# *I-7547*

# Ethernet To HART Converter

# User's Manual

#### Warranty

All products manufactured by ICP DAS are under warranty regarding defective materials for a period of one year from the date of delivery to the original purchaser.

#### Warning

ICP DAS assumes no liability for damages resulting from the use of this product. ICP DAS reserves the right to change this manual at any time without notice. The information furnished by ICP DAS is believed to be accurate and reliable. However, no responsibility is assumed by ICP DAS for its use, or for any infringements of patents or other rights of third parties resulting from its use.

#### Copyright

Copyright 2013 by ICP DAS. All rights are reserved.

#### Trademark

The names used for identification only may be registered trademarks of their respective companies.

## **Table of Contents**

1.	Introduction			
	1.1		Features	. 4
	1.2		Specifications	. 5
2.	. Hardwar			.7
	2.1		Pin Assignment of I-7547	. 8
		2.1.1	Pin Function Description	. 8
		2.1.2	HART Wiring	. 9
	2.2		Terminator Resistor Settings	12
	2.3		Init / Normal Dip-switch	13
		2.3.1	Firmware Update Mode	14
		2.3.2	Firmware Operation Mode	16
	2.4		LED Indication	16
		2.4.1	LED Function	16
		2.4.2	LED Indication Table	17
	2.5		Cable Selection	17
3.	We	b Serv	ver Configuration1	8
	3.1		Connect to I-7547 Web Server	18
	3.2		Home	19
	3.3		Network Setting	19
	3.4		Monitor	22
	3.5		Change Password	23
	3.6		Logout	23
	3.7		Port1 / Port2 Settings (Support Pair-Connection)	23
4.	HC	_Tool	Utility2	26
	4.1		VxComm Utility	26
	4.2		Run HC_Tool	28
	4.3		Serial Port and HART Command Settings	29
		4.3.1	Serial port settings	29
		4.3.2	HART Frame Settings	29
	4.4		Search HART devices	30
		4.4.1	Search HART devices automatically	30
		4.4.2	Search HART devices manually	31
		4.4.3	Search HART devices	32
	4.5		Send / Receive HART Frame (SRMsg)	34
	4.6		HART Information Log (Data Log)	35
	4.7		HART Configuration (HTCfg)	36

	4.8 Module Configuration (ModCfg)	38
5.	FAQ	41
	Q01 : How to use I-7547 to communicate with HART devices ?	41
	Q02 : Does I-7547 support the Pair-Connection for HART ?	41
	Q03 : Does I-7547 support HART OPC Server from HCF?	41
	Q04 : Set HART device address by using HART converter ?	41
	Q05 :How to send HART command for writing (Ex: CMD51)?	43
	Q06: How to connect with HART OPC server?	45
	Q07 : How to connect with HART FDT software?	48
	Q08 : How to listen HART network communication by HART converter	57
	Q101 : How to get the current IP address of I-7547 ?	60
	Q102 : How to avoid I-7547 to reset automatically ?	60
	Q103 : How to write Ethernet program to access HART device data via I-7547	61
6.	Version History	62

# 1. Introduction

I-7547 is an Ethernet to HART converter designed as the master device of HART protocol. It allows users to access the HART slaves via Ethernet by using virtual COM port. These HART slave devices may be a transmitter, actuator, current output device, and so forth. I-7547 provides four HART channels and 250  $\Omega$  load built-in resistors for each HART channel which are adjustable by jumpers. In addition, we also provide free utility tool (HC\_Tool) for users to configure I-7547 and test HART communication easily and quickly.

The following is the application structure of I-7547.



## 1.1 Features

- Support HART Short / Long frame.
- Support HART Burst mode.
- Support point-to-point or multi-drop HART mode.
- Support connecting up to 15 HART slave devices.
- Allow two HART masters.
- Provide utility tool for module configuration and HART communication.

- Provide four HART channels.
- Support firmware update via Ethernet
- Provide PWR / TxRx indication LED
- 4KV ESD Protection
- Built-in Watchdog
- Selectable  $250\Omega$  load resistor for each HART channel.
- Support FDT (Field Device Tool) technology (like: PACTware / FieldCare / Seimens PDM ...)
- Support HART Pair-Connection (FW\_v1.03)

## 1.2 Specifications

#### [ Ethernet Spec. ]

Ethernet Port	10/100 Base-TX with Auto MDI/MDI-X		
Virtual COM	Created by VxComm Utility		
Built-In Web Server	Ethernet Parameters Configuration		

#### [HART Spec.]

Channel	4		
Connector	2-pin screwed terminal block (for each HART Ch.)		
Device type	Two-wiring or four-wiring HART devices		
Network	Point to Point or Multi-drop		
Comm. Mode	Only HART digital communication		
Frame	Short or Long frame		
Burst Mode	Support		
Max. Device	15 HART slave devices		
Load Resistor	Selectable 250 $\Omega$ by Jumper (for each HART Ch.)		
Isolation	500 VDC		
Operate Mode	HART Master and supports all HART commands		

## [ COM Spec. ]

COM1	Tx / Rx / GND / RTS / CTS
Baud Rate (bps)	1200 ~ 115200bps
Data Format	N/O/E (parity), 5/6/7/8 (data bit), 1/2 (stop bit)

## [ Power Requirement ]

Power supply	Unregulated +10 ~ +30 VDC			
Protection	Power reverse protection, Over-Voltage brown-out protection			
Power Consumption	1.5W			

## [Module spec.]

Dimensions	123mm x 72mm x 35mm (H x W x D)		
Operating temperature	-25 ~ +75 ℃ (-13 to 167 °F)		
Storage temperature	-30 ~ +80 °C (-22 to 176 °F)		
Humidity	5% ~ 95% RH, non-condensing		
LED	PWR : Power Indicator TxRx : Data Received from Ethernet / HART Indicator		

## [Utility Tool]

- Provide module configuration and HART communication easily and quickly.
- Provide automatically searching function for HART devices.
- Provide diagnostic Information of HART device.
- Provide data logging for HART communication.

## [ Application ]

- Current Measuring.
- Petrochemical Industry Application.
- Environment Monitoring.
- Tunnel Monitoring.
- Monitor system.
- Building Monitoring.

## 2. Hardware



Figure 2-1: Hardware externals of I-7547

## 2.1 Pin Assignment of I-7547



Figure 2-3: Pin Assignment of I-7547

2.1.1 Pin Function Description

Pin No. Pin Name		Pin Function Description		
1	CTS1	CTS of RS-232		
2	RTS1	RTS of RS-232		
3	RxD1	Receive Data of RS-232		
4	TxD1	Transmit Data of RS-232		
5	GND	GND of RS-232		
6	-	N/A		
7	-	N/A		
8	+Vs	V+ of Power Supply (+10V~+30Vdc)		
9	GND	GND of Power Supply		
10	HT0+	HART+ of port 0		
11	HT0-	HART- of port 0		
12	-	N/A		
13	-	N/A		
14 HT1+ HAR1		HART+ of port 1		
15 HT1- HART- of port 1		HART- of port 1		
16	-	N/A		

I-7547 Ethernet to HART Converter User's Manual (Ver 1.07, 2019/11/25) ------ 8

17	-	N/A		
18	HT2+	HART+ of port 2		
19	HT2-	HART- of port 2		
20	-	N/A		
21	-	N/A		
22	HT3+	HART+ of port 3		
23	HT3-	HART- of port 3		
E1	Ethernet	10 / 100M		

#### 2.1.2 HART Wiring

The HART network connection can be divided into the following two types.

(1) "Peer to Peer" Mode.

[1] "Loop Power" (Passive) Mode: (Internal Resistor)



P2P => "Loop Power" Mode (Internal Resistor)

[2] "Loop Power" (Passive) Mode: (External Resistor)





[3] "External Power" (Active) Mode:



P2P => "External Power" Mode

## (2) Multi-Drop Mode

[1] "Loop Power" (Passive) Mode:



Multi-Drop => "Loop Power" Mode









(3) "Loop Power + External Power" (Passive+Active) Mode:

Multi-Drop => "Loop Power + External Power" Mode

## 2.2 Terminator Resistor Settings

In I-7547, there are four jumpers (JP3 ~ JP6) provided for four HART channels, shown as Figure 2-4. These jumpers can be used to connect or disconnect the 250 $\Omega$  (1/4 W) loop resistor to HART network.

(1) **Enabled** HART loop resistor : Please connect the pin 1&2 together.

(1) **Disabled** HART loop resistor : Please connect the pin 2&3 together.

=> The default setting is enabled (the pin1&2 is connected)



Figure 2-4: Internal Load Resistor

## 2.3 Init / Normal Dip-switch

There is a DIP switch on the back of the I-7547 module shown as the Figure 2-5.

- (1) "Init" Mode function : (Modified to Lower position)
  - [1] PWR LED will be ON after 5 seconds when power on.
  - [2] Adopt module default IP address (192.168.255.1).
  - [3] Firmware Update Mode.
- (2) "Normal" Mode function : (Modified to Upper position)
  - [1] PWR LED will be ON immediately when power on.
  - [2] Adopt the IP address set by users.
  - [3] Firmware Operation Mode.



#### 2.3.1 Firmware Update Mode

Please follow the following instructions to complete the firmware update process of I-7547.

