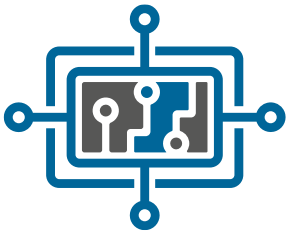
Active NPC System

User Manual r1.0



PED-Hub

1. Limited Warranty

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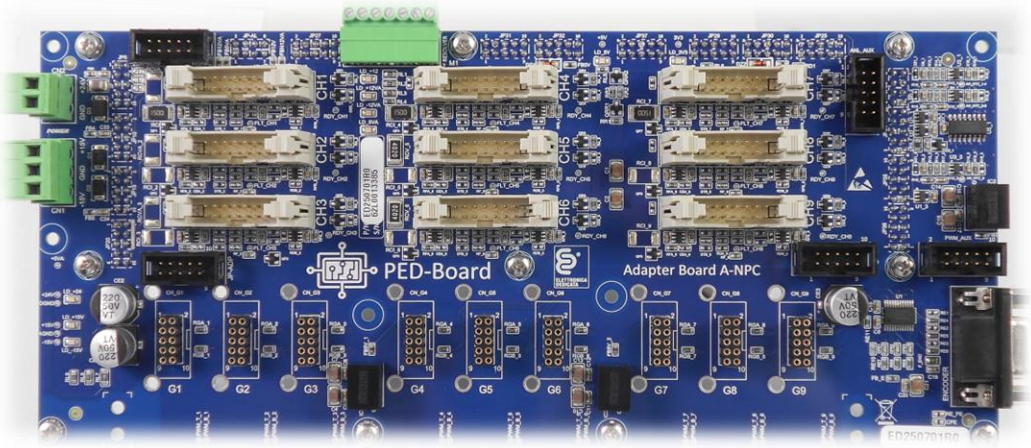
2. Components specifications

Description	Quantity	Code
PED-Board V4	1	PF_PED-BOARD
Adapter Board Active NPC	1	ED250701R0
Optical Transmitter Board 2ch	9	ED240603R1
One Phase Active NPC Module	3	ED250702R0
Optical Gate Driver	9	ED240601R0-A
Adapter 90° gate driver board	9	ED231003R0
Internal power supplies: ○ +12V @4A (3x) ○ +12V @8A(1x) ○ +/-15V @3,5A (2x) ○ +24V @4,5A (1x)	4	 ALIM_0008 ALIM_0012 ALIM_0016 ALIM_0013
Flat cables 14P 28AWG P1.27mm	9	ELM_0175
Fiber Optics 62.5um/125um 2m	18	ELM_0012
Structure for Active NPC system	1	ASS-ED-0168
High Voltage Sensing Board V3 (HVSB.V3)	3	PF_ED160107-R1

