InTouch® Compact Edition ABKE Configuration Guide

Invensys Systems, Inc.

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Invensys Systems, Inc.
26561 Rancho Parkway South
Lake Forest, CA 92630 U.S.A.
(949) 727-3200

http://www.wonderware.com

For comments or suggestions about the product documentation, send an e-mail message to productdocs@wonderware.com.

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Welcome

This guide shows you how to configure the ABKE driver for InTouch Compact Edition.

This guide assumes you know how to use Microsoft Windows, including navigating menus, moving between applications and moving objects on the screen. If you need help with these tasks, see the Microsoft online help.

You can view this document online or you can print it, in part or entirely, by using the print feature in Adobe Acrobat Reader.

Documentation Conventions

This documentation uses the following conventions:

Convention	Used for
Initial Capitals	Paths and file names.
Bold	Menus, commands, dialog box names, and dialog box options.
`Monospace`	Code samples and display text.

Technical Support

Wonderware Technical Support offers a variety of support options to answer any questions on Wonderware products and their implementation.

Before you contact Technical Support, refer to the relevant section(s) in this documentation for a possible solution to the problem. If you need to contact Technical Support for help, have the following information ready:

- The type and version of the operating system you are using.
- Details of how to recreate the problem.
- The exact wording of the error messages you saw.
- Any relevant output listing from the Log Viewer or any other diagnostic applications.
- Details of what you did to try to solve the problem(s) and your results.
- If known, the Wonderware Technical Support case number assigned to your problem, if this is an ongoing problem.

Chapter 1

About the ABKE Driver

This section explains the concepts of the ABKE driver and identifies all hardware and software components required to implement communication between InTouch Compact Edition and compatible PLCs.

About ABKE Driver

You use the ABKE I/O driver to establish communication between InTouch Compact Edition and Allen-Bradley devices that use the DF1 protocol. You can use the ABKE driver to exchange data with PLCs through a DH+ network using the appropriate DF1 DH+ gateway.

Link Specifications

To establish serial communication between Allen-Bradley devices and the ABKE driver, you must follow these specifications:

- Device communication port: Serial DF1 port
- Physical protocol: Serial RS232
- Logic protocol: DF1
- Device run-time software: None
- Specific PC board: None
- Cable: Allen-Bradley 1756CP3A/A01 S760 KSM

Chapter 2

Configuring the ABKE Driver

This section explains how to configure the ABKE driver by completing the following tasks:

- Select the PLC driver
- Configure the connection type
- Configure other PLC-specific settings
- Configure advanced settings
- Associate an InTouch Access Name with the configured driver

You configure the ABKE driver from the **Driver Configuration** dialog box. In a managed InTouch compact application, you access this dialog box from the WindowMaker **Special**, **InTouch Compact Edition application**, **IO Driver Configuration** menu.

For more information about configuring connection settings, see the documentation of your PLC hardware manufacturer.

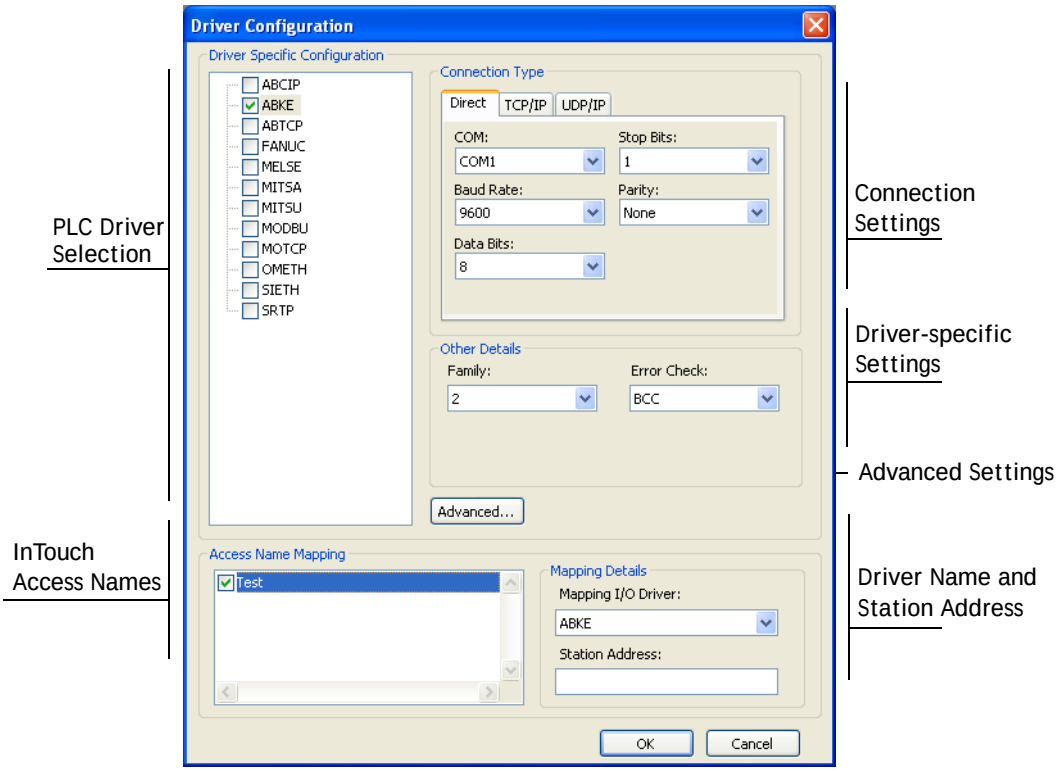
Note For each PLC type, you can configure only one set of driver parameters.

