

## 1. Description

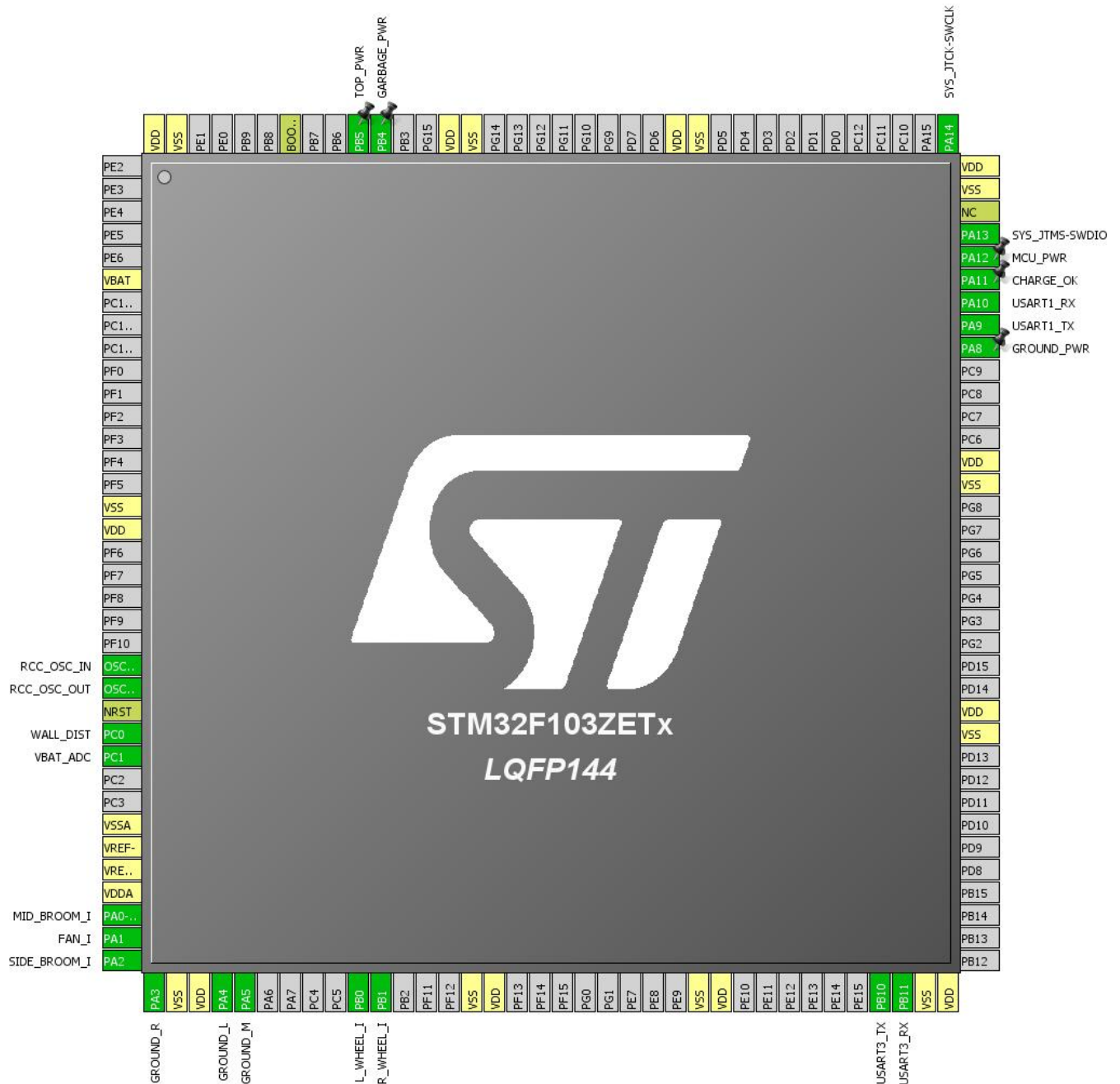
### 1.1. Project

Project Name	Hal_STM32_Cleaner
Board Name	Hal_STM32_Cleaner
Generated with:	STM32CubeMX 4.22.0
Date	08/23/2017

### 1.2. MCU

MCU Series	STM32F1
MCU Line	STM32F103
MCU name	STM32F103ZETx
MCU Package	LQFP144
MCU Pin number	144

