CEN

WORKSHOP

AGREEMENT

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Extensions for Financial Services (XFS) interface specification Release 3.40 - Part 76: Barcode Reader Device Class Interface - Migration from version 3.30 (CWA 16926) to Version 3.40 (this CWA) - Programmer's Reference

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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European Foreword

This CEN Workshop Agreement has been developed in accordance with the CEN-CENELEC Guide 29 "CEN/CENELEC Workshop Agreements – The way to rapid consensus" and with the relevant provisions of CEN/CENELEC Internal Regulations - Part 2. It was approved by a Workshop of representatives of interested parties on 2019-10-08, the constitution of which was supported by CEN following several public calls for participation, the first of which was made on 1998-06-24. However, this CEN Workshop Agreement does not necessarily include all relevant stakeholders.
The final text of this CEN Workshop Agreement was provided to CEN for publication on 2019-12-12.
The following organizations and individuals developed and approved this CEN Workshop Agreement:

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The CWA is published as a multi-part document, consisting of:

Part 1: Application Programming Interface (API) - Service Provider Interface (SPI) - Programmer's Reference

Part 2: Service Classes Definition - Programmer's Reference

Part 3: Printer and Scanning Device Class Interface - Programmer's Reference

Part 4: Identification Card Device Class Interface - Programmer's Reference

Part 5: Cash Dispenser Device Class Interface - Programmer's Reference

Part 6: PIN Keypad Device Class Interface - Programmer's Reference

Part 7: Check Reader/Scanner Device Class Interface - Programmer's Reference

Part 8: Depository Device Class Interface - Programmer's Reference

Part 9: Text Terminal Unit Device Class Interface - Programmer's Reference

Part 10: Sensors and Indicators Unit Device Class Interface - Programmer's Reference

Part 11: Vendor Dependent Mode Device Class Interface - Programmer's Reference

Part 12: Camera Device Class Interface - Programmer's Reference

Part 13: Alarm Device Class Interface - Programmer's Reference

Part 14: Card Embossing Unit Device Class Interface - Programmer's Reference

Part 15: Cash-In Module Device Class Interface - Programmer's Reference

Part 16: Card Dispenser Device Class Interface - Programmer's Reference

Part 17: Barcode Reader Device Class Interface - Programmer's Reference

Part 18: Item Processing Module Device Class Interface - Programmer's Reference

Part 19: Biometrics Device Class Interface - Programmer's Reference

Parts 20 - 28: Reserved for future use.

Parts 29 through 47 constitute an optional addendum to this CWA. They define the integration between the SNMP standard and the set of status and statistical information exported by the Service Providers.

Part 29: XFS MIB Architecture and SNMP Extensions - Programmer’s Reference

Part 30: XFS MIB Device Specific Definitions - Printer Device Class

Part 31: XFS MIB Device Specific Definitions - Identification Card Device Class

Part 32: XFS MIB Device Specific Definitions - Cash Dispenser Device Class

Part 33: XFS MIB Device Specific Definitions - PIN Keypad Device Class

Part 34: XFS MIB Device Specific Definitions - Check Reader/Scanner Device Class

Part 35: XFS MIB Device Specific Definitions - Depository Device Class

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Part 39: XFS MIB Device Specific Definitions - Alarm Device Class

Part 40: XFS MIB Device Specific Definitions - Card Embossing Unit Class

Part 41: XFS MIB Device Specific Definitions - Cash-In Module Device Class

Part 42: Reserved for future use.

Part 43: XFS MIB Device Specific Definitions - Vendor Dependent Mode Device Class

Part 44: XFS MIB Application Management

Part 45: XFS MIB Device Specific Definitions - Card Dispenser Device Class

Part 46: XFS MIB Device Specific Definitions - Barcode Reader Device Class

Part 47: XFS MIB Device Specific Definitions - Item Processing Module Device Class

Part 48: XFS MIB Device Specific Definitions - Biometrics Device Class

Parts 49 - 60 are reserved for future use.

Part 61: Application Programming Interface (API) - Migration from Version 3.30 (CWA 16926) to Version 3.40 (this CWA) - Service Provider Interface (SPI) - Programmer's Reference

Part 62: Printer and Scanning Device Class Interface - Migration from Version 3.30 (CWA 16926) to Version 3.40 (this CWA) - Programmer's Reference

Part 63: Identification Card Device Class Interface - Migration from Version 3.30 (CWA 16926) to Version 3.40 (this CWA) - Programmer's Reference

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Part 65: PIN Keypad Device Class Interface - Migration from Version 3.30 (CWA 16926) to Version 3.40 (this CWA) - Programmer's Reference

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Part 75: Card Dispenser Device Class Interface - Migration from Version 3.30 (CWA 16926) to Version 3.40 (this CWA) - Programmer's Reference

Part 76: Barcode Reader Device Class Interface - Migration from Version 3.30 (CWA 16926) to Version 3.40 (this CWA) - Programmer's Reference

Part 77: Item Processing Module Device Class Interface - Migration from Version 3.30 (CWA 16926) to Version 3.40 (this CWA) - Programmer's Reference

In addition to these Programmer's Reference specifications, the reader of this CWA is also referred to a complementary document, called Release Notes. The Release Notes contain clarifications and explanations on the CWA specifications, which are not requiring functional changes. The current version of the Release Notes is available online from: https://www.cen.eu/work/Sectors/Digital_society/Pages/WSXFS.aspx.

The information in this document represents the Workshop's current views on the issues discussed as of the date of publication. It is provided for informational purposes only and is subject to change without notice. CEN makes no warranty, express or implied, with respect to this document.

1. Migration Information

XFS 3.40 has been designed to minimize backwards compatibility issues. This document highlights the changes made to the BCR device class between version 3.30 and 3.40, by highlighting the additions and deletions to the text.

2. Barcode Readers

This specification describes the functionality of a Barcode Reader (BCR) Service Provider. It defines the service-specific commands that can be issued to the Service Provider using the **WFSGetInfo, WFSAsyncGetInfo**, **WFSExecute** and **WFSAsyncExecute** functions.

