

## Tiny Serial Port Converter/Sharer

### tSH-700 Series

#### Tiny Serial Port Sharer



tSH-700 series



### Features ▶▶▶

- Supports baud rate conversion application
- Supports two masters sharing one slave port
- Read-cache ensures faster response
- Redundant power inputs: PoE and DC jack
- Tiny form-factor and low power consumption
- Supports Modbus RTU/ASCII protocol conversion
- Raw data mode for most query-response protocols
- Built-in web server for easy configuration (HTTP)
- Allows automatic RS-485 direction control
- Power or Signal isolation for i versions
- ±4 kV ESD protection

### Introduction

Following the success of the original tGW-700/tDS-700 modules, ICP DAS has continued to develop new functions for these products in order to provide increased support for a greater number of applications. The tGW-700 modules are Modbus TCP-to-Serial gateway, while the tSH-700 modules are Serial Port Sharers working as Serial-to-Serial converters. The tSH-700 module provides a number of functions, including "Baud Rate Conversion", "Modbus RTU/ASCII Conversion" and "Two Masters Share One Slave". The built-in web server provides easy configuration interface, and no console commands are required.

#### • Baud Rate Conversion:

This function allows a single master device to communicate with slave devices using different baud rates and data formats. Most query-response protocols (half-duplex), e.g. DCON, are supported in the raw data mode. Full-duplex communication should also work when the data size is smaller than the built-in 512 bytes buffer on each serial port.

#### • Modbus RTU/ASCII Conversion:

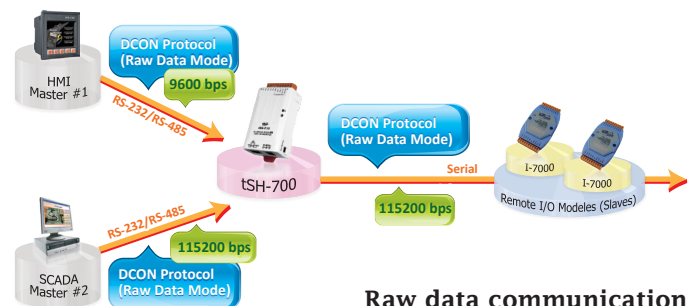
This function allows a single Modbus RTU/ASCII master device to communicate with Modbus RTU/ASCII slave devices using different protocols, baud rates and data formats.

#### • Two Masters Share One Slave:

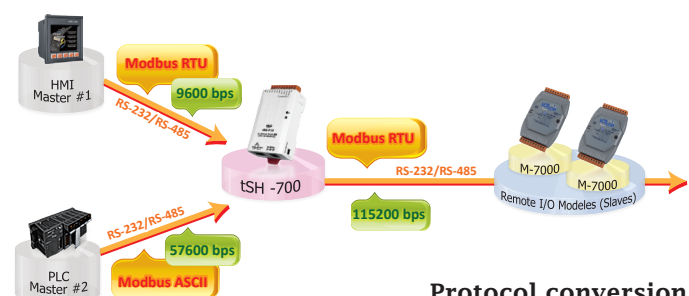
This function allows two master devices connected to different serial ports to share slave devices. The queries from the masters are queued in the tSH-700 module and then processed one-by-one. Modbus mode can be used to convert the Modbus RTU/ASCII protocols, while raw data mode can be used for DCON or other query-response protocols. Different baud rates and data formats can also be used on the different serial ports.

#### • Read-Cache Function:

The built-in read-cache function is used to store previous requests and responses of the Modbus messages in the memory buffer of the tSH-700 module. When other HMI/SCADA master controllers requiring the same information from the same slave RTU device, the cached response is returned immediately. This feature dramatically reduces the loading on the slave serial port communication, ensures faster responses to the master, and improves the stability of the entire system.



