Serial Communication Protocol (PC, F411RE)

UART Setup (8-E-1, Baud rate = 512000)

START (4 Bit)	MODE (4 Bit)	Check sum (1 Byte)

Frame #1

START (4 Bit)	MODE (4 Bit)	Data Frame (2 Byte)	Check sum (1 Byte)

Frame #2

START (4 Bit)	MODE (4 Bit)	n Station (1 Byte)	Data Frame (n Byte)	Check sum (1 Byte)

Frame #3

Start (4 bit) = [1 0 0 1]

Mode (4 bit) =

Mode 01 [0 0 0 1] = **Test Command** (Frame #2)

Mode 02 [0 0 1 0] = **Connect MCU** (Frame #1)

Mode 03 [0 0 1 1] = **Disconnect MCU** (Frame #1)

Mode 04 [0 1 0 0] = **Set Angular Velocity** (Frame #2)

Mode 05 [0 1 0 1] = **Set Angular Position** (Frame #2)

Mode 06 [0 1 1 0] = **Set Goal 1 Station** (Frame #2)

Mode 07 [0 1 1 1] = **Set Goal n Station** (Frame #3)

Mode 08 [1 0 0 0] = **Go to Station / Goal Position** (Frame #1)

Mode 09 [1 0 0 1] = **Request Current Station** (Frame #1)

Mode 10 [1 0 1 0] = **Request Angular Position** (Frame #1)

Mode 11 [1 0 1 1] = **Request MAX Angular Velocity** (Frame #1)

Mode 12 [1 1 0 0] = **Enable Gripper** (Frame #1)

Mode 13 [1 1 0 1] = **Disable Gripper** (Frame #1)

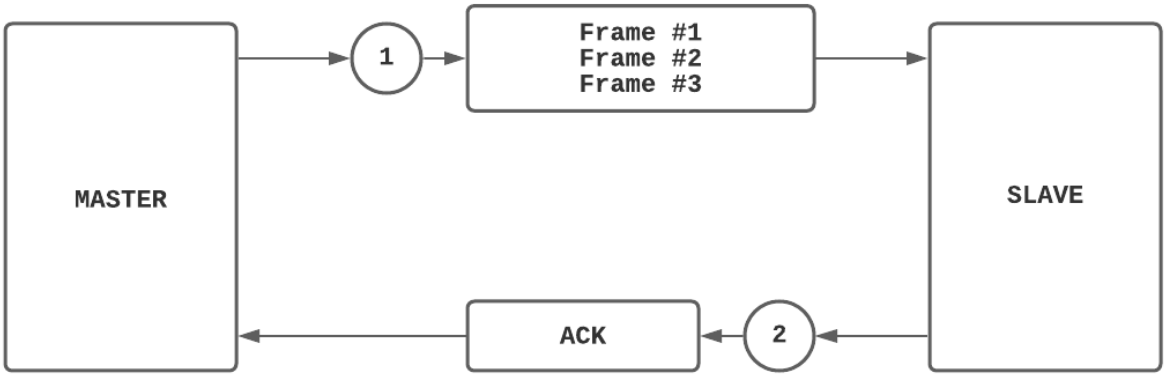
Mode 14 [1 1 1 0] = **Sethome** (Frame #1)

