

AX58100 Product Introduction

Revision 1.00
Sep. 27th, 2018

Revision History

Revision	Date	Description
0.10	2018/06/12	Preliminary release
1.00	2018/09/27	1. Modified some descriptions in Section 1, 3.

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1. Introduction

This document provides an overview of [AX58100 2/3-port EtherCAT slave controller](#).

The AX58100 is a 2/3-port EtherCAT Slave Controller (ESC), licensed from Beckhoff Automation, with two integrated Fast Ethernet PHYs which support 100Mbps full-duplex operation and HP Auto-MDIX. The AX58100 is interoperable with all EtherCAT systems with standard EtherCAT protocols such as CANopen over EtherCAT (CoE), File Access over EtherCAT (FoE), Vendor Specific-protocol over EtherCAT (VoE), etc. The AX58100 provides a cost-effective EtherCAT solution for industrial automation, motion/motor/Digital IO control, Digital to Analog (DAC)/Analog to Digital (ADC) converters control, sensors data acquisition, robotics, etc. industrial fieldbus applications.

The AX58100 provides either a three-channel PWM controller or a Step/Direction controller, and an Incremental (ABZ)/Hall Encoder interface for closed-loop motion/motor control applications; provides a SPI master controller for Digital to Analog (DAC)/Analog to Digital (ADC) converters control applications and sensors data acquisition applications; provides 32 Digital I/Os (DIO) for industrial fieldbus I/O control applications; and also provides an I/O watchdog and an emergency stop input for industrial automation functional safety applications.

The AX58100 provides SPI slave and Local bus Process Data Interfaces (PDI) to provide an easy way for system designers to implement the standard EtherCAT communication functionalities on those traditional non-EtherCAT MCU and DSP industrial platforms. AX58100 supports a configurable individual function SPI slave interface to enhance SPI slave bandwidth.

To help customers to evaluate and develop applications with AX58100 EtherCAT slave controller, ASIX provides comprehensive technical support including reference schematics, PCB design guidelines, hardware/software application notes, user guides, software firmware, etc., and also provides AX58100 evaluation board for designers to easily evaluate the AX58100 EtherCAT slave controller functionalities.