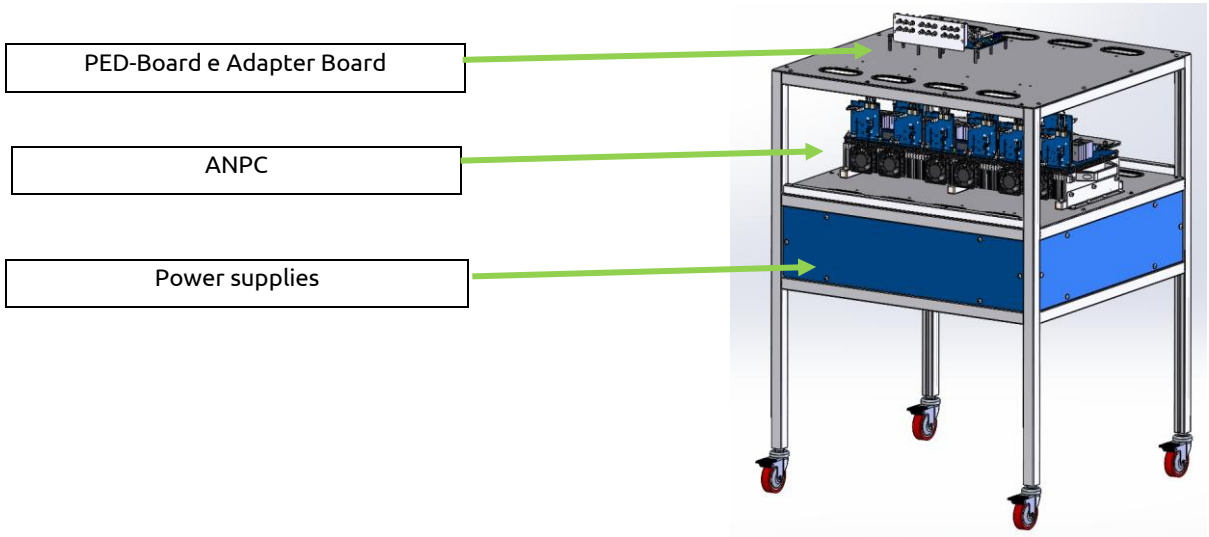
3. Adapter board ANPC



4. System Architecture and Peripheral Modules

The Active Neutral Point Clamped system, hereinafter ANPC, is structured on 3 main levels:

- Control system, PED-Board V4 with dedicated Adapter Board
- Inverter ANPC.
- Section with auxiliary power supplies



The control system consists of the PED-Board V4 and a ANPC adapter board capable of managing up to 18 Sic modules, with transmission of PWM signals over optical fiber and electrical management of fault, ready, voltage and current signals.

The power supplies used by the control system are:

- +12V for the PED-Board
- +24V, +/-15V for ANPC modules.

4.1. Specifications

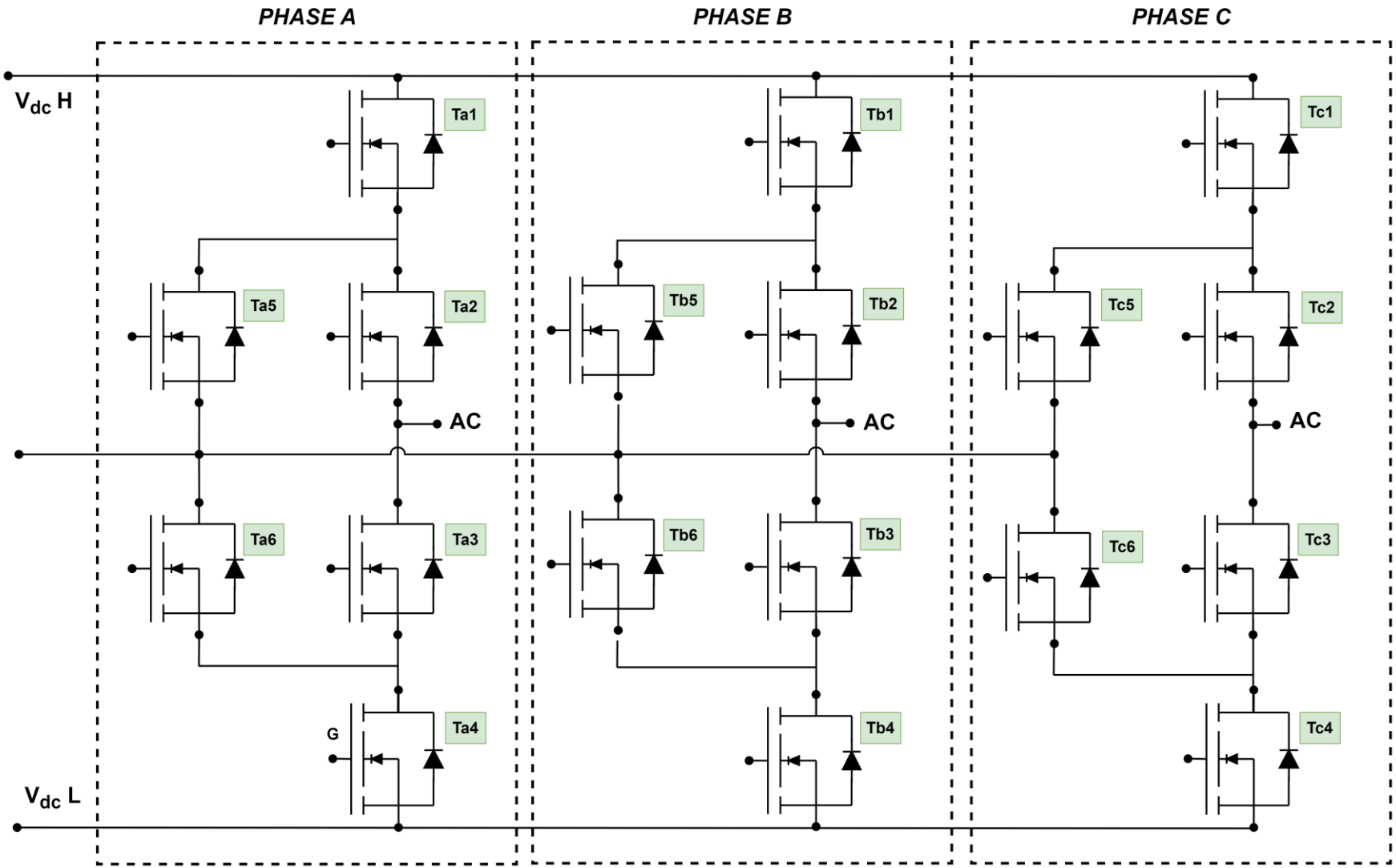
- System Dimensions: 750 x 700 x 865 mm
- Weight: 120Kg
- Main power supply: 230VAC