- (1) Connect I-7547 to the same network with PC and make sure they can communicate with each other. (Please don't connect I-7547 to Internet, or it may cause the firmware update failure.)
- (2) Run "eSearch" Utility.

(Download : <u>ftp://ftp.icpdas.com/pub/cd/fieldbus\_cd/hart/converter/i-7547/firmware/</u> and make sure the version is newer than v1.0.8) Click "Search Servers" button to search I-7547 module automatically. Right click on I-7547 item and choose the "Firmware Update" option to start firmware update process.

🥪 eSearch Utility [ v1.0.8, Mar.22, 2013 ]								
<u>File S</u> erver <u>T</u> ools								
Name	Alias	IP Address	Sub-net M	Gateway	MAC Address	DHCP		
(1-7547)	ETH2HART	192.168.255.1	255.255.0.0	192.168.0.1	00:0d:e0:8f:ff:ff	OFF		
2.	🖑 Ping Server							
<b>Г</b>	Configure Serve	r (UDP)						
3. (	膏 <u>F</u> irmware Update							
<								
1.								
Search Servers Configuration (UDP)								
Status								

(3) Choose I-7547 firmware file.
 (Download: <u>ftp://ftp.icpdas.com/pub/cd/fieldbus\_cd/hart/converter/i-7547/firmware/</u>)

Open		? 🔀				
Look in: 🗀 17547	7FW 🔽 🗸	- 🗈 💣 🎟-				
<mark>िक्त</mark> 17547fw_v1.00.c	lat					
File name: 1754	47fw_∨1.00.dat	Open				
Files of type: firmv	ware file (*.dat)	Cancel				
Firmware Update (Tiny Module only)						
File Name Note: This while the 1	D:\I-7547_FW\I7547FW.dat IP Address is depending on MAC address in depending o	your network, n your device.				
IP Address	192.168.255.1	For Updating				
MAC Addre	ss 00:0d:e0:8f:ff:ff	MAC Finder				
	OK Cance	I				

(4) In DOS command prompt, it will show the message for ready to update firmware.



(5) Set the dip switch to the "Init" position and reboot I-7547. After that, it will start to update firmware automatically.

If firmware updates successfully, the progress will run to 100%. If not, the following error message will show:

C:\Windows\system32\cmd.exe Waiting request from MAC 00-0d-e0-80-55-71 (IP:192.168.255.1) Starting BOOTP/TFTP Server ... BOOTPREQ from MAC: 00-0D-E0-80-55-71

(6) After the process of firmware update finished, set the dip switch to the "Normal" position and reboot I-7547.

#### 2.3.2 Firmware Operation Mode

Set the dip switch to the "Normal" position and then reboot I-7547. I-7547 will run under operation mode and then users can communicate with HART devices via Ethernet.

### 2.4 LED Indication

There are two LEDs provided to indicate the status of I-7547. The Figure 2-6 is the illustration of these two LEDs.



Figure 2-6: LED position of I-7547

## 2.4.1 LED Function

#### (1) PWR LED :

When I-7547 turned on, if it is in the firmware operation mode, then the PWR LED will be on immediately. If I-7547 is in the firmware update mode, after 5 seconds, it will switch from update mode to operation mode. When I-7547 turns off, all LEDs turn off.

### (2) TxRxD LED :

When I-7547 is receiving data from Ethernet or HART port, then the TxRx LED will flash until data transmission completed.

2.4.2 LED Indication Table

Mode LED Name	Power off	FW Update	FW Operation	Ethernet Data Received	HART Port Data Received
PWR LED	Off	On after 5 sec when reboot	On immediately when reboot	On	On
TxRx LED	Off	Off	Off	Flash	Flash

## 2.5 Cable Selection

The HART bus is a balanced (differential) 2-wire interface running over a Shielded Twisted Pair (STP), Un-shielded Twisted Pair (UTP), or Ribbon cable. Please refer to the following table to decide what cable type, cable length, and terminator to use in the HART bus network.

No. Network Devices	Cable Capacitance – pf/ft (pf/m)			
	20 pf/ft	30 pf/ft	50 pf/ft	70 pf/ft
	(65 pf/m)	(95 pf/m)	(160 pf/m)	(225 pf/m)
1	9,000 ft	6,500 ft	4,200 ft	3,200 ft
	(2,769 m)	(2,000 m)	(1,292 m)	(985 m)
5	8,000 ft	5,900 ft	3,700 ft	2,900 ft
	(2,462 m)	(1,815 m)	(1,138 m)	(892 m)
10	7,000 ft	5,200 ft	3,300 ft	2,500 ft
	(2,154 m)	(1,600 m)	(1,015 m)	(769 m)
15	6,000 ft	4,600 ft	2,900 ft	2,300 ft
	(1,846 m)	(1,415 m)	(892 m)	(708 m)

Allowable cable lengths for 1.0mm (#18 AWG) shield twisted pair

Note: The AWG means a standard method used to measure wire. The numbering system works backwards from what people would think, the thicker (heavier) the wire, the lower the number.

## 3. Web Server Configuration

I-7547 provides the built-in web server for module Ethernet parameter setting.

## 3.1 Connect to I-7547 Web Server

#### [Step 1: Type "IP Address" in the Web Browser ]

I-7547 supports many kinds of web browser like Mozilla, Firefox, Google Chrome and IE etc. The default IP address of I-7547 is "192.168.255.1".



## [ Step 2: Type "Password" in Log-In screen ]

When connecting to I-7547 web server, please input the password in the "Login password" field (Default Password : admin) and click "Submit" button to log in.



## 3.2 Home

Provide the basic software and hardware information of I-7547.



I-7547 (Ethernet to HART Converter)

Home Network Setting | Monitor | Change Password | Logout

#### System Information

Model Name:	I-7547	Alias Name:	ETH2HART
Firmware Version:	v1.00 [2013/04/25]	MAC Address:	00-0d-e0-8f-ff-ff
IP Address:	192.168.255.1	TCP Command Port:	10000
Initial Switch:	OFF	System Timeout: (Network Watchdog, Seconds)	300

## 3.3 Network Setting

Provide following configuration.

## (1) IP Address Setting:

Provide module Ethernet communication configuration.

IP Address	
Address Type:	Static IP 🗸
Static IP Address:	192 . 168 . 255 . 1
Subnet Mask:	255 . 255 . 0 . 0
Default Gateway:	192 . 168 . 0 . 1
MAC Address:	(Format: FF-FF-FF-FF-FF)
Virtual COM	
TCP Command Port:	10000 (Default: 10000)
Command Port Timeout: (Socket Watchdog)	180 (1 ~ 65535 seconds, 30=default, 0=disable)
	Update Settings

ltems	Description
Address Type	[ Static IP ] If there is no DHCP server in the network, then static IP can be assigned to I-7547.



### (2) General Setting:

Provide the general module configuration like module alias, watchdog and web auto-logout etc.

Network	
System Timeout: (Network Watchdog)	300 (30 ~ 65535 seconds, 300=default, 0=disable) Action=Reboot
Web Auto-logout:	10 (1 ~ 255 minutes, 10=default, 0=disable)
CGI Configuration:	Enable V (Enable/Disable the assign.cgi, Enable=default.)
UDP Alarm	
Alarm IP Address(UDP):	255 _ 255 _ 255 _ 255
Alarm Port(UDP):	54300
Misc.	
Alias Name:	ETH2HART (Max. 18 chars)
UART Watchdog:	Tx:0 Rx:0 (30 ~ 65535 seconds, 0=default=disable) Action=Reboot
Debug Message(UDP):	20 (1 ~ 255 seconds, 20=default, 0=disable)
	Update Settings

Items	Description	Default
Alias Name	Set the module alias so it is easier to identify in the	ETH2HART
	network.	
System Timeout	Set the system timeout value.	300
(Network WDT)	(When error occurs and lost communication, I-7547 will reboot automatically after system timeout value passed.)	
	Range : 30~65535 (seconds); Disabled = 0;	
Web Auto-logout	Set the timeout value for web auto-logout. (If there is no action on the I-7547 web server for a period of time, then it will log out automatically.) Range : 1~65535 (minutes); Disabled = 0;	10
Update Settings	Click the button to save the new settings to I-7547.	

## (3) Restore Factory Defaults:

Provide restoration to the factory default settings of I-7547.

[1] Click "Restore Defaults" button to restore the factory default settings. Restore Factory Defaults

	Restore all options to their factory default states:	Restore Defaults Step1
[2]	Click "OK" button to finish the set	ting.
	Microsoft Internet Explorer	
	This will erase all existing configuration changes and want to do this or Cancel to retain existing setting Step2	nd restore factory default settings. Click OK if you are sure you ys. Cancel

Items	Factory Default
IP	192.168.255.1
Gateway	192.168.0.1
Mask	255.255.0.0

### (4) Forced Reboot:

Provide remote reboot I-7547 module via web.

## 3.4 Monitor

Provide the connection status and transmitted data byte count of the "Ethernet to COM" and "Ethernet to HART" function.

## I-7547 (Ethernet to HART Converter)

Home | Network Setting Monitor | Change Password | Logout

## Connection Status (Ethernet) :

Port Number	COM 1	HART
Client/Server Mode:	Server	Server
Connected IP1:	192.168.255.203	192.168.255.203
IP2:	0.0.0	0.0.0
IP3:	0.0.00	0.0.0.0
IP4:	0.0.00	0.0.0.0

(1) COM1: The VxComm connection status of "Ethernet to COM".