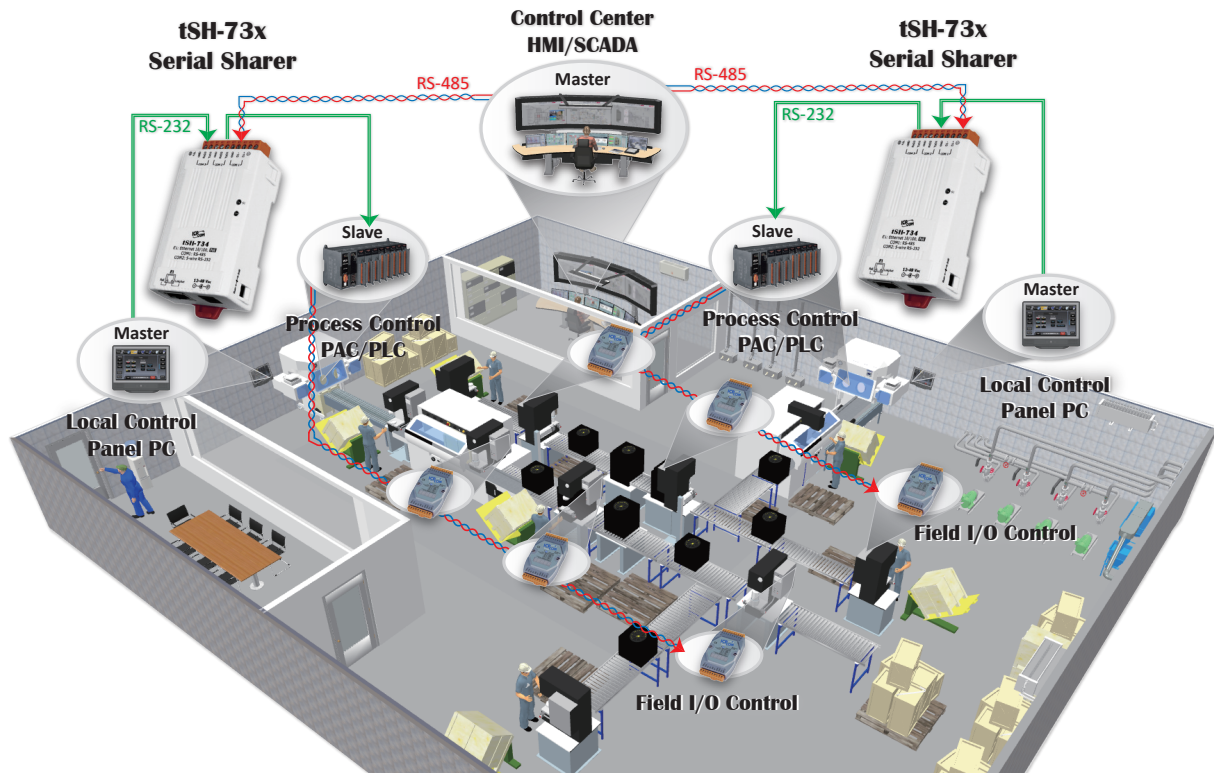
Raw data communication



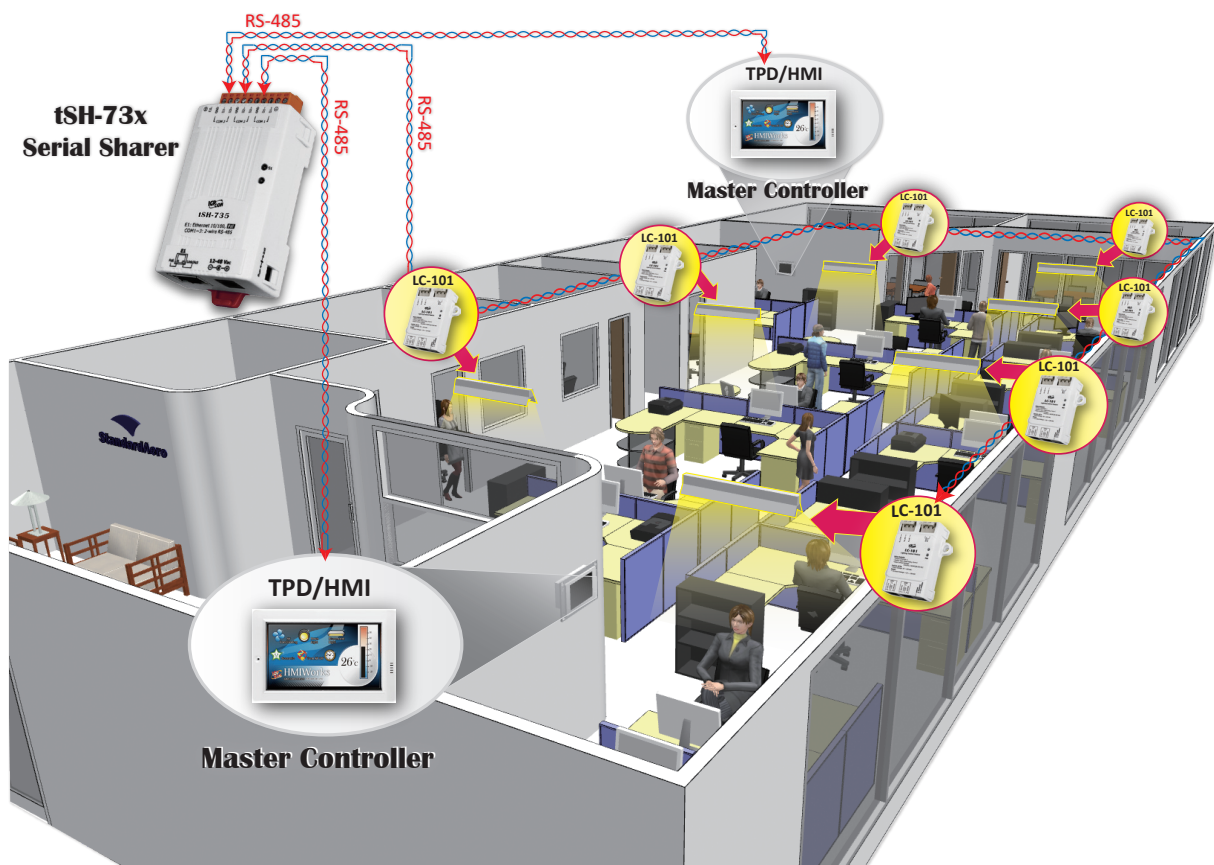
Protocol conversion

## Applications

### Accessing a Process Controller from Local Panel and Control Center



### Control Office Lightings from Two HMI Devices (Masters) in Different Places



2

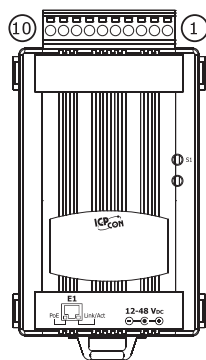
7

Serial Device Server

## System Specifications

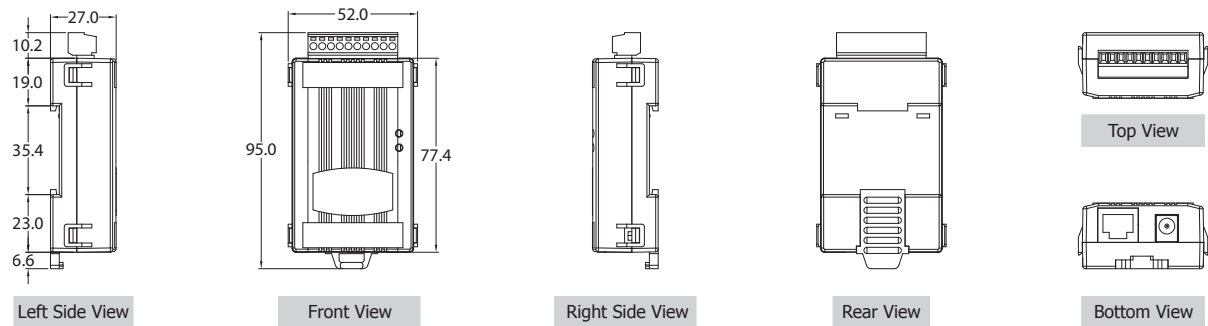
Models	tSH-722 tSH-722i	tSH-732 tSH-732i	tSH-725 tSH-725i	tSH-735 tSH-735i	tSH-724 tSH-724i	tSH-734 tSH-734i
System						
CPU	32-bit MCU					
Communication Interface						
Ethernet	10/100 Base-TX, 8-pin RJ-45 x 1, (Auto-negotiating, Auto-MDI/MDIX, LED indicator)					
PoE	IEEE 802.3af, Class 1					
COM Port	2 × RS-232	3 × RS-232	2 × RS-485	3 × RS-485	1 × RS-485 1 × RS-232	1 × RS-485 2 × RS-232
Self-Tuner	–		Yes, automatic RS-485 direction control			
Power Isolation	1000 V <sub>DC</sub> for only tSH-722i/ 732i					
Signal Isolation	3000 V <sub>DC</sub> for only tSH-725i/ 735i /724i /734i					
ESD Protection	+/-4 kV					
COM Port Capability (16C550 or compatible UART)						
Baud Rate	115200 bps Max.					
Data Bit	5, 6, 7, 8					
Parity	None, Odd, Even, Mark, Space					
Stop Bit	1, 2					
Power						
Power Input	IEEE 802.3af, Class 1 for PoE; +12 ~ 48 VDC for DC Jack					
Power Consumption	0.07 A @ 24 V <sub>DC</sub>					
Mechanical						
Connector	10-pin Removable Terminal Block x 1					
Dimensions (W x H x D)	52 mm x 95 mm x 27 mm					
Installation	DIN-Rail mounting					
Case	Plastic					
Environment						
Operating Temperature	-25 °C ~ +75 °C					
Storage Temperature	-30 °C ~ +80 °C					
Humidity	10 ~ 90% RH, non-condensing					