4.2. Software

- LabVIEW RT e FPGA: Active NPC_Starting Project_LV.7z
- Typhoon HIL: Active NPC_Typhoon HIL.7z

5. ANPC SYSTEM

T__: Sic power modules

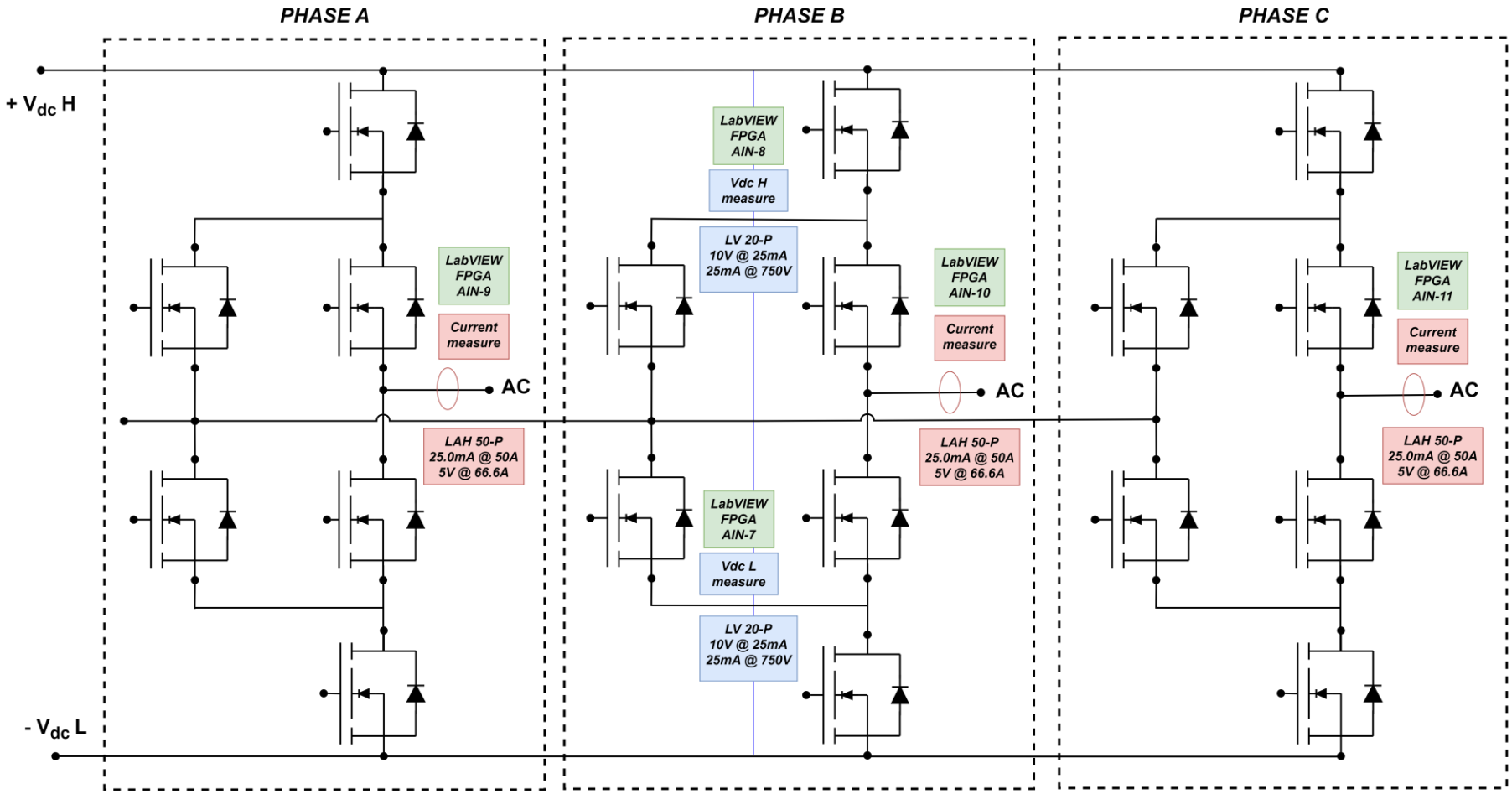