Persistent values are maintained through power failures, open sessions, close session and system resets.

This extension to XFS specifications defines the functionality of BCR service.

A Barcode Reader scans barcodes using any scanning technology. The device logic converts light signals or image recognition into application data and transmits it to the host system.

The basic operation of the Barcode Reader is managed using **WFSExecute/WFSAsyncExecute** functions.

When an application wants to read a barcode, it issues a WFS_CMD_BCR_READ command to prepare the scanner to read any barcode presented to it. When a document is presented to the BCR and a barcode type is recognized, a completion event is received which contains the barcode data that has been read.

3. References

1. XFS Application Programming Interface (API)/Service Provider Interface (SPI), Programmer's Reference Revision 3.40

4. Info Commands

1.1 WFS_INF_BCR_STATUS

Description This command is used to request status information for the device.

Input Param None.

Output Param LPWFSBCRSTATUS lpStatus;

```
typedef struct _wfs_bcr_status
     {
     WORD                 fwDevice;
     WORD                 fwBCRScanner;
     DWORD                dwGuidLights[WFS_BCR_GUIDLIGHTS_SIZE];
     LPSTR                lpszExtra;
     WORD                 wDevicePosition;
     USHORT               usPowerSaveRecoveryTime;
     WORD                 wAntiFraudModule;
     } WFSBCRSTATUS, *LPWFSBCRSTATUS;
```

fwDevice
Specifies the state of the BCR device as one of the following flags:

Value	Meaning
WFS_BCR_DEVONLINE	The device is online (i.e. powered on and operable).
WFS_BCR_DEVOFFLINE	The device is offline (e.g. the operator has taken the device offline by turning a switch).
WFS_BCR_DEVPOWEROFF	The device is powered off or physically not connected.
WFS_BCR_DEVNODEVICE	There is no device intended to be there; e.g. this type of self service machine does not contain such a device or it is internally not configured.
WFS_BCR_DEVHWERROR	The device is inoperable due to a hardware error.
WFS_BCR_DEVUSERERROR	The device is present but a person is preventing proper device operation.
WFS_BCR_DEVBUSY	The device is busy and unable to process an execute command at this time.
WFS_BCR_DEVFRAUDATTEMPT	The device is present but is inoperable because it has detected a fraud attempt.
WFS_BCR_DEVPOTENTIALFRAUD	The device has detected a potential fraud attempt and is capable of remaining in service. In this case the application should make the decision as to whether to take the device offline.

fwBCRScanner
Specifies the scanner status (laser, camera or other technology) as one of the following flags:

Value	Meaning
WFS_BCR_SCANNERON	Scanner is enabled for reading.
WFS_BCR_SCANNEROFF	Scanner is disabled.
WFS_BCR_SCANNERINOP	Scanner is inoperative due to a hardware error.
WFS_BCR_SCANNERUNKNOWN	Scanner status cannot be determined.

dwGuidLights [...]
Specifies the state of the guidance light indicators. A number of guidance light types are defined below. Vendor specific guidance lights are defined starting from the end of the array. The maximum guidance light index is WFS_BCR_GUIDLIGHTS_MAX.

Specifies the state of the guidance light indicator as WFS_BCR_GUIDANCE_NOT_AVAILABLE, WFS_BCR_GUIDANCE_OFF or a combination of the following flags consisting of one type B, optionally one type C, and optionally one type D.

Value	Meaning	Type
WFS_BCR_GUIDANCE_NOT_AVAILABLE	The status is not available.	A
WFS_BCR_GUIDANCE_OFF	The light is turned off.	A
WFS_BCR_GUIDANCE_SLOW_FLASH	The light is blinking slowly.	B
WFS_BCR_GUIDANCE_MEDIUM_FLASH	The light is blinking medium frequency.	B
WFS_BCR_GUIDANCE_QUICK_FLASH	The light is blinking quickly.	B
WFS_BCR_GUIDANCE_CONTINUOUS	The light is turned on continuous (steady).	B
WFS_BCR_GUIDANCE_RED	The light is red.	C
WFS_BCR_GUIDANCE_GREEN	The light is green.	C
WFS_BCR_GUIDANCE_YELLOW	The light is yellow.	C
WFS_BCR_GUIDANCE_BLUE	The light is blue.	C
WFS_BCR_GUIDANCE_CYAN	The light is cyan.	C
WFS_BCR_GUIDANCE_MAGENTA	The light is magenta.	C
WFS_BCR_GUIDANCE_WHITE	The light is white.	C
WFS_BCR_GUIDANCE_ENTRY	The light is in the entry state.	D
WFS_BCR_GUIDANCE_EXIT	The light is in the exit state.	D

dwGuidLights [WFS_BCR_GUIDANCE_BCR]
Specifies the state of the guidance light indicator on the Barcode Reader unit.

lpszExtra
Pointer to a list of vendor-specific, or any other extended, information. The information is returned as a series of *"key=value"* strings so that it is easily extensible by Service Providers. Each string is null-terminated, with the final string terminating with two null characters. An empty list may be indicated by either a NULL pointer or a pointer to two consecutive null characters.

wDevicePosition
Specifies the device position. The device position value is independent of the *fwDevice* value, e.g. when the device position is reported as WFS_BCR_DEVICENOTINPOSITION, *fwDevice* can have any of the values defined above (including WFS_BCR_DEVONLINE or WFS_BCR_DEVOFFLINE). This value is one of the following values:

Value	Meaning
WFS_BCR_DEVICEINPOSITION	The device is in its normal operating position, or is fixed in place and cannot be moved.
WFS_BCR_DEVICENOTINPOSITION	The device has been removed from its normal operating position.
WFS_BCR_DEVICEPOSUNKNOWN	Due to a hardware error or other condition, the position of the device cannot be determined.
WFS_BCR_DEVICEPOSNOTSUPP	The physical device does not have the capability of detecting the position.

usPowerSaveRecoveryTime
Specifies the actual number of seconds required by the device to resume its normal operational state from the current power saving mode. This value is zero if either the power saving mode has not been activated or no power save control is supported.

wAntiFraudModule
Specifies the state of the anti-fraud module as one of the following values:

Value	Meaning
WFS_BCR_AFMNOTSUPP	No anti-fraud module is available.
WFS_BCR_AFMOK	Anti-fraud module is in a good state and no foreign device is detected.
WFS_BCR_AFMINOP	Anti-fraud module is inoperable.