## 2. Pinout Configuration



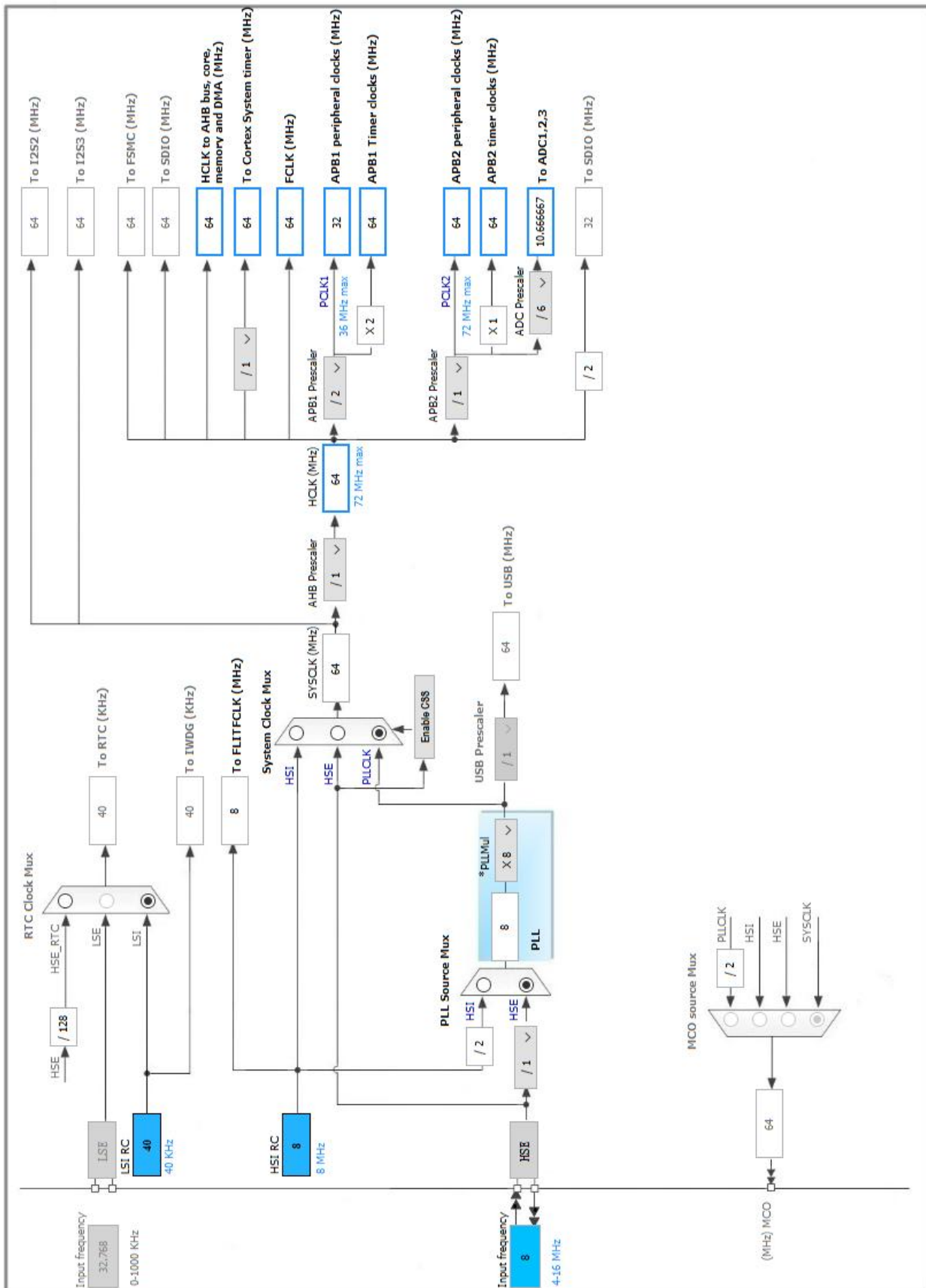
### 3. Pins Configuration

Pin Number LQFP144	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
6	VBAT	Power		
16	VSS	Power		
17	VDD	Power		
23	OSC_IN	I/O	RCC_OSC_IN	
24	OSC_OUT	I/O	RCC_OSC_OUT	
25	NRST	Reset		
26	PC0	I/O	ADC1_IN10	WALL_DIST
27	PC1	I/O	ADC2_IN11	VBAT_ADC
30	VSSA	Power		
31	VREF-	Power		
32	VREF+	Power		
33	VDDA	Power		
34	PA0-WKUP	I/O	ADC1_IN0	MID_BROOM_I
35	PA1	I/O	ADC1_IN1	FAN_I
36	PA2	I/O	ADC1_IN2	SIDE_BROOM_I
37	PA3	I/O	ADC1_IN3	GROUND_R
38	VSS	Power		
39	VDD	Power		
40	PA4	I/O	ADC1_IN4	GROUND_L
41	PA5	I/O	ADC1_IN5	GROUND_M
46	PB0	I/O	ADC1_IN8	L_WHEEL_I
47	PB1	I/O	ADC1_IN9	R_WHEEL_I
51	VSS	Power		
52	VDD	Power		
61	VSS	Power		
62	VDD	Power		
69	PB10	I/O	USART3_TX	
70	PB11	I/O	USART3_RX	
71	VSS	Power		
72	VDD	Power		
83	VSS	Power		
84	VDD	Power		
94	VSS	Power		
95	VDD	Power		
100	PA8 *	I/O	GPIO_Output	GROUND_PWR
101	PA9	I/O	USART1_TX	

Pin Number LQFP144	Pin Name (function after reset)	Pin Type	Alternate Function(s)	Label
102	PA10	I/O	USART1_RX	
103	PA11 *	I/O	GPIO_Input	CHARGE_OK
104	PA12 *	I/O	GPIO_Output	MCU_PWR
105	PA13	I/O	SYS_JTMS-SWDIO	
106	NC	NC		
107	VSS	Power		
108	VDD	Power		
109	PA14	I/O	SYS_JTCK-SWCLK	
120	VSS	Power		
121	VDD	Power		
130	VSS	Power		
131	VDD	Power		
134	PB4 *	I/O	GPIO_Output	GARBAGE_PWR
135	PB5 *	I/O	GPIO_Output	TOP_PWR
138	BOOT0	Boot		
143	VSS	Power		
144	VDD	Power		

\* The pin is affected with an I/O function

## 4. Clock Tree Configuration



## 5. IPs and Middleware Configuration

### 5.1. ADC1

mode: IN0

mode: IN1

mode: IN2

mode: IN3

mode: IN4

mode: IN5

mode: IN8

mode: IN9

mode: IN10

mode: Temperature Sensor Channel

mode: Vrefint Channel

#### 5.1.1. Parameter Settings:

##### ADCs\_Common\_Settings:

Mode Independent mode

##### ADC\_Settings:

Data Alignment Right alignment

Scan Conversion Mode Enabled

Continuous Conversion Mode **Enabled \***