6. MEASURAMENTS

CURRENT Measuring range: -50A / 50A LSB= 0.00813802

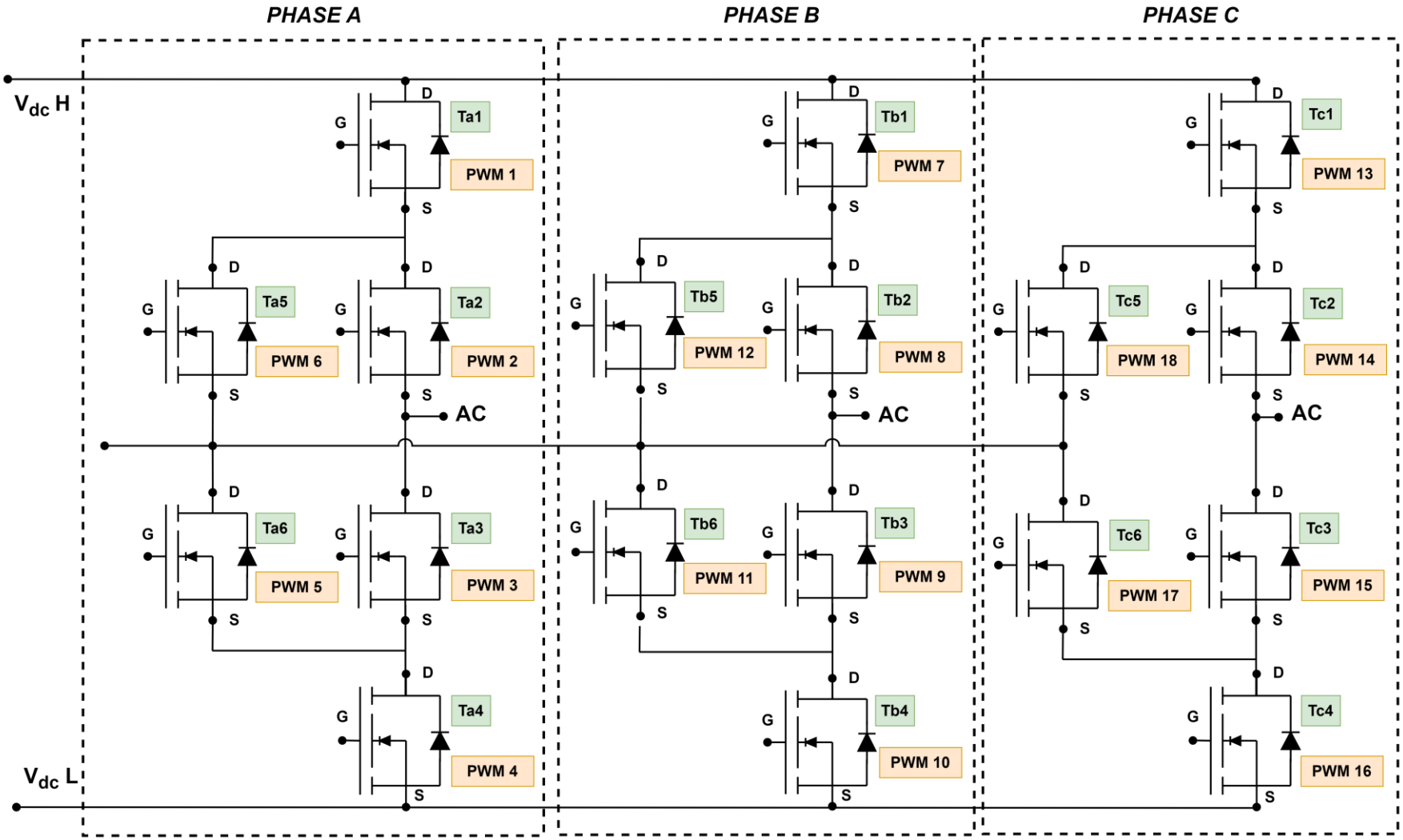
VOLTAGE Measuring range: 0 / 750V LSB= 0.0457764

