FD provider

DENSO DPM Scanner Provider

Version 1.0.0

User's Guide

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Remark

This document is translated into English by machine translation.

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1.0.0	2020-02-10	First edition

[Operation Check Model]

Model	Firmware version
FD2-HS1000-ERU	Ver1.10.0

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1. Introduction

This document is a User's Guide for the FD Provider, a provider for Denso fixed code scanners.

An FD provider is a provider that outputs data from a code scanner.

This document describes the functionality and implemented methods of this FD provider.

2. Provider overview

2.1. Overview

There are two ways to get a value with a code scanner: a push (event) method in which the value is output when the code is scanned, and a pull (stock) method in which a command is sent to the code scanner and the value is obtained.

The FD provider implements an event mode that always runs the receive thread as a means of obtaining values using the push method. In addition, a command mode is implemented as a method for obtaining values by the pull method, and these can be switched by options at the time of AddController.

The FD provider supports only the LAN connection (TCP) of the scanner.

The file format of FD providers is DLL (Dynamic Link Library), and the file format of FD providers is shown in Table 2-1.

Table 2-1 FD Provider

File name	CaoProvDENSOFD.dll
ProgID	CaoProv.DENSO.FD
Registry enrollment[1]	Regsvr32 CaoProvDENSOFD.dll
Unregistering the registry	Regsvr32 /u CaoProvDENSOFD.dll

2.1.1. Operation mode

2.1.1.1. Commanding mode

In Command Mode, when a value is retrieved using the system variable "@ONE_SHOT", the command is sent to retrieve the data. This can be used only when the scanners are configured to accept TRGON,TRGOFF.

2.1.1.2. Event mode

In Event Mode, a OnMessage event is generated when the code scanner acquires data. This allows clients to retrieve values from the data stored in the Message objects retrieved from this event.

[1] You do not need to manually register/delete the ORiN SDK installations.

2.1.2. Presetting the scanner

Before using this provider, perform the settings in Table 2-2, Table 2-3, Table 2-4 on the scanner before using this provider.

The read format and command response format are designed based on the following settings (Table 2-5). Therefore, different settings in the following table will cause unexpected operation.

Table 2-2 Communication interface settings

Setting items		Content
Read data transmission interface		Ethernet
IP address		Fixed IP.
Command control	Protocol	TCP Server
	Port	Any
Read data transmission	Protocol	TCP Client
	IP	Any
	Port	Any

Table 2-3 Trigger type settings

Setting items		Content
Trigger type		Command / Input terminal
Trigger command settings	Response	Permission
	Trigger ON command	TRGON
	Trigger OFF command	TRGOFF
Output failure notification data		Yes
Failure notification data character		Any ※Set a character string different from the scanner ID.

Table 2-4 Output format setting

Setting items	Content
Scanner ID	Output
Print verification	Output / None ※See Notes
Read stability	Output

Table 2-5 Operational Formats for Three Providers

Item	Header	Data length	Scanner ID	Comma	Print verification	Comma	Reading Stability	Reading Data	Terminator
Length (byte)	1	4	6	1	None: 0 Alphabet: 31 Digit :33	1	4	N	1
Remark	STX fixed							※See note	ETX fixed

Notes

The AddController options allow you to set the print test results for scanners. Set the scanner settings and the provider settings in advance.

When using in Command Mode, set "Direct Software Mode (Asynchronous)" and set Unread Code Transfer to Yes. When using in Event Mode, set the setting that allows you to push the scanned data from the scanner (for example, Continuous Read Mode).

When "Code mark", "Number of digits of code data" or "Suffix" is set, the data is outputted together with the scanned data. If you want to sort each item, create a separate sorting process.

2.2. Connection Configuration

This provider assumes the connection shown in Figure 2-1.