## Pin Assignments



tSH-722/tSH-722i			tSH-732/tSH-732i			tSH-735/tSH-735i		
COM2	10	F.G.	10	F.G.		10	F.G.	
	09	CTS2	09	GND		09	GND	
	08	RTS2	08	RxD3	COM3	08	D3-	
	07	RxD2	07	TxD3		07	D3+	
	06	TxD2	06	GND		06	GND	
COM1	05	GND	COM2	05	RxD2	COM2	05	D2-
	04	CTS1		04	TxD2		04	D2+
	03	RTS1		03	GND		03	GND
	02	RxD1	COM1	02	RxD1	COM1	02	D1-
	01	TxD1		01	TxD1		01	D1+
tSH-725/tSH-725i			tSH-724/tSH-724i			tSH-734/tSH-734i		
	10	F.G.	10	F.G.		10	F.G.	
	09	N/A	09	N/A		09	GND	
	08	N/A		08	CTS2	COM3	08	RxD3
	07	N/A		07	RTS2		07	TxD3
COM2	06	GND	COM2	06	GND		06	GND
	05	D2-		05	RxD2	COM2	05	RxD2
	04	D2+		04	TxD2		04	TxD2
COM1	03	GND		03	GND		03	GND
	02	D1-	COM1	02	D1-	COM1	02	D1-
	01	D1+		01	D1+		01	D1+

## Dimensions (Unit: mm)



## Ordering Information

Non-Isolated	Isolated	Serial Port Sharer: Includes one CA-002 cable.
tSH-722 CR	tSH-722i CR	Tiny Serial Port Sharer with PoE and 2 RS-232 Ports (RoHS)
tSH-732 CR	tSH-732i CR	Tiny Serial Port Sharer with PoE and 3 RS-232 Ports (RoHS)
tSH-725 CR	tSH-725i CR	Tiny Serial Port Sharer with PoE and 2 RS-485 Ports (RoHS)
tSH-735 CR	tSH-735i CR	Tiny Serial Port Sharer with PoE and 3 RS-485 Ports (RoHS)
tSH-724 CR	tSH-724i CR	Tiny Serial Port Sharer with PoE, 1 RS-485 and 1 RS-232 Ports (RoHS)
tSH-734 CR	tSH-734i CR	Tiny Serial Port Sharer with PoE, 1 RS-485 and 2 RS-232 Ports (RoHS)

## Accessories

### CA-002

DC connector to 2-wire power cable, 0.3 M



### CA-0915

Male DB-9 to Female DB-9 Cable, 1.5 m



### CA-0910F

Female DB-9 to Female DB-9 Cable, 1.0 m



### CA-0910N

DB-9 Female-Female 3-wire Null Modem Cable, 1M



### CA-PC09F

DB-9 Female Connector with Plastic Cover



### FRA05-S12-SU CR

12V/0.58A (max.) Power Supply (RoHS, for tDS/tGW-700)



### DIN-KA52F CR

24V/1.04A, 25 W Power Supply with DIN-Rail Mounting (RoHS, for NS-205 and NS-205PSE-24V)



### DIN-KA52F-48 CR

48V/0.52A, 25 W Power Supply with DIN-Rail Mounting (RoHS, for NS-205PSE)



### NS-205PSE CR

Unmanaged Ethernet Switch with 4 PoE Ports and 1 RJ-45 Uplink (RoHS)



### NS-205PSE-24V CR

Unmanaged 5-port 10/100 Mbps PoE (PSE) Ethernet Switch; 24 Vdc Input (RoHS)