LabVIEW FPGA variable



7. PWM SIGNALS

PWM signals

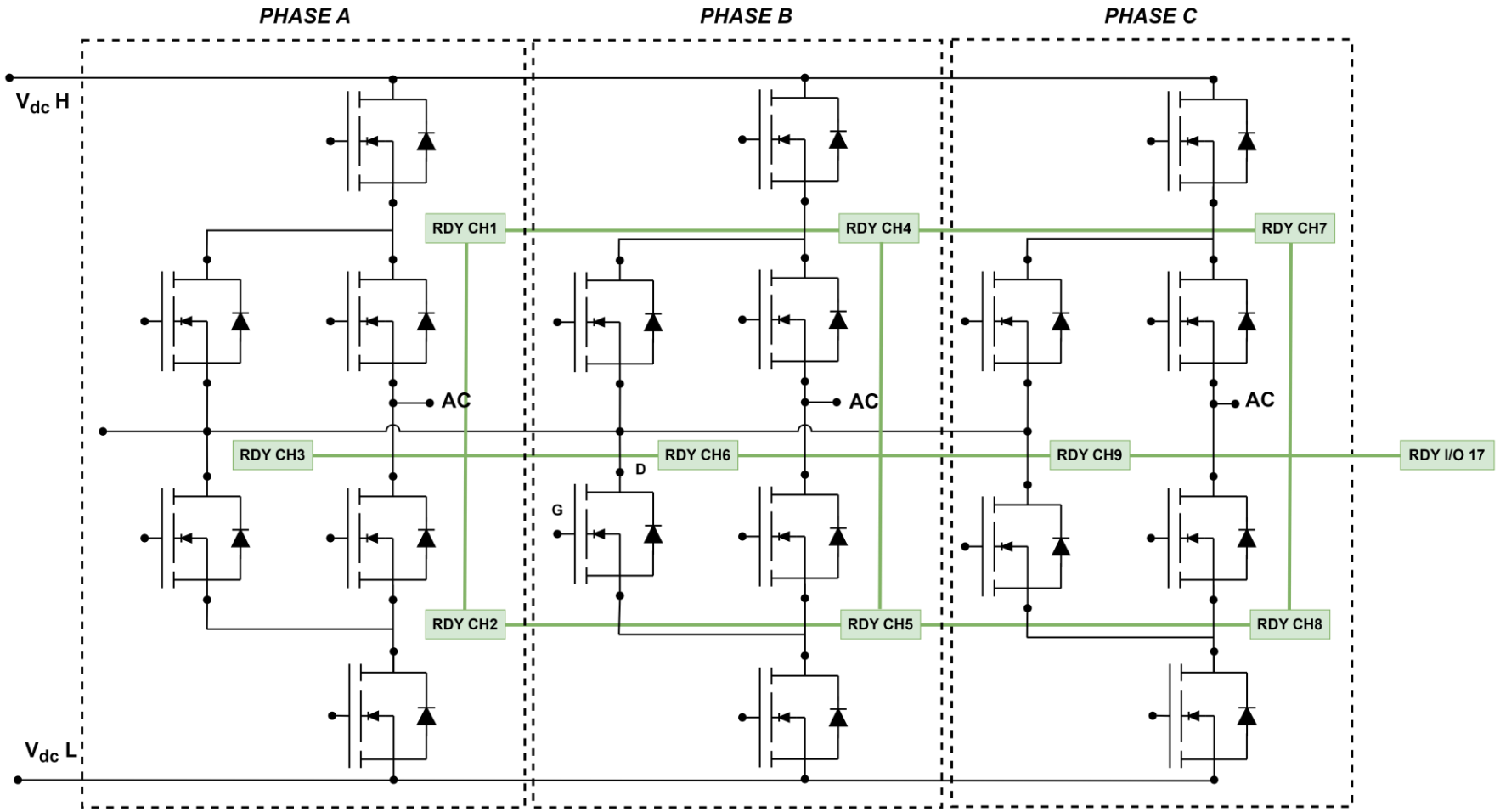


8. READY

LabVIEW FPGA variable

Variable that indicates all gate-drives are