Discontinuous Conversion Mode Disabled

##### ADC\_Regular\_ConversionMode:

Enable Regular Conversions Enable

Number Of Conversion **11 \***

External Trigger Conversion Source Regular Conversion launched by software

Rank 1

Channel **Channel Vrefint \***

Sampling Time **55.5 Cycles \***

Rank **2 \***

Channel **Channel Temperature Sensor \***

Sampling Time **55.5 Cycles \***

Rank **3 \***

Channel Channel 0

Sampling Time	55.5 Cycles *
<u>Rank</u>	4 *
Channel	Channel 1 *
Sampling Time	55.5 Cycles *
<u>Rank</u>	5 *
Channel	Channel 2 *
Sampling Time	55.5 Cycles *
<u>Rank</u>	6 *
Channel	Channel 3 *
Sampling Time	55.5 Cycles *
<u>Rank</u>	7 *
Channel	Channel 4 *
Sampling Time	55.5 Cycles *
<u>Rank</u>	8 *
Channel	Channel 5 *
Sampling Time	55.5 Cycles *
<u>Rank</u>	9 *
Channel	Channel 8 *
Sampling Time	55.5 Cycles *
<u>Rank</u>	10 *
Channel	Channel 9 *
Sampling Time	55.5 Cycles *
<u>Rank</u>	11 *
Channel	Channel 10 *
Sampling Time	55.5 Cycles *

**ADC\_Injected\_ConversionMode:**

Number Of Conversions 0

**WatchDog:**

Enable Analog WatchDog Mode false

## 5.2. ADC2

mode: IN11

### 5.2.1. Parameter Settings:

#### ADCs\_Common\_Settings:

Mode Independent mode

#### ADC\_Settings:

Data Alignment Right alignment

Scan Conversion Mode Disabled

Continuous Conversion Mode **Enabled \***

Discontinuous Conversion Mode Disabled

#### ADC\_Regular\_ConversionMode:

Enable Regular Conversions Enable

Number Of Conversion 1

External Trigger Conversion Source Regular Conversion launched by software

Rank 1

Channel Channel 11

Sampling Time **71.5 Cycles \***

#### ADC\_Injected\_ConversionMode:

Number Of Conversions 0

#### WatchDog:

Enable Analog WatchDog Mode false

### 5.3. CRC

mode: Activated

### 5.4. RCC

High Speed Clock (HSE): Crystal/Ceramic Resonator

#### 5.4.1. Parameter Settings:

##### System Parameters:

VDD voltage (V) 3.3

Prefetch Buffer Enabled

Flash Latency(WS) 2 WS (3 CPU cycle)