(2) HART: The VxComm connection status of "Ethernet to HART".

## Tx/Rx Count (COM/HART) :

Port Number	COM 1	HART
Last Tx Count (bytes):	0	0
Last Rx Count (bytes):	0	0
Total Tx Count (bytes):	14	55
Total Rx Count (bytes):	21	0

(1) COM1: The Tx/Rx byte count of "Ethernet to COM".

(2) HART: The Tx/Rx byte count of "Ethernet to HART".

## 3.5 Change Password

Provide the new password setting for web server login.



# I-7547 (Ethernet to HART Converter)

Home | Network Setting | Monitor Change Password Logout

#### Change Password

The length of the password is 12 characters maximum.

Current password:	••••	
New password:	•••••	
Confirm new password:	•••••	Submit

Items	Description
Current password	Input the old password. (Default : admin)
New password	Input the new password.
Confirm new password	Input the new password again.
Submit	Click the button to save the new settings to I-7547.

## 3.6 Logout

When click the "Logout" label, it will logout from the web server of I-7547 automatically and redirect to the login screen.

## I-7547 (Ethernet to HART Converter)

Home | Network Setting | Monitor | Change Password Logout

#### The system is logged out.

To enter the web configuration, please type password in the following field.

Login password:	Submit

## 3.7 Port1 / Port2 Settings (Support Pair-Connection)

When click the "Port1" or "Port2" label, it will provide the setting of "Pair-Connection" function. (The function needs to use two I-7547 modules and connect these two I-7547 Ethernet ports in the same network.)

(1) Port1 Page: The Pair-Connection settings for **COM1** port. (Port 10001)

(2) Port2 Page: The Pair-Connection settings for **HART** port. (Port 10002)

Items	I-7547 Server Setting	I-7547 Client Setting				
Server Mode	Server	Client				
Remote Server IP	Disable	Remote I-7547 Server IP				
Remote TCP Port	Disable	Port1: 10001 (COM)				
		Port2: 10002 (HART)				
Submit Button	Click the button to save the new settings to I-7547.					

Server / Client Settings of "Pair-Connection":

I-7547 (Ethernet t	o HART Converter)	
Home Port1   Port2 Netw	vork Setting   Monitor   Change Password   Logout	
Dynamic Serial Setting:	Enable	Enable 👻
Operation Mode:	0	⁰ 🕶 (0=Data-sharing, 1=Non-sharing)
Local TCP Port:	10002	(=TCP Command Port +2)
TCP Timeout (seconds):	180	180 (1 ~ 65535, 180=default, 0=disable)
Serial Data Packing	Current	Updated
Slave Timeout (ms):	1000	1000 (After last TX)
Packing Length(bytes):	0	0 (0 ~ 1024, 0=default=disable)
Serial Ending Chars: (Number[,char1][,char2])	0	0 (e.g.: 2,0x0D,0x0A)
Timeout Between Chars (ms):	10	10 (After last RX) (10 ~ 65535, 10=default, 0=disable)
Pair-Connection Settings (Client/Server Mode)	Current	Updated
Server Mode:	Server	Server 🖌 (Server=Slave, Client=Master)
Remote Server IP:	Disable	10 . 8 . 244
Remote TCP Port:	Disable	10002
		Submit

(1) Enable HART "Pair-Connection" :

Set the Server Mode to be "**Server**" in one I-7547 and Set another I-7547 to be "**Client**". In client mode, the "<u>Remote Server IP</u>" and "<u>TCP</u> <u>Port</u>" parameters need to be configured.

(2) Disable "Pair-Connection" :

Set the Server Mode to be "**Server**" in two I-7547 modules to disable the function.

=> Remember to click "Submit" button to save settings to I-7547.

#### I-7547 Server Settings:

Pair-Connection Settings (Client/Server Mode)	Current	Updated
Server Mode:	Server	Server 💌 (Server=Slave, Client=Master)
Remote Server IP:	Disable	10 . 0 . 8 . 244
Remote TCP Port:	Disable	10002

I-7547 Client Settings:

Pair-Connection Settings (Client/Server Mode)	Current	Updated
Server Mode:	Client	Client 💌 (Server=Slave, Client=Master)
Remote Server IP:	192.168.255.1	192 . 168 . 255 . 1
Remote TCP Port:	10002	10002

# 4. HC\_Tool Utility

## 4.1 VxComm Utility

Before using HC\_Tool utility to communicate with I-7547, please install the "VxComm Utility" software first to create a virtual com port.

(1) Install the "VxComm Utility".

(Download:

http://www.icpdas.com/root/product/solutions/software/utilities/vxcomm. html and make sure the version is newer than v2.12) °

(2) Run the "VxComm Utility".

Click the "Search Servers" button to search all I-7547 modules automatically.

🛷 YxComm Utility [ v2.12	.01, Mar.22	, 2013 ]					
<u>File S</u> erver <u>P</u> ort <u>T</u> ools							
	P			Configure Serv	er		
VxConfirmed utility Where remote serve processing of your PC	¥×Co	mm Servers					Port
Add Server(s)							
Remove Server							
🥭 Web							
Search Servers							
Configuration (UDP)							
Exit							
	Name	Alias	IP Address	Sub-net M	Gateway	MAC Address	DHCP
	1-7547	ETH2HART	192.168.255.1	255.255.0.0	192.168.0.1	00:0d:e0:8f:ff:ff	OFF

(3) Right click the "I-7547" item(s) and choose the "Add Server(s)" option.

Name	Alias	IP Address	Sub-net M	Gateway	MAC Address	DHCP
1-7547	FTH2HART ((() Ping Server Diagnostic	192.168.255.1	255.255.0.0	192.168.0.1	00:0d:e0:8f:ff:ff	OFF
	∬Configure Server ∰Add Server(s)	r (UDP)				

(4) In "COM Port:" item, choose the com port number.

Adding Servers		
IP Range Server O	ptions Port Options	
– Server Informati	on	
Server Name :	1-7547	Get name automatically
IP Range Start :	192.168.255.1	Skip duplicated IP
IP Range End :	192.168.255.1	
Includes the follo	wing special IP :	
🗌 🗆 0 (Net) 🗹 2	54 (Gateway) 🗌 255	i (Broadcast)
Virtual COM and	I/O Port Mappings —	
COM Port :	СОМ14 🔽	
🗆 Fixed baudrat	COM14	of servers.
🗌 🗖 Maps virtual (	COM16 rt I/O"	on servers.
	COM17	
		OK Cancel
	COM19 COM20	

(5) If success, the "I-7547" item will be listed in the above "VxComm Servers" list. The virtual com port will be shown in the right field like Port1 and Port2.

[1] Port 1 (COM14) : The virtual com port for <u>Ethernet to COM</u>. [2] Port 2 (COM15) : The virtual com port for <u>Ethernet to HART</u>.

<u>File S</u> erver <u>P</u> ort <u>T</u> ools									
	ø			Configure Serv	er				
VxComfriver & utility Where remote Berning become part of your PC	V×Co	mm Servers 547 (192.168.	255.1)				Port Port I/O Port 1	Virtual COM Reserved COM14	Baudrate N/A Dynamic
Add Server(s)							Port 2	COM15	Fixed
🔀 Remove Server									
🧭 Web									
Search Servers									
Configuration (UDP)									
Exit									
	Name	Alias	IP Address	Sub-net M	Gateway	MAC Address	DHCP		
	1-7547	ETH2HART	192.168.255.1	255.255.0.0	192.168.0.1	00:0d:e0:8f:ff:ff	OFF		

(6)Click "Tools" menu and choose the "Restart Driver" option then it will enable the virtual com port settings.



## 4.2 Run HC\_Tool

HC\_Tool utility is provided to configure all ICP DAS's HART converter modules (like I-7567 / I-7570 / I-7547) and transmit / receive HART frame for HART communication easily and quickly. HC\_Tool utility can be downloaded from the ICP DAS website :

http://ftp.icpdas.com/pub/cd/fieldbus\_cd/hart/converter/i-7547/software/.

Run the "**HC\_Tool**", like Figure 4-1. If users can't run "HC\_Tool", please install .NET Framework 3.5 first.

(http://www.microsoft.com/downloads/details.aspx?familyid=333325FDAE 52-4E35-B531-508D977D32A6&displaylang=en ).



## 4.3 Serial Port and HART Command Settings

Please click "**Settings**" menu to open settings window of serial port and HART parameters like Figure 4-2.

#### 4.3.1 Serial port settings

- (1) Please select serial port no. of PC like Figure 4-2.
- (2) "Timeout" Field: HART command Timeout value. The default value is 650ms. (Supported by HC\_Tool v1.04 or newer. When using HART pair-connection function, suggest to set the timeout value to be 2000 (2 sec))

HC_Tool	v1.04 (ICP DAS)
Settings	Data Log SRMsg HTCfg ModCfg About
COM6 :	: Open Close
Search :	Start Stop
Star Set	ttings
	Com Port Port Name : OM15     Timeout (ms) : 650     I -7570 : 115200     N     8     1  HART (For Cmd 0) Auto Configure : Enable     HT Channel : 0     Frame type : Short     Master type : Primary Preambles : 5     Address : 2 Manufacturer ID : 62 Device type : 1 Device ID : 250205
	OK Cancel

Figure 4-2: Set Serial Port No.

