

# Indoor LoRa Smart Gateway of COTX Networks

## Product Introduction

COTX-X series indoor LoRa smart gateway is a new generated product of low-power WAN-IoT converged gateway independently developed by Beijing COTX Networks Technology Co. Ltd. (COTX). It supports the LoRaWAN standard formulated by the International LoRa Alliance and other mainstream IoT access protocols such as Wifi, BLE, NFC etc. It can be applied to the deployment in various conditions with multiple uplink options such as 2G/3G/4G, Emtc/NB-IoT, WiFi and Ethernet. With camera, audio interfaces and in-built OLED display screen, it can be accessed to security system and deployed in security application. The built-in LoRa low-frequency chip can satisfy the coverage range of 1km-15km according to the actual conditions of deployment. The terminal can transmit data by the LoRa protocol for WAN-level transmission with lower power consumption.



## Product Features

- High-level security protection
- Comprehensive and diverse options for backhaul
- Support mainstream cloud platform
- Flexible and easy to deploy
- Full APP manipulation, humanized operation and maintenance management
- Multi-service interface and analysis capabilities, rich application scenarios

## Product function

### COTX-X series

Product Features	Description
Ethernet	Auto-negotiation of 1*FE 10/100M rate
4G/NB-IOT	<ul style="list-style-type: none"> <li>● Single Radio, single SIM card</li> <li>● eMTC(LTE-CAT M1)/NB-IoT uplink (one option from two)</li> </ul>
WiFi	<ul style="list-style-type: none"> <li>● 2.4 GHz 802.11b/g/n</li> <li>● STA wireless client mode</li> <li>● Wireless hotspot mode</li> </ul>
WiFi Scanning	Support wireless scanning for USB Monitor WLAN card working module
BLE scanning	Support scanning BLE client
NFC	Support NFC read-write card and fast match NFC terminals
Capability of TDOA positioning	Support positioning via TDOA and terminal RSSI, no GPS terminal location
Application installation	Support Linux system software/application installation extension
Smart power-saving	Support manual/automatic entry into smart power-saving mode
Auto record video/ photograph	Support gateway to automatic record video and photograph
USB devices extension application	Support USB / WiFi WLAN card and other plug and play devices extension
Support installation of LoRa Packet Forwarder for third-party	Support installation of LoRa packet forwarder SDK on third-party platform
Local standard LoRaWAN NS/AS	<ul style="list-style-type: none"> <li>● Support local standard LoRaWAN NS/AS, and offline cache data of gateway</li> <li>● Synchronization for gateway resuming online data</li> </ul>
Access to third-party terminal of LoRaWAN	Support access to third-party terminal of standard LoRaWAN
Compatible with mainstream IoT cloud platforms	Compatible with mainstream IoT cloud platforms at home and abroad
Scanning wireless channel	Support scanning wireless channel for environmental
Wireless listening	Support listening to wireless messages to diagnose and analyze message interaction of wireless network data

### IP Features

<b>DHCP</b>	<ul style="list-style-type: none"> <li>● DHCP server (IPV4 and IPV6)</li> <li>● DHCP client (IPV4 and IPV6)</li> </ul>
<b>Static IP</b>	Static IP (IPV4 and IPV6)
<b>DNS</b>	DNS client
<b>NTP</b>	NTP client
<b>Network for communication</b>	Starlike network/MESH ad hoc network communication

### Security features

<b>Integrated KEY Management System for online/offline application</b>	<ul style="list-style-type: none"> <li>● Integrated KEY generation management of cloud/gateway/terminal</li> <li>● KEY management of gateway offline operation, consistent with the cloud</li> </ul>
<b>Security encryption algorithm</b>	Data Encryption Standard (DES), 3DES, Advanced Encryption Standard (AES) 128, AES 192, and AES 256
<b>PKI (Public Key Infrastructure)</b>	Support PKI public key infrastructure of X.509 standard
<b>Secure HTTP/MQTT</b>	Support HTTPS/MQTT TLS secure channel connection to the cloud
<b>VPN</b>	Support PPTP protocol to remotely access local ISP network and services
<b>Encrypted storage</b>	Terminal key/ encrypted storage of data
<b>Safe boot of system files</b>	Isolate boot of system files from third-party application software
<b>Digital signature verification of system files</b>	System files support digital signature verification

