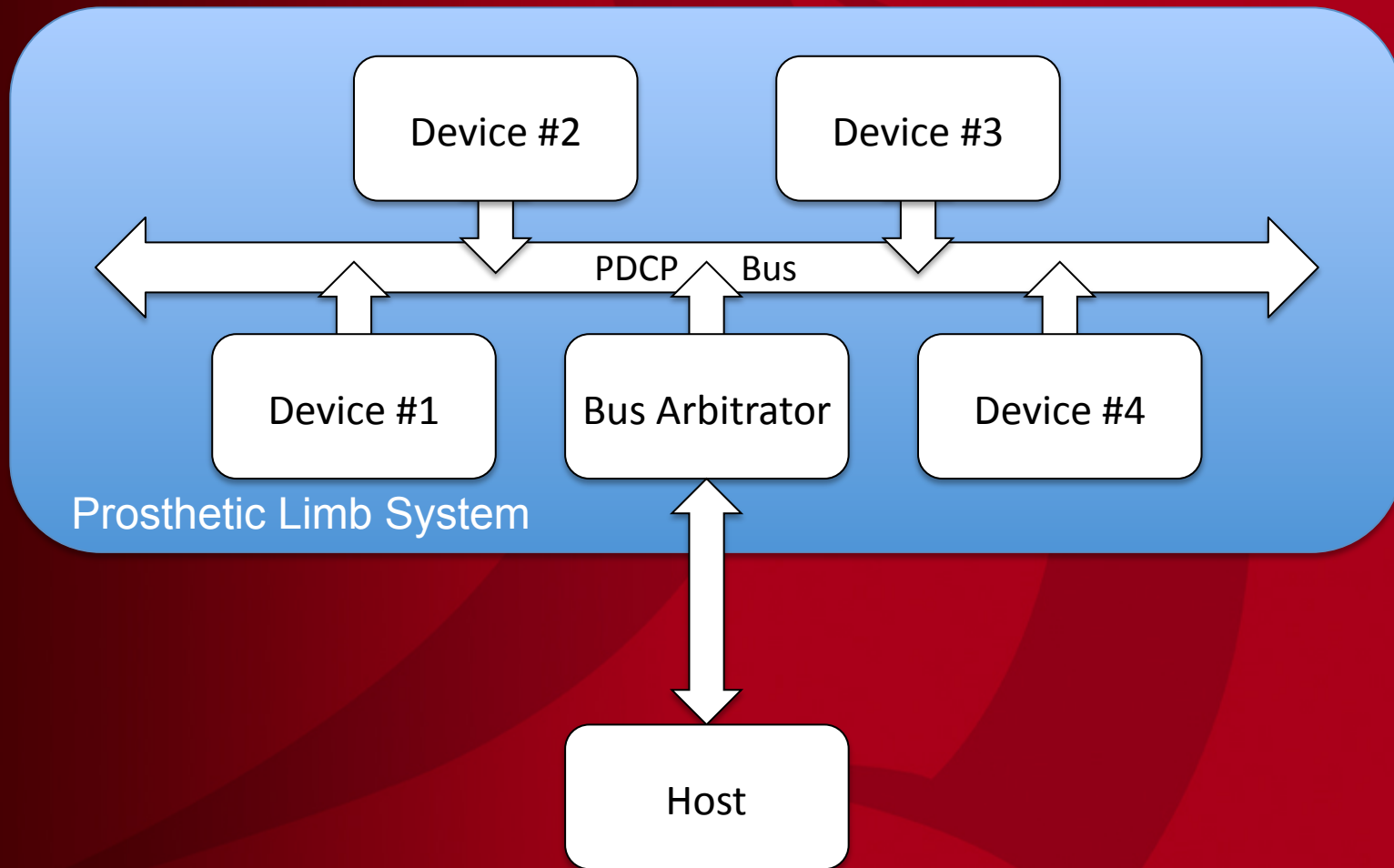


Prosthetic Device Communication Protocol

PDCP Overview

Structure of the PDCP Bus System



Structure of the PDCP Bus System

- Main Philosophy
 - Design of a device should not require any knowledge of the system(s) in which it could be used
 - Avoids limiting the capability/interoperability potential of devices
 - Simplifies design by focusing on PDCP design requirements instead of the requirements of a specific system
 - Device must be capable of saving any of its configurable parameters
 - Avoids the need for reconfiguration on subsequent power-on reset
 - Node Ids are assigned by the Bus Arbitrator and may or may not vary on every power-on reset
 - Node Ids simply used to avoid CAN arbitration issues and not intended to be a means of configuring system