2. Block Diagram

The following is AX58100 block diagram,

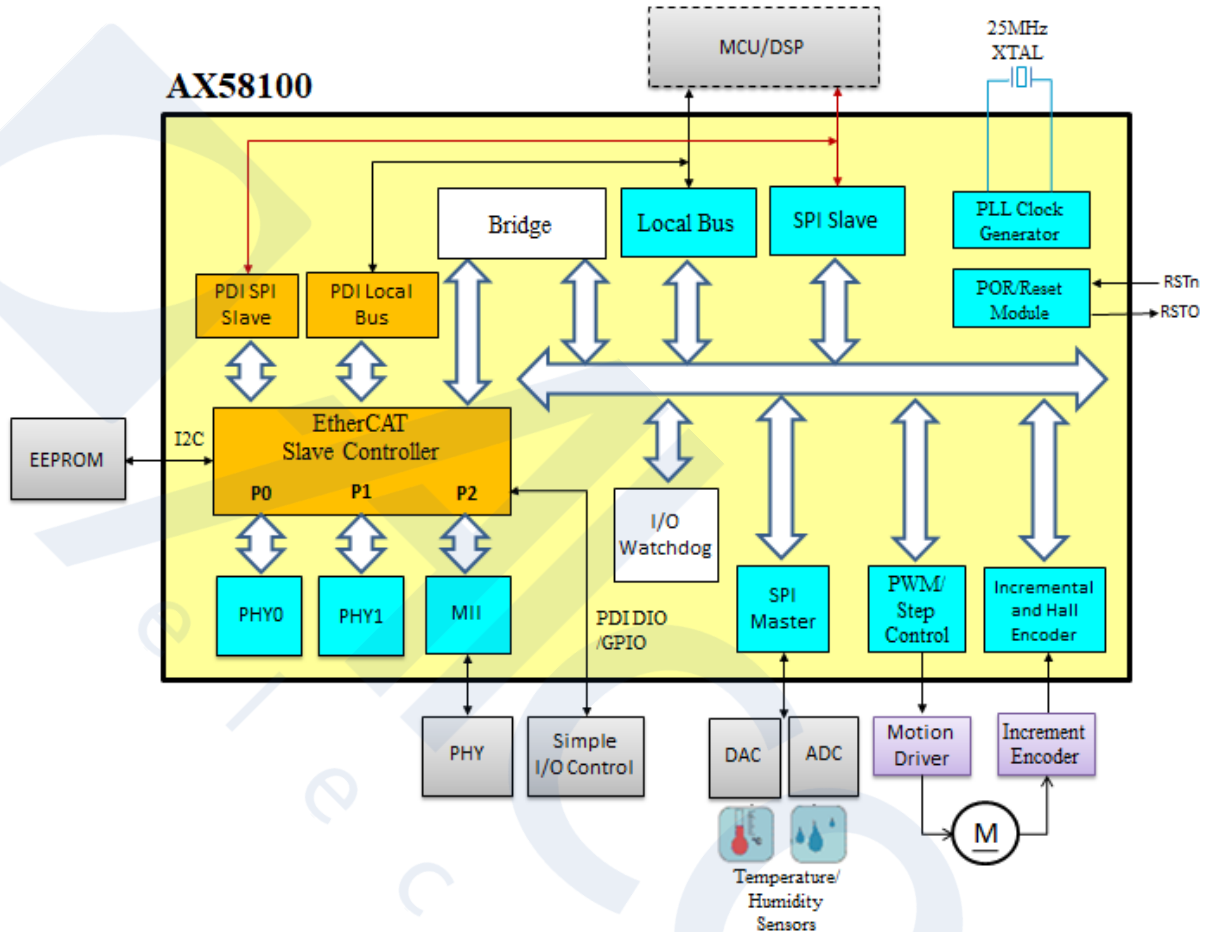


Figure 1. AX58100 Block Diagram

3. Major Features

The following are AX58100 major features,

Fast Ethernet Ports	FMMU	Sync Managers	RAM (Kbytes)	Distributed Clock	Digital I/O	SPI Slave
2 x Internal PHY 1 x MII	8	8	9	64-bit	32-bit	Yes
Local Bus	SPI Master	PWM	Incremental (ABZ)/ Hall Encoder	Emergency Stop Input	Temperature Range (°C)	Package
8/16-bit Async	Yes	Yes	Yes	Yes	-40 ~ +105	LQFP-80

Figure 2. AX58100 Major Features

4. Target Applications

The following are AX58100 typical target applications.

Target Applications

- Industrial Automation
- Motor/Motion Control
- Digital I/O Control
- DAC/ADC Converters Control
- Sensors Data Acquisition
- Robotics
- Communication Module
- Operator HMI Interfaces

