Intel® Ethernet Controller X710/ XXV710/XL710

Dynamic Device Personalization PPPoE and PPPoL2TPv2 Protocols

Ethernet Products Group (EPG)

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Revision 1.1

Revision History

Document Revision	Date	Comments
1.1	July 2020	Refreshed.
1.0	July 2018	Initial release (Intel Public).

1.0 Introduction

This documents describes the Dynamic Device Personalization (DDP) functionality supported by the Intel® Ethernet Controller X710/XXV710/XL710 starting with firmware version 6.01.

The DDP profile (0x80000006) contains the X710/XXV710/XL710 parser graph for PPPoE and PPPoL2TPv2 protocols.

Table 1. Terms and Definitions

Term	Definition
DDP	Dynamic device personalization.
L2TPv2	Layer 2 tunneling protocol, version 2.
PPP	Point-to-point protocol.
PPPoE	PPP over Ethernet.
PPPoL2TPv2	PPP over L2TPv2.

Table 2. Version History

Version	Description
0.0.0.7	Initial release of PPP parser graph for the X710/XXV710/XL710.
0.0.0.8	Metadata sections to use OIPV4/OIPV6 for tunneled packets.
0.0.0.9	Default FDINSET for PCTYPE 22, make it same as HINSET: inner IP SA/DA + L4 SPORT/DPORT.
0.0.0.10	Default fields swap for symmetrical IPv4/IPv6 hash.
0.0.0.17	Re-factor L2TPv2 support to minimize number of PCTYPEs.
1.1.6.1	PPP for PPPoE Session and L2TP data with Offset field support.

Table 3. Firmware/NVM Support Matrix

FW Version	NVM Map Version	Description
6.01	6.36	Operating system and device independent.
6.02	6.48	

Table 4. PPP Packet Field Vector

Word Num	Protocol Layers			
	L2 Protocol Layers			
0:2	Destination MAC address (in outer or single L2 header).			
3:5	Source MAC address (in outer or single L2 header).			
6	Default S-tag (DPDK: word 37).			
7	0x00.			
8	Inner or single VLAN tag (in outer or single L2 header).			
	L3 Protocol Layers			
	PPP Inner IPv4	**PPP Inner IPv6**	**PPP Control**	**L2TPv2 Control**
9	First 8 words of the IPv4 header (up to including the source IP address).	First 4 words of the IPv6 header (up to including the hop limit).	0x00	0x00
10			0x00	0x00
11:12			0x00	0x00
13:16		IPv6 source address.	0x00	0x00
17:20	0x00		0x00	0x00
21:22	0x00	IPv6 destination address.	0x00	0x00
23:26	0x00		0x00	0x00
27:28	Destination IP address.		0x00	0x00
	L4 Protocol Layers			
	TCP	**UDP**	**SCTP**	**ICMP**
29:30	First 16 bytes of the TCP header.	First 8 bytes of the UDP header.	First 8 bytes of the SCTP header.	Words 0, 1 of the header.
31:32				0x00
33:36		0x00	0x00	
	DPDK Outer VLAN for QinQ			
37	S-tag (DPDK)	S-tag (DPDK)	S-tag (DPDK)	S-tag (DPDK)
	PPP/L2TPv2 Tunnel Layer and Flexible Payload			
38:43	0x00			
44:45	Tunneling key (VXLAN, GRE).			
46	L2TPv2 tunnel ID.			
	PPP/L2TPv2 Tunnel Layer and Flexible Payload			
47	L2TPv2 or PPPoE session ID.			
48	PPP protocol ID.			
50:57	Outer destination IP address or flexible payload.			

Note: DPDK (up to release 17.11) forces flexible payload to the first 16 bytes of the payload and overrides the outer destination IP address. Starting from DPDK 18.02, the flexible payload is extracted only if enabled by the flow director configuration.

Table 5. Packet Classifier Types and Its Input Set

PCTYPE	PCTYPE Description	Hash Input Set	FD Input Set
14	IP, L2TPv2 control[1]	MAC SA, L2TPv2 session ID	MAC SA, L2TPv2 session ID
15	PPPoE, IPv4	IPv4 SA, IPv4 DA, S-port, D-port	IPv4 SA, IPv4 DA, S-port, D-port
16	PPPoE, IPv6	IPv6 SA, IPv6 DA, S-port, D-port	IPv6 SA, IPv6 DA, S-port, D-port
17	PPPoE Control	MAC SA, PPPoE session ID	MAC SA, PPPoE session ID
18	IP, L2TPv2, PPP, IPv4	IPv4 SA, IPv4 DA, S-port, D-port	IPv4 SA, IPv4 DA, S-port, D-port
19	IP, L2TPv2, PPP, IPv6	IPv6 SA, IPv6 DA, S-port, D-port	IPv6 SA, IPv6 DA, S-port, D-port
20	IP, L2TPv2, PPP control	MAC SA, L2TPv2 session ID	MAC SA, L2TPv2 session ID
21	IP, L2TPv2 data[2]	MAC SA, L2TPv2 session ID	MAC SA, L2TPv2 session ID