### 4.3.2 HART Frame Settings

The following are the descriptions of HART command fields. Auto Configure : (1) Enable : search HART devices automatically. (2) Disable : search HART devices according to manual parameters.

HT Char	nel : Select HART channel no.						
Frame ty	pe : Select HART frame format (Short/Long).						
Master ty	ype : Select Primary master or Secondary master.						
Preambl	es : Select 5~20 bytes (0xFF) number.						
Address	: Select HART Polling Address (0~15).						
Manufac	turer ID: Manufacturer Identification Code						
Device ty	ype : Manufacturer Device Type Code						
Device II	: Manufacturer Device Identification Code.						
	Settings						
	Com Port						
	Port Name : COM15 🖌						
	□ I-7570: 115200 ♥ N ♥ 8 ♥ 1 ♥						
	HART (For Cmd 0)						
	Auto Configure : Disable 💌 HT Channel : 0 💌						
	Frame type : Long 🗸 Master type : Primary 🗸						
	Preambles : 5 Address : 2						
	Manufacturer ID : 62 Device type : 1						
	Device ID : 250205						
	OK Cancel						

Figure 4-3: Set HART Frame Format

## 4.4 Search HART devices

4.4.1 Search HART devices automatically

Set the option of "Auto Configure" field to be "Enable" and the option of "Master type" field to be "Secondary" like Figure 4-4. Then HC\_Tool utility will automatically search all HART devices by using HART short frame with "Secondary Master" identity.

Settings	
Com Port-	
Port Name : COM15 🛛 👻	
🔄 I-7570 : 115200 🔍	N 💙 8 💙 1 💙
HART (For Cmd 0)	
Auto Configure : Enable 💌	HT Channel : 0 💌
Frame type : Short 🛛 👻	Master type : Secondary 🖌 🗸
Preambles : 5	Address : 2
Manufacturer ID : 62	Device type : 1
Device ID : 250205	]
	OK Cancel

Figure 4-4: Auto Configure - Enable

4.4.2 Search HART devices manually

Set the option of "Auto Configure" field to be "Disable" and then users can set the HART frame manually to search HART devices.

(1) If the option of "Frame type" field is "Short", then "Master type", "Preambles", "Address" fields need to be configured like Figure 4-5.

Settings	
Com Port	
Port Name : COM15 💌	•
□ I-7570 : 115200 💌	N 🗸 8 🗸 1 🗸
HART (For Cmd 0)	
Auto Configure : Disable 🗸 🗸	HT Channel : 0 💌
Frame type : Short 🗸 🗸	Master type : Secondary 🛛 👻
Preambles : 5	Address: 2
Manufacturer ID : 62	Device type : 1
Device ID : 250205	]
	OK Cancel

Figure 4-5: Short frame settings

(2) If the option of "Frame type" field is "Long", then "Master type", "Preambles", "Manufacturer ID", "Device type", "Device ID" fields need to be configured like Figure 4-6.

Settings		
-Com Port		
Port Name :	сом15 🛛 👻	]
🔲 I-7570 :	115200 💌	N 🗸 8 🗸 1 🗸
-HART (For Cmd 0	)	
Auto Configure :	Disable 💌	HT Channel : 0 💌
Frame type :	Long 💌 💌	Master type : Secondary 💌
Preambles :	5	Address : 2
Manufacturer ID :	62	Device type : 1
Device ID :	250205	
		OK Cancel

Figure 4-6: Long frame settings

If the setting of serial port and HART frame format is finished, please click the "OK" button. Then users can test the HART communication.

## 4.4.3 Search HART devices

(1) Click "**Open**" button to open the com port of PC like Figure 4-7. If com port open failed, please check the com port setting.

HC_Tool	v1.02 (IC	P DAS)				×
Settings	Data Log		HTCfg	ModCfg	About	
COM6 :	Open	Clo	se			
Search :	Start	Sto	P			
Status :	Idle					
Informa	tion :					
1						

Figure 4-7: Click "Open" button

(2) Click "**Start**" button to search all HART devices and the result will be shown in the "Information" field like Figure 4-8.



Figure 4-8: HART device Information

If the error message - "Search Device Failed !!" shows like Figure 4-9, please check HART network status and HART command format.





## 4.5 Send / Receive HART Frame (SRMsg)

(1) Click "**SRMsg**" menu and it will open the HART command function window for HART communication like Figure 4-10.

HC_Tool	v1.02 (IC	P DAS)				(	🛛
Settings	Data Log	SRMsg	HTCfg	ModCfg	About		
COM6 :	Open	Clo	se 🛛				
Search :	Start	Sto	p				
Status :	Idle						
Informa	tion :						
I							~

Figure 4-10: SRMsg Function

(2) Please type the HART command in the "Send Data" filed and click "Send" button to send out the HART command like Figure 4-11.

#### [1] "With Parity Check" item :

When check the item, it will add the "check byte" automatically while sending the HART frame.

### [2] "Auto Scroll" item :

When check the item, it will scroll the HART message field automatically to show the latest HART message information.

Send & Receive Msg	
Send Data FF FF FF FF FF 02 80 00 00 With Parity Check	Send
Auto Scroll	Clear

Figure 4-11: Send HART Command

(3) When HART device responses the HART information, it will show in the "Receive Data" field like Figure 4-12. If error happened in HART communication, it will not show any message in the "Receive Data" field. Please check the HART command in the "Send Data" field if it is correct.

Send & Receive Msg	
Send Data	
FF FF FF FF 02 80 00 00	Send
V With Parity Check	
下午 07:20:52.703—>FF FF FF FF FF 02 80 00 00 82	
	~
Auto Scroll	Clear
Receive Data	
下午 07:20:53.062<=FF FF FF FF FF 06 80 00 0E 00 00 FE 16 85 07 05 02 0B 08 02 0B 0A 42 A7	
	Clear

Figure 4-12: Receive HART Command

## 4.6 HART Information Log (Data Log)

When using "SRMsg" or "Start" function for HART communication, all the HART command information will be logged in the "Data Log" function. Users can click "**Data Log**" item and all the HART communication information will be shown in "Log" field like Figure 4-13.

HC_	pol v1.02 (ICP DAS)	
Se	gs DataLog SRMsg HTCfg ModCfg About	
CC Se	6 : Open Close h : Start Stop	
St	s: Idle	
D	1 Log	X
Γ	og	
	F ← 05:27:58.812→FF FF	
	Auto Scroll Clear	

Figure 4-13: HART Information Log

## 4.7 HART Configuration (HTCfg)

When HART devices are searched in HC\_Tool, then users can use "**HTCfg**" function to configure HART devices like Figure 4-14. (Supported by HC\_Tool v1.02 or newer)

HC_Tool v1.02 (ICP DAS)	×
Settings Data Log SRMsg HTCfg ModCfg About	
COM6 : Open Close Search : Start Stop	
Status : Idle	_
[Polling Address : 0] Manufacturer ID Code : 22 (0x16) => Hartmann & Braun (ABB) Manufacturer Device Type Code : 133 (0x85) => AS800 (Pressure) Number of Preambles Required : 7 Universal Command Revision : 5 Device-Specific Command Revision : 2 Software Revision : 11 Hardware Revision : 8 Device Function Flags : 2 Device ID Number : 723522 (0x0B0A42) Unique Address : 0x16850B0A42	
[Polling Address : 1] Manufacturer ID Code : 20 (0x14) => Invensys/Foxboro Manufacturer Device Type Code : 46 (0x2E) => I/A Pressure/IA Series (Pressure) Number of Preambles Required : 5 Universal Command Revision : 5 Device-Specific Command Revision : 1 Software Revision : 1 Hardware Revision : 32 Device Function Flags : 1 Device ID Number : 8659467 (0x84220B) Unique Address : 0x142E84220B	

Figure 4-14: HTCfg Item

The following are the function descriptions of "HTCfg" screen. (Like Figure 4-15)

- (1) "DevAddr" Field: Assign the HART device for configuration.
- (2) "Response" Field: Show the response message of HART

configuration command.

- (3) "**Universal**" Page: Choose the "Universal" command for configuration. (Support HART Command version v6.0)
- (4) "**Common**" Page: Choose the "Common-Practice" for configuration. (Support HART Command version v6.0)
- (5) "Start" Button: Trig to send the HART configuration command.
- (6) "Listen Mode" item: Check it and click the "Start" button, HC\_Tool will listen HART bus and show the received HART message information.
- (7) "HART RecvMsg Count" Area: Show the total count of the received HART messages. (Including Master sending message and Slave response message)

ART Commnad		
HART Device DevAddr : 00 (Hartmann & Braun (ABB) - AS800) 00 (Hartmann & Braun (ABB) - AS800) 01 (Invensys/Foxboro - I/A Pressure/IA Serie HART Comp 02 (Smar - LD290(1)) Master type : Secondary Preambles : 7 Response : 0x0000 => OK Universal Common Specific	s) k3	HART RecvMsg Count Master Msg : 0 Slave Msg : 1 Listen_Mode Stop Start
Universal Cmd : 03 : Re HART Setting & Info Cmd1 Cmd2 Cmd3 Cmd6 Cmd7 Read Dynamic Variables and Loop Current	ad Dynamic Variables And Loop C Cmd8 Cmd9 Cmd11 C 20123780 m4	Current
PV : SV : TV : QV :	Number           0.384189         kPa           24.378250         deg(C)           100.773600         %           None         Unit	

Figure 4-15: HTCfg Screen

## 4.8 Module Configuration (ModCfg)

Click "**ModCfg**" item, it will show the below two options to open the module configuration screen of HART Converter like Figure 4-16.