Selecting the PLC Driver

Before you configure the PLC driver, you need to select it in the **Driver Configuration** dialog box. You can use the Driver Configuration dialog box to configure more than one PLC driver. All selected PLC drivers can be associated with InTouch Access Names.

To select the PLC driver

1. In WindowMaker on the **Special** menu, point to **InTouch Compact Edition application** and then click **IO Driver Configuration**. The **Driver Configuration** dialog box appears.



2. From the list shown in the left pane, select the check box next to the ABKE driver.

   The selected PLC driver appears in the **Mapping I/O Driver** list in the **Mapping Details** area of the **Driver Configuration** dialog box. You can associate it with an InTouch Access Name. For more information, refer to Associating a PLC Driver with an Access Name on page 23

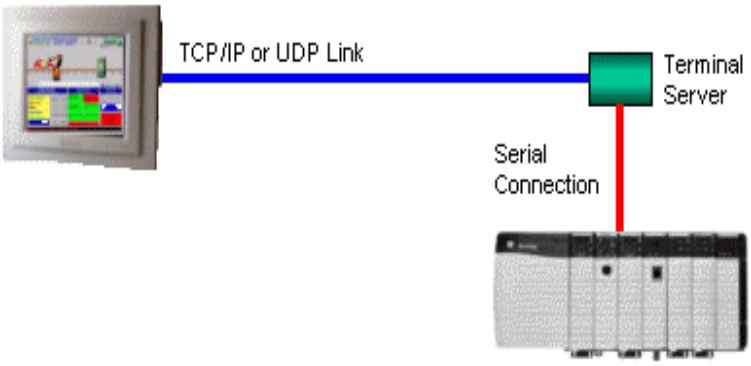
You can now configure connection settings, advanced settings and other PLC-specific settings on the right side of the panel.

Configuring the Connection Type

You need to configure the connection type that the InTouch Compact Edition uses to communicate with an Allen-Bradley PLC.

The serial driver allows the use of TCP/IP or UDP/IP encapsulation. The encapsulation mode provides communication with serial devices connected to terminal servers on Ethernet or wireless networks. A terminal server (for example, ADAM 4577) converts TCP/IP or UDP/IP messages on Ethernet or wireless networks to serial data. After the message is converted to a serial form, you can connect standard devices that support serial communications to the terminal server.

The following diagram provides an example of this solution.



Note See the manufacturer documentation to configure gateway for TCP/IP and UDP/IP mode.

You can configure one of the following connection types:

- Direct serial
- TCP/IP
- UDP/IP

Configuring a Serial Connection

If the panel is directly connected to the PLC, you configure a serial connection. You can configure the following settings:

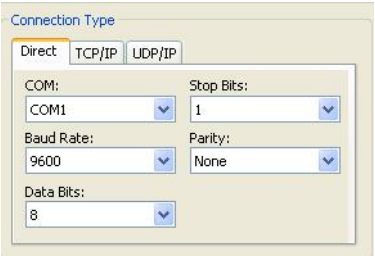
- Com port
- Stop Bits
- Baud Rate
- Parity
- Data Bits

The default values assigned to serial communication parameters are:

- Com port: COM1
- Stop Bits: 1
- Baud Rate: 9600
- Parity: None
- Data Bits: 8

To configure a serial connection

1. In the **Driver Configuration** dialog box, select the driver you want to configure.
2. In the **Connection Type** area, click the **Direct** tab.