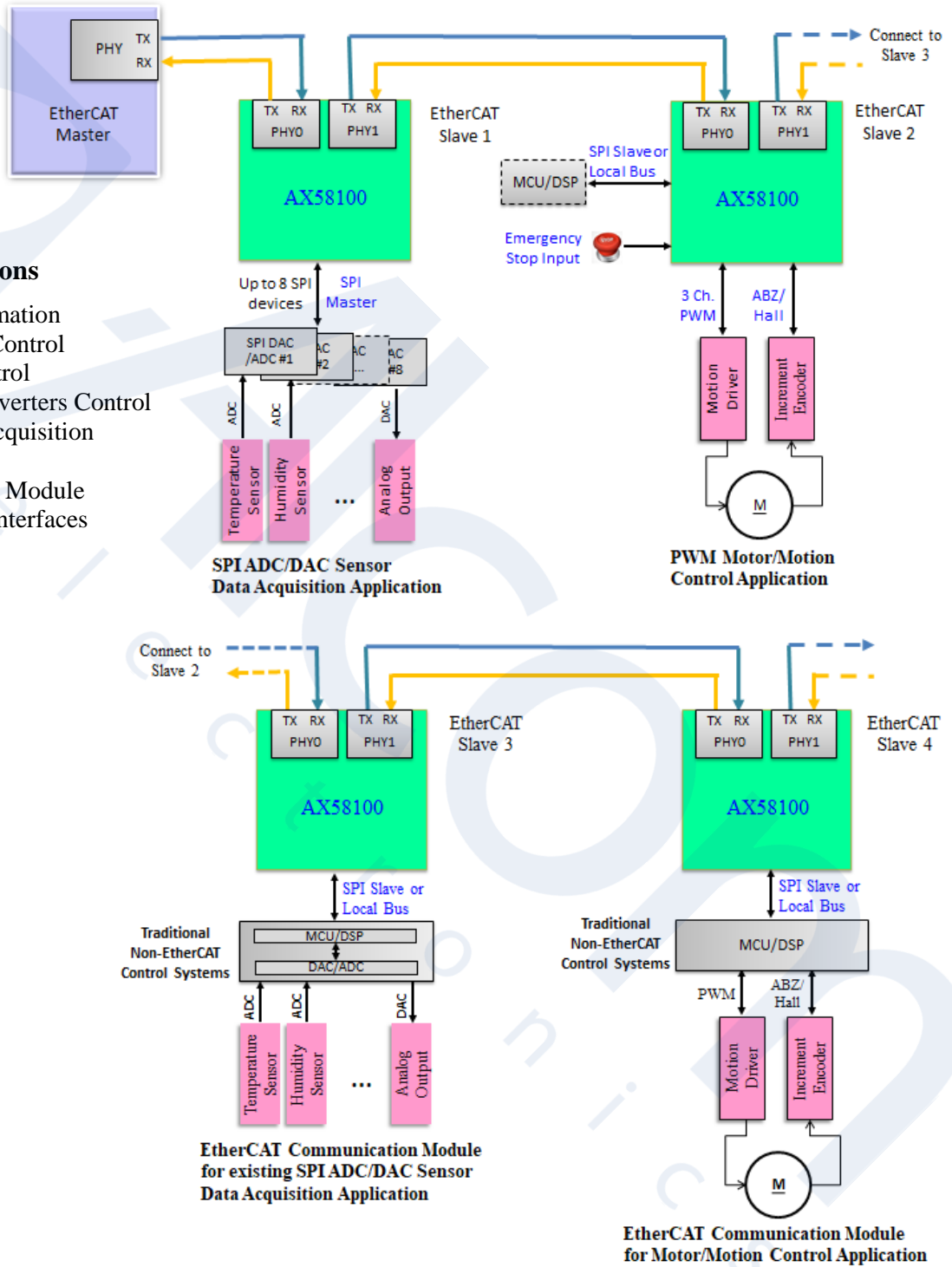


Figure 3. AX58100 Target Applications

5. AX58100 Evaluation Board

ASIX Electronics provides AX58100 Evaluation Board for users to evaluate AX58100 functionalities on different target applications.

5-1. AX58100 Evaluation Board

Interface Connector

J1	
GND	1
RSTO	3
GPIO00	5
GPIO02	7
GPIO04	9
GPIO06	11
GPIO08	13
GPIO10	15
GPIO12	17
GPIO14	19
GND	21
GPIO16	23
GPIO18	25
GPIO20	27
GPIO22	29
GPIO24	31
GPIO26	33
GPIO28	35
GPIO30	37
OE_EXT	39
OUTVLD	41
EOF	43
SYNC_L0	45
LAT_IN	47
GND	49
DB_5V	51
GND	2
RSTn_I	4
GPIO01	6
GPIO03	8
GPIO05	10
GPIO07	12
GPIO09	14
GPIO11	16
GPIO13	18
GPIO15	20
GND	22
GPIO17	24
GPIO19	26
GPIO21	28
GPIO23	30
GPIO25	32
GPIO27	34
GPIO29	36
GPIO31	38
GND	40
SOF	42
WD_TRIG	44
SYNC_L1	46
EEP_DONE	48
GND	50
DB_5V	52