(1) HC\_Tool : v1.02 or newer supported.

(2) I-7567 : FW\_v1.5 or newer supported.

(3) I-7570 : FW\_v1.4 or newer supported

HC_Tool	v1.02 (IC	P DAS)					
Settings	Data Log	SRMsg	HTCfg	ModCfg	About		
COM6 : Search :	Open Start	Clo Sto	se P	For I For I	411 -7570	-	
Status :	Idle						
Informa	tion :						



The following is the function description of "ModCfg".

```
1. "For All" Option : (Like Figure 4-17)
Note : It is used for all HART Converter modules
```

HC Module Info		
Config Cmd :		HART Ch. :
5 : Set HART Channel	*	0 🔽
1 : Get Module FW Version 2 : Reset Module 3 : Get HART Send/Recv Count	k	
4 : Reset HART Send/Recv Count 5 : Set HART Channel 6 : Get HART Channel		Send

Figure 4-17: "For All" Option - Configuration Screen

### (1) "Get Module FW Version":

=> Return the firmware version of HART converter module.

(2) "Reset Module":

=> Reset HART converter module.

(3) "Get HART Send/Recv Count":

=> Return the total count of the sending and receiving HART messages in HART converter module.

(4) "Reset HART Send/Recv Count":

=> Reset the total count of the sending and receiving HART messages in HART converter module.

(5) "Set HART Channel": (Only for I-7547)
 => Set the HART channel (Range: 0 ~ 3) of I-7547 for HART

communication by using "HART Ch" option.

Users can also set the HART channel by send com port command. For example:

Send Command => **#C52\r** (Set HART channel to be 2)

```
Return Data => !C5\r (Success)
Return Data => ?02\r (Failure)
[Note]
```

1. Only one HART channel in I-7547 can be used to communicate with HART device in the same time.

## (6) "Get HART Channel": (Only for I-7547)

=> Return the current HART communication channel (Range:  $0 \sim 3$ ) of I-7547.

Users can also get the HART channel by send com port command. For example:

Send Command => #C6\r

Return Data => **!C6\_2\r** (The current HART channel is 2.)

### 2. "For I-7570" Option : (Like Figure 4-18)

Note : It is just used to I-7570 module and make sure the I-7570 must run in "Config Mode" first.

I-7570 Config	
Config Cmd : 2 : Get Serial Baudrate 1 : Set Serial Baudrate 2 : Get Serial Baudrate 3 : Get Module Info 4 : Reset Module (SW WDT) 5 : Reset Module (HW WDT)	Send
[ Note : Make sure I-7570 in "Config	Mode" first ‼]

Figure 4-18: "For I-7570" Option - Configuration Screen

# 5. FAQ

# Q01 : How to use I-7547 to communicate with HART devices ?

- 1. Install "VxComm" utility to create the virtual com port. (refer to section 4.1)
- 2. Run "HC\_Tool" utility to communicate with HART devices. (refer to section 4.2~4.7)

# Q02 : Does I-7547 support the Pair-Connection for HART ? A02:

Yes, please refer the below steps. (It needs two I-7547 modules for Pair-Connection)

- 1. Log in the web setting page of I-7547. (refer to section 3.1)
- Set the pair-connection parameters for these two I-7547s.
   (Note: One should be set for server and the other will be client. (refer to section 3.7))
- 3. Connect the Ethernet port of these two I-7547 modules in the same network.

# Q03 : Does I-7547 support HART OPC Server from HCF?

- 1. Not yet. Because of the timeout setting value is too short in the HART OPC Server and it does not provide any field for timeout value setting in it.
- 2. The other HART converters of ICP DAS (like: I-7567 / I-7570) can work well without any problem.

# Q04 : Set HART device address by using HART converter ? A04: (2016/03/17)

Please follow the steps below.

- (1) Just connect one HART device to one HART converter (like : I-7567 / I-7570 / I-7547).
- (2) Run "HC\_Tool" software.
  - [1] Open the ComPort  $\circ$

[2] Click the "Start" button to search HART device automatically. As the figure below, the original address of the HART device is 0.

HC_Tool v1.05 (ICP DAS)	
Settings Data Log SRMsg HTCfg ModCfg About	
COM5 : Open Close Search : Start Stop Status : Idle	
[Polling Address : 0] Manufacturer ID Code : 22 (0x16) => Hartmann & Braun (ABB) Manufacturer Device Type Code : 133 (0x85) => AS800 (Pressure) Number of Preambles Required : 7 Universal Command Revision : 5 Device-Specific Command Revision : 2 Software Revision : 11 Hardware Revision : 8 Device Function Flags : 2 Device ID Number : 723522 (0x0B0A42) Unique Address : 0x16850B0A42	

[3] Click the "HTCfg" button to open HART configuration page.

[4] Choose the "HART device" for configuration. In the "Universal" page, click the "Cmd6" option and users can choose the new address of HART device (Example : set to 1). Then click the "Start" button to set the new address.

HART Commnad	
HART Device DevAddr 00 (Hartmann & Braun (ABB) - AS800) 00 (Hartmann & Braun (ABB) - AS800) UADE Commended	
Master type : Secondary Preambles : 7 Period (ms) : 0 Listen_Mode Start Response :	
Universal Common Specific Universal Cmd: 06: Write Polling Address	
Cmd1 Cmd2 Cmd3 Cmd6 Cmd7 Cmd8 Cmd9 Cmd11 Cmd12 Cmd13 Cmd14 Cn <> Write Polling Address Polling Addr : 1	

[5] After the setting for the new address is successful, the below message will show.



[6] Click the "Start" button in the main page to search HART device again. Then the address of the HART device will be 1 as the below figure.



## Q05 :How to send HART command for writing (Ex: CMD51)? A05: (2017/04/05)

Please follow the steps below.

- (1) Just connect one HART device to I-7547
- (2) Run "HC\_Tool" software.
  - [1] Open the ComPort •
  - [2] Click the "Start" button to search HART device automatically.
  - [3] Click the "HTCfg" button to open HART configuration page.

HC_Tool v1.0	6 (ICP DAS)					<b>I X</b>
Settings	Data Log	SRMsg	HTCfg	ModCfg	About	
сомз : 1	Open	Close	3			
Search : 2	Start	Stop				
Status : I	dle					
Information	n :					
[ Polling I Manufactu Manufactu Number o Universal Device-Sp Software I Hardware Device Fu Device ID Unique Ad	Address : 0 ] urer ID Code : 2 urer Device Typ f Preambles Rey Command Rev Jecific Comman Revision : 178 Revision : 8 (H nction Flags : 2 Number : 530) ddress : 0x1A01	26 (0x1A) => be Code : 11 quired : 5 (M ision : 5 d Revision : W_Rev:1 / E 3245 (0x50E 350EBCD	Kent (ABI (0x0B) => aster to Sla 3 3ell_202_C BCD)	3) TTx300 family ve) urrent)	(Temperature)	*

[4] Choose the "HART device" for configuration. In the "Common" tab, select no.51 from the "Common-Practice Cmd" dropdown menu and users can enter dynamic variable assignments. Then click the "Start" button and check the responses.

DevAddi	.: 00 (Rosemount (Emerson) - 3051C)	Master Msg : 0	Clear
	/	Slave Msg : 0	
HART Co	mmand		
Master t	ype : Secondary   Preambles : 5  Period (ms) : 0	🔲 Listen_Mode	Start
Respo	nse :		Start
Universa	Common Specific		1
	Common-Practice Cmd: 51 : Write Dynamic Variable Assign	uments 👻	
DataL	ink PVRange Current DevMan TransTrim MapProVar PriVar Dev	Var Burst AnalogCh	
	HART Cmd : 51 · Wr	rite Dymamic Variable Assignment	
Cm.	150 Cmd51		
	Request		
	Device Verichle Code for DV (Dee) :	indo for TV (Dec) - 0	_
	Device Variable Code for PV (Dec) : Device Variable C	.ode for IV (Dec):	
	Device Variable Code for SV (Dec) : U Device Variable C	ode for QV (Dec) : U	
	Response		
	Device Variable Code for PV (Dec) : Device Variable C	code for TV (Dec) :	
	Device Variable Code for SV (Dec) : Device Variable C	ode for QV (Dec) :	

## Q06: How to connect with HART OPC server? A06: (2017/06/22)

#### I-7567 or I-7570 is highly recommended to be used for HART OPC server connection.

HART OPC server provided by HCF can be downloaded from the following link:

https://fieldcommgroup.org/hart-server

After installation finished, open the OPC server and follow the steps below: (1) Right click the HARTServer icon and choose Add Network

🎹 未命名標題 - H/	ART	Server	
File View Help	>		
🗅 🖆 🖃 🎒	ę		
HARTServ		Add Network	
		Expand Collapse Lockdown	
	_	Properties	

(2) Choose Single Serial Port option

(3)

	Add Network
	Connected To: Server: HARTServer
	Network Type: Single Serial Port
	Add Cancel Help
Open COM F	Port
[	Network Properties
	Network Type: Single Serial Port Name: I-7547
	Properties
	Master: Secondary
	Retries: 10
	OK Cancel Help

