PROPRIETARY INFORMATION

ORBIT READER 20

Protocol to communicate with screen readers v0.0

23rd September, 2017
Version 0.0

Revision History

Rev.	Date	Description of Changes	Author
0.0	23-Sep-17	Created	

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1 Contents

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2 Serial/Bluetooth Protocol

<Esc> (=$1B) shows the beginning of an information-block. If there is an <ESC> between the data, it will be sent twice and reduced to one at the receiver.
We've defined the following infotypes at the Escape-Protocol for the communication with the APH device:

2.1 Transfer-direction: PC ⇒ OR20 (Out reports)

2.1.1 $01 Display-data

This report is used to display something on the Braille display.

ESC
$01
Byte 0
Byte 1
Byte 2
…
…
Byte 19

Position of the display-elements:

0																			19

2.1.2 $05 Call major firmware version-number

This infotype is used to receive the major firmware version from the device. To get full version number please check $85 infotype.

ESC
$05

2.1.3 $08 Repeat all

This report is used to receive all buttons status (button is pressed/not pressed).

ESC
$08

2.1.4 $15 Protocol on/off

If the protocol is turned on, the device enters in communication mode and sends the device ID, the serial number and the Braille display length.

ESC	
$15	
Data	0 = Off / 1 = On

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2.1.5 $16 Get Communication Channel

This report is used to get the current communication channel. Data must be $FF to receive the current channel.

ESC	
$16	
Data	$FF – query for the current setting

2.1.6 $84 Call Device ID

This report calls the device-ID.

ESC
$84

2.1.7 $8A Call Serial-Number

This report calls the serial number of the device.

ESC
$8A

2.1.8 $8C Call Bluetooth Device Name

This report calls the Bluetooth Device Name.

ESC
$8C

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2.2 Transfer-direction: OR20 ⇒ PC (IN Reports)

2.2.1 $01 Number of cells

No matter if more or less data is received this will trigger the $01 (Number of cells) report.

ESC	
$01	
Number of cells	20

2.2.2 $15 Protocol on/off

If the protocol is turned on, the device enters in communication mode and sends the device ID, the serial number and the Braille display length.

ESC	
$15	
Data	0 = Off / 1 = On

2.2.3 $16 Communication-Channel USB, HID or BT

This report will be sent if the report parameter received from PC is $FF.

ESC	
$16	
Data	$00 – USB $01 – Bluetooth $03 – HID

2.2.4 $24 Button-data

ESC
$24
Byte

	bit7	bit6	bit5	Bit4	bit3	bit2	bit1	bit0
Byte	0	0	D6	PR OR D5	D4	D3	PL or D2	D1

PL = Panning Left PR = Panning Right

Pressing the “Select” key first and then the B1… B6 keys the device will emulate the D1…D6 keys.

2.2.5 $33 Braille Keys

ESC
$33
Byte1
Byte2

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	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte1	0	0	0	0	0	0	0	B9
Byte2	B8	B7	B6	B5	B4	B3	B2	B1

Position of Braille Keys

B3 – B2 – B1		B4 – B5 – B6
B7	B9	B8

2.2.6 $34 Arrow Keys

ESC
$34
Byte

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	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte	0	0	0	Select	Right	Down	Left	Up

Position of Joystick keys

	Up	
Left	Select	Right
	Down	

2.2.7 $84 Device ID

This report is sent once, if the communication protocol is started. It is also sent, as an answer to the report $84 (Call Device-ID). The 16 bytes following the infotype represent the Device-ID in ASCII. If the name has less than 16 characters it will be filled with 0(ASCII 0 character). For example Device-ID is: **"Orbit Reader 20".**

ESC	
$84	
Byte 1	Device name as 16 ASCII bytes (padded with 0 at the end for the unused characters)
Byte 2	
Byte 3	
Byte 4	
Byte 5	
Byte 6	
Byte 7	
Byte 8	
Byte 9	
Byte 10	
Byte 11	
Byte 12	
Byte 13	
Byte 14	
Byte 15	
Byte 16	

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2.2.8 $8A Serial Number

This report is sent once, if the protocol is started. It is also sent if infotype $8A (Call Serial Number) received. The 8 bytes following the infotype are the serial number as 8 ASCII characters.

ESC
$8A
Byte1
Byte2
...
Byte7
Byte8

2.2.9 $8C Bluetooth Device Name

This report sends the Device Bluetooth Name. The name will be padded with 0 at the end for the unused characters.

ESC	
$8C	Infotype
ASCII 1	Bluetooth device name as 20 ASCII bytes (padded with 0 at the end for the unused characters)
ASCII 2	
. . . .	
ASCII 13	
ASCII 14	

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3 HID Protocol

The communication between the device and PC is made using IN/OUT reports.

3.1 Transfer-direction: PC ⇒ OR20 (Out reports)

3.1.1 $01 Display-data

This report is used to display something on the Braille display.