CON52A_2X26_2.54mm

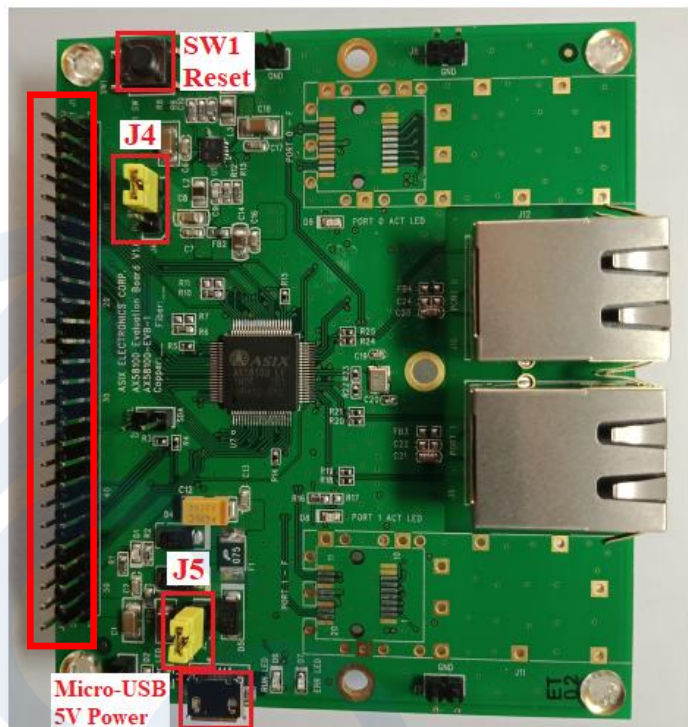


Figure 4. AX58100 Evaluation Board

The following is the jumper setting table of the AX58100 Evaluation Board.

Jumper	Setting	Description
J4	J4 <input checked="" type="checkbox"/> 123	Pull-up AX58100 RSTO signal
	J4 <input type="checkbox"/> 123 (Default)	Pull-down AX58100 RSTO signal
J5	J5 <input checked="" type="checkbox"/>	Provide separate 5V power supply to the interface connector J1 (DB_5V)
	J5 <input type="checkbox"/> (Default)	Provide 5V power supply from Micro-USB 5V power connector to the interface connector J1 (DB_5V)

Figure 5. AX58100 Evaluation Board Jumpers Setting

6. AX58100 Demo Kits

ASIX Electronics provides different AX58100 applications demo kits which include AX58100 reference schematic, BOM/PCB layout/gerber files, TwinCAT PLC demo source, sample ESI file, etc. Designers can refer to these AX58100 technical archives to easily evaluate and implement AX58100 on different EtherCAT target applications.

6-1. AX58100 SPI Master ADC Sensor/DIO Demo Kit

The AX58100 SPI Master ADC Sensor/DIO Demo Kit demonstrates AX58100 SPI Master and Digital I/O functionalities for the ADC sensor data acquisition and digital I/O control target applications.