(4) After module added to the server successful, right click on the module icon and choose Add Device

🏧 未命名標題 - ト	IART	Server	
<u>F</u> ile <u>V</u> iew <u>H</u> el	р		
] D 🗳 🔒   🖨	) <b>?</b>		
□ 10 HARTServ	er		
		Add Device	1
		Learn	
		Statistics	
		Expand	
		Collapse	
		Lockdown	
		Delete	
	_	Properties	

(5) Choose polling address, and click OK for Instrument Properties window

Add Instrument
Connected To:
Network: I-7547
Instrument Location
Poll Address:
<u>A</u> dd Cancel <u>H</u> elp

Instrument Properti	es	×
_Instrument Identific	ation	
Tag Name:	PRESSURE TRANSMITTER	
Descriptor:	В	
Message:	PRESSURE TRANSMITTER	
Manufacturer:	Fuji	
Model:	FCX-A/C	
ID:	1541427	
Revs:	5,1,2,1	Reset
Properties Poll Address:	Date: 21 7 1900 Number of Prea	mbles: 5
	OK Cancel Help	

(6) Check device dat	a: double click o	n the device i	con added			
🚟 未命名標題 - HART Server						
<u>F</u> ile <u>V</u> iew <u>H</u> elp						
🗅 🖻 🖬 🎒 💡						
HARTServer		Name		Address	Туре	Status
		M PRESS	URE TRANSMITTER	00	FCX-A/C	Ok
HARTServer.I-7547.PRE	SSURE TRANSMIT	TER - Generic H	ART Host			X
File Edit View Help						
🐱   X 🖻 🛍 洲   ?						
Process / Output Device	HART Status Co	ommand				
Process-			1			- for all
PV	-942.6158	kPa			R	erresn
	,				;	Send
Units Select	kPa	•				
Loop Current			1			
Analog Value	11.9216	mA				
Percent Range	49.51	%				
Upper Range Value	0.00	kPa				
Lower Range Value	-1866.4026	kPa				
Damping	9.60	sec				
Transfer Function	Linear					
			a			

Note: Because of I-7547's efficiency, module no response happens sometimes. I-7567/ I-7570 is recommended to be used which both have been tested to work properly with.

# Q07 : How to connect with HART FDT software? A07: (2018/11/27)

ICP DAS converter can be used with FDT software. The following introduces 3 different FDT software and connection instruction.

(1) PACTware



COM1 Parame	ter			
Communic	ation interface HART	modem		*
Serial Inter	face COM1	(\Device\Serial1)		*
HABT prof		4 (\Device\USBSE	R000)	
nam po		1 (Serial30) 2 (Serial31)		45
	Numbe retries	r of communication	3	~
[2] Add HART	Device DTM (Gen	eric HART D	TM)	
<mark>]]</mark> РАСТware				
<u>File E</u> dit <u>V</u> iev	<u>Project D</u> evice E	<u>x</u> tras <u>W</u> indow	<u>H</u> elp	
i 🗅 💕 🖬 🖪	🗗 - i 🛄 <table-cell> i 🗖</table-cell>	D 🕸 🗐 🔮	) 🧕 🥸	* 🗖 🖉
Project		×		
Device tag				
💻 HOST PC				
COM14	<u>C</u> onnect			
÷	<u>D</u> isconnect			
	Get device state			
<u> </u>	Load from device			
	<u>S</u> tore to device			
	<u>P</u> arameter			
	<u>M</u> easured value			
	<u>S</u> imulation			
	<u>D</u> iagnosis			
	Display channels			
	Channels		•	
	Up-/Download-Manage	c .		
	Print			
	Additional <u>f</u> unctions		•	
<u>-</u>	<u>A</u> dd device			
<u></u>	D <u>e</u> lete device			
	Properties <com14>HA</com14>	ART Communicatio	n	

Device for						
		All Devices				Ľ
		Device		Protocol	Vendor	
Driver						
🖗 Gateway		ET Deltapilot S /	DB 5x / V1.x	HART	Endress+H	Hauser
		Ell Deltapilot S /	DB 5x / ¥2.0	HART	Endress+H	Hauser
		E Deltapilot S /	FMB 707 Y02.10.xx	HART	Endress+1	lauser
		Gammapilot I	M / FMG 60 / YUL.XX	HARI	Endress+1	lauser
			M / FMG 60 / YUZ.XX	HARI	Endress+1	lauser
		TTT iTown / TMT	1 D IM 122 / W1 1	UADT	Endress	Jauser
Vendor Group Type Protocol		iTemp / TMT	1427 91.1	UADT	Endresst	Janoar
Chamana a stad daviana ta	_	<	1427 11:05:00	IIIII	Endlessti	
All Devices	U	**PROFILE	_REVISION::5;**;			
111 201 200		**IS_GENE	RIC::1;**			
					ОК	Cancel
[3] Connect to HA	١RT	device and sh	ow HART inf	ormatio	n	
PACTware						
<u>File E</u> dit <u>V</u> iew	Proje	ect <u>D</u> evice E <u>x</u> tras	: <u>W</u> indow <u>H</u> el	₽		
i 🗋 💕 🖬 🗐 🖥		😟 🖸 i 🗖 🕸	🕸 NO   🤹 🧵	🎙 👬 🖏		
Project		Ψ×				
Device tag						
I HOST PC						
		_				
💷 🔝 Generic HART	DTM					
		AC Connect	2			
		💦 Disconnec	t			
DACT						
PAC I Ware						
<u>File Edit View Project</u>	Device	e E <u>x</u> tras <u>W</u> indow <u>H</u> elp				
	40	: 🗖 👘 🗗 M 🛯 🗃 👔	- 18 - 18 - 18 - 18 - 18 - 18 - 18 - 18			
Project		Ψ×				
Device tag						
HOST PC						
E Generic HART DIM	36	Connect			-	
	<u></u>	Disconnect				
	~	Get device state				
		Load from device				
	S≝ MP	Store to device				
	22	Pinte in revire				
		Parameter		• <u>1</u>	Parameterization	
		<u>M</u> easured value			Online parameterization	
		Simulation				
		<u>D</u> iagnosis				
		Print		•		
		Additional functions		•		
	-9	Add device				
		Delete device				
	-32	Propagation 10 Course II AD 77	TM. General HADE DEL			
		riopernes <0,Generic HART I	JIM>Generic HARI DIM			



## (2) FieldCare

#### [1] Enabling SQLFIELDCARE

SQL Active Directory Helper Service	Enabl		已停用	Network S
SQL Server (MSSQLSERVER)	Provi	已啓動	自動	本機系統
SQL Server (SQLEXPRESS)	Provi		手動	Network S
🏶 SQL Server (SQLFIELDCARE)	Provi	已啓動	手動	本機系統
🏶 SQL Server Agent (MSSQLSERVER)	Exec		已停用	Network S
SQL Server Agent (SQLEXPRESS)	Exec		已停用	Network S
SQL Server Agent (SQLFIELDCARE)	Exec	已啓動	自動	Network S
🖏 SQL Server Browser	Provi	已啓動	目動	Local Serv
SQL Server VSS Writer	Provi	已啓動	自動	本機系統

#### [2] Add HART Communication DTM

Connection Wizard				
Select the communication protocol and the CommDTM with which you wish to connect to devices!				
1. Select the communication protocol:  Protocol HART SERVICE Select the Communication DTM to be used.	et			
Communication DTM	Communication Hardware	Version	Manufacturer	
HABT Communication	EXA191: EXA195	1.0.42	CodeWrights GmbH	
HART OPC Client	-	2.0	Endress+Hauser, Met	
FX4520	FieldGate FXA520	1.05.09	Endress+Hauser	
Help			Next > Cancel	

Network		E Generic HART DTM (Online	Parameterize) 🔟	•
Network Tag	Connection Charnel A Device type (DTM) aton ♦ - S HART Communication 1750M (t) HARTCH TURGeneric HART DTM	Prov	Generic HART DTM     ABB Automation     1.0       Image: Sensor range     URV     0.23761 [JP-2]       Image: URV     0.2313443     KPa     Image: Sensor range       URV     1.350043     KPa     Image: Sensor range       URV     1.350043     KPa     Image: Sensor range       Urat     KPa     Image: Sensor range       Urat     KPa     Image: Sensor range       Current output     D25     Image: Sensor range       Current alarm     High     Image: Sensor range	Endress + Hauser 🖾 Receive for Process Automation
<		>		
DTM messages				ά ×
Tag	Error/User message			Timestamp
Generic HART DTM	Reading of the device parameter succeeded	N		2013-09-10 10:36:58.343
The following	g error or user messages were received. User messages were answered au	الار tomatically with the default answer. Messages	are collected to this view when CommServer is running and while reading/writing.	
				Administrator Administrator /