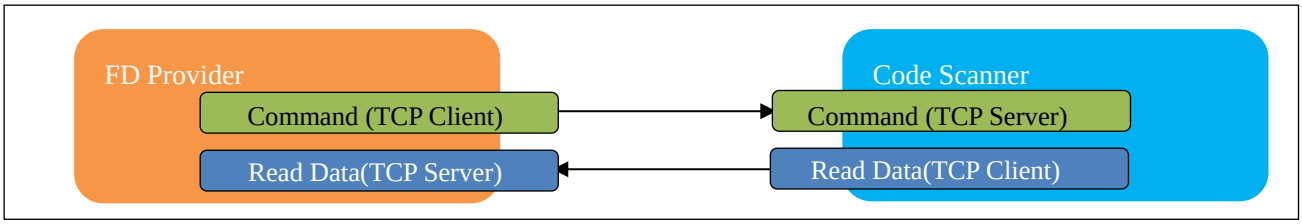

Figure 2-1 Connection Configuration

Connect to the TCP server for command control of the code scanner at AddController. The code scanner then connects to the provider's TCP server for reading data. This read data server connects only the scanner from the IP address specified at the time of AddController.

2.3. Method Properties

2.3.1. CaoWorkspace::AddController method

During AddController, FD providers refer to the connection parameters for communication and connect to the

FD provider for communication.

At this time, specify the communication mode, connection parameters, and timeout settings as options.

```
AddController
(
    Controller name                 // Controller name
    "CaoProv.DENSO.FD ",            // Provider name Fixing
    Machine name                    // The name of the provider's execution machine.
    Option                          // Option string
)
```

Here is the list that you specify for the option string:

Table 2-6 Option strings of CaoWorkspace::AddController

Option	Required	Description	Values range	Default value
Conn=<Eth-connection-option>	✓	Specify the IP address of the device to connect to. Details are shown in 2.3.1.1	--	
Trigger = <operation mode>	--	Provider mode of operation. Read using '1'-Event Mode, '2'-Command Mode Execute(OneShot) and variables (@ONE_SHOT).	1 or 2	1
ReadPort =<read data receive port>	--	Specifies the port for receiving read data.	1-65535	50010
Timeout =<Timeout>	--	Specify the timeout period for sending and receiving. If you enter a value outside the extent, it is automatically set to 500.	1-65535	500
Format = <Print judgment result>	--	Specify whether to include the print judgment result in the scanned data format. 0... No print judgment result is output. 1... Print judgment results are output in alphabetic characters. 2... Numerical output of print	0-2	0

		judgment result.		
MessageMax =<Message Objects Created>	--	Set a limit on how many Message objects are generated by your FD-provider.	1-42949672 95	100
Encode=<Read data encoding>	--	Sets the encoding for read data output. '1' - current Windows ANSI codepage[2], '2' - UTF-8 (Default: 1)	1 or 2	1
Sleep=<reception wait interval>	--	Set the waiting time for receiving read data from the scanner. Valid only when the Trigger option is 3.	1-1000	1

2.3.1.1. Conn options

The following are the connection-parameter strings for the Conn options: Here, square brackets ("[]") indicate optional. The underscore in the description of each parameter indicates the default value when no option is specified.

In this provider, when ETH is specified, TCP connection is made.

Eth

"Conn =Eth:<Host IP>[:<Host port>[:<Local IP>[:<Local port>]]]""

<Host IP> : Host address . "192.168.0.1" etc.

<Destination port> : Destination port number 50001

<Local IP> : Local Address

<Local port> : Local Port Number

2.3.2. CaoController::AddVariable method

Gets a variable object. The only variables that can be specified with this method are the system variables listed in the 2.4 Variable List. If you use other variable names, this method fails.

```
AddVariable
(
    Variable name                   // System Variable Name
    Option                          // Option string
)
```

2.3.3. CaoController::get_AddVariableNames Properties

2.4 Variable List of system variables Get the list of system variable names shown in the list.

[2] It depends on the OS language used.

2.3.4. CaoController::Execute method

This method sends a command to the code scanner. Specify a command name for the first argument and a command parameter for the second argument. The STX+ data length and ETX are added as the header to the specified command, and the command is sent to the code scanner. The availability of sending commands is returned by HRESULT.