### LORA features

<b>LoRaWAN protocol</b>	<ul style="list-style-type: none"> <li>● LoRaWAN standard 1.0.1 and 1.0.2</li> <li>● Support Class A/B/C terminal</li> </ul>
<b>LoRa technology</b>	<ul style="list-style-type: none"> <li>● Automatic rate adjustment of adaptive Data Rates (ADR) terminal</li> <li>● Spread-spectrum factor</li> </ul>
<b>ISM band</b>	<ul style="list-style-type: none"> <li>● CN470-510MHz, EU863-870 MHz, U.S.902-928MHz, AU915-928MHz</li> <li>● Maximum 8 channels</li> </ul>

### System control

<b>System management method</b>	<ul style="list-style-type: none"> <li>● Support control of remote security access to SSH</li> <li>● COTX APP</li> </ul>
---------------------------------	--

	<ul style="list-style-type: none"> <li>● Cloud Platform of COTX</li> </ul>
Indication of system status	<ul style="list-style-type: none"> <li>● System LED indicator</li> <li>● Built-in LED display screen</li> <li>● COTX APP (system status display of CPU/Memory/Temperature/Version)</li> </ul>
Abnormal alarm of system status	<ul style="list-style-type: none"> <li>● COTX APP</li> <li>● Alarm notification from built-in LED display screen</li> </ul>
System configuration management	<ul style="list-style-type: none"> <li>● Save and backup system configuration</li> <li>● Restore system configuration to the initial setting</li> </ul>
OS	<ul style="list-style-type: none"> <li>● Upgrade system software</li> <li>● Shutdown system</li> <li>● Restart system</li> </ul>
System log	Support log audit of system/terminal status

## Product specifications

### COTX-X series

Product specification	COTX-X3
<b>Physical specifications</b>	
Product size (H*W*D)	<ul style="list-style-type: none"> <li>● H*W*D: 95*79*29mm</li> </ul>
Product weight	<ul style="list-style-type: none"> <li>● 265g</li> </ul>
Material of accessories	<ul style="list-style-type: none"> <li>● Aluminum alloy</li> </ul>
Fixing way	<ul style="list-style-type: none"> <li>● Wall-mounted, desktop or outdoor placement</li> </ul>
Operating temperature	<ul style="list-style-type: none"> <li>● 0°C~50°C</li> </ul>
Protection level	<ul style="list-style-type: none"> <li>● IP41</li> </ul>
<b>System performance</b>	
OS	Linux OS 4.9
CPU	Quad-core Cortex-A72 @1.5GHz
RAM	2GB/4G/8G LPDDR4-3200 SDRAM
<b>LoRa performance</b>	

<b>Operating frequency</b>	<ul style="list-style-type: none"> <li>● China: 470MHz~510MHz</li> <li>● Europe and other regions: 863-870Mhz</li> <li>● America and other regions: 902-928Mhz</li> <li>● Australia: 915-928Mhz</li> </ul>
<b>Number of channels</b>	8 channels in uplink at the same time
<b>Data rate</b>	292.97bps、 537.11bps、 976.56bps、 1757.81bps、 3125bps、 5468.75bps
<b>Receiving sensitivity</b>	-140dbm
<b>Transmitting power</b>	27dBm