3. Assign values to the following settings:
   - In the **COM** list, select the serial communication port.
   - In the **Stop Bits** list, select the number of stop bits.
   - In the **Baud Rate** list, select the communication speed.
   - In the **Parity** list, select the parity.
   - In the **Data Bits** list, select the number of bits per character or code word.
   - In the **PLC Family** box, select the PLC family that connects to the driver.

     PLC2: Driver uses "unprotected read/write" command (in the DF1 protocol) to communicate with the PLC2 family or compatible.

     PLC5: Driver uses "typed read/write" command (in the DF1 protocol) to communicate with the PLC5 family or compatible. The address for all data types is decimal.

     PLC5 with I/O Octal: Driver uses "typed read/write" command (in the DF1 protocol) to communicate with the PLC5 family or compatible. The address for I and O data types is octal. The address for all remaining data types is decimal.

SLC500: Driver uses "protected typed logical read/write" command (in the DF1 protocol) to communicate with the SLC500 family or compatible.

- In the **Error Check** box, select the error checking method.

Configuring a TCP/IP Connection

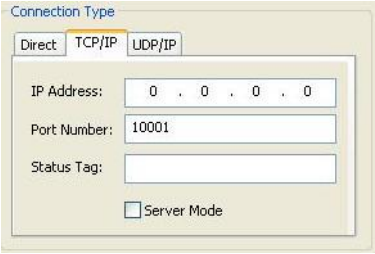
If the panel uses a TCP/IP connection to communicate with the PLC, you need to configure TCP/IP settings. You can configure the following settings:

- IP Address
- Port Number
- Status Tag
- Server Mode

Note When **Server mode** is enabled, the driver listens to the TCP/IP port specified instead of trying to establish a connection (the driver is a TCP/IP server). The remote PLC/Device is responsible for connecting to the Wonderware Compact Panel. After TCP/IP connection has been made, all data is sent through it. When **Server Mode** is enabled, the IP Address field is not used because the driver does not try to connect with the PLC.

To configure a TCP/IP connection

1. In the **Driver Configuration** dialog box, select the driver you want to configure.
2. In the **Connection Type** area, click the **TCP/IP** tab.



3. Configure the following settings:
   - In the **IP Address** box, type the IP address of the terminal server that is used to support serial connection.
   - In the **TCP Port Number** box, type the port number assigned to the terminal server that is used to support serial connection.

- In the **Status Tag** box, type the name of an InTouch discrete tag. The tag value is set to True if the TCP/IP connection is established, otherwise False.
- Select **Server Mode** if the remote PLC is responsible for connecting to the Wonderware Compact Panel.

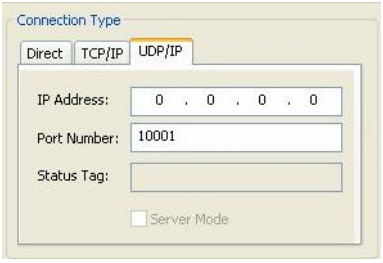
Configuring a UDP/IP Connection

If the panel uses a UDP/IP connection to communicate with the PLC, you need to configure UDP/IP settings. You can configure the following settings:

- IP Address
- Port Number

To configure a UDP/IP connection

1. In the **Driver Configuration** dialog box, select the driver you want to configure.
2. In the **Connection Type** area, click the **UDP/IP** tab.



3. Configure the following settings:
   - In the **IP Address** box, type the IP address of the terminal server that is used to support serial connection.
   - In the **UDP Port Number** box, type the port number assigned to the terminal server that is used to support serial connection.

Configuring Advanced Settings for Serial Connection

This section explains how to configure advanced settings for an ABKE driver using serial connection. You can configure the following settings:

- Time-out settings
- Protocol settings
- Hand Shake settings
- Buffer Length settings
- Enabling DTR and IR

Depending on the PLC driver you select, one or more of these settings might be disabled.

Note For more information about configuring advanced settings, see the documentation of your PLC hardware manufacturer.

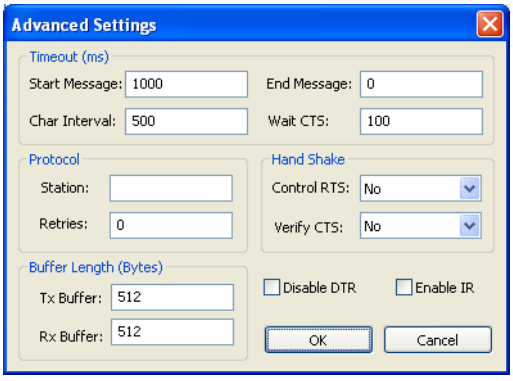
Configuring Time-out Settings

You can configure the following time-out settings:

- Start Message
- End Message
- Interval between characters
- Clear to Send wait

To configure time-out settings

1. In the **Driver Specific Configuration** dialog box, select the driver you want to configure.
2. Click **Advanced**. The **Advanced Settings** dialog box appears.