#### [3] Connect to HART device and show HART information

#### (3) Siemens PDM

[1] Add HART Device DDL (ABB AS-800 as example) SIMATIC Manager <u>File View Options Window H</u>elp D 😅 🛛 Customize.. Ctrl+Alt+E SIMATIC <u>P</u>DM Sho<u>w</u> Log <u>M</u>anage Device Catalog Set PG/PC Interface.. HART server Start <u>L</u>ifeList Open protocol Settings. SIMATIC PDM Manage Device Catalog Source: D:\Edward\Fieldbus\Doc\HART\HART\_Soft\Siemens PDM\CD\_2 OK Browse. Device type: Abort ~ <u>H</u>elp 🖻 🗹 🖉 🕂 📝 HART Infact I
 Actuators
 Actuators
 Sensors
 Fow
 Fow
 Fow
 Fow
 Fow
 For Pressure
 PROFIDIUS PA Sort.. 🗄 🔲 PROFIBUS PA 🕂 🗌 Auma 🗄 🔲 Berthold Technologies GmbH & Co.KG 🛨 🔲 Bopp & Reuther Heinrichs Select all 🗄 🔲 buerkert fluid control systems Deselect all . . n ۰. . Mark HCF library Information on the Device type: Attribute Value >

Properties of -/- (H.)	ART device)			X
General Device U	pload to PC/program	nming Device   Downlos	d to Device   Change	log   Import   Connection
<b>B</b> 1 1		W ED. 0. 004 CH 4 0000 F	D 0 000531D . D	
Device type:	INN_BRAU	10 (ID: 0x0019)/82800 (	ID: 0x0085]\Device R	Revision:02 DD Revision:02
Device DDL:	\HART\HO	CF\16\85\0202\A\$800.D1	)L	
Order-No:	*			<u>N</u> ew Selection
MANUFACTURER	E HARTMANI	N_BRAUN (22)		
DD_REVISION:	2			
DEVICE_TYPE:	_AS800			
DEVICE_REVISIO	DN: 2			
Cubabirate	0 /			
Subobjects:	0 (maxamum	i permissible number)		
Redundancy:	Ŷ			
åddræss list:				Communication nath
		·		E management bant
selected	A. Communicat	non path Networks\HAR T modem\	HWConfig	
OK (	Cancel			Help
[2] Scan HART	Device (Con	mPort)		
SIMATIC Man	ager			
File View Ontions	Window Help			
	omize	Ctrl+Alt+E		
SITY STATE			v Log	
SIM.	ATIC <u>T</u> DM	Мал	<u>e pog</u> age Device Catalog	
Set F	G/PC Interface	HAF	T server	
		Start	<u>L</u> ifeList	
		0.000		N

<u>O</u>pen protocol S<u>e</u>ttings...

SIMATIC PDM LifeList							×
- Communication							_
Communication				_			
PROFIBUS	<u>A</u> ddress	0		1	26		
• HART modem	<u>C</u> OM port	CO	M3		•		
Seen							
Scall							
🔽 Scan immediately after Start			<u>W</u> ith di	iagno	stics		
🔲 Sca <u>n</u> cyclically		<b>V</b> S	scan su	ibnets	:		
🔽 Display dialog during startup	)						
OK			Cancel			Help	
	iormatio	n					
FINALIC FUN/- [Temporary pro	lieet]						
	2						
	Barar	notor	Value	11	Statua	-	
E	Onlin	e	value	Joint	Status		
🖻 🚼 HART modem			1	inH2	Initial		
	Analo	g outp	1.000	mΑ	Initial		
	LRV		1	inH2	Initial		
	URV		1	inH2	Initial		
	Versio	on 1.1	Englis		Initial		
	» D	evice	setup				
	<u>)) ))</u>	Proc	ess va	riabl	es		
			1	inH2	Initial		
	% rng	e	1.000	% ~~^	Initial		
	Analo	g outp	1.000	mA	Initial		
	<b>T</b> () (		1.0	deg	muar		
	111/1/2		1       0	inH2	Initial		

Tag -/inH2O Initial Unit Xfer fnctn Initial Linear 1.000 s Initial Damp Range values » » )) LSL 1.00 inH2 Initial USL 1.00 inH2 Initial LRV inH2 Initial 1 URV inH2 Initial 1

Unit

Status grou

» » Test device » » » » Status Status grou

» » » Calibration » » Basic setup

Initial

Initial

Initial

Initial

Distributor Acrom

inH2O

» » » Device information

Display Measure	ed ¥alue/- (Onlin	æ)	×
Process variables	]		
	-0	kPa	
% rnge	-0.0	]%	
Analog output	3.997	] mA	
	22.1	degC	
TV Value	\1.81e-002	]%	
Close	Messages	Help	

## Q08 : How to listen HART network communication by HART

#### converter

#### A08: (2019/02/14)

HART converter is a good tool for analyzing and debugging HART network communication. To do so, please follow the instruction below:

#### Hardware:

ICP DAS HART converter \*1

#### Software:

HC\_Tool

Download from: <a href="http://ftp.icpdas.com.tw/pub/cd/fieldbus\_cd/hart/converter/i-7547/software/">http://ftp.icpdas.com.tw/pub/cd/fieldbus\_cd/hart/converter/i-7547/software/</a>

#### Steps:

1. Add HART converter to the existing HART network.



- 2. Make sure the loop resistance is 250 Ω, if HART converter's built-in resistor needs to turn off, please refer to section 2.2 of Terminator Resistor Settings.
- 3. Use HC\_Tool to record HART communication frames
  - (1) Simple data logging (does not affect existing communication)

[1] "Open" Com Port and click the "Data Log" button

HC_Tool v1.0	8 (ICP DAS)					
Settings	Data Log	SRMsg	HTCfg	ModCfg	About	
СОМ15 :	Open	Close				
Search :	Start	Stop				

[2] Click the "**Start Record**" button to record communication frames, and click "**Stop Record**" to end

ta Log	
Log	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0B 50 EB CD 03 00 E6 0B 50 EB CD 03 10 05 04 12D 91 95 20 41 D8 F5 FA 20 41 E0 F0 28 24 3F 8B 0D 6D FA 7F A0 00 00 FA 0B 50 EB CD 03 00 E6 0B 50 EB CD 03 10 05 0B 50 EB CD 03 1A 00 50 41 2D 90 2C 20 41 D8 F5 FA 20 41 E0 F0 28 24 3F 8B 03 24 FA 7F A0 00 00 1B 0B 50 EB CD 03 1A 00 50 41 2D 90 2C 20 41 D8 F4 38 20 41 E0 F0 28 24 3F 8B 0C 48 FA 7F A0 00 00 A5 0B 50 EB CD 03 1A 00 50 41 2D 90 2C 20 41 D8 F4 38 20 41 E0 F0 28 24 3F 8B 0C 48 FA 7F A0 00 00 A5 0B 50 EB CD 03 1A 00 50 41 2D 9C CE 20 41 D9 04 02 20 41 E0 FC 99 24 3F 8B 16 8A FA 7F A0 00 00 A5 0B 50 EB CD 03 1A 00 50 41 2D 9C CE 20 41 D9 04 02 20 41 E0 EC 99 24 3F 8B 16 8A FA 7F A0 00 00 A5 0B 50 EB CD 03 1A 00 50 41 2D 79 F9 20 41 D8 D8 77 20 41 E0 EC 99 24 3F 8B 14 8A FA 7F A0 00 00 AA 0B 50 EB CD 03 1A 00 50 41 2D 9A 58 20 41 D9 00 EE 20 41 E0 EC 99 24 3F 8B 14 8A FA 7F A0 00 00 8F 0B 50 EB CD 03 1A 00 50 41 2D 9A 58 20 41 D9 00 EE 20 41 E0 EC 99 24 3F 8B 14 8A FA 7F A0 00 00 0 F5 0B 50 EB CD 03 1A 00 50 41 2D 9A 58 20 41 D9 00 EE 20 41 E0 EC 99 24 3F 8B 14 8A FA 7F A0 00 00 CD 0B 50 EB CD 03 1A 00 50 41 2D 9A 58 20 41 D9 00 EE 20 41 E0 EC 99 24 3F 8B 14 8A FA 7F A0 00 00 CD 0B 50 EB CD 03 1A 00 50 41 2D 92 9A 20 41 D8 F7 41 20 41 E0 EC 99 24 3F 8B 0E 41 FA 7F A0 00 00 CD 0B 50 EB CD 03 00 E6 0B 50 EB CD 03 1A 00 50 41 2D 96 4A 20 41 D8 F7 DD 20 41 E0 EC 99 24 3F 8B 0E 41 FA 7F A0 00 00 8C 0B 50 EB CD 03 1A 00 50 41 2D 96 4A 20 41 D8 E7 DD 20 41 E0 EC 99 24 3F 8B 0A 42 FA 7F A0 00 00 8C 0B 50 EB CD 03 1A 00 50 41 2D 91 E6 20 41 D8 F6 60 20 41 E0 EC 99 24 3F 8B 0A AF A 7F A0 00 00 07F 0B 50 EB CD 03 1A 00 50 41 2D 91 E6 20 41 D8 F6 60 20 41 E0 EC 99 24 3F 8B 0A FA 7F A0 00 00 7F 0B 50 EB CD 03 1A 00 50 41 2D 88 68 20 41 D8 EA 81 20 41 E0 EC 99 24 3F 8B 05 F9 FA 7F A0 00 00 7F 0B 50 EB CD 03 1A 00 50 41 2D 88 68 20 41 D8 EA 81 20 41 E0 EC 99 24 3F 8B 05 F9 FA 7F A0 00 00 4B 0B 50 EB CD 03 1A 00 50 41 2D 88 68 20 41 D8 EA 81 20 41 E0 EC 99 24 3F 8B 05 F9 FA 7F A0 00 00 4B 0B 50 EB CD 03 1A 00 50 41 2D 88 68 20 41 D8 EA 81 20 41 E0 E
∢ ▼ Auto Seroll	Start Record Clear
	Stan Record Clear