WFS_BCR_AFMDEVICEDETECTED	Anti-fraud module detected the presence of a foreign device.
WFS_BCR_AFMUNKNOWN	The state of the anti-fraud module cannot be determined.

Error Codes Only the generic error codes defined in [Ref. 1] can be generated by this command.

Comments In the case where communications with the device has been lost, the *fwDevice* field will report WFS_BCR_DEVPOWEROFF when the device has been removed or WFS_BCR_DEVHWERROR if the communications are unexpectedly lost. All other fields should contain a value based on the following rules and priority:

1. Report the value as unknown.
2. Report the value as a general h/w error.
3. Report the value as the last known value.

1.2 WFS_INF_BCR_CAPABILITIES

Description This command is used to retrieve the capabilities of the BCR unit.

Input Param None.

Output Param LPWFSBCRCAPS lpCaps;

```
typedef struct _wfs_bcr_caps
     {
     WORD                 wClass;
     BOOL                 bCompound;
     BOOL                 bCanFilterSymbologies;
     LPWORD               lpwSymbologies;
     DWORD                dwGuidLights[WFS_BCR_GUIDLIGHTS_SIZE];
     LPSTR                lpszExtra;
     BOOL                 bPowerSaveControl;
     BOOL                 bAntiFraudModule;
     LPDWORD              lpdwSynchronizableCommands;
     } WFSBCRCAPS, *LPWFSBCRCAPS;
```

wClass
Specifies the logical service class as WFS_SERVICE_CLASS_BCR.

bCompound
Specifies whether the logical device is part of a compound physical device.

bCanFilterSymbologies
Specifies whether the device is capable of discriminating between the presented barcode symbologies such that only the desired symbologies are recognized/reported.

lpwSymbologies
Pointer to an array of WORDs. This list specifies the barcode symbologies readable by the scanner. The array is terminated with a zero value. *lpwSymbologies* is a NULL pointer if the supported barcode symbologies can not be determined.

Value	Meaning
WFS_BCR_SYM_EAN128	GS1-128
WFS_BCR_SYM_EAN8	EAN-8
WFS_BCR_SYM_EAN8_2	EAN-8 with 2 digit add-on
WFS_BCR_SYM_EAN8_5	EAN-8 with 5 digit add-on
WFS_BCR_SYM_EAN13	EAN13
WFS_BCR_SYM_EAN13_2	EAN-13 with 2 digit add-on
WFS_BCR_SYM_EAN13_5	EAN-13 with 5 digit add-on
WFS_BCR_SYM_JAN13	JAN-13
WFS_BCR_SYM_UPCA	UPC-A
WFS_BCR_SYM_UPCE0	UPC-E
WFS_BCR_SYM_UPCE0_2	UPC-E with 2 digit add-on
WFS_BCR_SYM_UPCE0_5	UPC-E with 5 digit add-on
WFS_BCR_SYM_UPCE1	UPC-E with leading 1
WFS_BCR_SYM_UPCE1_2	UPC-E with leading 1and 2 digit add-on
WFS_BCR_SYM_UPCE1_5	UPC-E with leading 1and 5 digit add-on
WFS_BCR_SYM_UPCA_2	UPC-A with2 digit add-on
WFS_BCR_SYM_UPCA_5	UPC-A with 5 digit add-on
WFS_BCR_SYM_CODABAR	CODABAR (NW-7)
WFS_BCR_SYM_ITF	Interleaved 2 of 5 (ITF)
WFS_BCR_SYM_11	CODE 11 (USD-8)
WFS_BCR_SYM_39	CODE 39
WFS_BCR_SYM_49	CODE 49
WFS_BCR_SYM_93	CODE 93
WFS_BCR_SYM_128	CODE 128
WFS_BCR_SYM_MSI	MSI
WFS_BCR_SYM_PLESSEY	PLESSEY
WFS_BCR_SYM_STD2OF5	STANDARD 2 of 5 (INDUSTRIAL 2 of 5 also)
WFS_BCR_SYM_STD2OF5_IATA	STANDARD 2 of 5 (IATA Version)

WFS_BCR_SYM_PDF_417	PDF-417
WFS_BCR_SYM_MICROPDF_417	MICROPDF-417
WFS_BCR_SYM_DATAMATRIX	GS1 DataMatrix
WFS_BCR_SYM_MAXICODE	MAXICODE
WFS_BCR_SYM_CODEONE	CODE ONE
WFS_BCR_SYM_CHANNELCODE	CHANNEL CODE
WFS_BCR_SYM_TELEPEN_ORIGINAL	Original TELEPEN
WFS_BCR_SYM_TELEPEN_AIM	AIM version of TELEPEN
WFS_BCR_SYM_RSS	GS1 DataBar™
WFS_BCR_SYM_RSS_EXPANDED	Expanded GS1 DataBar™
WFS_BCR_SYM_RSS_RESTRICTED	Restricted GS1 DataBar™
WFS_BCR_SYM_COMPOSITE_CODE_A	Composite Code A Component
WFS_BCR_SYM_COMPOSITE_CODE_B	Composite Code B Component
WFS_BCR_SYM_COMPOSITE_CODE_C	Composite Code C Component
WFS_BCR_SYM_POSICODE_A	Posicode Variation A
WFS_BCR_SYM_POSICODE_B	Posicode Variation B
WFS_BCR_SYM_TRIOPTIC_CODE_39	Trioptic Code 39
WFS_BCR_SYM_CODABLOCK_F	Codablock F
WFS_BCR_SYM_CODE_16K	Code 16K
WFS_BCR_SYM_QRCODE	QR Code
WFS_BCR_SYM_AZTEC	Aztec Codes
WFS_BCR_SYM_UKPOST	UK Post
WFS_BCR_SYM_PLANET	US Postal Planet
WFS_BCR_SYM_POSTNET	US Postal Postnet
WFS_BCR_SYM_CANADIANPOST	Canadian Post
WFS_BCR_SYM_NETHERLANDSPOST	Netherlands Post
WFS_BCR_SYM_AUSTRALIANPOST	Australian Post
WFS_BCR_SYM_JAPANESEPOST	Japanese Post
WFS_BCR_SYM_CHINESEPOST	Chinese Post
WFS_BCR_SYM_KOREANPOST	Korean Post

