如何使用 PDM 功能发送自定义数据

PDM 支持完整的原始数据发送功能,数据格式参考表格

字节 1	字节 1-2	字节 3-6	字节 7-10	…	字 节 23-26	27-30
SOP	Header	Object 0	Object 1		Object 5	Object 6

例 1: 向 Source 发送一条 SOP VMD Discover Identity , Hander 中 MsgID 字段自动替换掉

pd data=008F1201A800FF

连续发送两次后 ID 会增加

74	SOP	GoodCRC	0	SRC←SNK		V3	0:00:26.890	5.076V/0.000A	81 00
75	SOP	Request	0	SRC←SNK	1	V3	0:00:31.463	5.032V/0.000A	82 10 2C B1 04 23
76	SOP	GoodCRC	0	SRC→SNK		V3	0:00:31.464	5.032V/0.000A	A1 01
77	SOP	Accept	1	SRC→SNK		V3	0:00:31.465	5.032V/0.000A	A3 03
78	SOP	GoodCRC	1	SRC←SNK		V3	0:00:31.466	5.032V/0.000A	81 02
79	SOP	PS RDY	2	SRC→SNK		V3	0:00:31.624	9.077V/0.000A	A6 05
80	SOP	GoodCRC	2	SRC←SNK		V3	0:00:31.625	9.077V/0.000A	81 04
81	SOP	Vendor Defined	1	SRC←SNK	1	V3	0:00:37.223	9.070V/0.000A	8F 12 01 A0 00 FF
82	SOP	GoodCRC	1	SRC→SNK		V3	0:00:37.224	9.070V/0.000A	A1 03
83	SOP	Vendor Defined	3	SRC→SNK	4	V3	0:00:37.226	9.070V/0.000A	AF 47 41 A0 00 FF D9 22 00 00 00 00 65 A5 00 00
84	SOP	GoodCRC	3	SRC←SNK		V3	0:00:37.226	9.070V/0.000A	81 06
85	SOP	Vendor Defined	2	SRC←SNK	1	V3	0:01:27.508	9.082V/0.000A	8F 14 01 A0 00 FF
86	SOP	GoodCRC	2	SRC→SNK		V3	0:01:27.508	9.082V/0.000A	A1 05
87	SOP	Vendor Defined	4	SRC→SNK	4	V3	0:01:27.510	9.082V/0.000A	AF 49 41 A0 00 FF D9 22 00 00 00 00 65 A5 00 00
88	SOP	GoodCRC	4	SRC←SNK		V3	0:01:27.511	9.082V/0.000A	81 08

详细数据

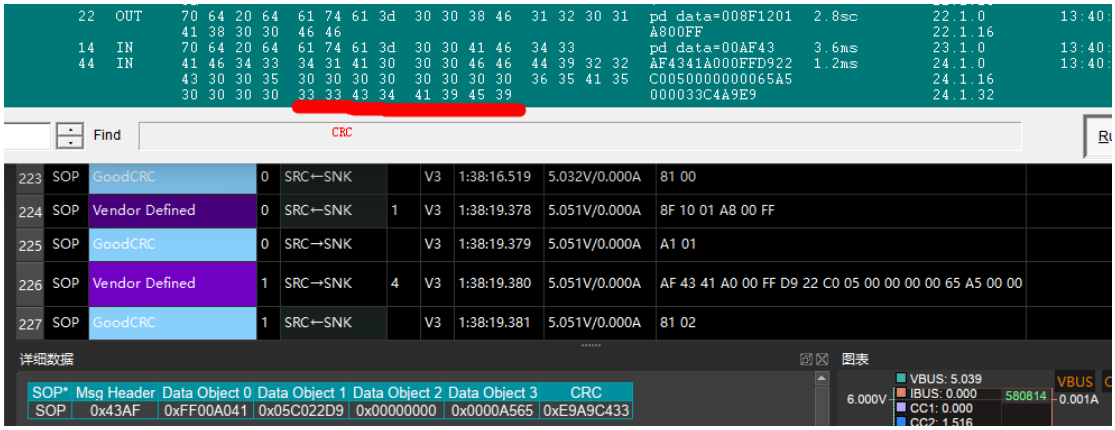
SOP*	Msg Header	Data Object 0	CRC
SOP	0x128F	0xFF00A001	0x08C216C4