### Device interface

<b>Ethernet</b>	<ul style="list-style-type: none"> <li>● 1* 10/100/1000M fast Ethernet interface (RJ-45)</li> </ul>
<b>WiFi</b>	<ul style="list-style-type: none"> <li>● 2GB/4G/8G LPDDR4-3200 SDRAM</li> </ul>
<b>4G</b>	<ul style="list-style-type: none"> <li>● 4G</li> <li>● Cat.1</li> </ul>
<b>BLE</b>	<ul style="list-style-type: none"> <li>● 1* Bluetooth BLE5.0</li> </ul>
<b>NFC</b>	<ul style="list-style-type: none"> <li>● 1* NFC Reader (NCI V1.3)</li> </ul>
<b>USB interface</b>	<ul style="list-style-type: none"> <li>● 2* USB 3.0, type A;</li> <li>● Compatible with USB 2G/3G/4G Module;</li> <li>● Compatible with USB WiFi card</li> </ul>
<b>Reset button</b>	<ul style="list-style-type: none"> <li>● Restart the system / restore factory settings / control screen lock</li> </ul>
<b>Audio interface</b>	<ul style="list-style-type: none"> <li>● 1*Audio interface, 4 output channels for stereo audio</li> </ul>
<b>Camera Interface</b>	<ul style="list-style-type: none"> <li>● 1* CSI Camera interface</li> </ul>
<b>Micro SIM card slot</b>	1* Micro SD card (32G capacity as standard configuration)
<b>RF1 antenna</b>	1* External LORA antenna, SMA interface
<b>RF2 antenna</b>	1* External 4G/Cat.1 antenna, SMA interface
<b>WiFi antenna</b>	<ul style="list-style-type: none"> <li>● 1* In-built WiFi antenna</li> </ul>

GNSS	
GNSS/GPS/Beidou module	<ul style="list-style-type: none"> <li>● GPS L1C/A, QZSS L1C/A, SBAS L1C/A</li> <li>● GLONASS L1OF</li> <li>● Beidou positioning system</li> </ul>
Power	
Local power supply	<ul style="list-style-type: none"> <li>● 5V DC input power supply</li> </ul>
Maximum power consumption	Indoor: <ul style="list-style-type: none"> <li>● &lt;15W</li> </ul>
LEDs	
System LED	<ul style="list-style-type: none"> <li>● OFF: the system is not powered on</li> <li>● FLASH: the system is starting</li> <li>● ON: the system is operating normally</li> </ul>
LED display screen	<ul style="list-style-type: none"> <li>● 1*0.96 inch LED display screen;</li> </ul>

## Ordering Information

### COTX-X series IoT smart gateway

Product Type	Product description
COTX-X3-CN	<ul style="list-style-type: none"> <li>● Operator-level LoRa IoT access gateway of COTX Networks in China</li> <li>● Operating frequency: 470MHz-510Mhz, applicable standard LoRaWAN in China</li> <li>● Supporting channel: 8</li> </ul>
COTX-X3-EU-H	<ul style="list-style-type: none"> <li>● SME-level LoRa IoT access gateway of COTX Networks in Europe</li> <li>● Operating frequency: 863MHz-870Mhz, applicable standard LoraWAN in Europe, Middle East, Africa and India</li> <li>● Supporting channel: 8</li> </ul>
COTX-X3-EU-L	<ul style="list-style-type: none"> <li>● Operator-level LoRa IoT access gateway of COTX Networks in Europe</li> <li>● Operating frequency: 433Mhz, applicable standard LoraWAN in Europe, Middle East, Africa and India</li> </ul>

	<ul style="list-style-type: none"> <li>● Supporting channel: 8</li> </ul>
COTX-X3-US	<ul style="list-style-type: none"> <li>● Operator-level LoRa IoT access gateway of COTX Networks in America</li> <li>● Operating frequency: 902MHz-928Mhz, applicable standard LoRaWAN in America, Asia Pacific and other regions</li> <li>● Supporting channel: 8</li> </ul>

## Compatibility list

COTX-X series smart converged gateway is compatible with the following

USB plug and play devices:

Product Type	Product description
<b>USB WiFi WLAN card</b>	
EW-7811Un	<ul style="list-style-type: none"> <li>● EW-7811Un mini 802.11b/g/n WiFi WLAN card</li> <li>● Maximum rate: 150Mbps</li> </ul>
EP-N8508GS	<ul style="list-style-type: none"> <li>● EDUP mini 802.11b/g/n WiFi WLAN card</li> <li>● Maximum rate: 150Mbps</li> </ul>
TL-WN722N	<ul style="list-style-type: none"> <li>● TP-LINK 802.11b/g/n WiFi WLAN card</li> <li>● Support wireless monitoring mode</li> <li>● Maximum rate: 300Mbps</li> </ul>
<b>USB 2G/3G/4G WLAN card</b>	
BroadMobi	Shanghai BroadMobi 2G/3G/4G WLAN card
Huawei e3372	Huawei Unicom/Telecom 4G WLAN card

COTX-X series smart converged gateway of COTX is compatible

with the following mainstream cloud platforms:

Cloud platform	Compatibility
COTX IoT platform	YES
Actility	YES
TTN	YES
Jasper (Cisco) platform	YES

Azure IoT platform	YES
AWS IoT platform	YES
Alibaba IoT platform	YES
Tencent IoT platform	YES
Baidu Cloud IoT Platform	YES
China Unicom IoT Platform	YES
China Mobile IoT Platform (ONENET)	YES
China Telecom IoT Platform	YES

**COTX-X series smart converged gateway of COTX is compatible with the following scenario-based terminals:**

Terminal Devices Type/Name	Description
<b>Module</b>	
<b>UM401</b>	ManThink 433MHz-510MHz LoRa terminal module
<b>LSD4WN</b>	Lierda 433MHz-510MHz LoRa terminal module
<b>RAK811</b>	RAK 433MHz-510MHz LoRa terminal module
<b>Smart city</b>	
<b>Hydraulic pressure transmitter</b>	A stable and highly reliable piezoresistive pressure sensor and a high-performance dedicated circuit for transmitter are used to detect fluid pressure in petroleum, chemical, electric power, hydrology, geology and other industries.
<b>Liquid level transmitter</b>	The wireless transmitting liquid level transmitter whose liquid level measured by fully-sealed submersible diffusion silicon is used, which is widely applied to monitor liquid level in the fields of property fire-fighting, industry, petroleum, power plants, mines, urban water supply and drainage, and hydrological exploration.
<b>Water-immersion transmitter</b>	Based on the principle of liquid conductivity, the sensor uses 4 probes to perform testing. Normally, the two-pole probe is insulated by air; when the probe is immersed in water, it will automatically alarm. It widely used in communication base stations, precision computer rooms, libraries, exhibition halls, museums and other application scenarios.
<b>Buried geomagnetism</b>	Three axis magnetoresistance sensor is used to dynamically track the changes of environmental magnetic field parameters, and then the status information of occupied / idle parking spaces can be accurately identified. It is widely used in urban road parking, scenic spot parking, community parking and so on.
<b>Manhole cover alarm</b>	The manhole cover status is monitored in real time, and the alarm information is automatically upload when the manhole cover moves or opens abnormally. It is



	widely applied to monitor manholes in safety in the fields of municipal administration, electric power, telecommunications, energy and so on.
<b>Single lamp controller</b>	It can monitor and collect the voltage, current, power, electric energy and other data parameters of a single street lamp, and has functions such as controlling switches of street lamp and dimming. It is widely used in tunnel lighting, urban road lighting, landscape lighting and other scenarios.
<b>Smart environment and location monitoring</b>	
<b>Wireless humiture collection unit</b>	A wireless humiture collection unit integrates data collection of temperature and humidity and monitoring. It is widely used in communication equipment rooms, workshop production lines, pharmaceutical warehouses, large logistics warehouses, agricultural greenhouses, flower greenhouses, archives, museums, HVAC control and other application scenarios that require monitoring temperature and humidity and alarming.
<b>GPS positioner</b>	Built-in GPS module, G-sensor sensor and anti-folding switch are used to monitor the positioning of items. It is widely applied to supervise asset, position livestock, supervise commodities, and position shared bicycle and so on.