ready to be driven. All gate-drives signals are gathered in AND logic.

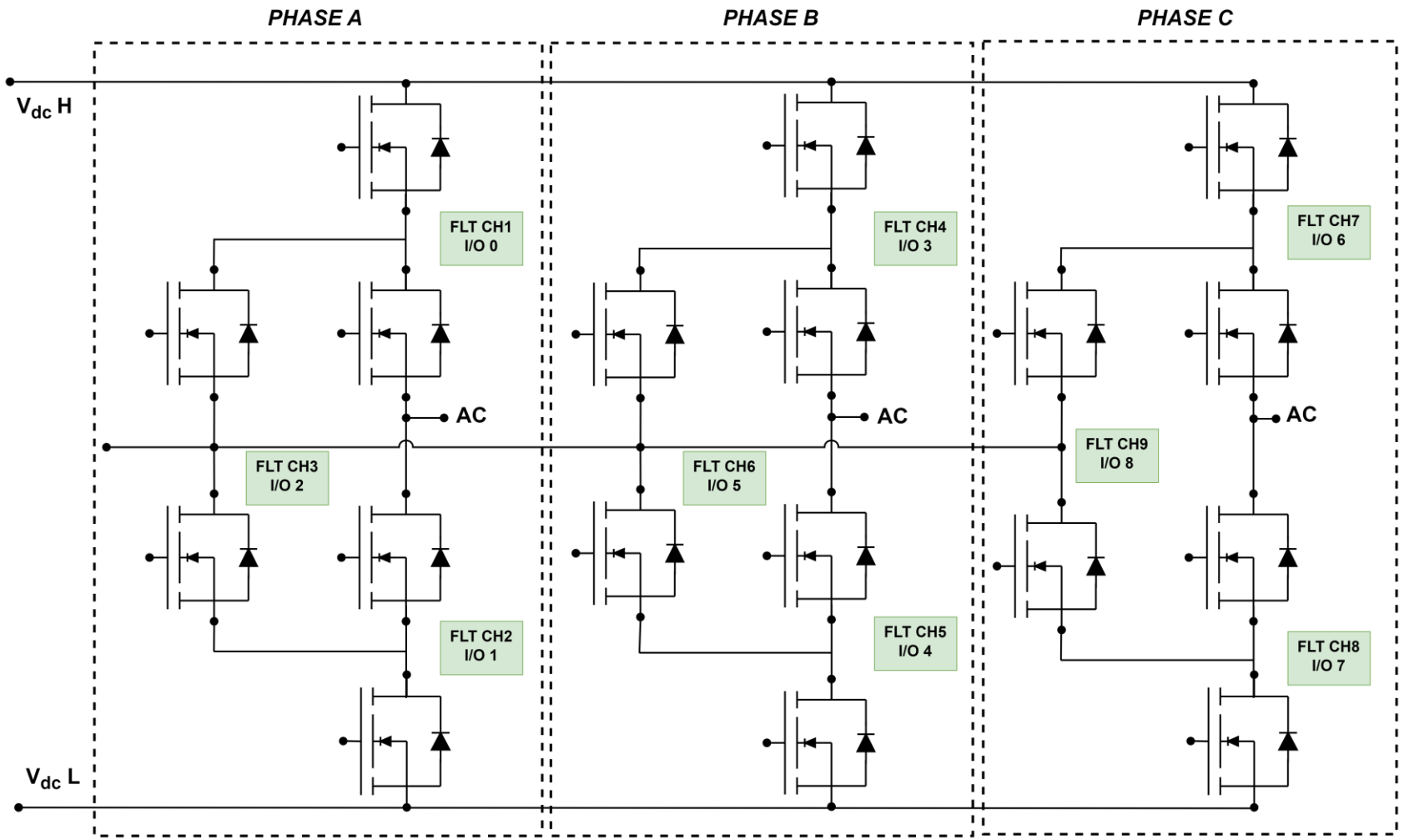
True - ALL READY /False - AT LEAST ONE GATE DRIVE NOT READY