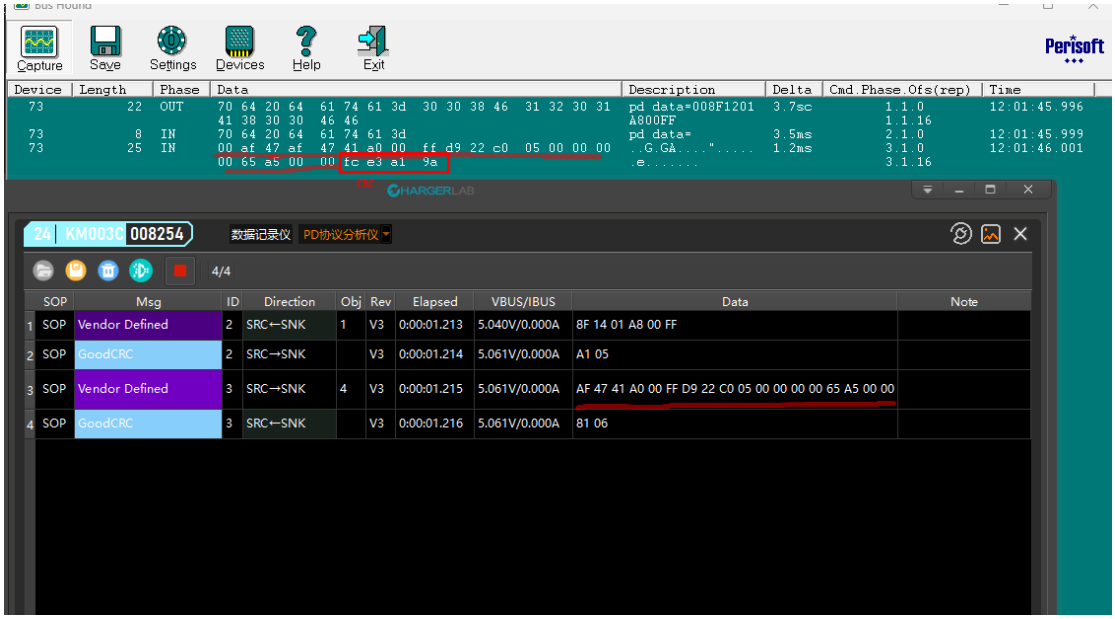
Msg Header	Extended	Objects	Msg ID	Power Role	Spec Rev	Data Role	Msg Type
Vendor Defined	0	1	1	0	2	0	15

VDM Header	SVID	VDM Type	Major Version	Minor Version	ObjPos	CommandType	Command
0xFF00A001	0xFF00	1	1	0	0	0	1
		Structured				REQ	Discover Identity

如何收数据:

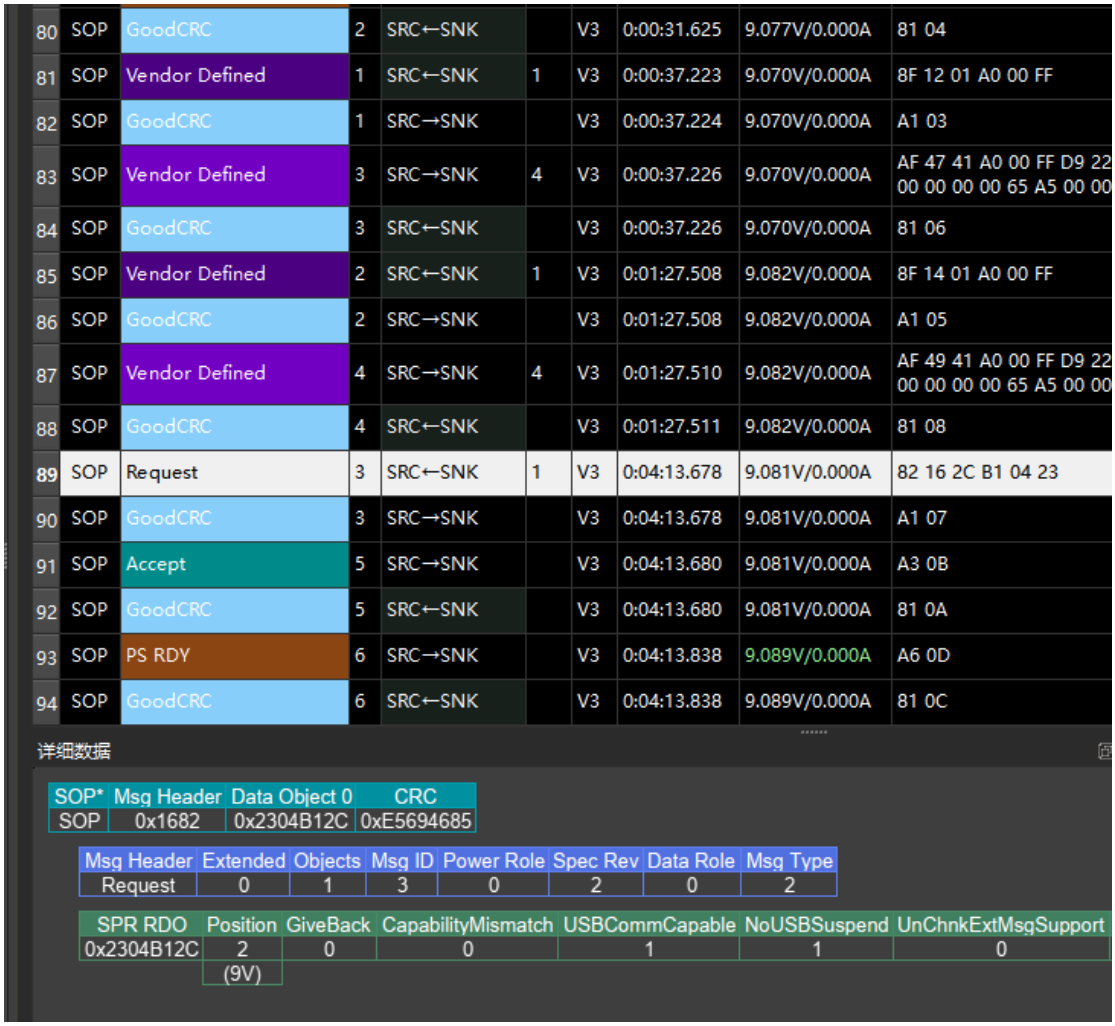
pd data=00AF43AF4341A000FFD922C0050000000065A5000033C4A9E9





例 2: 向 Source 发送一条 Request Fixed 9V

pd data=0082102CB10423



80	SOP	GoodCRC	2	SRC←SNK		V3	0:00:31.625	9.077V/0.000A	81 04
81	SOP	Vendor Defined	1	SRC←SNK	1	V3	0:00:37.223	9.070V/0.000A	8F 12 01 A0 00 FF
82	SOP	GoodCRC	1	SRC→SNK		V3	0:00:37.224	9.070V/0.000A	A1 03
83	SOP	Vendor Defined	3	SRC→SNK	4	V3	0:00:37.226	9.070V/0.000A	AF 47 41 A0 00 FF D9 22 00 00 00 00 65 A5 00 00
84	SOP	GoodCRC	3	SRC←SNK		V3	0:00:37.226	9.070V/0.000A	81 06
85	SOP	Vendor Defined	2	SRC←SNK	1	V3	0:01:27.508	9.082V/0.000A	8F 14 01 A0 00 FF
86	SOP	GoodCRC	2	SRC→SNK		V3	0:01:27.508	9.082V/0.000A	A1 05
87	SOP	Vendor Defined	4	SRC→SNK	4	V3	0:01:27.510	9.082V/0.000A	AF 49 41 A0 00 FF D9 22 00 00 00 00 65 A5 00 00
88	SOP	GoodCRC	4	SRC←SNK		V3	0:01:27.511	9.082V/0.000A	81 08
89	SOP	Request	3	SRC←SNK	1	V3	0:04:13.678	9.081V/0.000A	82 16 2C B1 04 23
90	SOP	GoodCRC	3	SRC→SNK		V3	0:04:13.678	9.081V/0.000A	A1 07
91	SOP	Accept	5	SRC→SNK		V3	0:04:13.680	9.081V/0.000A	A3 0B
92	SOP	GoodCRC	5	SRC←SNK		V3	0:04:13.680	9.081V/0.000A	81 0A
93	SOP	PS RDY	6	SRC→SNK		V3	0:04:13.838	9.089V/0.000A	A6 0D
94	SOP	GoodCRC	6	SRC←SNK		V3	0:04:13.838	9.089V/0.000A	81 0C