- (2) Listen mode analysis data logging (may affect existing communication)
  - [1] "Open" Com Port and "Start" searching HART network device
  - [2] After finish searching device, click "HTCfg" button

ſ	HC_Tool v1.(	08 (ICP DAS)						x
	Settings	Data Log	SRMsg	HTCfg	ModCfg	About		
	COM3 :	Open	Close					
	Search :	Start	Stop					
	Status : 3	Idle						
	Informatio	n :						
31 Tic	[Polling Address : 0] Manufacturer ID Code : 26 (0x1A) => Kent (ABB) Manufacturer Device Type Code : 11 (0x0B) => TTx300 family (Temperature)							
HART Co	ommnad							
-HAI De	RT Device vAddr : 00 (Undef	ined (Undefined) - U	Indefined)		HAP Ma	RT Send/RecvM ster Msg : lave Msg :	lsg Count O O	Clear
UAL	PTCommond					SendCnt :	0	
М	aster type : Seconda	ary 🔻 Pre	ambles : 7	▼ Period (m	s): 0	🔽 Lister	_Mode	
	Response :							STATT
41 Cli	ck the " <b>Da</b> t	ta Loq" bu	itton					

HC_Tool v1.0	08 (ICP DAS	)			
Settings	Data Log	SRMsg	HTCfg	ModCfg	About
COM15 :	Open	Close			
Search :	Start	Stop			

[5] Click the "Start Record" button to record communication frames, and click "Stop Record" to end

Data Log		
Log		
2019/02/1 2019/02/1 HART An	4 13:57:58.885 < FF FF FF FF FF 82 1A 0B 50 EB CD 03 00 E6 4 13:57:59.335 < FF FF FF FF 86 1A 0B 50 EB CD 03 1A 00 50 41 2C FD 1C 20 41 D8 3C 63 20 41 E0 A4 24 24 3F 8A 94 E0 FA 7F A0 alysis 0x0050 => OK / More_Status   Config_Changed / Sec-Master_Addr=0_Cmd=3	00 00 03
2019/02/1 2019/02/1 HART An	4 13:57:59.912 <= FF FF FF FF FF 82 1A 0B 50 EB CD 03 00 E6 4 13:58:00.422 <= FF FF FF FF 86 1A 0B 50 EB CD 03 1A 00 50 41 2C EB 29 20 41 D8 25 F3 20 41 E0 A4 24 24 3F 8A 86 4E FA 7F A0 alysis 0x0050 => OK / More_Status   Config_Changed / Sec-Master_Addr=0_Cmd=3	00 00 15
2019/02/1 2019/02/1 HART An	4 13:58:00.902 <= FF FF FF FF FF 82 1A 0B 50 EB CD 03:00 E6 4 13:58:01.322 <= FF FF FF FF 86 1A 0B 50 EB CD 03:1A 00:50 41 2C F0 16:20 41 D8 2C 1C 20 41 E0 A4 24 24 3F 8A 8A 4E FA 7F A0 alysis 0x0050 => 0K / More_Status   Config_Changed / Sec-Master_Addr=0_Cmd=3	00 00 DB
2019/02/1 2019/02/1 HART An	4 13:58:01.922 <= FF FF FF FF FF 82 1A 0B 50 EB CD 03 00 E6 4 13:58:02.432 <= FF FF FF FF 86 1A 0B 50 EB CD 03 1A 00 50 41 2C F5 B8 20 41 D8 33 26 20 41 E0 A4 24 24 3F 8A 8E E0 FA 7F A0 alysis 0x0050 => OK / More_Status   Config_Changed / Sec-Master_Addr=0_Cmd=3	00 00 FF
2019/02/1 2019/02/1 HART An	4 13:58:02:942 <== FF FF FF FF FF 82 1A 0B 50 EB CD 03:00 E6 4 13:58:03:392 <== FF FF FF FF 86 1A 0B 50 EB CD 03:1A 00:50 41 2C EE E8 20 41 D8 2A A1 20 41 E0 A6 9F 24 3F 8A 89 58 FA 7F A0 alysis 0x0050 => OK / More_Status   Config_Changed / Sec-Master_Addr=0_Cmd=3	00 00 2C
2019/02/1 2019/02/1 HART An	4 13:58:03:962 <== FF FF FF FF FF 82 1A 0B 50 EB CD 03:00 E6 4 13:58:04:382 <== FF FF FF FF 86 1A 0B 50 EB CD 03:1A 00:50 41 2C DA 7E 20 41 D8 11 1F 20 41 E0 A6 9F 24:3F 8A 78 C7 FA 7F A0 alysis 0x0050 => 0K / More_Status   Config_Changed / Sec-Master_Addr=0_Cmd=3	00 00 65
2019/02/1 2019/02/1 HART An	4 13:58:04:982 <== FF FF FF FF FF 82 1A 0B 50 EB CD 03:00 E6 4 13:58:05:402 <== FF FF FF FF 86 1A 0B 50 EB CD 03:1A 00:50 41 2C ED 7E 20 41 D8 28 DF 20 41 E0 A6 9F 24 3F 8A 88 33 FA 7F A0 alysis 0x0050 => OK / More_Status   Config_Changed / Sec-Master_Addr=0_Cmd=3	00 00 AF
4		
🔽 Auto S	croll Start Record	Clear
	Stop Record Clear	

# Q101 : How to get the current IP address of I-7547 ? A101: (2016/04/26)

- 1. Use the "Search Servers" function in the "VxComm utility" to search I-7547 module automatically and users can get the current IP address of I-7547.
- 2. If users set the IP type of I-7547 to be "DHCP" and no DHCP server exists in the network, please follow the below steps.
  - (1) Set the dip-switch in the back of I-7547 to be "Init" position and reboot I-7547. Then the default IP of I-7547 will be <u>192.168.255.1</u>.
  - (2) Use the "Search Servers" function in the "VxComm utility" to search I-7547 module automatically and then users can set the network settings of I-7547 again.

# Q102 : How to avoid I-7547 to reset automatically ? A102: (2019/08/28)

- 1. The default function of I-7547, when Ethernet of I-7547 without any communication lasts for 300 seconds (5 minutes), I-7547 will reset automatically.
- 2. If users want to modify the reset time or stop the function, please follow the below steps.
  - (1) Connect to the web of I-7547.
  - (2) Go to the page of "**Network Setting**" and find the "**General Setting**" subject. Then you can adjust the reset time in the "**System Timeout**" field,
    - [1] Default : 300 (300 seconds = 5 minutes)
    - [2] Disable: 0 (Stop the function)
    - [3] Max. : 65535 (655.35 seconds)



## I-7547 (Ethernet to HART Converter)

Home | Port1 | Port2 | Network Setting Monitor | Change Password | Logout

#### General Settings

Network	
System Timeou (Network Watchdog	0 ) (30 ~ 65535 seconds, 300=default, 0=disable) Action=Reboot
Web Auto-logou	10 (1 ~ 255 minutes, 10=default, 0=disable)
CGI Configuration	Enable 🔹 (Enable/Disable the assign.cgi, Enable=default.)
UDP Alarm	
Alarm IP Address(UDP)	255 . 255 . 255 . 255
Alarm Port(UDP;	54300
Misc.	
Alias Name	ETH2HART (Max. 18 chars)
UART Watchdog	Txo Rxo (30 ~ 65535 seconds, 0=default=disable) Action=Reboot
Debug Message(UDP)	20 (1 ~ 255 seconds, 20=default, 0=disable)
	Update Settings

# Q103 : How to write Ethernet program to access HART device data via I-7547

#### A102: (2019/08/28)

- 1. In general, we will suggest users to install VxComm Utility (refer to section 4.1) to create the virtual com port of I-7547 and write com port program or use HC\_Tool to access HART device data.
- If users want to write Ethernet program to access HART device data, I-7547 supports to use IP and Port 10002 to do that. (Demo refers to "I-7547\_Ethernet\_HART\_Demo", download : <u>ftp://ftp.icpdas.com.tw/pub/cd/fieldbus\_cd/hart/converter/i-7547/software/</u>)

# 6. Version History

Ver.	Author	Date	Description
1.00	Edward	2013/08/27	1. First version
1.01	Edward	2014/04/29	<ol> <li>Modify the position of Init/Normal in the back of I-7547. (Refer to section 2.3)</li> <li>Init: Move to down.</li> <li>Normal: Move to up.</li> <li>In FW_v1.03, add the below function.</li> <li>In Web Configuration, add Port1 / Port2 page.</li> <li>In Port1 / Port2 page, add Pair-Connection function. (Refer to section 3.7)</li> </ol>
1.02	Edward	2015/10/30	1. Add the FAQ chapter.
1.03	Edward	2016/04/26	1. Add the Q101 in the FAQ chapter.
1.04	Peter	2017/06/22	1. Add the Q05 of FAQ 2. Add the Q06 of FAQ
1.05	Peter	2018/11/27	1. Add the Q07 of FAQ
1.06	Peter	2019/02/14	1. Add the Q08 of FAQ
1.06	Edward	2019/08/28	1. Add the Q102 / Q103 of FAQ