dwGuidLights [...]
Specifies which guidance lights are available. A number of guidance light types are defined below. Vendor specific guidance lights are defined starting from the end of the array. The maximum guidance light index is WFS_BCR_GUIDLIGHTS_MAX.

In addition to supporting specific flash rates and colors, some guidance lights also have the capability to show directional movement representing “entry” and “exit”. The “entry” state gives the impression of leading a user to place a card into the device. The “exit” state gives the impression of ejection from a device to a user and would be used for retrieving a card from the device.

The elements of this array are specified as a combination of the following flags and indicate all of the possible flash rates (type B), colors (type C) and directions (type D) that the guidance light indicator is capable of handling. If the guidance light indicator only supports one color then no value of type C is returned. If the guidance light indicator does not support direction then no value of type D is returned. A value of WFS_BCR_GUIDANCE_NOT_AVAILABLE indicates that the device has no guidance light indicator or the device controls the light directly with no application control possible.

Value	Meaning	Type
WFS_BCR_GUIDANCE_NOT_AVAILABLE	There is no guidance light control available at this position.	A
WFS_BCR_GUIDANCE_OFF	The light can be off.	B
WFS_BCR_GUIDANCE_SLOW_FLASH	The light can blink slowly.	B
WFS_BCR_GUIDANCE_MEDIUM_FLASH	The light can blink medium frequency.	B
WFS_BCR_GUIDANCE_QUICK_FLASH	The light can blink quickly.	B
WFS_BCR_GUIDANCE_CONTINUOUS	The light can be continuous (steady).	B
WFS_BCR_GUIDANCE_RED	The light can be red.	C
WFS_BCR_GUIDANCE_GREEN	The light can be green.	C
WFS_BCR_GUIDANCE_YELLOW	The light can be yellow.	C

WFS_BCR_GUIDANCE_BLUE	The light can be blue.	C
WFS_BCR_GUIDANCE_CYAN	The light can be cyan.	C
WFS_BCR_GUIDANCE_MAGENTA	The light can be magenta.	C
WFS_BCR_GUIDANCE_WHITE	The light can be white.	C
WFS_BCR_GUIDANCE_ENTRY	The light can be in the entry state.	D
WFS_BCR_GUIDANCE_EXIT	The light can be in the exit state.	D

dwGuidLights [WFS_BCR_GUIDANCE_BCR]
Specifies whether the guidance light indicator on the barcode reader unit is available.

lpszExtra
Pointer to a list of vendor-specific, or any other extended, information. The information is returned as a series of *"key=value"* strings so that it is easily extensible by Service Providers. Each string is null-terminated, with the final string terminating with two null characters. An empty list may be indicated by either a NULL pointer or a pointer to two consecutive null characters.

bPowerSaveControl
Specifies whether power saving control is available. This can either be TRUE if available or FALSE if not available.

bAntiFraudModule
Specifies whether the anti-fraud module is available. This can either be TRUE if available or FALSE if not available.

lpdwSynchronizableCommands
Pointer to a zero-terminated list of DWORDs which contains the execute command IDs that can be synchronized. If no execute command can be synchronized then this parameter will be NULL.

Error Codes Only the generic error codes defined in [Ref. 1] can be generated by this command.

Comments Applications which require or expect specific information to be present in the *lpszExtra* parameter may not be device or vendor-independent.

5. Execute Commands

1.3 WFS_CMD_BCR_READ

Description This command enables the barcode reader. The barcode reader will scan for barcodes and when it successfully manages to read one or more barcodes the command will complete. The completion event for this command contains the scanned barcode data.

Input Param LPWFSBCRREADINPUT lpReadInput;

```
typedef struct _wfs_bcr_read_input
     {
     LPWORD               lpwSymbologies;
     } WFSBCRREADINPUT, *LPWFSBCRREADINPUT;
```

lpwSymbologies
Array specifying a list that contains the sub-set of bar code symbologies that the application wants to be accepted for this command. The array is terminated with a zero value.
In some cases the Service Provider can discriminate between barcode symbologies and return the data only if the presented symbology matches with one of the desired symbologies. See the *bCanFilterSymbologies* capability to determine if the Service Provider supports this feature. If the Service Provider does not support this feature then this parameter is ignored. If all symbologies should be accepted then *lpwSymbologies* should be set to NULL.

Output Param LPWFSBCRREADOUTPUT *lppReadOutput;

Pointer to a NULL terminated array of pointers to WFSBCRREADOUTPUT structures. There is one array element for each barcode read during the scan.

```
typedef struct _wfs_bcr_read_output
     {
     WORD                 wSymbology;
     LPWFSBCRXDATA        lpxBarcodeData;
     LPSTR                lpszSymbologyName;
     } WFSBCRREADOUTPUT, *LPWFSBCRREADOUTPUT;
```

wSymbology
Specifies the barcode symbology recognized. This contains one of the values returned in the *lpwSymbologies* field of the WFS_INF_BCR_CAPABILITIES command. If the barcode reader is unable to recognize the symbology as one of the values reported via the device capabilities then the value for this field will be WFS_BCR_SYM_UNKNOWN.

lpxBarcodeData
Contains the barcode data read from the barcode reader. The format of the data will depend on the barcode symbology read. In most cases this will be an array of bytes containing ASCII numeric digits. However, the format of the data in this field depends entirely on the symbology read, e.g. it may contain 8 bit character values where the symbol is dependent on the codepage used to encode the barcode, may contain UNICODE data, or may be a binary block of data. The application is responsible for checking the completeness and validity of the data.

lpszSymbologyName
A vendor dependent symbology identifier for the symbology recognized.