3 In the **Timeout** area, assign values to the following settings:
   - **Start Message** - Time-out period in milliseconds for the message to start.
   - **End Message** - Time-out period in milliseconds for the message to end.
   - **Char Interval** - Time-out period in milliseconds between each character.
   - **Wait CTS** - Time-out period in milliseconds for the Clear to Send wait.

4 Click **OK**.

Configuring Protocol Settings

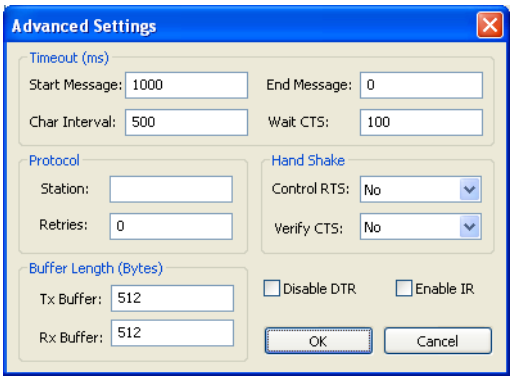
You can configure the following protocol settings:

- Station slave address
- Number of retries

To configure Protocol settings

1 In the **Driver Specifc Configuration** dialog box, select the driver you want to configure.

2 Click **Advanced**. The **Advanced Settings** dialog box appears.



3 In the **Protocol** area, assign values to the following settings:
   - **Station** - Specify the slave network address.
   - **Retries** - Specify how many times the driver attempts to execute the same communication command before reporting a communication error.

4 Click **OK**.

Configuring Hand Shake Settings

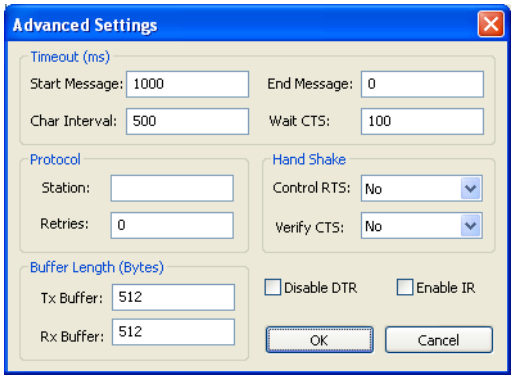
You can configure the following Hand Shake settings:

- Request to Send control
- Clear to Send verification

Hand Shake settings determine how the PLC driver communicates with the PLC over a communication channel after the physical establishment of the channel and before the normal information transfer.

To configure Hand Shake settings

1. In the **Driver Specific Configuration** dialog box, select the driver you want to configure.
2. Click **Advanced**. The **Advanced Settings** dialog box appears.



3. In the **Hand Shake** area, assign values to the following settings:
   - **Control RTS** - Specify whether to use the Request to Send control.The following options are available:

     No: Do not set the RTS (Request to Send) Hand Shake signal. Important: If you are using Windows 95/98 or Windows CE with the correct RS232/RS485 adapter (i.e. without RTS control), then you must select this option.

     Yes: Set the RTS (Request to Send) Hand Shake signal before communication. Important: If you are using Windows NT and the Cutler-Hammer RS232/RS485 adapter, then you must select this option.

     Yes+echo: Set the RTS (Request to Send) Hand Shake signal before communication, and echo the signal received from the target device.

     The default value is No.

- **Verify CTS** - Specify whether to use the Clear to Send type of verification.

  The default value is No.

4 Click **OK**.

Configuring Buffer Length Settings

You can configure the following Buffer Length settings:

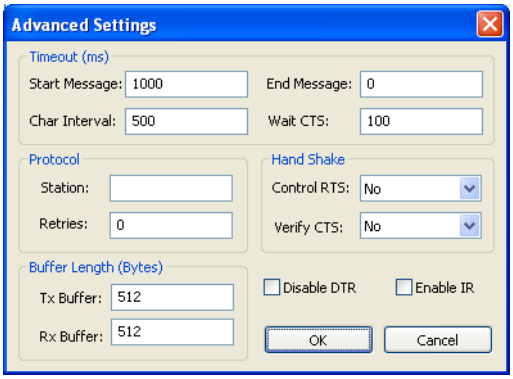
- Transmission Buffer (Tx) Length
- Reception Buffer (Rx) Length

The Buffer Length settings determine the number of bytes allocated from memory as a temporary buffer. The driver stores data in the temporary buffer while communicating with the PLC.