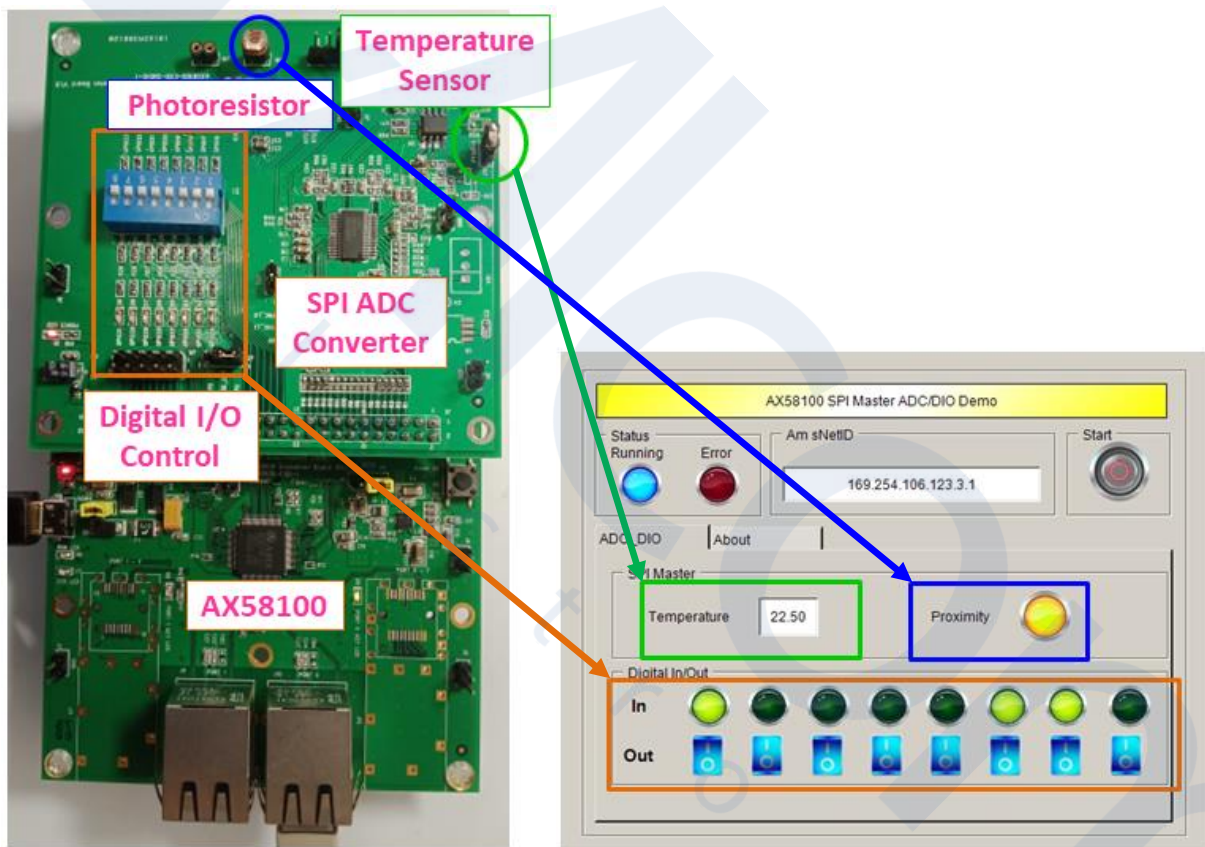


Figure 6. AX58100 SPI Master ADC Sensor/DIO Demo Kit & TwinCAT PLC Demo

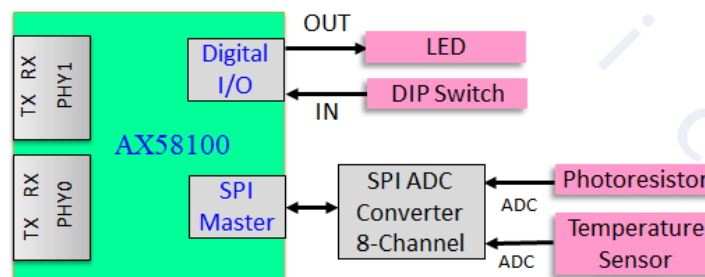


Figure 7. AX58100 SPI Master ADC Sensor/DIO Demo Kit Block Diagram

6-2. AX58100 Six-Step PWM BLDC Motor Control with SPI Slave MCU CoE F/W Demo Kit Demo Kit

The AX58100 Six-Step PWM BLDC Motor Control Demo Kit demonstrates the AX58100 PWM/Hall Encoder and SPI slave PDI functionalities for the PWM motor/motion control target applications.