Error Codes In addition to the generic error codes defined in [Ref. 1], the following error codes can be generated by this command:

Value	Meaning
WFS_ERR_BCR_BARCODEINVALID	The read operation could not be completed successfully. The barcode presented was defective or was wrongly read.

Events Only the generic events defined in [Ref. 1] can be generated by this command.

Comments The device waits for the period of time specified by the *dwTimeOut* parameter in the **WFSExecute** call for one of the enabled symbologies to be presented, unless the hardware has a fixed timeout period that is less than the value passed in the WFSExecute command.

The data type LPWFSBCRXDATA is used to return the barcode data.

```
typedef struct _wfs_bcr_hex_data
     {
     USHORT              usLength;
     LPBYTE              lpbData;
     } WFSBCRXDATA, *LPWFSBCRXDATA;
```

usLength
Length of the byte stream pointed to by *lpbData.*

lpbData
Pointer to the data stream.

1.4 WFS_CMD_BCR_RESET

Description	This command is used to reset the device. The scanner returns to power-on initial status and remains disabled for any barcode label reading.
Input Param	None.
Output Param	None.
Error Codes	Only the generic errors codes defined in [Ref. 1] can be generated by this command.
Events	Only the generic events defined in [Ref. 1] can be generated by this command.
Comments	None.

1.5 WFS_CMD_BCR_SET_GUIDANCE_LIGHT

Description This command is used to set the status of the BCR guidance lights. This includes defining the flash rate, the color and the direction. When an application tries to use a color or direction that is not supported then the Service Provider will return the generic error WFS_ERR_UNSUPP_DATA.

Input Param LPWFSBCRSETGUIDLIGHT lpSetGuidLight;

```
typedef struct _wfs_bcr_set_guidlight
     {
     WORD                wGuidLight;
     DWORD               dwCommand;
     } WFSBCRSETGUIDLIGHT, *LPWFSBCRSETGUIDLIGHT;
```

wGuidLight
Specifies the index of the guidance light to set as one of the values defined within the capabilities section.

dwCommand
Specifies the state of the guidance light indicator as WFS_BCR_GUIDANCE_OFF or a combination of the following flags consisting of one type B, optionally one type C and optionally one type D. If no value of type C is specified then the default color is used. The Service Provider determines which color is used as the default color.

Value	Meaning	Type
WFS_BCR_GUIDANCE_OFF	The light indicator is turned off.	A
WFS_BCR_GUIDANCE_SLOW_FLASH	The light indicator is set to flash slowly.	B
WFS_BCR_GUIDANCE_MEDIUM_FLASH	The light indicator is set to flash medium frequency.	B
WFS_BCR_GUIDANCE_QUICK_FLASH	The light indicator is set to flash quickly.	B
WFS_BCR_GUIDANCE_CONTINUOUS	The light indicator is turned on continuously (steady).	B
WFS_BCR_GUIDANCE_RED	The light indicator color is set to red.	C
WFS_BCR_GUIDANCE_GREEN	The light indicator color is set to green.	C
WFS_BCR_GUIDANCE_YELLOW	The light indicator color is set to yellow.	C
WFS_BCR_GUIDANCE_BLUE	The light indicator color is set to blue.	C
WFS_BCR_GUIDANCE_CYAN	The light indicator color is set to cyan.	C
WFS_BCR_GUIDANCE_MAGENTA	The light indicator color is set to magenta.	C
WFS_BCR_GUIDANCE_WHITE	The light indicator color is set to white.	C
WFS_BCR_GUIDANCE_ENTRY	The light indicator is set to the entry state.	D
WFS_BCR_GUIDANCE_EXIT	The light indicator is set to the exit state.	D

Output Param None.

Error Codes In addition to the generic error codes defined in [Ref. 1], the following error codes can be generated by this command:

Value	Meaning
WFS_ERR_BCR_INVALID_PORT	An attempt to set a guidance light to a new value was invalid because the guidance light does not exist.

Events Only the generic events defined in [Ref. 1] can be generated by this command.

Comments The slow and medium flash rates must not be greater than 2.0 Hz. It should be noted that in order to comply with American Disabilities Act guidelines only a slow or medium flash rate must be used.

1.6 WFS_CMD_BCR_POWER_SAVE_CONTROL

Description This command activates or deactivates the power-saving mode.

If the Service Provider receives another execute command while in power saving mode, the Service Provider automatically exits the power saving mode, and executes the requested command. If the Service Provider receives an information command while in power saving mode, the Service Provider will not exit the power saving mode.

Input Param LPWFSBCRPOWERSAVECONTROL lpPowerSaveControl;

```
typedef struct _wfs_bcr_power_save_control
     {
     USHORT               usMaxPowerSaveRecoveryTime;
     } WFSBCRPOWERSAVECONTROL, *LPWFSBCRPOWERSAVECONTROL;
```

usMaxPowerSaveRecoveryTime
Specifies the maximum number of seconds in which the device must be able to return to its normal operating state when exiting power save mode. The device will be set to the highest possible power save mode within this constraint. If *usMaxPowerSaveRecoveryTime* is set to zero then the device will exit the power saving mode.

Output Param None.

Error Codes In addition to the generic error codes defined in [Ref. 1], the following error codes can be generated by this command:

Value	Meaning
WFS_ERR_BCR_POWERSAVETOOSHORT	The power saving mode has not been activated because the device is not able to resume from the power saving mode within the specified *usMaxPowerSaveRecoveryTime* value.

Events In addition to the generic events defined in [Ref. 1], the following events can be generated by this command:

Value	Meaning
WFS_SRVE_BCR_POWER_SAVE_CHANGE	The power save recovery time has changed.

Comments None.