To configure Buffer Length settings

1 In the **Driver Specific Configuration** dialog box, select the driver you want to configure.

2 Click **Advanced**. The **Advanced Settings** dialog box appears.



3 In the **Buffer Length (Bytes)** area, assign values to the following settings:

- **Tx Buffer** - Transmission buffer size in bytes.
- **Rx Buffer** - Reception buffer size in bytes.

4 Click **OK**.

Configuring DTR/IR Settings

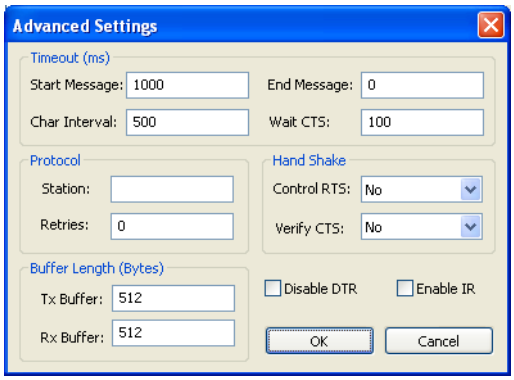
You can enable or disable the DTR and IR settings.

Setting DTR (Data Terminal Ready) means that the panel sends an additional signal to the PLC to indicate that the panel is ready to receive data.

Setting IR means that an infrared interface is used instead of a standard serial port to communicate with the device.

To enable or disable DTR and IR Settings

1. In the **Driver Specific Configuration** dialog box, select the driver you want to configure.
2. Click **Advanced**. The **Advanced Settings** dialog box appears.



3. Assign values to the following settings:
   - Select or clear the **Disable DTR** check box.
   - Select or clear the **Enable IR** check box.
4. Click **OK**.

Configuring Advanced Settings for TCP/IP and UDP/IP Connection

This section explains how to configure advanced settings for an ABKE driver using TCP/IP or UDP/IP connection. You can configure the following:

- Time-out settings
- Protocol settings
- Buffer Length settings

Depending on the PLC driver you select, one or more of these settings might be disabled.

Note For more information about configuring advanced settings, see the documentation of your PLC hardware manufacturer.

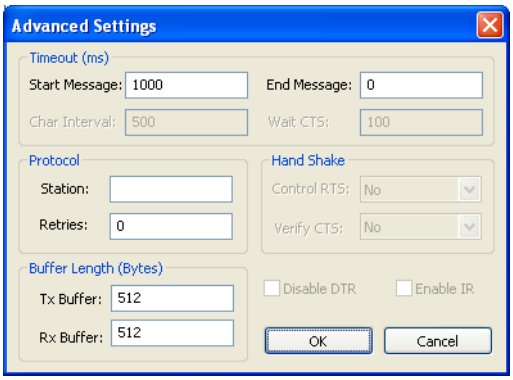
Configuring Time-out Settings

You can configure the following time-out settings:

- Start Message
- End Message

To configure time-out settings

1. In the **Driver Specific Configuration** dialog box, select the driver you want to configure.
2. Click **Advanced**. The **Advanced Settings** dialog box appears.



3. In the **Timeout** area, assign values to the following settings:
   - **Start Message** - Time-out period in milliseconds for the message to start.
   - **End Message** - Time-out period in milliseconds for the message to end.
4. Click **OK**.

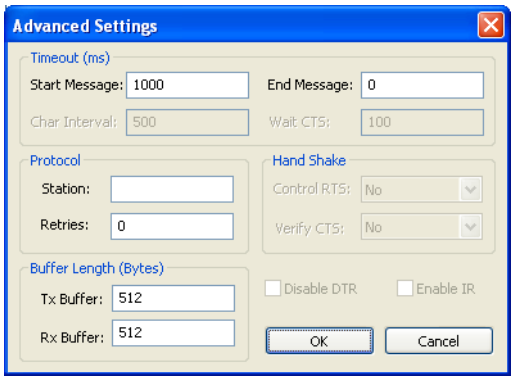
Configuring Protocol Settings

You can configure the following protocol settings:

- Station slave address
- Number of retries

To configure Protocol settings

1. In the **Driver Specific Configuration** dialog box, select the driver you want to configure.
2. Click **Advanced.** The **Advanced Settings** dialog box appears.



3. In the **Protocol** area, assign values to the following settings:
   - **Station** - Specify the slave network address.
   - **Retries** - Specify how many times the driver attempts to execute the same communication command before reporting a communication error.
4. Click **OK**.

