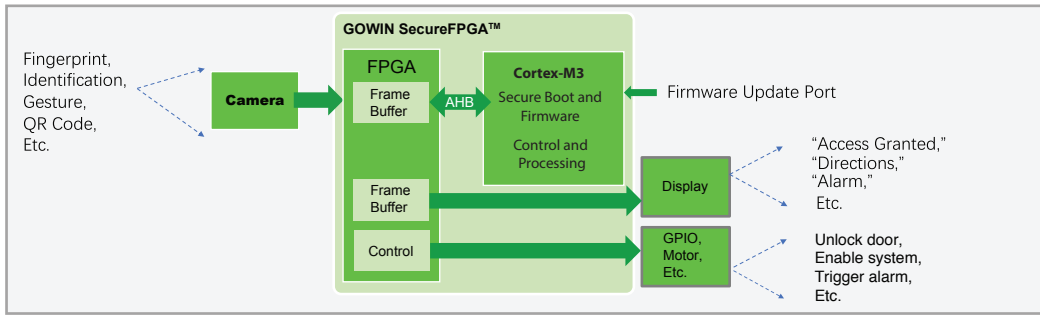
Start-up SRAM values establish a unique Silicon fingerprint

Fingerprint turned into a strong secret cryptographic key

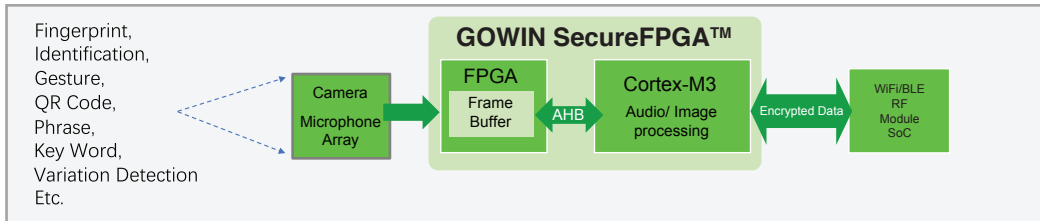
User keys can be wrapped or encrypted with this PUF key (red/ black system)

# Example Applications

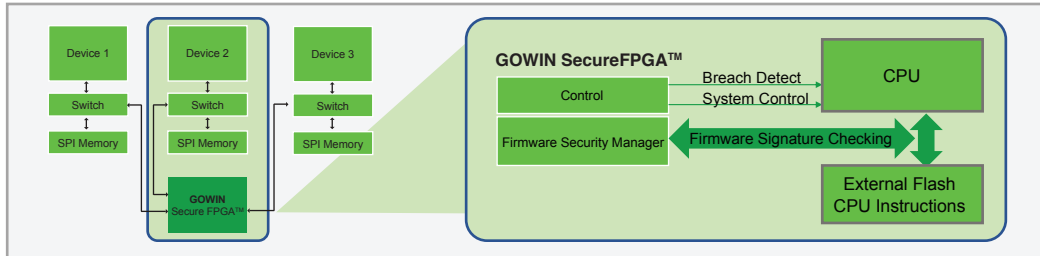
## Standalone IoT Secure Application Example



## Data Encryption Application Examples



## Server Firmware Checking System Example



# SecureFPGA Demonstration

## MQTT Cloud Connectivity and IoT Device Communication Demo



Demo link