1.7 WFS_CMD_BCR_SYNCHRONIZE_COMMAND

Description This command is used to reduce response time of a command (e.g. for synchronization with display) as well as to synchronize actions of the different device classes. This command is intended to be used only on hardware which is capable of synchronizing functionality within a single device class or with other device classes.

The list of execute commands which this command supports for synchronization is retrieved in the *lpdwSynchronizableCommands* parameter of the WFS_INF_BCR_CAPABILITIES.

This command is optional, i.e. any other command can be called without having to call it in advance. Any preparation that occurs by calling this command will not affect any other subsequent command. However, any subsequent execute command other than the one that was specified in the *dwCommand* input parameter will execute normally and may invalidate the pending synchronization. In this case the application should call the WFS_CMD_BCR_SYNCHRONIZE_COMMAND again in order to start a synchronization.

Input Param LPWFSBCRSYNCHRONIZECOMMAND lpSynchronizeCommand;

```
typedef struct _wfs_bcr_synchronize_command
     {
     DWORD                    dwCommand;
     LPVOID                   lpCmdData;
     } WFSBCRSYNCHRONIZECOMMAND, *LPWFSBCRSYNCHRONIZECOMMAND;
```

dwCommand
The command ID of the command to be synchronized and executed next.

lpCmdData
Pointer to data or a data structure that represents the parameter that is normally associated with the command that is specified in *dwCommand*. For example, if *dwCommand* is WFS_CMD_BCR_READ then *lpCmdData* will point to a WFSBCRREADOUTPUT structure. This parameter can be NULL if no command input parameter is needed or if this detail is not needed to synchronize for the command.

It will be device-dependent whether the synchronization is effective or not in the case where the application synchronizes for a command with this command specifying a parameter but subsequently executes the synchronized command with a different parameter. This case should not result in an error; however, the preparation effect could be different from what the application expects. The application should, therefore, make sure to use the same parameter between *lpCmdData* of this command and the subsequent corresponding execute command.

Output Param None.

Error Codes In addition to the generic error codes defined in [Ref. 1], the following error codes can be generated by this command:

Value	Meaning
WFS_ERR_BCR_COMMANDUNSUPP	The command specified in the *dwCommand* field is not supported by the Service Provider.
WFS_ERR_BCR_SYNCHRONIZEUNSUPP	The preparation for the command specified in the *dwCommand* with the parameter specified in the *lpCmdData* is not supported by the Service Provider.

Events Only the generic events defined in [Ref. 1] can be generated by this command.

Comments For sample flows of this synchronization see the [Ref 1] Appendix C.

6. Events

6.1 WFS_SRVE_BCR_DEVICEPOSITION

Description This service event reports that the device has changed its position status.

Event Param LPWFSBCRDEVICEPOSITION lpDevicePosition;

```
typedef struct _wfs_bcr_device_position
     {
     WORD                wPosition;
     } WFSBCRDEVICEPOSITION, *LPWFSBCRDEVICEPOSITION;
```

wPosition
Position of the device as one of the following values:

Value	Meaning
WFS_BCR_DEVICEINPOSITION	The device is in its normal operating position.
WFS_BCR_DEVICENOTINPOSITION	The device has been removed from its normal operating position.
WFS_BCR_DEVICEPOSUNKNOWN	The position of the device cannot be determined.

Comments None.

1.8 WFS_SRVE_BCR_POWER_SAVE_CHANGE

Description This service event specifies that the power save recovery time has changed.

Event Param LPWFSBCRPOWERSAVECHANGE lpPowerSaveChange;

```
typedef struct _wfs_bcr_power_save_change
     {
     USHORT              usPowerSaveRecoveryTime;
     } WFSBCRPOWERSAVECHANGE, *LPWFSBCRPOWERSAVECHANGE;
```

usPowerSaveRecoveryTime
Specifies the actual number of seconds required by the device to resume its normal operational state. This value is zero if the device exited the power saving mode.

Comments If another device class compounded with this device enters into a power saving mode this device will automatically enter into the same power saving mode and this event will be generated.

