

ZigBee I/O Pair-Connection Products and Applications

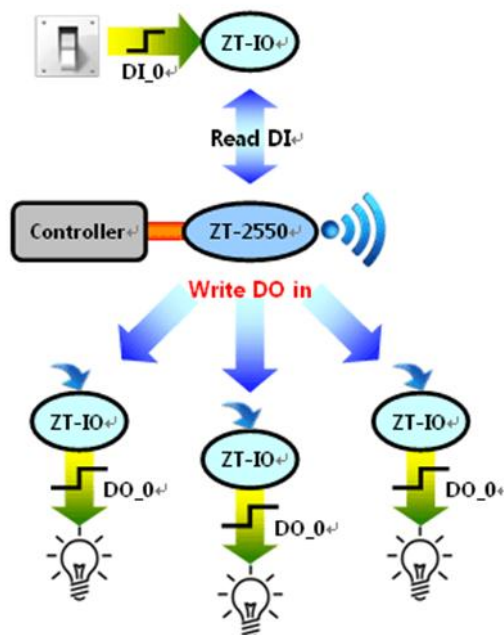
ZigBee wireless transmission features low power consumption, low-power, low data rate, compact design, easy-to- setup and mesh network etc. It is particularly suitable for wireless transmission technology in a limited- space area. As we are in the Internet of Things era, there are numerous requirements in monitoring of the devices at the terminal end; therefore wireless communication becomes one of the most important applications. ICP DAS has been working on ZigBee wireless communication products for years; and with extended experiences in I/O monitoring applications, the new ZT-2000-IOP series product has been developed and introduced to the market to meet increasing demands; it is an I/O Pair-connection product, no programming is required and features digital input & output channels, automatic I/O status synchronization via ZigBee. And with Mesh network properties; it can broadcast and update the messages to each terminal devices immediately. ZT-2000-IOP series product is equipped with benefits of ZigBee system such as: wireless, low-cost, easy-to-deploy, etc.

Conventional Monitoring Architecture

In a conventional automation monitoring system, the system usually has to go through “read & write” process repeatedly to achieve automation operations. For example: when there is a status modification of one Digital Input channel, the system will perform corresponding actions (such as: output Digital output) according to the pre-set logic on the controller.

However, in this architecture, a series of tedious issues such as: equipment selections, design of the software architecture, program writing, logic debugging, on-site installation, etc. always brought headache to the users and is inevitable to meet the following problems:

- ◆ High Cost
 - It requires using of controllers, the cost of hardware is high.
 - It requires programming, the cost of labour is high.
- ◆ Slow
 - It requires to update remote I/O module one by one via DCON/Modbus.



What is IOP (I/O Pair-connection)?

IOP (I/O Pair-connection) indicates that the I/O channels are paired and bounded. Using ZT-2000-IOP series (below abbreviated as ZT-IOP) as an example; when the DI channel status of ZT-IOP module is changed, ZT-IOP will automatically broadcast the status of this DI channel to all ZigBee nodes in the Zigbee network, and synchronize the DO channel status of ZT-2000 I/O series module (below abbreviated as ZT-IO). It does not require using of controller and no programming is required to achieve the update I/O channel status automatically.