详细数据

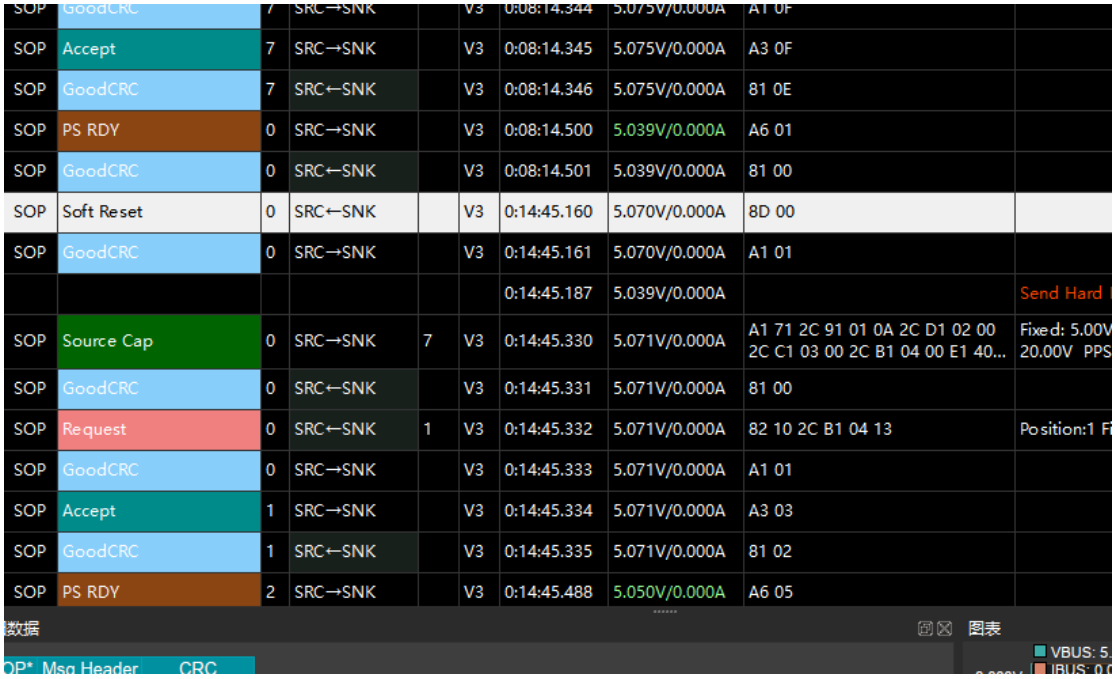
SOP*	Msg Header	Data Object 0	CRC
SOP	0x1682	0x2304B12C	0xE5694685

Msg Header	Extended	Objects	Msg ID	Power Role	Spec Rev	Data Role	Msg Type
Request	0	1	3	0	2	0	2

SPR RDO	Position	GiveBack	CapabilityMismatch	USBCommCapable	NoUSBSuspend	UnChnkExtMsgSupport
0x2304B12C	2 (9V)	0	0	1	1	0