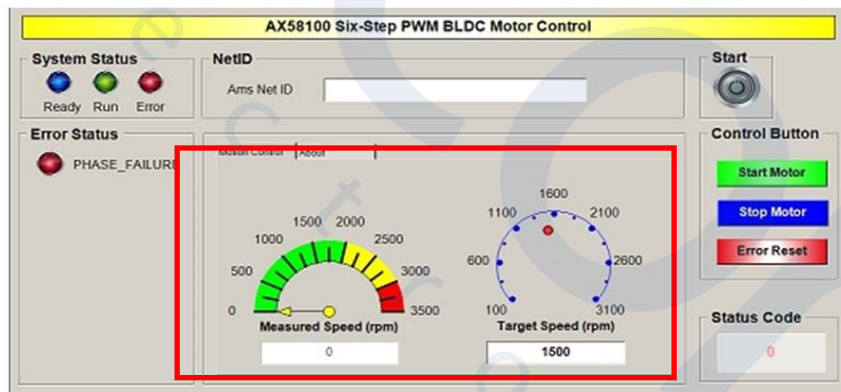
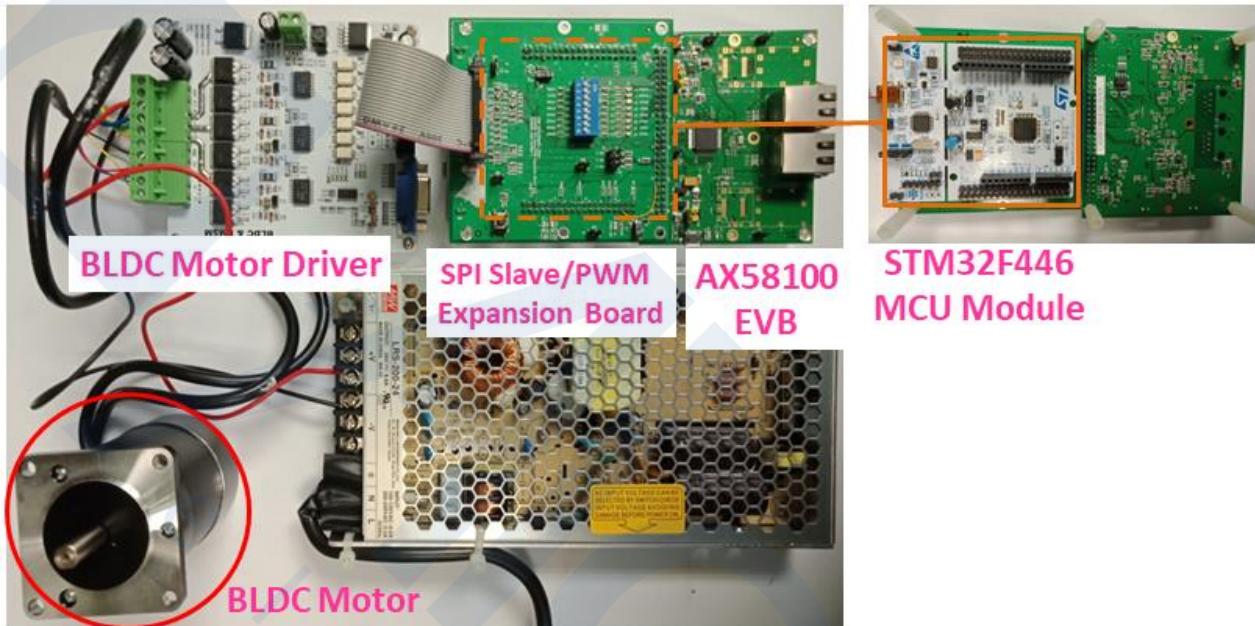