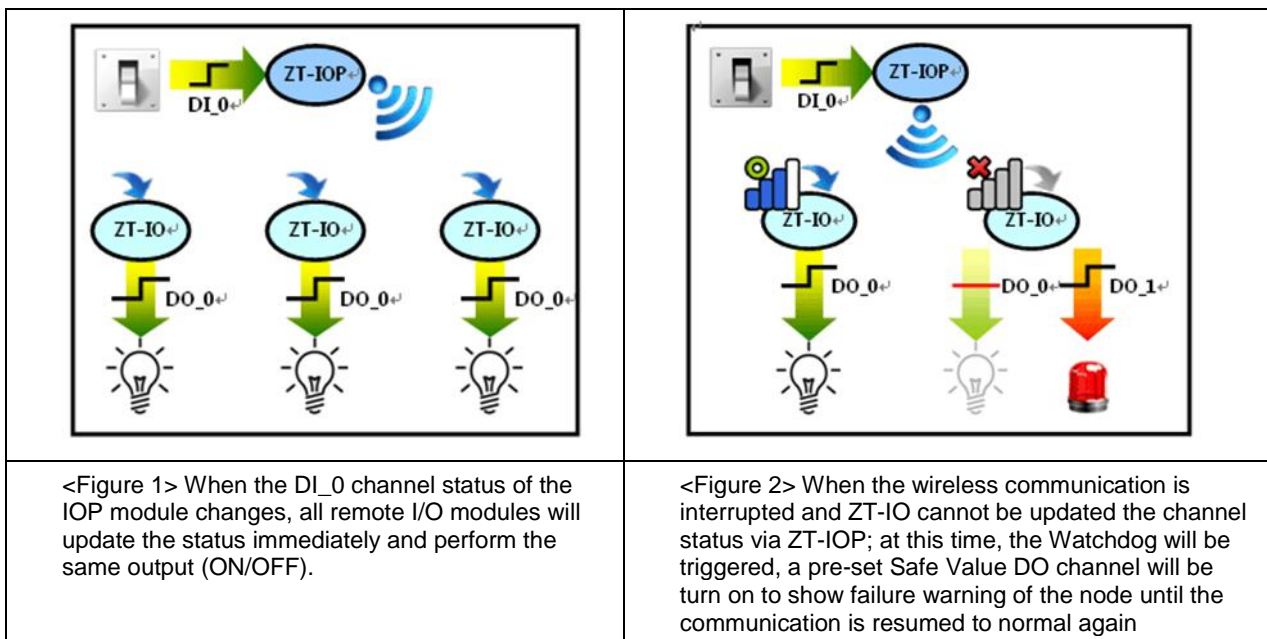
◆ Low Cost

- No controller is required, reduce the cost of equipment
- No programming is required, reduce the cost of labour
- Wireless, reduce wiring and simplified wiring deployment

◆ Faster

- ZigBee Mesh network architecture enables fast broadcast updates

Through a few simple steps, the refresh and reset operations of watchdog on the remote ZT-IO module can be done automatically. And once when the wireless communication of ZigBee is interrupted, the warning lights, buzzer can be triggered for warning purpose via Safe Value DO channel on the ZT-IO module until the resumption of communication.



Prevent and deal with the interruption of wireless communications - Warning

Because it does not require using the controller for programming to complete the pairing control of I/O channels; it is occasionally when the ZigBee wireless communication is interrupted, the users cannot be aware of the communication disconnection of the ZigBee notes. This may cause potential damage. Therefore, ZT-IOP and ZT-IO modules provide Safe Value option for warning purpose. The setting steps of the Safe Value is:

◆ Set up ZT-IOP hardware settings:

- Set the Safe Value of the DIP switch to be "ON"
- Set up the number of devices to be monitored by setting up the Pair Number of the DIP switch.

- ◆ Set up the ZT-IO software settings (via ZT Converter Series):
 - Set up the specified DO channel as Safe Value
 - Set Watchdog trigger time WDT (Watchdog Time)

Enhance ZigBee Wireless Signal Strength and Quality

ICP DAS ZigBee wireless product is compatible with IEEE 802.15.4 standard products. Its communication quality will be affected to the environmental and atmospheric conditions. If the environment of the application encounters interference sources such as: rain, snow, high/low level terrain, slopes, swales, or obstacles (such as buildings, metal objects or others), the wireless communication quality may be reduced and communication distance may be shortened; in some serious cases, it may even not be able to communicate at all. Therefore, initiate a communication test for the on-site environment is necessary. For each on-site environment may not have the same problem, the following solutions are provided to enhance the signal strength and quality; the users may choice best solution according to their specific on-site environment condition.