Configuring Buffer Length Settings

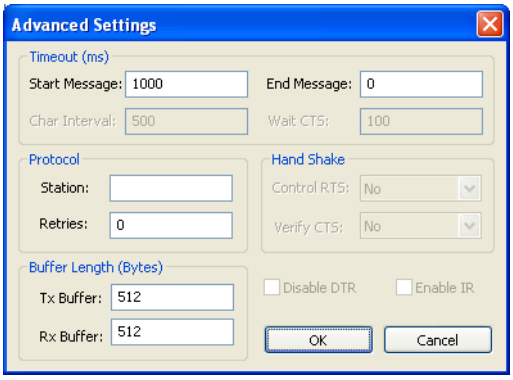
You can configure the following Buffer Length settings:

- Transmission Buffer (Tx) Length
- Reception Buffer (Rx) Length

The Buffer Length settings determine the number of bytes allocated as temporary memory. The driver uses temporary memory to communicate with the PLC.

To configure Buffer Length settings

1. In the **Driver Specific Configuration** dialog box, select the driver you want to configure.
2. Click **Advanced**. The **Advanced Settings** dialog box appears.



3. In the **Buffer Length (bytes)** area, assign values to the following settings:
   - **Tx Buffer** - Transmission buffer size in bytes.
   - **Rx Buffer** - Reception buffer size in bytes.
4. Click **OK**.

Associating a PLC Driver with an Access Name

After configuring the PLC driver, you need to associate it with an existing InTouch Access Name. For more information about creating an InTouch Access Name, see the *InTouch HMI Data Management Guide*.

When you associate a PLC driver with an Access Name, you need to specify a Station Address. The station address is used by the InTouch Compact Edition driver to specify slave network addresses of PLCs.

The Station Address must comply with the following syntax:

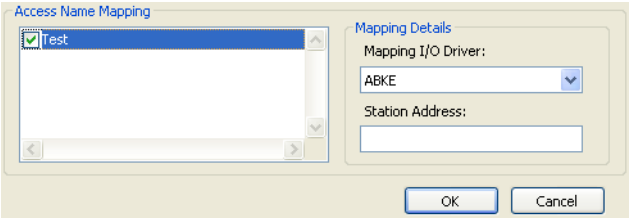
<PLC ID>
where:

PLC ID is the ID number of the PLC.

Note For more information about configuring the station address, see the documentation of your PLC hardware manufacturer.

To associate a PLC driver with an Access Name

1. Open the **Driver Configuration** dialog box.
2. In the **Access Name Mapping** area, locate the InTouch Access Name you want to associate with the ABKE driver.



Note If no Access Names appear in the list, you need to define an Access Name from the InTouch HMI.

3. Select the Access Name you want to associate.
4. In the **Mapping I/O Driver** list, select the configured driver.
5. In the **Station Address** box, type the station address.

   When you move the mouse pointer over the **Station Address** box, a tooltip shows the required syntax for a station address.
6. Click **OK**.

Chapter 3

Troubleshooting the ABKE Driver

You can detect communication errors between an InTouch Compact Edition application and the PLC by using the following item names:

Item name	Purpose
SysReadStatus	Receives error code for a failed read operation from the PLC
SysWriteStatus	Receives error code for a failed write operation to the PLC
SysReadCompleted	Indicates if the read operation from the PLC completes (TRUE) or not (FALSE)
SysWriteCompleted	Indicates if the write operation to the PLC completes (TRUE) or not (FALSE)

Note You can associate only one InTouch tag with each item name.

To troubleshoot communication problems

1. In WindowMaker, configure a set of I/O tags to associate with the error item names:
   - An I/O discrete tag to point at the item name SysReadCompleted.
   - An I/O discrete tag to point at the item name SysWriteCompleted.
   - An I/O integer tag to point at the item name SysReadStatus.

- An I/O integer tag to point at the item name SysWriteStatus.

2. Configure animation display links for the I/O tags, such as:
   - Fill color animations for the I/O tags associated with the SysReadCompleted and SysWriteCompleted items.
   - Analog value display links for the I/O tags associated with the SysReadStatus and SysWriteStatus items.
3. At run time, if a read or write error occurs between the InTouch Compact Edition and the PLC, the fill color animation indicates a problem. The value next to the fill color animation shows the error code.

Find the ABKE error codes in the following table. The table also includes typical problems associated with an error code and possible solutions.