9. FAULT

LabVIEW FPGA variable

Protection associated to DESSAT of the switches: TRUE = ERROR, FALSE = No error



10. ROUTING TABLES

MEASUREMENTS channels

		ADAPTER	PED-BOARD PINOUT	PED-BOARD LABVIEW	VARIABLE NAME
Phase A	Current	IM_CUR_CH1	AIN-9	ADC2[0]	I_a
		IM_CUR_CH2	NC		
		IM_CUR_CH3			
	Voltage	VDC_Meas_CH1	NC		
		VDC_Meas_CH2			
		VDC_Meas_CH3			
Phase A	Current	IM_CUR_CH4	AIN-10	ADC2[1]	I_b
		IM_CUR_CH5	NC		
		IM_CUR_CH6			
	Voltage	VDC_Meas_CH4	NC		
		VDC_Meas_CH5	AIN-7	ADC1[6]	V_{dc} L
		VDC_Meas_CH6	AIN-8	ADC2[7]	V_{dc} H
Phase C	Current	IM_CUR_CH7	AIN-11	ADC2[2]	I_c
		IM_CUR_CH8	NC		
		IM_CUR_CH9			
	Voltage	VDC_Meas_CH7	NC		
		VDC_Meas_CH8			
		VDC_Meas_CH9			

Butterworth filter on PED-Board or Adapter board.

PWM channels

			ADAPTER	PED-BOARD PINOUT	VARIABLE NAME
Phase A	G1	T	PWM_T_CH1	PWM_1_out	Ta1
		B	PWM_B_CH1	PWM_2_out	Ta2
	G2	T	PWM_T_CH2	PWM_3_out	Ta3
		B	PWM_B_CH2	PWM_4_out	Ta4
	G3	T	PWM_T_CH3	PWM_6_out	Ta5
		B	PWM_B_CH3	PWM_5_out	Ta6
Phase B	G4	T	PWM_T_CH1	PWM_7_out	Tb1
		B	PWM_B_CH1	PWM_8_out	Tb2
	G5	T	PWM_T_CH2	PWM_9_out	Tb3
		B	PWM_B_CH2	PWM_10_out	Tb4
	G6	T	PWM_T_CH3	PWM_12_out	Tb5
		B	PWM_B_CH3	PWM_11_out	Tb6
Phase C	G7	T	PWM_T_CH1	PWM_13_out	Tc1
		B	PWM_B_CH1	PWM_14_out	Tc2
	G8	T	PWM_T_CH2	PWM_15_out	Tc3
		B	PWM_B_CH2	PWM_16_out	Tc4
	G9	T	PWM_T_CH3	PWM_18_out	Tc5
		B	PWM_B_CH3	PWM_17_out	Tc6

11. Contacts

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