例 3: 向 Source 发送一条 soft reset

pd data=008D00



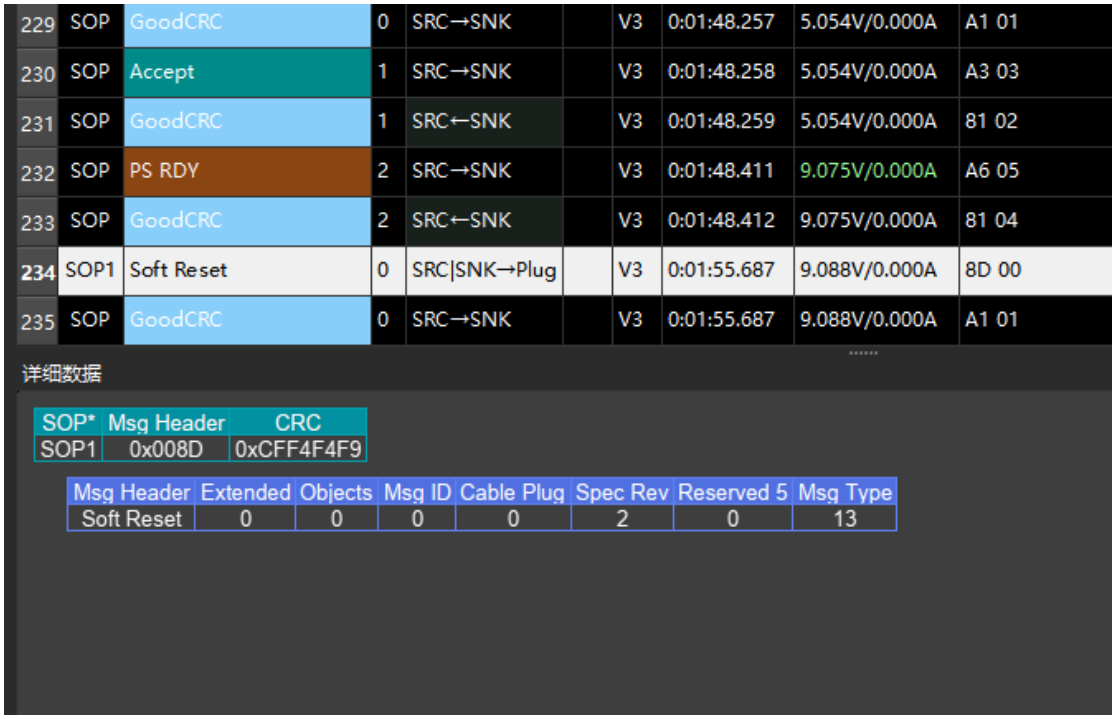
SOP	Accept	7	SRC→SNK		V3	0:08:14.345	5.075V/0.000A	A3 0F	
SOP	GoodCRC	7	SRC←SNK		V3	0:08:14.346	5.075V/0.000A	81 0E	
SOP	PS RDY	0	SRC→SNK		V3	0:08:14.500	5.039V/0.000A	A6 01	
SOP	GoodCRC	0	SRC←SNK		V3	0:08:14.501	5.039V/0.000A	81 00	
SOP	Soft Reset	0	SRC←SNK		V3	0:14:45.160	5.070V/0.000A	8D 00	
SOP	GoodCRC	0	SRC→SNK		V3	0:14:45.161	5.070V/0.000A	A1 01	
						0:14:45.187	5.039V/0.000A		Send Hard
SOP	Source Cap	0	SRC→SNK	7	V3	0:14:45.330	5.071V/0.000A	A1 71 2C 91 01 0A 2C D1 02 00 2C C1 03 00 2C B1 04 00 E1 40...	Fixed: 5.00V 20.00V PPS
SOP	GoodCRC	0	SRC←SNK		V3	0:14:45.331	5.071V/0.000A	81 00	
SOP	Request	0	SRC←SNK	1	V3	0:14:45.332	5.071V/0.000A	82 10 2C B1 04 13	Position:1 F
SOP	GoodCRC	0	SRC→SNK		V3	0:14:45.333	5.071V/0.000A	A1 01	
SOP	Accept	1	SRC→SNK		V3	0:14:45.334	5.071V/0.000A	A3 03	
SOP	GoodCRC	1	SRC←SNK		V3	0:14:45.335	5.071V/0.000A	81 02	
SOP	PS RDY	2	SRC→SNK		V3	0:14:45.488	5.050V/0.000A	A6 05	

数据 图表

OP* Msg Header CRC

VBUS: 5.

注意了向发送 Cable 命令需要 Cable 供电才能工作，同时低于 V2.0.4 不兼容，高于 2.0.4 后会兼容 SOP1 SOP2 等
发送一条 Cable soft reset
pd data=018D00