Error Code	Description	Possible Causes	Procedure to Solve
0	OK	Communication without problems	None required
1	Protocol error	• Wrong Family type specified for the Family field on the I/O driver configuration dialog • Wrong cable or CPU in fault mode	• Check PLC family specified in the Family field • Check cable • Check CPU mode
2	Block size error	Internal error	Contact Technical Support and send your published application
3	Invalid family	Wrong Family specified for family field	Check the I/O driver settings family field, it should be configured with a valid PLC family
4	Invalid number of stop bits	The number of stop bits specified is invalid	Specify the correct number of stop bits
5	Invalid parity	The invalid parity specified is invalid	Specify the correct Invalid parity
6	Invalid irq	Internal error	Contact Technical Support and send your published application

Error Code	Description	Possible Causes	Procedure to Solve
7	Serial port already in use	Some other program is using the selected serial port	Choose another serial port or close the program using the current one
8	Invalid buffer size	Buffer received has an invalid size	Check if the equipment that you are communicating with supports the same protocol as the I/O server
9	Out of memory	There is not enough memory for the I/O Server	Check the amount of RAM memory available for your system
10	Message sequence error	Invalid sequence received from PLC	Check CPU status(high probability of a CPU error)
11	Tx buffer full	Internal error	Contact Technical Support and send your published application
12	Rx buffer empty	Internal error	Contact Technical Support and send your published application
13	Rx buffer full	Internal error	Contact Technical Support and send your published application
14	Time out waiting CTS	CTS signal was not received, could not send request	• Check the cable • Check if the communication line is busy
15	Time out waiting start a message	Response was not received from the device	• Check the cable connection • Make sure that the I/O Server settings match the PLC configuration
16	Illegal command or format	Item configured does not exist in PLC	Check item names you have configured

Error Code	Description	Possible Causes	Procedure to Solve
17	Time out between rx char	Response was not received from the device	• Check the cable connection • Make sure that the I/O Server settings match the PLC configuration
18	Time out between tx char	Started receiving a response but the communication was suspended	• Check the cable connection • Make sure that the I/O server settings match the PLC configuration
19	No carrier detected	Started receiving a response but the communication was suspended	• Check the cable connection • Make sure that the I/O Server settings match the PLC configuration
20	Invalid or unsupported item name	• Timers, counters and controls files were not specified correctly in the item name • Item name specified is invalid	Check the item names configured
30	Invalid or unsupported item name	An item name not compatible with the I/O Server was specified	Make sure to use valid item names
32	Host has a problem and cannot communicate	Item name specified is either invalid or unsupported	Check item names for unsupported or invalid items
33	Invalid driver configuration file	Internal error	Contact Technical Support and send your published application
34	Invalid or unsupported item name	Item name specified is either invalid or unsupported	Check item names for unsupported or invalid items

Error Code	Description	Possible Causes	Procedure to Solve
35	Driver API not initialized	Internal error	Contact Technical Support and send your published application
36	Invalid or unsupported item name	Item name specified is either invalid or unsupported	Check item names for unsupported or invalid items
37	Invalid or unsupported item name	Item name specified is either invalid or unsupported	Check item names for unsupported or invalid items
38	Invalid station	Station specified for this driver is invalid	Check the I/O driver configuration and specify a valid Station Address
39	Invalid Block Size	Internal error when generating the protocol block sizes	Contact Technical Support and send your published application
40	Remote node host is missing, disconnected or shut down	PLC is not connected, the node configuration is invalid or in a shutdown process	• Check the PLC state to ensure the processor is not at fault • Check to see if the cables are connected correctly
64	Host could not complete function due to hardware fault	Local PLC backplane error(either memory parity or Time out/disconnected) and PLC aborted the message execution	• Check parity configuration for both PLC and the I/O driver configuration • Verify that cables are connected properly
80	Address problem or memory protect rungs	Attempt to access an illegal address in the PLC processor aborted message execution	• Check that you configured the family on the I/O driver configuration dialog • Check the PLC address
96	Function not allowed due to command protection selection	Execution of a command at the PLC processor disabled by a switch option	• Check PLC to see if a command protection is specified. If so, disable it