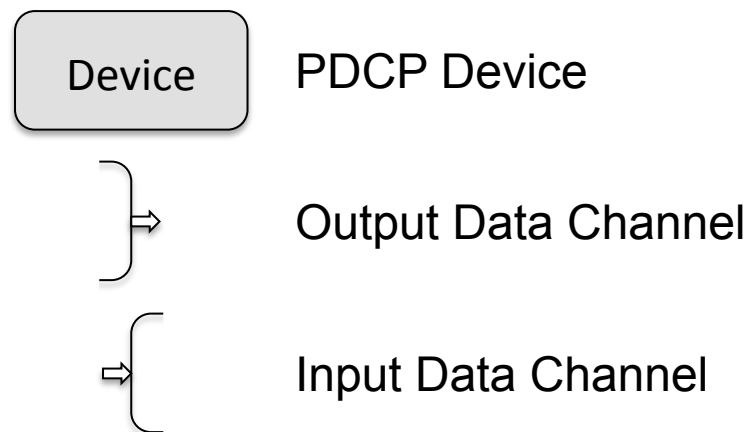
Structure of the PDCP Bus System

- Main Philosophy
 - Each device must be uniquely identifiable
 - Vendor Id
 - Product Id
 - Serial Number
 - Bus Arbitrator responsible for binding devices onto network and providing an interface for Software Applications to configure the devices and device interconnections on the PDCP bus system
 - Provides a layer of abstraction to the Software Application developers since there is no need to understand the PDCP's Network Layer (OSI Layer 3) functions and definitions when creating the PDCP's Application Layer (OSI Layer 7)

PDCP Device Structure Overview

Structure of a Device in a PDCP Bus System

- Two Main Components:
 - The device itself
 - The device's data channel(s)
 - Input
 - Output



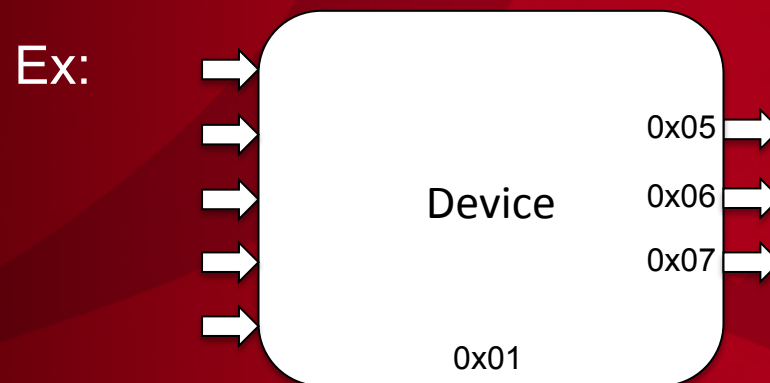
Structure of a Device in a PDCP Bus System

- Device can have multiple input and output data channels



Structure of a Device in a PDCP Bus System

- A Node Id is assigned to the Device by the Bus Arbitrator during the binding process
 - The assigned Node Id used for Device <-> Bus Arbitrator communication (includes acquiring and setting parameters)
- Additional Node Id are assigned to each Output Data Channel of the bounded Device

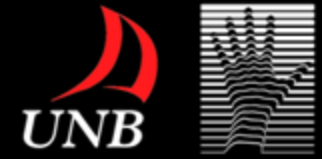


Device Parameters Structure Overview

Structure of Device Parameters

- Device Parameters are subdivided into different sections
 - Device specific parameters
 - Parameters associated with a specific input data channel
 - Parameters associated with a specific output data channel

PDCP Overview



Structure of Device Parameters

Parameter Id	Parameter Description	DEVICE PARAMETERS
1	Device VID and PID	
2	Device Serial Number	
3	Device EAN13L	
4	Device EAN13H	
5	Device FW and HW ver.	
6	Device Type and Profile	
7	Device Descriptor	
8	Device Node Id	
9	# of Data Channels	
10	Beacon Interval	
11	Time to Wait for Acknowledgement	
12	Bind Request Timeout	
13	Parameter #13	
⋮	⋮	

Device Specific Parameters

Parameter Id	Parameter Description	DATA CHANNEL #N PARAMETERS
1	Channel Type and Profile	
2	Channel Descriptor	
3	Transfer Type (Input = 1)	
4	Data Transfer Enabled Flag	
5	Source's VID and PID	
6	Source's SN and Channel Index	
7	Source's Node Ids	
8	Parameter #8	
9	Parameter #9	
⋮	⋮	

Input Data Channel Parameters

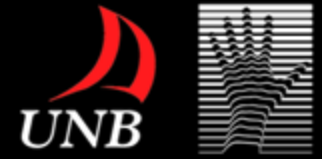
Parameter Id	Parameter Description	DATA CHANNEL #M PARAMETERS
1	Channel Type and Profile	
2	Channel Descriptor	
3	Transfer Type (Output = 2)	
4	Data Transfer Enabled Flag	
5	Channel Node Id	
6	Parameter #6	
7	Parameter #7	
8	Parameter #8	
9	Parameter #9	
⋮	⋮	