1. T bit set to 1b.
2. T bit set to 0b, but payload is not a PPP packet.

Table 6. Packet Types

PTYPE	Description	PTYPE	Description
PPPoE --> Payload			
154	PPPoE, PAY3		
PPPoE --> IPv4		**PPPoE --> IPv6**	
155	PPPoE, IPV4FRAG, PAY3	161	PPPoE, IPV6 FRAG, PAY3
156	PPPoE, IPV4, PAY3	162	PPPoE, IPV6, PAY3
157	PPPoE, IPV4, UDP, PAY4	163	PPPoE, IPV6, UDP, PAY4
158	PPPoE, IPV4, TCP, PAY4	164	PPPoE, IPV6, TCP, PAY4
159	PPPoE, IPV4, SCTP, PAY4	165	PPPoE, IPV6, SCTP, PAY4
160	PPPoE, IPV4, ICMP, PAY4	166	PPPoE, IPV6, ICMPV6, PAY4
IPv4 --> L2TPv2 --> PPP		**IPv6 --> L2TPv2 --> PPP**	
167	IPV4, PRE_L2TPv2 PPPoL2TPv2, PAY3	180	IPV6, PRE_L2TPv2 PPPoL2TPv2, PAY3
168	IPV4, PRE_L2TPv2 PPPoL2TPv2, IPV4 FRAG, PAY3	181	IPV6, PRE_L2TPv2 PPPoL2TPv2, IPV4 FRAG, PAY3
169	IPV4, PRE_L2TPv2 PPPoL2TPv2, IPV4, PAY3	182	IPV6, PRE_L2TPv2 PPPoL2TPv2, IPV4, PAY3
170	IPV4, PRE_L2TPv2 PPPoL2TPv2, IPV4, UDP, PAY4	183	IPV6, PRE_L2TPv2 PPPoL2TPv2, IPV4, UDP, PAY4
171	IPV4, PRE_L2TPv2 PPPoL2TPv2, IPV4, TCP, PAY4	184	IPV6, PRE_L2TPv2 PPPoL2TPv2, IPV4, TCP, PAY4
172	IPV4, PRE_L2TPv2 PPPoL2TPv2, IPV4, SCTP, PAY4	185	IPV6, PRE_L2TPv2 PPPoL2TPv2, IPV4, SCTP, PAY4
173	IPV4, PRE_L2TPv2 PPPoL2TPv2, IPV4, ICMP, PAY4	186	IPV6, PRE_L2TPv2 PPPoL2TPv2, IPV4, ICMP, PAY4
174	IPV4, PRE_L2TPv2 PPPoL2TPv2, IPV6 FRAG, PAY3	187	IPV6, PRE_L2TPv2 PPPoL2TPv2, IPV6 FRAG, PAY3
175	IPV4, PRE_L2TPv2 PPPoL2TPv2, IPV6, PAY3	188	IPV6, PRE_L2TPv2 PPPoL2TPv2, IPV6, PAY3
176	IPV4, PRE_L2TPv2 PPPoL2TPv2, IPV6, UDP, PAY4	189	IPV6, PRE_L2TPv2 PPPoL2TPv2, IPV6, UDP, PAY4
177	IPV4, PRE_L2TPv2 PPPoL2TPv2, IPV6, TCP, PAY4	190	IPV6 ,PRE_L2TPv2 PPPoL2TPv2, IPV6, TCP, PAY4
178	IPV4, PRE_L2TPv2 PPPoL2TPv2, IPV6, SCTP, PAY4	191	IPV6, PRE_L2TPv2 PPPoL2TPv2, IPV6, SCTP, PAY4
179	IPV4, PRE_L2TPv2 PPPoL2TPv2, IPV6, ICMPV6, PAY4	150	IPV6, PRE_L2TPv2 PPPoL2TPv2, IPV6, ICMPV6, PAY4
IPv4 --> L2TPv2CTRL		**IPv6 --> L2TPv2CTRL**	
12	IPV4, L2TPv2CTRL, PAY4	13	IPV6, L2TPv2CTRL, PAY4
16	IPV4, UDP, L2TPv2, L2TPv2CTRL, PAY4	17	IPV6, UDP, L2TPv2, L2TPv2CTRL, PAY4

Note: Due to limited number of packet types available, types numeration is not sequential and some spare types with lower numbers are used.

Double tunnelling is not supported. For example, packet types for PPPoE over VXLAN are not defined.

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