Error Code	Description	Possible Causes	Procedure to Solve
112	Processor is in program mode	PLC is in program or remote Program mode or 1171-KA is in download mode	• Switch PLC mode to RUN
128	Compatibility mode file missing or communication zone problem	Execution of protected commands at the PLC processor inhibited because PROG light is ON	• See if PLC is on PROG Mode. If so, change to RUN mode • Compare existing files to configured files
144	Remote node cannot buffer command	Driver error: invalid command	• Contact Technical Support and send in your published application
150	Send File number error	• PLC is not responding • The PLC responds that there is no file specified • Invalid station number	• Verify that required file exists • Check the I/O driver configuration and specify a valid Station Address
176	Remote node problem due to download	PLC is under downloading action or last download generated a problem	• Try downloading PLC program again
-15	Time out waiting to start a message	• Disconnected cables • PLC turned off, or in Stop or Error mode • Wrong Station Number • Wrong RTS/CTS configuration settings	• Check cable wiring • Ensure that the PLC state is set to RUN • Check the I/O driver configuration and specify a valid Station Address • Verify that you are using the correct configuration

Error Code	Description	Possible Causes	Procedure to Solve
-17	Time out between rx and char	• PLC in stop or error mode • Wrong Station Number • Wrong parity • Wrong RTS/CTS configuration settings	• Check cable wiring • Ensure that PLC state is RUN • Check the I/O driver configuration and specify a valid Station Address • Verify that you are using the correct configuration

Appendix

ABKE Driver Item References

This section lists the item names supported by the ABKE driver. The ABKE driver supports item names only from the PLC5 and SLC500 families of Allen-Bradley PLC's.

If an "OUT OF RANGE" item is used in the InTouch Compact Edition application, then the quality for that item is shown as 0 or BAD. It is also possible that the quality of one or more valid items goes to 0 or BAD due to an "OUT OF RANGE" item being used.

Invalid values in items (with/without suffixes) can return unpredictable results. You should ensure that valid values are written for each data type. For example, 0 to 65535 is the valid value range for 'word' type of data.

The ABKE driver supports float values with 4 bytes up to 7 digits. Therefore, the valid range for float values is 3.4E +/- 38 (7 digits). Values outside this range result in an invalid value written to the tag. Furthermore, values with more than 7 digits of precision are rounded at the seventh digit.

The ABKE driver supports valid BCD values from 0 to 9999 and valid LBCD values from 0 to 99999999. Invalid BCD values (e.g.: 1010 in binary base) result in an invalid value written to the tag.

The timer, counter, and control file types are read-only when specified without a dotfield value. For example, T4:1, C5:2, and R6:3.

Note The ABKE I/O driver does not support DBCS, only ANSI characters. An ASCII item only supports a range of ASCII items, for example, A10:3-6.

Supported PLC5 Item Names

X	File Type	Default File#	.Fields	Supported by InTouch Compact Edition
O	Output	0		Yes
I	Input	1		Yes (Read-only)
S	Status	2		Yes
B	Binary	3		Yes
T	Timer	4	.PRE .ACC .EN .TT .DN	Yes
C	Counter	5	.PRE .ACC .CU .CD .DN .OV .UN	Yes
R	Control	6	.LEN .POS .EN .EU .DN .EM .ER .UL .IN .FD	Yes
N	Integer	7		Yes
F	Floating point	8		Yes
A	ASCII	None		Yes
D	BCD	None		Yes
ST	ASCII string	None		Yes
PD	PID	None	.ADRF .ADRE .BIAS .CA .CL .CT .DB .DO .DVDB .DVN .DVNA .DVP .DVPA .EN .ERR .EWD .INI .KD .KI .KP .MAXI .MAXO .MAXS .MINI .MINO .MINS .MO .OLH .OLL .OUT .PE .PV .PVDB .PVH .PVHA .PVL .PVLA .PVT .SO .SP .SPOR .SWM .TIE .UDP	No
SC	SFC Status	None	.DN .ER .FS .LS .OV .PRE .SA .TIM	No
BT	Block transfer (Read-only)	None	.EN .ST .DN .ER .CO .EW .NR .RW .TO .RLEN .DLEN .FILE .ELEM	No

Note The output and input file types work only when the format is <FileType>:<Slot Number>.<Octet Number>/[Bit]

Supported SLC500 Item Names

X	File Type	Default File#	.Fields	Supported by InTouch Compact Edition
O	Output	0		Yes
I	Input	1		Yes (Read-only)
S	Status	2		Yes
B	Binary	3		Yes
T	Timer	4	.PRE .ACC .EN .TT .DN	Yes
C	Counter	5	.PRE .ACC .CU .CD .DN .OV .UN .UA	Yes
R	Control	6	.LEN .POS .EN .DN .ER .UL .IN .FD	Yes
N	Integer	7		Yes
F	Floating point	8		Yes
A	ASCII	None		Yes
ST	ASCII string	None		Yes

Note The output and input file types work only when the format is <FileType>:<Slot Number>.<Octet Number>/[Bit]

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