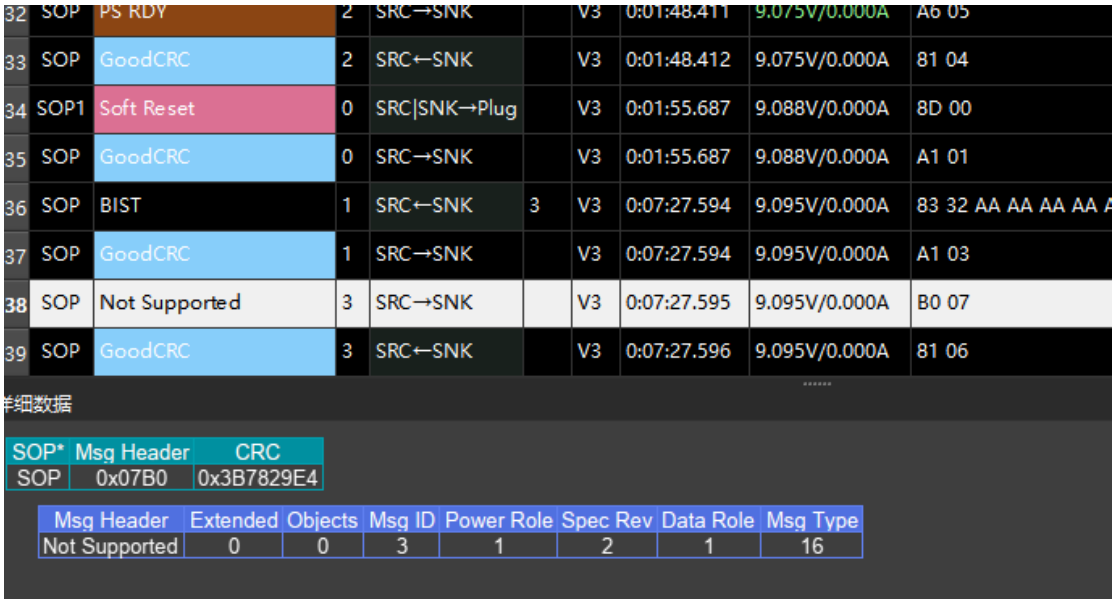
229	SOP	GoodCRC	0	SRC→SNK		V3	0:01:48.257	5.054V/0.000A	A1 01
230	SOP	Accept	1	SRC→SNK		V3	0:01:48.258	5.054V/0.000A	A3 03
231	SOP	GoodCRC	1	SRC←SNK		V3	0:01:48.259	5.054V/0.000A	81 02
232	SOP	PS RDY	2	SRC→SNK		V3	0:01:48.411	9.075V/0.000A	A6 05
233	SOP	GoodCRC	2	SRC←SNK		V3	0:01:48.412	9.075V/0.000A	81 04
234	SOP1	Soft Reset	0	SRC|SNK→Plug		V3	0:01:55.687	9.088V/0.000A	8D 00
235	SOP	GoodCRC	0	SRC→SNK		V3	0:01:55.687	9.088V/0.000A	A1 01

详细数据

SOP*	Msg Header	CRC
SOP1	0x008D	0xCFF4F4F9

Msg Header	Extended	Objects	Msg ID	Cable Plug	Spec Rev	Reserved 5	Msg Type
Soft Reset	0	0	0	0	2	0	13

例 4: 向 Source 发送一条 BIST
pd data=008330AAAAAAAAAAAAAAAAAAAAAA



32	SOP	PS RDY	2	SRC→SNK		V3	0:01:48.411	9.075V/0.000A	A6 05
33	SOP	GoodCRC	2	SRC←SNK		V3	0:01:48.412	9.075V/0.000A	81 04
34	SOP1	Soft Reset	0	SRC|SNK→Plug		V3	0:01:55.687	9.088V/0.000A	8D 00
35	SOP	GoodCRC	0	SRC→SNK		V3	0:01:55.687	9.088V/0.000A	A1 01
36	SOP	BIST	1	SRC←SNK	3	V3	0:07:27.594	9.095V/0.000A	83 32 AA AA AA AA A
37	SOP	GoodCRC	1	SRC→SNK		V3	0:07:27.594	9.095V/0.000A	A1 03
38	SOP	Not Supported	3	SRC→SNK		V3	0:07:27.595	9.095V/0.000A	B0 07
39	SOP	GoodCRC	3	SRC←SNK		V3	0:07:27.596	9.095V/0.000A	81 06

详细数据

SOP*	Msg Header	CRC
SOP	0x07B0	0x3B7829E4

Msg Header	Extended	Objects	Msg ID	Power Role	Spec Rev	Data Role	Msg Type
Not Supported	0	0	3	1	2	1	16

还可以这样处理 cmd 数据 pd cmd=9 命令(data swap)
发送 pd cmd=1 命令(good crc)会出现奇异效果

当需要对发送的 header 都包含 data role 置 1 时 就必须先发送一条 pd drp
发送 pd drp \ pd cmd=9 \ pd data=008906 结果一样

需要注意 Message Header 中的数据用户能控制的只有 Extended \ Number of Data Objects \ Message Type MessageID \ Port Power Role \ Specification Revision \ Port Data Role 由状态机决定的，和串口发送的数据有偏差，