Output Data Channel Parameters

Structure of Device Parameters

- Referencing these parameters is accomplished using both a Parameter Id and a Channel Index
 - Device Specific Parameters always use Channel Index = 0
 - The Channel Index value will be ≥ 1 any data channel available on the device

PDCP Overview



Example of Parameter Listing for a PDCP Device

Channel Index	Parameter Id	Parameter Description	
0	1	Device VID and PID	DEVICE PARAMETERS
	2	Device Serial Number	
	3	Device EAN13L	
	4	Device EAN13H	
	5	Device FW and HW ver.	
	6	Device Type and Profile	
	7	Device Descriptor	
	8	Device Node Id	
	9	# of Data Channels	
	10	Beacon Interval	
	11	Time to Wait for Acknowledgement	
	12	Bind Request Timeout	
	13	Parameter #13	
	:	:	
1	1	Channel Type and Profile	DATA CHANNEL #1 PARAMETERS
	2	Channel Descriptor	
	3	Transfer Type (Input = 1)	
	4	Data Transfer Enabled Flag	
	5	Source's VID and PID	
	6	Source's SN and Channel Index	
	7	Source's Node Ids	
	8	Parameter #8	
	9	Parameter #9	
	:	:	
2	1	Channel Type and Profile	DATA CHANNEL #2 PARAMETERS
	2	Channel Descriptor	
	3	Transfer Type (Output = 2)	
	4	Data Transfer Enabled Flag	
	5	Channel Node Id	
	6	Parameter #6	
	7	Parameter #7	
	8	Parameter #8	
	9	Parameter #9	
	:	:	

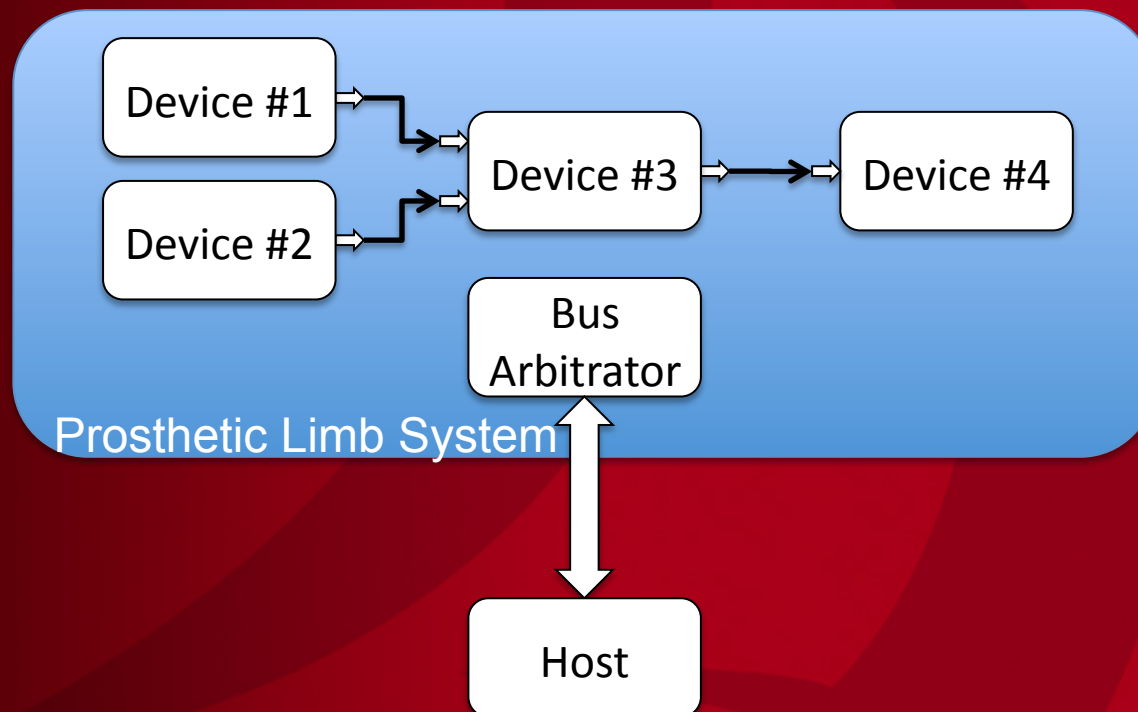
Device

Input Data Channel
Output Data Channel

Inter-Device Communication Data Channel Link

Data Channel Link

- Data streaming and inter-device communication accomplished using both Input and Output Data Channels



Data Channel Link

- PDCP System allows for multiple Input Data Channels to receive the same data from a single Output Data Channel
- Format of the streaming data is dependent on the Output Data Channel's Type and Profile parameters

