MODEL BASED DESIGN TOOLBOX
ENABLING FAST PROTOTYPING AND DESIGN

- Open Loop Control – power up the Motor for 1st time
- Create Simulink model for Open Loop Control BLDC
- Test Open Loop Control application
Application mapping: SW vs. HW

MotorGD DevKit

- ADC
- GPIO
- SPI
- Initialization
- UART
- CAN
- OpenSDA

Desired Speed

Motor Actual Speed

Speed PI Controller

PWM Duty cycle

MC34GD3000 pre-driver

FlexPWM

Vdc

Idc

ADC

Protection

GPIO

eTIMER

Hall A

Hall B

Hall C

3-phase Inverter

ON

OFF

Desired Speed

Actual Speed

PWM Duty cycle

DIR CW/CCW

BLDC commutation Control Sequence

SVM

ON

OFF

Motor Actual Speed

Hall A

Hall B

Hall C

Hall counts

Position

MISO/MOSI/SCLK/CS

EN

RST

MotorGD DevKit

MPC5744P DevKit

FreeMASTER

OpenSDA

UART

CAN

GPIO

ADC

SPI

FlexPWM

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Control Sequence

SVM

ON
OFF

Hall counts

Position

Measure Hall Time & Position Recognition

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Measure Hall Time &
Position Recognition

FreeMASTER

INITIALIZE

Hall A
Hall B
Hall C

OpenSDA
GPIO
UART
CAN

HS
LS

1
2
3
4
5
6

Initialization

Duty cycle

DIR

Desired Speed

Actual Speed

PWM

Motor

Controller

Hall

counts

ON

OFF

GPIO

Motor

Actual Speed

 Desired Speed
Open Loop Control – Block Diagram

MotorGD DevKit

MC34GD3000 pre-driver

MPC5744P DevKit

3-phase Inverter

Hall A
Hall B
Hall C

FlexPWM

Position Recognition

BLDC commutation Control Sequence

PWM Duty cycle

Duty cycle

DIR CW/CCW

SVM

Position

Speed2PWM_DC

SCALER

Initialization

Desired Speed

ADC

SPI

GPIO

GPIO

UART

CAN

OpenSDA

FreeMASTER

MISO/MOSI/SCLK/CS

EN

RST

HS 1

HS 2

HS 3

HS 4

HS 5

HS 6

LS 1

LS 2

LS 3

LS 4

LS 5

LS 6

MC34GD3000

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CAN

OpenSDA

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Desired Speed

Commutation is driven by Hall sensors

Hall A

Hall B

Hall C

Open Loop Control

- Block Diagram

MotorGD DevKit

MPC5744P DevKit

FlexPWM

- phase Inverter

Hall A

Hall B

Hall C

MC34GD3000

EN

RST

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HS 3

LS 4

HS 5

LS 6

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…you are now ready to design the next big thing. Good luck!

Need help? Visit us at: https://community.nxp.com/community/mbdt to share ideas