7. C - Header file

```
/******************************************************************************
*                                                                             *
* xfsbcr.h    XFS - Barcode Reader (BCR) definitions                          *
*                                                                             *
*             Version 3.40  (December 6 2019)                                 *
*                                                                             *
******************************************************************************/

#ifndef __INC_XFSBCR__H
#define __INC_XFSBCR__H

#ifdef __cplusplus
extern "C" {
#endif

#include <xfsapi.h>

/* be aware of alignment */
#pragma pack (push, 1)

/* values of WFSBCRCAPS.wClass */

#define     WFS_SERVICE_CLASS_BCR               (15)
#define     WFS_SERVICE_CLASS_VERSION_BCR       (0x2803) /* Version 3.40 */
#define     WFS_SERVICE_CLASS_NAME_BCR          "BCR"

#define     BCR_SERVICE_OFFSET                  (WFS_SERVICE_CLASS_BCR * 100)

/* BCR Info Commands */

#define     WFS_INF_BCR_STATUS                  (BCR_SERVICE_OFFSET + 1)
#define     WFS_INF_BCR_CAPABILITIES            (BCR_SERVICE_OFFSET + 2)

/* BCR Execute Commands */

#define     WFS_CMD_BCR_READ                    (BCR_SERVICE_OFFSET + 1)
#define     WFS_CMD_BCR_RESET                   (BCR_SERVICE_OFFSET + 2)
#define     WFS_CMD_BCR_SET_GUIDANCE_LIGHT      (BCR_SERVICE_OFFSET + 3)
#define     WFS_CMD_BCR_POWER_SAVE_CONTROL      (BCR_SERVICE_OFFSET + 4)
#define     WFS_CMD_BCR_SYNCHRONIZE_COMMAND     (BCR_SERVICE_OFFSET + 5)

/* BCR Messages */

#define     WFS_SRVE_BCR_DEVICEPOSITION         (BCR_SERVICE_OFFSET + 1)
#define     WFS_SRVE_BCR_POWER_SAVE_CHANGE      (BCR_SERVICE_OFFSET + 2)

/* values of WFSBCRSTATUS.fwDevice */

#define     WFS_BCR_DEVONLINE                   WFS_STAT_DEVONLINE
#define     WFS_BCR_DEVOFFLINE                  WFS_STAT_DEVOFFLINE
#define     WFS_BCR_DEVPOWEROFF                 WFS_STAT_DEVPOWEROFF
#define     WFS_BCR_DEVNODEVICE                 WFS_STAT_DEVNODEVICE
#define     WFS_BCR_DEVHWERROR                  WFS_STAT_DEVHWERROR
#define     WFS_BCR_DEVUSERERROR                WFS_STAT_DEVUSERERROR
#define     WFS_BCR_DEVBUSY                     WFS_STAT_DEVBUSY
#define     WFS_BCR_DEVFRAUDATTEMPT             WFS_STAT_DEVFRAUDATTEMPT
#define     WFS_BCR_DEVPOTENTIALFRAUD           WFS_STAT_DEVPOTENTIALFRAUD

/* values of WFSBCRSTATUS.fwBCRScanner */

#define     WFS_BCR_SCANNERON                   (0)
#define     WFS_BCR_SCANNEROFF                  (1)
#define     WFS_BCR_SCANNERINOP                 (2)
#define     WFS_BCR_SCANNERUNKNOWN              (3)

/* values of WFSBCRSTATUS.wDevicePosition
             WFSBCRDEVICEPOSITION.wPosition */

#define     WFS_BCR_DEVICEINPOSITION            (0)
#define     WFS_BCR_DEVICENOTINPOSITION         (1)
#define     WFS_BCR_DEVICEPOSUNKNOWN            (2)
```

```
#define     WFS_BCR_DEVICEPOSNOTSUPP            (3)

/* values of WFSBCRCAPS.lpwSymbologies
             WFSBCRREADINPUT.lpwSymbologies
             WFSBCRREADOUTPUT.wSymbology */

#define     WFS_BCR_SYM_UNKNOWN                 (0)
#define     WFS_BCR_SYM_EAN128                  (1)
#define     WFS_BCR_SYM_EAN8                    (2)
#define     WFS_BCR_SYM_EAN8_2                  (3)
#define     WFS_BCR_SYM_EAN8_5                  (4)
#define     WFS_BCR_SYM_EAN13                   (5)
#define     WFS_BCR_SYM_EAN13_2                 (6)
#define     WFS_BCR_SYM_EAN13_5                 (7)
#define     WFS_BCR_SYM_JAN13                   (8)
#define     WFS_BCR_SYM_UPCA                    (9)
#define     WFS_BCR_SYM_UPCE0                   (10)
#define     WFS_BCR_SYM_UPCE0_2                 (11)
#define     WFS_BCR_SYM_UPCE0_5                 (12)
#define     WFS_BCR_SYM_UPCE1                   (13)
#define     WFS_BCR_SYM_UPCE1_2                 (14)
#define     WFS_BCR_SYM_UPCE1_5                 (15)
#define     WFS_BCR_SYM_UPCA_2                  (16)
#define     WFS_BCR_SYM_UPCA_5                  (17)
#define     WFS_BCR_SYM_CODABAR                 (18)
#define     WFS_BCR_SYM_ITF                     (19)
#define     WFS_BCR_SYM_11                      (20)
#define     WFS_BCR_SYM_39                      (21)
#define     WFS_BCR_SYM_49                      (22)
#define     WFS_BCR_SYM_93                      (23)
#define     WFS_BCR_SYM_128                     (24)
#define     WFS_BCR_SYM_MSI                     (25)
#define     WFS_BCR_SYM_PLESSEY                 (26)
#define     WFS_BCR_SYM_STD2OF5                 (27)
#define     WFS_BCR_SYM_STD2OF5_IATA            (28)
#define     WFS_BCR_SYM_PDF_417                 (29)
#define     WFS_BCR_SYM_MICROPDF_417            (30)
#define     WFS_BCR_SYM_DATAMATRIX              (31)
#define     WFS_BCR_SYM_MAXICODE                (32)
#define     WFS_BCR_SYM_CODEONE                 (33)
#define     WFS_BCR_SYM_CHANNELCODE             (34)
#define     WFS_BCR_SYM_TELEPEN_ORIGINAL        (35)
#define     WFS_BCR_SYM_TELEPEN_AIM             (36)
#define     WFS_BCR_SYM_RSS                     (37)
#define     WFS_BCR_SYM_RSS_EXPANDED            (38)
#define     WFS_BCR_SYM_RSS_RESTRICTED          (39)
#define     WFS_BCR_SYM_COMPOSITE_CODE_A        (40)
#define     WFS_BCR_SYM_COMPOSITE_CODE_B        (41)
#define     WFS_BCR_SYM_COMPOSITE_CODE_C        (42)
#define     WFS_BCR_SYM_POSICODE_A              (43)