For details on each command, see 3 Command reference.

Format Execute (<bstrCommandName: VT_BSTR>, [<vntParam:VT_VARIANT>])

BstrCommandName:[in] CommandNames

VntParam :[in] parameter

2.3.5. CaoController::OnMessage events

When an FD provider receives data, the FD provider passes the data to clients as CaoController classes of OnMessage events. At this time, the received data is stored in the Message::Value properties as it is.

Table 2-7 Message::Number Properties Values and Data Types

Number properties	Data type	Data type	Description
1	Code data	VT_VARIANT | VT_ARRAY	For details, See Read data format
2	Error code	VT_UI4	Returns the error that occurred while receiving read data in event mode (Trigger option is 1).

2.3.6. CaoVariable::get_Value Properties

2.4 Variable List Get the values for the system variables listed in the variable list.

2.3.7. Read data format

OnMessage events and @ONESHOT variables are read in the following formats:

The content of the print judgment result items varies depending on the Format options of the AddController (print judgment result outputting setting).

Table 2-8 Success Read Data Format

Data type			Description
VT_ARRAY | VT_VARIANT			--
0	VT_BSTR		Stores read data.
1	VT_BSTR		Stores the scanner ID (fixed to 6 digits).
2	VT_UI2		Stores the reading stability (fixed to 3 digits).
3	VT_ARRAY | VT_BSTR		Stores the print judgment result.
	0	VT_BSTR	Stores measurement items 1 to 14. If there is no printing judgment result, all items are "-".
	...	...	
	13	VT_BSTR	

Table 2-9 Failed Read Data Format

Data type			Description
VT_ARRAY | VT_VARIANT			--
0	VT_BSTR		Stores failure notification data.
1	VT_BSTR		Stores the scanner ID (fixed to 6 digits).
2	VT_UI2		Stores the 0.
3	VT_ARRAY | VT_BSTR		Stores the print verification result.
	0	VT_BSTR	All items is "-".
	...	...	
	13	VT_BSTR	

When unread, the unread code set in the scanner is returned. If unread code has not been set, error code 0x80100002 is returned.

2.4. Variable List

2.4.1. Controller class

Table 2-10 Controller Class System Variable List

Variable name	Acquisition Data Types	Description	Attribute	
			Get	Put
@ONE_SHOT[3]	VT_VARIANT | VT_ARRAY	Sends a read command to the code scanner and retrieves the data read within the time specified by the option argument. When using this parameter, set the code scanner to accept the TRGON,TRGOFF of control commands. The following option strings are available: ReadTime = 1000 (defaults to [ms]): specifies the read duration. Note "TRGON" and "TRGOFF" are sent to the Code Scanner, but @ONE_SHOT cannot be used if not supported. Refer to the code scanner documentation for the response status.	✓	-
@ID	VT_BSTR	Get the code scanner serial number.	✓	-
@MAKER_ NAME	VT_BSTR	"DENSO WAVE Inc."	✓	-
@VERSION	VT_BSTR	Get the version of provider.	✓	-
@DEVICE_VE RSION	VT_BSTR	Get the firmware version of the code scanner.	✓	-
@READ_ CONNECTED	VT_BOOL	Gets the connection status between the read data receiving port and the scanner. True: Connecting False: Disconnecting	✓	-

2.5. Error-code

Table 2-11 shows the unique error codes defined by the FD provider.

For error codes received from devices, the error code masked with 0x80100000 is used as the error. Refer to each scanner specification for the meaning of the error code received from the device.