$01
Byte 0
Byte 1
Byte 2
…
…
Byte 19

Position of the display-elements:

0																			19

3.1.2 $05 Call major firmware version-number

This infotype is used to receive the major firmware version from the device. To get full version number please check $85 infotype. Version number 255 is send by all beta versions

$05
Any value

3.1.3 $02 Info request

This report is used to get the device information. The reports $84, $8A and $01 will be received.

$02
Value 0

3.1.4 $08 Repeat all

This report is used to receive all buttons status (button is pressed/not pressed).

$08
Any value

3.1.5 $15 Protocol on/off

If the protocol is turned on, the device enters in communication mode and sends the device ID, the serial number and the Braille display length.

$15	
Data	0 = Off / 1 = On

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3.1.6 $16 Get Communication Channel

This report is used to get the current communication channel. Data must be $FF to receive the current channel.

$16	
Data	$FF – query for the current setting

3.1.7 $84 Call Device ID

This report calls the device-ID.

$84
Any value

3.1.8 $8A Call Serial-Number

This report calls the serial number of the device.

$8A
Any value

3.1.9 $8C Call Bluetooth Device Name

This report calls the Bluetooth Device Name.

$8C
Any value

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3.2 Transfer-direction: OR20 ⇒ PC (IN Reports)

3.2.1 $01 Number of cells

No matter if more or less data is received this will trigger the $01 (Number of cells) report.

$01	
Number of cells	"N"

3.2.2 $05 Major Version number

$05
Major Version

3.2.3 $15 Protocol on/off

If the protocol is turned on, the device enters in communication mode and sends the device ID, the serial number and the Braille display length.

$15	
Data	0 = Off / 1 = On

3.2.4 $16 Communication-Channel USB, HID or BT

This report will be sent if the report parameter received from PC is $FF.

$16	
Data	$00 – USB $01 – Bluetooth $03 – HID

3.2.5 $24 Button-data

$24
Byte

	bit7	bit6	bit5	Bit4	bit3	bit2	bit1	bit0
Byte	0	0	D6	PR OR D5	D4	D3	PL or D2	D1

PL = Panning Left PR = Panning Right

Pressing the "Select" key first and then the B1… B6 keys the device will emulate the D1…D6 keys.

3.2.6 $33 Braille Keys

$33
Byte1
Byte2

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	Bit 7	Bit 6		Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte1	0	0		0	0	0	0	0	B9
Byte2	B8	B7		B6	B5	B4	B3	B2	B1

Position of Braille Keys

B3 – B2 – B1		B4 – B5 – B6
B7	B9	B8

3.2.7 $34 Arrow Keys

$34
Byte

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	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte	0	0	0	Select	Right	Down	Left	Up

Position of Joystick keys

	Up	
Left	Select	Right
	Down	

3.2.8 $84 Device ID

This report is sent once, if the communication protocol is started. It is also sent, as an answer to the report $84 (Call Device-ID). The 16 bytes following the infotype represent the Device-ID in ASCII. If the name has less than 16 characters it will be filled with 0(ASCII 0 character). For example, Device-ID is: **"Orbit Reader 20".**

$84	
Byte 1	Device name as 16 ASCII bytes (padded with 0 at the end for the unused characters)
Byte 2	
Byte 3	
Byte 4	
Byte 5	
Byte 6	
Byte 7	
Byte 8	
Byte 9	
Byte 10	
Byte 11	
Byte 12	
Byte 13	
Byte 14	
Byte 15	
Byte 16	

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3.2.9 $8A Serial Number

This report is sent once, if the protocol is started. It is also sent if infotype $8A (Call Serial Number) received. The 8 bytes following the infotype are the serial number as 8 ASCII characters.

$8A
Byte1
Byte2
...
Byte7
Byte8

3.2.10 $8C Bluetooth Device Name

This report sends the Device Bluetooth Name. The name will be padded with 0 at the end for the unused characters.

$8C	Infotype
ASCII 1	Bluetooth device name as 20 ASCII bytes (padded with 0 at the end for the unused characters)
ASCII 2	
. . . .	
ASCII 13	
ASCII 14	

4 Configuration table

#	***Field***	***Value***
1	*Product Name*	*“Orbit Reader 20 “(Please make note of the trailing space after ‘20’ ”.*
2	*USB Vendor ID (VID) (For both USB serial and USB HID)*	*0x0483*
3	*USB Product ID (PID) for HID mode*	*0xA1D3*
5	*USB Product ID (PID) for serial mode*	*0x5740*
5	*Bluetooth Name*	*Orbit reader 20 xxxx (xxxx is the last four digits of the unit serial number and so it varies from unit to unit)*
6	*Size of the display*	*20 cell*
7	*Communication modes supported*	*USB HID, USB Serial, Bluetooth (SPP profile)*

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