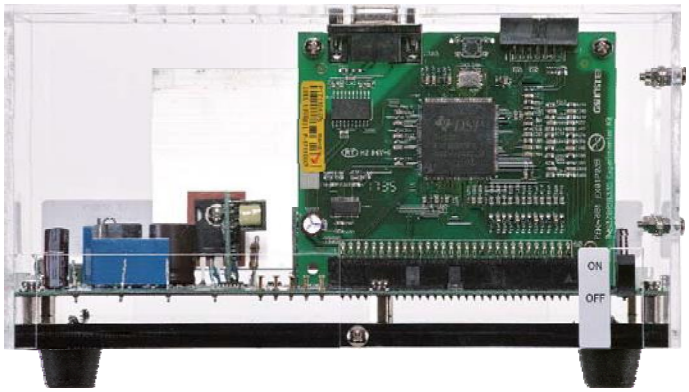
BUCK CONVERTER DEVELOPER'S KIT



PEK-120

FEATURES

- Provide Analysis, Design, Simulation and Implementation Verification for Power Electronics
- Allow Students With no DSP Firmware Programming Capability to Easily Complete Programming so as to Swiftly Proceed To Digital Control Domain
- Provide Comprehensive Trainings and After-sales Maintenance Services
- Provide a Complete Experiment Kit List
- Provide Circuit Diagram Files for Each Course Kit
- Provide DSP Hardware Planning, Setting and Program Burning Method
- Provide Detailed Principle and Design of Experiment Circuits

Power converter utilizing digital control is the development trend of the present industrial products. Digital control can elevate the function and performance of power converter to increase product's added value. More and more power converters are using the digital control technology. The objective of this course kit is to provide a learning platform for power converter using digital control. Users, via PSIM software and simulation, learn the principle, analysis and design of power converter. Furthermore, the SimCoder tool of PSIM can be used to convert control circuit to digital control program as well as to operate a second simulation for circuit, which will be replaced by DSP. Finally, control program, via simulation verification, can be burned into DSP chip. DSP, via control and communications, verifies the correctness of designed circuit and controller.

PEK-120 is the development module of full digital controlled Buck Converter, aiming at the training of circuit analysis, design, simulation and experiment for researchers to conduct problem-oriented learning. The quantitative design of power circuit and controller is based upon converter's specifications. Users can further understand the related technology of Buck Converter through PSIM simulation verification and SimCoder programming processes.

With the comprehensive capabilities of realizing simulation, design, hardware circuit, PSIM is a simulation software specifically designed for systems such as power electronics, motor driver and power conversion. PSIM features comprehensive functions, complete components, fast simulation, accurate simulation results and easy to use, and this software is often used by the international academics and industries for education and research.

Front Panel

Rear Panel

THE SPECIFICATIONS OF BUCK CONVERTER DEVELOPMENT MODULE

PEK-120 Buck Converter							
Description		Symbol	Min	Typ	Max	Units	Comment
DC Input	Voltage	V_{IN}	30	50	70	V	
	Current	I_{IN}		3		A	
DC Output	Voltage	V_{OUT}		24		V	
	Current	I_{OUT}	0		5	A	
	Power	P_{OUT}			120	W	
Dimensions (L × W × H)			220 (mm) × 150 (mm) × 110 (mm)				
Weight			Approx. 1.5kg				

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EXPERIMENTS

Experiment 1: Pulse Width Modulation Buck Converter
Experiment objective is to learn the principle of Pulse Width Modulation Buck Converter. Via PEK-120 module, students learn the voltage and current measurement method and the settings of TI F28335 DSP IC pin locations, PWM and A/D hardware as well as to understand how to conduct the control and measurement of DSP's internal signal by RS-232.

Experiment 2: Voltage Mode Control Buck Converter
Experiment objective is to learn the small signal model derivation of Buck Converter and the design of voltage and current loop controllers. After designing hardware SimCoder is utilized to conduct programming.

Experiment 3: Average Current Mode Control Buck Converter
Experiment objective is to understand the method of Buck Converter's Average Current Mode Control; small signal derivation of voltage and current loop, and the design of voltage and current loop controllers. After designing Buck Converter SimCoder is utilized to conduct programming.

Experiment 4: MPPT Converter for PV System
Experiment objective is to understand PV module characteristics and various MPPT methods; and to learn SimCoder programming for perturb and observe method and incremental conductance method. PEK-120 is utilized to verify experiment results.

Experiment 5: PV Battery Charger
Experiment objective is to learn PV battery charger's control method for combining MPPT controller with battery's three-stage controller. After designing PEK-120's hardware SimCoder is utilized to conduct programming and to verify experiment results.

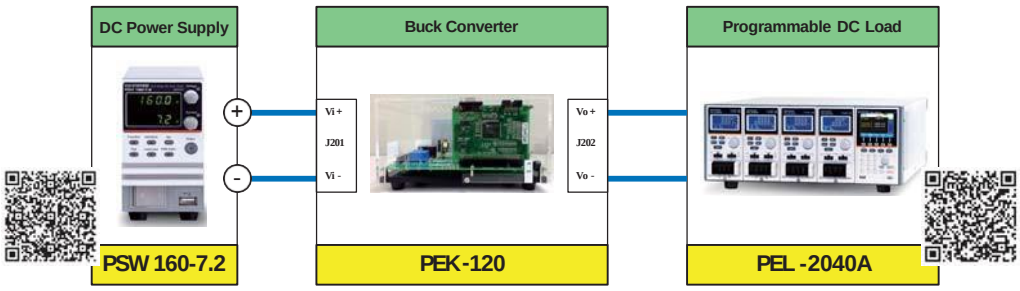

Fig1

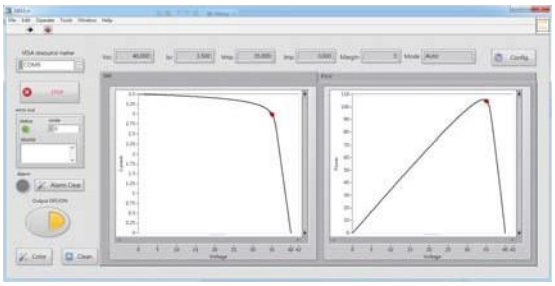

Fig2

ORDERING INFORMATION

PEK-120 **Buck Converter Developer's Kit**

STANDARD ACCESSORIES

terminal, RS-232 communications cable

OPTIONAL ACCESSORIES

PEK-003 TMS320F28335 experiment board that isolates RS-232 interface
PEK-005(A) Multi-output auxiliary power supply
PEK-006 Isolated JTAG emulated adapter

* The required accessories for digital control module:
PEK-005(A) x 1 and PEK-006 x 1

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