#define     WFS_BCR_SYM_POSICODE_B              (44)
#define     WFS_BCR_SYM_TRIOPTIC_CODE_39        (45)
#define     WFS_BCR_SYM_CODABLOCK_F             (46)
#define     WFS_BCR_SYM_CODE_16K                (47)
#define     WFS_BCR_SYM_QRCODE                  (48)
#define     WFS_BCR_SYM_AZTEC                   (49)
#define     WFS_BCR_SYM_UKPOST                  (50)
#define     WFS_BCR_SYM_PLANET                  (51)
#define     WFS_BCR_SYM_POSTNET                 (52)
#define     WFS_BCR_SYM_CANADIANPOST            (53)
#define     WFS_BCR_SYM_NETHERLANDSPOST         (54)
#define     WFS_BCR_SYM_AUSTRALIANPOST          (55)
#define     WFS_BCR_SYM_JAPANESEPOST            (56)
#define     WFS_BCR_SYM_CHINESEPOST             (57)
#define     WFS_BCR_SYM_KOREANPOST              (58)

/* Size and max index of dwGuidLights array */

#define WFS_BCR_GUIDLIGHTS_SIZE                 (32)
#define WFS_BCR_GUIDLIGHTS_MAX                  (WFS_BCR_GUIDLIGHTS_SIZE - 1)

/* Indices of WFSBCRSTATUS.dwGuidLights [...]
             WFSBCRCAPS.dwGuidLights [...]
*/
```

```
#define     WFS_BCR_GUIDANCE_BCR                (0)

/* Values of WFSBCRSTATUS.dwGuidLights [...]
             WFSBCRCAPS.dwGuidLights [...],
             WFSBCRSETGUIDLIGHT.wGuidLight */

#define     WFS_BCR_GUIDANCE_NOT_AVAILABLE      (0x00000000)
#define     WFS_BCR_GUIDANCE_OFF                (0x00000001)
#define     WFS_BCR_GUIDANCE_SLOW_FLASH         (0x00000004)
#define     WFS_BCR_GUIDANCE_MEDIUM_FLASH       (0x00000008)
#define     WFS_BCR_GUIDANCE_QUICK_FLASH        (0x00000010)
#define     WFS_BCR_GUIDANCE_CONTINUOUS         (0x00000080)
#define     WFS_BCR_GUIDANCE_RED                (0x00000100)
#define     WFS_BCR_GUIDANCE_GREEN              (0x00000200)
#define     WFS_BCR_GUIDANCE_YELLOW             (0x00000400)
#define     WFS_BCR_GUIDANCE_BLUE               (0x00000800)
#define     WFS_BCR_GUIDANCE_CYAN               (0x00001000)
#define     WFS_BCR_GUIDANCE_MAGENTA            (0x00002000)
#define     WFS_BCR_GUIDANCE_WHITE              (0x00004000)
#define     WFS_BCR_GUIDANCE_ENTRY              (0x00100000)
#define     WFS_BCR_GUIDANCE_EXIT               (0x00200000)


/* values of WFSBCRSTATUS.wAntiFraudModule */

#define     WFS_BCR_AFMNOTSUPP                  (0)
#define     WFS_BCR_AFMOK                       (1)
#define     WFS_BCR_AFMINOP                     (2)
#define     WFS_BCR_AFMDEVICEDETECTED           (3)
#define     WFS_BCR_AFMUNKNOWN                  (4)

/* XFS BCR Errors */

#define WFS_ERR_BCR_BARCODEINVALID              (-(BCR_SERVICE_OFFSET + 0))
#define WFS_ERR_BCR_INVALID_PORT                (-(BCR_SERVICE_OFFSET + 1))
#define WFS_ERR_BCR_POWERSAVETOOSHORT           (-(BCR_SERVICE_OFFSET + 2))
#define WFS_ERR_BCR_COMMANDUNSUPP               (-(BCR_SERVICE_OFFSET + 3))
#define WFS_ERR_BCR_SYNCHRONIZEUNSUPP           (-(BCR_SERVICE_OFFSET + 4))


/*=================================================================*/
/* BCR Info Command Structures */
/*=================================================================*/
typedef struct _wfs_bcr_status
{
    WORD             fwDevice;
    WORD             fwBCRScanner;
    DWORD            dwGuidLights[WFS_BCR_GUIDLIGHTS_SIZE];
    LPSTR            lpszExtra;
    WORD             wDevicePosition;
    USHORT           usPowerSaveRecoveryTime;
    WORD             wAntiFraudModule;
} WFSBCRSTATUS, *LPWFSBCRSTATUS;

typedef struct _wfs_bcr_caps
{
    WORD             wClass;
    BOOL             bCompound;
    BOOL             bCanFilterSymbologies;
    LPWORD           lpwSymbologies;
    DWORD            dwGuidLights[WFS_BCR_GUIDLIGHTS_SIZE];
    LPSTR            lpszExtra;
    BOOL             bPowerSaveControl;
    BOOL             bAntiFraudModule;
    LPDWORD          lpdwSynchronizableCommands;
} WFSBCRCAPS, *LPWFSBCRCAPS;

/*=================================================================*/
/* BCR Execute Command Structures */
/*=================================================================*/
typedef struct _wfs_bcr_hex_data
{
    USHORT           usLength;
    LPBYTE           lpbData;
```

```
} WFSBCRXDATA, * LPWFSBCRXDATA;

typedef struct _wfs_bcr_read_input
{
    LPWORD           lpwSymbologies;
} WFSBCRREADINPUT, *LPWFSBCRREADINPUT;

typedef struct _wfs_bcr_read_output
{
    WORD             wSymbology;
    LPWFSBCRXDATA    lpxBarcodeData;
    LPSTR            lpszSymbologyName;
} WFSBCRREADOUTPUT, *LPWFSBCRREADOUTPUT;

typedef struct _wfs_bcr_set_guidlight
{
    WORD             wGuidLight;
    DWORD            dwCommand;
} WFSBCRSETGUIDLIGHT, *LPWFSBCRSETGUIDLIGHT;

typedef struct _wfs_bcr_power_save_control
{
    USHORT           usMaxPowerSaveRecoveryTime;
} WFSBCRPOWERSAVECONTROL, *LPWFSBCRPOWERSAVECONTROL;

typedef struct _wfs_bcr_synchronize_command
{
    DWORD           dwCommand;
    LPVOID          lpCmdData;
} WFSBCRSYNCHRONIZECOMMAND, *LPWFSBCRSYNCHRONIZECOMMAND;

/*=================================================================*/
/* BCR Message Structures */
/*=================================================================*/

typedef struct _wfs_bcr_device_position
{
    WORD             wPosition;
} WFSBCRDEVICEPOSITION, *LPWFSBCRDEVICEPOSITION;

typedef struct _wfs_bcr_power_save_change
{
    USHORT           usPowerSaveRecoveryTime;
} WFSBCRPOWERSAVECHANGE, *LPWFSBCRPOWERSAVECHANGE;

/*   restore alignment   */
#pragma pack(pop)
#ifdef __cplusplus
} /*extern "C"*/

#endif
#endif /* __INC_XFSBCR__H */
```