

HID Parser Error Checking

The following is a list of the error conditions that a HID parser should check and report. To facilitate debugging HID devices it is important that a HID parser report the detection of any of the following Errors in detail. The checking for and reporting of Warnings is optional but recommended.

Warnings flag unused or redundant items in report descriptors

A standard format is suggested below for parsers to report these errors. This reporting format is optional for parsers.

Revision Status

Revision	Date	Remarks
1.0	1/30/98	First Release

Error Tables

The Error Tables are divided into 4 groups: Unknown Items, Global Items, Local Items and Main Items. These groups correspond to the errors that can be generated by the respective HID item types.

Unknown Items

Item Name	Error Tag	Errors	Error Subcode	Warnings
	00	"Unknown Item" or "Reserved Item" found -- 0xUU	0x3F	
	00		0x3E	Long Item defined

Global Items

Item Name	Error Tag	Errors	Error Subcode	Warnings
Usage Page	04		0	Data field should be non-Zero
			1	Data field should not use reserved values
Logical Minimum	14	Must be within bounds of "Report Size" ¹	0	Min should be less than or equal to Max ¹
Logical Maximum	24	Must be within bounds of "Report Size" ¹	0	Max should be greater than or equal to Min ¹
Physical Minimum	34	Must have corresponding Max ¹	0	Min should be less than or equal to Max ¹
Physical Maximum	44	Must have corresponding Min ¹	0	Max should be greater than or equal to Min ¹
Unit Exponent	54		0	Data field reserved bits should be Zero (0)
Unit	64		0	Data field reserved bits should be Zero (0)
Report Size	74			
Report ID	84	Must be non-Zero	0	
		Must be less than or equal to 255 (contained by a byte)	1	
		Must be defined prior to any Input/Output/Feature items	2	
		Cannot span top level application collection boundaries	3	
Report Count	94		0	Report Count = 0
Push	A4		0	Data Field Size should be Zero (0)
			1	Should have corresponding "Pop"
Pop	B4	Must have corresponding "Push"	0	Data Field Size should be Zero (0)

¹ Checked when main item encountered.

All Local item checks for errors and warnings are (except delimiters) are checked when the parser encounters the next main item. Delimiter error are checked when they are encountered.

Local Items

Item Name	Error Tag	Errors	Error Subcode	Warnings
Usage	08		0	Data field should be non-Zero
Usage Minimum	18	Must have a corresponding Usage Maximum	0	
		Must be less than or equal to Usage Maximum	1	
		Usage Page of an extended Usage Minimum must match the Usage Page of corresponding extended Usage Maximum	3	
Usage Maximum	28	Must have a corresponding "Usage Minimum"	0	
		Must be greater than or equal to Minimum	1	
		Usage Page of an extended Usage Maximum must match the Usage Page of corresponding extended Usage Minimum	2	
Designator Index	38			
Designator Minimum	48	Must have a corresponding Designator Maximum	0	
		Must be less than or equal to Maximum	1	
Designator Maximum	58	Must have a corresponding Designator Minimum	0	
		Must be greater than or equal to Minimum	1	
String Index	78			
String Minimum	88	Must have a corresponding String Maximum	0	
		Must be less than or equal to Maximum	1	
String Maximum	98	Must have a corresponding String Minimum	0	
		Must be greater than or equal to Minimum	1	
Delimiter	A8	Must be Open (0) or Close (1)	0	
		No Nesting of Delimited sets	1	
		Must be corresponding Open and Close	2	
		May only contain Usage, Usage Minimum and Usage Maximum local items	3	
		May not be declared for top-level application collections	4	

Main Items

Item Name	Error Tag	Errors	Error Subcode	Warnings
Input	80	Required Global/Local Items must be defined ²	0	Data field reserved "flag" bits should be Zero (0)
		Cannot be contained within Delimiter (Open) and Delimiter (Close)	1	Local Items unused
		Logical Min/Max must be within bounds of Report Size ³	2	Local Items used more than once
		Logical or Physical Maximum must be greater than respective Minimum	3	
Output	90	Required Global/Local Items must be defined ²	0	Data field reserved "flag" bits should be Zero (0)
		Cannot be contained within Delimiter (Open) and Delimiter (Close)	1	Local Items unused
		Logical Min/Max must be within bounds of Report Size ³	2	Local Items used more than once
		Logical or Physical Max must be greater than respective Min	3	
Feature	B0	Required Global/Local Items must be defined ²	0	Data field reserved "flag" bits should be Zero (0)
		Cannot be contained within Delimiter (Open) and Delimiter (Close)	1	Local Items unused
		Logical Min/Max must be within bounds of Report Size ³	2	Local Items used more than once
		Logical or Physical Max must be greater than respective Min	3	
Collection	A0	Must have a corresponding "End Collection"	0	Data field should not use reserved values
		Cannot be contained within "Set Delimiter Open" and "Set Delimiter Close"	1	Local Items unused
			2	Collection Type Unknown
End Collection	C0	Must have a corresponding "Collection"	0	Local Items unused
		Cannot be contained within "Set Delimiter Open" and "Set Delimiter Close"	1	Data size should be Zero

² Item Names in bold font are "required" items.

³ The bit field declared by Report Size must be large enough to hold all values declared by Logical Minimum and Logical Maximum. This includes a sign bit if either are less than 0. Also if the Null flag is set then the field must be capable of reporting all values declared by Logical Minimum and Logical Maximum, and a null value.

HID Parser Error Code reporting

A standard method of reporting these errors and warnings as unique 16 bit error codes is:

Part	Description
BmParserErrorCode	Characteristics of this request
D15	Error Level 0 = Warning 1 = Error
D14	Error Type 0 = Standard Error 1 = Vendor Defined Error
D13..8	Error Subcode
D7..0	Item Error Tag

eg. Where the error code generated by a Report ID that Spans an application collection boundary is 0x4384:

Error Level = 1 (Error).

Error Sub Code = 0x03

Item Error Tag = 0x84