[3] Only available when the Trigger of optional arguments in the CaoWorkspace::AddController method is '2'.CaoWorkspace::AddController method

Table 2-11 List of Unique Error Codes

Error name	Error Number	Description
E_OPTION_INVALID	0x80100001	This error is returned when the Trigger option is other than 2 and the following command is executed. CaoController::Execute ("OneShot ") Get @OneShot variables. Get @VERSION Variables Get @ID Variables Set the Trigger option to 2 and try again.
E_READ_ERR_RES	0x80100002	Unread code reception failed. Connecting to a Scanner, Set the unread code of the scanner.
E_INVALID_PACKET	0x80100003	Read data and command response packets are corrupted. Check the connection and scanner settings.
E_OPT_NONCONN	0x80100004	Do not specify eth in the Conn option, or the option settings are different from the specifications.Check the AddController option.
E_NOCLIENT	0x80100005	The read data destination port is not connected to the scanner. Check the connection.
E_DISAGREEMENT_FORMAT	0x80100006	The Device formatting conflicts with the provisioning settings. Set the device format by referring to 2.1.2 Set the providers' format options to be the same as the devices.

Refer to the Error Codes section of the ORiN2 Programming Guide for additional information about ORiN2 common errors.

3. Command reference

This chapter describes the commands for the CaoController::Execute method.

Table 3-1 CaoController::Execute Commands

Commanded	Facility	
Command transmission		
Raw	Sends a code scanner-specific command	p.14
Send Read Command		
OneShot	Sends a readable command to the code scanner.	p.15
Send Reset Command		
Reset	Reset code scanner.	p.15

3.1. Control command transmission

3.1.1. CaoController::Execute ("Raw") commands

Sends control commands to the scanner.

Refer to the documentation for your code scanner for the types of control commands that you can specify.

Format Raw(<bstrParam >)

BstrParam : [in] Command string of the code scanner to send

Returned value : [out] Command response received (VT_BSTR)

Commands from scanners are received as OnMessage events.

Example: Sending TRGON Commands

```
CaoCtrl.Execute("Raw", "TRGON")
```

3.2. Send Read Command

3.2.1. CaoController::Execute ("OneShot ")

Send a readable command to the code scanner,

You can read something or send a read stop command after a certain period of time.

Format OneShot(<iTimeout>)

iTimeout	:	[in] read wait time (VT_UI2) Specify in milliseconds.
Returned value	:	[out] read result (VT_VARIANT | VT_ARRAY) For details, see Read data format

Note

It can be used only when the optional argument Trigger at CaoWorkspace::AddController method is ‘2’.

3.3. Send Reset Command

3.3.1. CaoController::Execute ("Reset")

Send RESET command to the code scanner and restart the code scanner.

After sending this command, re-connect CaoController as the connection with the device will be cut off.

In case of operation with IoT Data Share, please execute "Reconnect Controller" of the trigger action.

Format Reset()

Argument	:	[in] none
Returned value	:	[out] RESET Command response received (VT_BSTR)

4. Sample program

The following example shows how to output QR code data to text.

List 4-1 SampleText.vb

```
Imports CAOLib

Public Class Form1
    Private eng As CaoEngine
    Private WithEvents ctrl As CaoController

    Private Delegate Sub SetTextCallback(ByVal msg As String)
     Private Sub Button1_Click(ByVal sender As System.Object, ByVal e As System.EventArgs)
                                                                        Handles Button1.Click
        Eng = New CaoEngine
        Ctrl = eng.Workspaces(0).AddController("Sample",
                                                    "CaoProv.DENSO.FD",
                                                     "",
                                                     "Conn=eth:192.168.0.10")

        AddHandler ctrl.OnMessage, New _ICaoControllerEvents_OnMessageEventHandler
                                                                (AddressOf ctrl_OnMessage)

    End Sub

    Private Sub ctrl_OnMessage(ByVal pICaoMsg As CaoMessage)
        Dim SetMsg As SetTextCallback = New SetTextCallback(AddressOf SetText)
        Invoke(SetMsg, pICaoMsg.Value.ToString())
    End Sub

    Private Sub SetText(ByVal msg As String)
        TextBox1.Text = msg
    End Sub
End Class
```

Appendix A. Communication protocol command correspondence table

CaoController::AddVariable

Variable	Communication command
@ID	ID
@DEVICE_VERSION	VER
@ONE_SHOT	TRGON
	TRGOFF

CaoController::Execute

Command	Communication command
OneShot	TRGON
	TRGOFF
Reset	RESET