Figure 8. AX58100 Six-Step PWM BLDC Motor Control Demo Kit & TwinCAT PLC Demo

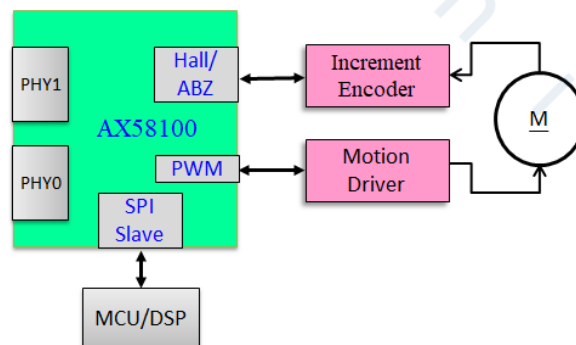
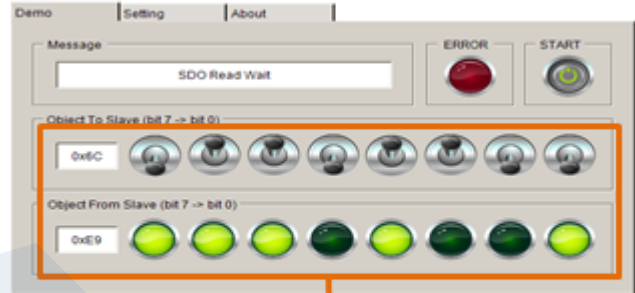


Figure 9. AX58100 Six-Step PWM BLDC Motor Control Demo Kit Block Diagram

6-3. AX58100 + AX99100 Local Bus Demo Kit

The AX58100 + AX99100 Local Bus Demo Kit demonstrates the AX58100 Local Bus PDI functionalities for the PCIe EtherCAT slave adapter applications.

AX58100 TwinCAT PLC Demo



AX58100 Windows SSC Demo

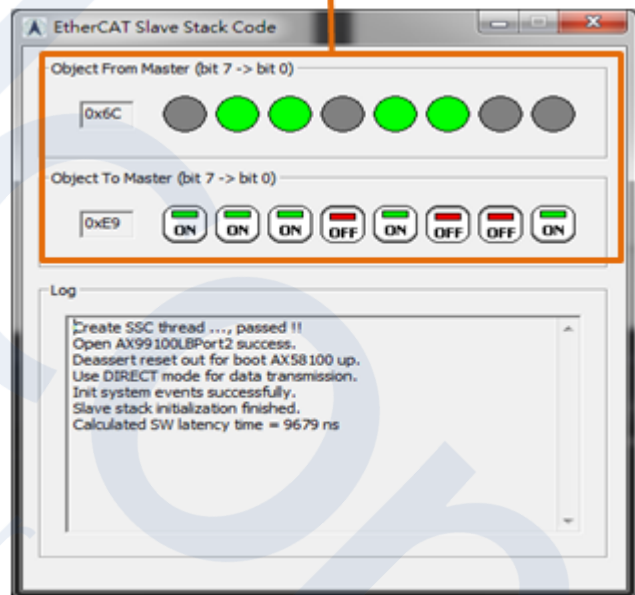


Figure 10. AX58100 + AX99100 Local Bus Demo Kit & Windows SSC/TwinCAT PLC Demo

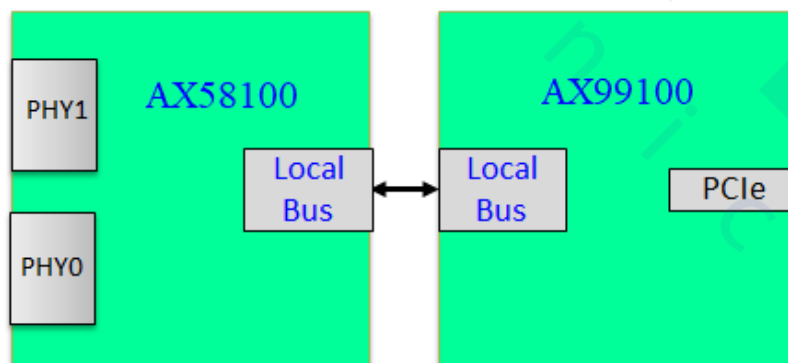


Figure 11. AX58100 + AX99100 Local Bus Demo Kit Block Diagram

7. Hardware/Software Support

AX58100 supports different applications demo kits described in [Section 6](#) which include AX58100 evaluation board reference schematic, PCB layout/gerber/BOM files, application design note and sample TwinCAT PLC demo source/ESI file, etc. Please contact ASIX Sales (Sales@asix.com.tw) for details.