All Communications always have Acknowledge

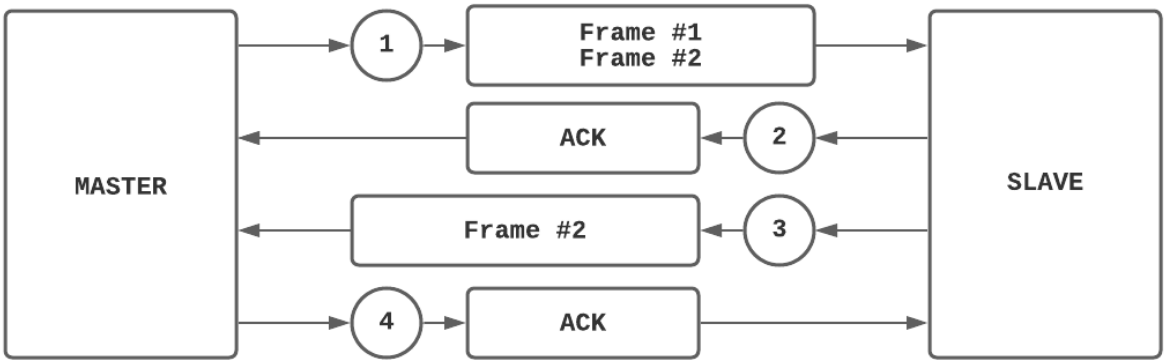
ACK#1 =	0x58	0b01110101

ACK#2 =	70	0o156

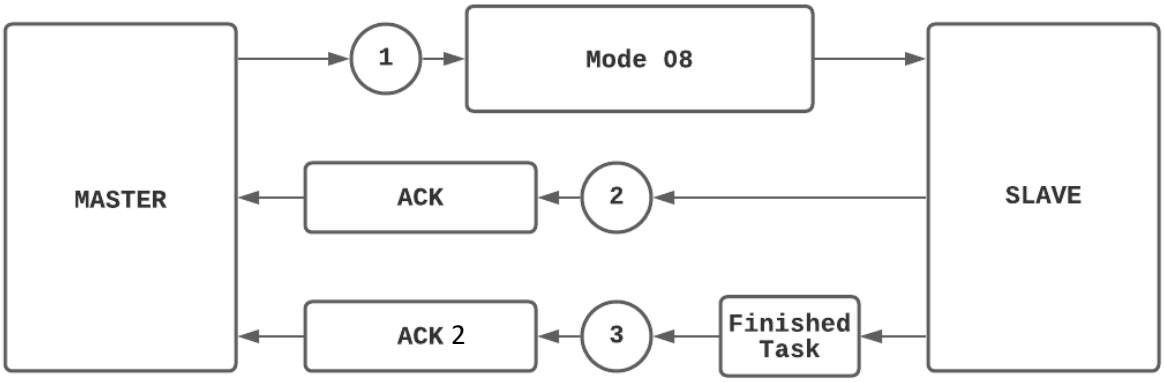
Serial Communication Flow



Mode {2, 3, 4, 5, 6, 7, 12, 13, 14}



Mode {9, 10, 11}



Mode 8

Checksum

Frame #1

Checksum = ~ (START,MODE)

Frame #2

Checksum = ~ (START,MODE + Data Frame 1 + … + Data Frame n)

Frame #3

Checksum = ~ (START,MODE + n Station + Data Frame 1 + … + Data Frame n)

Serial Communication Protocol Example

Mode 01 [0 0 0 1] = **Test Command** (Frame #2)

START (4 Bit)	**MODE (4 Bit)**	**Data Frame (n Byte)**	**Check sum (1 Byte)**

Command_6969 =

0x91	0o100	46

MASTER Send Command_6969 to SLAVE

SLAVE Send ACK to MASTER

SLAVE Send Command_6969 back to MASTER

MASTER Send ACK to SLAVE

Mode 07 [0 1 1 1] = **Set Goal n Station** (Frame #3)

START (4 Bit)	MODE (4 Bit)	n Station (1 Byte)	Data Frame (n Byte)	Check sum (1 Byte)

Frame #3

n = number of Stations on Data Frame

Control robot to station A,B,C,D,E

Data on Station bit is 4 bit

START	MODE	5	B	A	D	C	0	E	Check sum
(1 Byte)		(1 Byte)	(1 Byte)		(1 Byte)		(1 Byte)		(1 Byte)

Mode 4, 11

	MIN	MAX
RPM	0	10
DATA on Protocol	0	255

Mode 5, 10

	MIN	MAX
Rad	0	2 π
DATA on Protocol	0	65535

DATA on Protocol Decimal degrees = 4

Example

Rad = 1.5634 DATA on Protocol = 15634

High_Byte = 0x3D

Low_Byte = 0b00010010

149	0x3D	0b00010010	0o33