◆ Add ZigBee Repeater

ZT-2510	ZigBee Repeater (Slave, ZigBee Router)
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◆ Change the External Antenna

ANT-15	15 dBi 2.4GHz External Antenna (Omni-Directional)
ANT-18	18 dBi 2.4GHz External Antenna (Directional)
ANT-21	21 dBi 2.4GHz External Antenna (Directional)

◆ Add Antenna Extension Cable (Changing the Installation Location of the Antenna)

3S001-1	RG58A/U 1 Meter Long RP-SMA male to RP-SMA Female
3S003-1	RG58A/U 3 Meter Long RP-SMA male to RP-SMA Female
3S005-1	RG58A/U 5 Meter Long RP-SMA male to RP-SMA Female
3S008-1	RG58A/U 8 Meter Long RP-SMA male to RP-SMA Female

◆ Add Amplifier

ANF-2401	1W 2.4GHz Power Amplifier
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Compliance with environmental standards, electromagnetic compatibility (EMC)

ICP DAS concerns on product development as well as environment protection. From raw material to manufacturing, all processes are compliance with certificates such as: RoHS, WEEE, CE and FCC. From the product itself to a variety of packaging materials are in line with relevant regulations. In addition, ZT-2000 series modules are manufactured under electromagnetic compatibility (EMC) certification standard. The electromagnetic interference waves of the module will not affect the operations of other devices; therefore ensures each device can function appropriately under harsh industrial environments.

How to select and pair ZT-2000-IOP series modules?

ICP DAS provides total solution of wireless ZigBee products, the default factory settings of ZT-IOP products will match the ZT-IO module with the same I/O channels (refer to Table 1). The users can choose the modules according to their requirements.

- ◆ I/O Channel Numberst
- ◆ I/O Channel Mode

Pairs		ZT-IOP Series	ZT-IO Series
Two-Ways	4	ZT-2060-IOP	ZT-2060
One-Way	8	ZT-2052-IOP	ZT-2042
Two-Ways	8	ZT-2055-IOP	ZT-2055
One-Way	14	ZT-2053-IOP	ZT-2043

<Table 1> ZT-2000-IOP Series Products Default Matching Table

◆ Select the module as Digital Input from ZT-IOP series

ZT-IOP Series		ZT-2052-IOP	ZT-2053-IOP	ZT-2055-IOP
DI	Channels	8	14	8
	Wet Contact	Sink/Source	Sink/Source	Sink/Sourc
	Dry Contact	---	Source	Source
DO	Channels	0	0	8
	Type	---	---	Isolated O.C.
	Output Voltage	---	---	+3.5 ~ 50 VDC
	Max. Load Current	---	---	700 mA

◆ Select the module as remote Digital Output from ZT-IO series to match with the ZT-IOP module

ZT-IO Series		ZT-2042	ZT-2043	ZT-2055	
DI	Channels	0	0	8	
	Wet Contact	---	---	Sink/Sourc	
	Dry Contact	---	---	Source	
DO	Channels	4	4	14	8
	Type	PhotoMOS Relay, Form A	Isolated O.C.	Isolated O.C.	Isolated O.C.
	Output Voltage	60 VAC/VDC	+5 to 50 VDC	+5 to 50 VDC	+3.5 to 50 VDC
	Max. Load Current	700 mA	700 mA	1.1 A	700 mA

<Note> If not using with its default matching module; it will require using of ZT Converter Series (ZT-USBC / ZT-255x / ZT-257x) for ZT-IOP software settings.

ZT-2000-IOP series modules are flexible to meet customized requirements

ICP DAS provides total solution of wireless ZigBee products. The standard ZT-IOP products are one-to-one (a DI channel binding to a DO channel), one-to-many (a DI channel binding to multiple DO channels) - which can synchronize the upgrade of status. If customers have specific application cases that require adding customized logic program, ODM project is available for customized service.