##### RCC Parameters:

HSI Calibration Value 16

HSE Startup Timeout Value (ms) 100

LSE Startup Timeout Value (ms) 5000



## 5.5. SYS

Debug: Serial Wire

Timebase Source: SysTick

## 5.6. USART1

Mode: Asynchronous

### 5.6.1. Parameter Settings:

#### Basic Parameters:

Baud Rate	115200
Word Length	8 Bits (including Parity)
Parity	None
Stop Bits	1

#### Advanced Parameters:

Data Direction	Receive and Transmit
Over Sampling	16 Samples

## 5.7. USART3

Mode: Asynchronous

### 5.7.1. Parameter Settings:

#### Basic Parameters:

Baud Rate	115200
Word Length	8 Bits (including Parity)
Parity	None
Stop Bits	1

#### Advanced Parameters:

Data Direction	Receive and Transmit
Over Sampling	16 Samples

**\* User modified value**

## 6. System Configuration

### 6.1. GPIO configuration

IP	Pin	Signal	GPIO mode	GPIO pull/up pull down	Max Speed	User Label
ADC1	PC0	ADC1_IN10	Analog mode	n/a	n/a	WALL_DIST
	PA0-WKUP	ADC1_IN0	Analog mode	n/a	n/a	MID_BROOM_I
	PA1	ADC1_IN1	Analog mode	n/a	n/a	FAN_I
	PA2	ADC1_IN2	Analog mode	n/a	n/a	SIDE_BROOM_I
	PA3	ADC1_IN3	Analog mode	n/a	n/a	GROUND_R
	PA4	ADC1_IN4	Analog mode	n/a	n/a	GROUND_L
	PA5	ADC1_IN5	Analog mode	n/a	n/a	GROUND_M
	PB0	ADC1_IN8	Analog mode	n/a	n/a	L_WHEEL_I
	PB1	ADC1_IN9	Analog mode	n/a	n/a	R_WHEEL_I
ADC2	PC1	ADC2_IN11	Analog mode	n/a	n/a	VBAT_ADC
RCC	OSC_IN	RCC_OSC_IN	n/a	n/a	n/a	
	OSC_OUT	RCC_OSC_OUT	n/a	n/a	n/a	
SYS	PA13	SYS_JTMS-SWDIO	n/a	n/a	n/a	
	PA14	SYS_JTCK-SWCLK	n/a	n/a	n/a	
USART1	PA9	USART1_TX	Alternate Function Push Pull	n/a	High *	
	PA10	USART1_RX	Input mode	No pull-up and no pull-down	n/a	
USART3	PB10	USART3_TX	Alternate Function Push Pull	n/a	High *	
	PB11	USART3_RX	Input mode	No pull-up and no pull-down	n/a	
GPIO	PA8	GPIO_Output	Output Open Drain *	n/a	Low	GROUND_PWR
	PA11	GPIO_Input	Input mode	No pull-up and no pull-down	n/a	CHARGE_OK
	PA12	GPIO_Output	Output Push Pull	n/a	Low	MCU_PWR
	PB4	GPIO_Output	Output Open Drain *	n/a	Low	GARBAGE_PWR
	PB5	GPIO_Output	Output Push Pull	n/a	Low	TOP_PWR

## 6.2. DMA configuration

DMA request	Stream	Direction	Priority
USART1_RX	DMA1_Channel5	Peripheral To Memory	<b>High *</b>
USART1_TX	DMA1_Channel4	Memory To Peripheral	<b>Medium *</b>
USART3_RX	DMA1_Channel3	Peripheral To Memory	<b>High *</b>
USART3_TX	DMA1_Channel2	Memory To Peripheral	<b>Medium *</b>
ADC1	DMA1_Channel1	Peripheral To Memory	<b>Very High *</b>

### USART1\_RX: DMA1\_Channel5 DMA request Settings:

Mode: Normal  
Peripheral Increment: Disable  
Memory Increment: **Enable \***  
Peripheral Data Width: Byte  
Memory Data Width: Byte

### USART1\_TX: DMA1\_Channel4 DMA request Settings:

Mode: Normal  
Peripheral Increment: Disable  
Memory Increment: **Enable \***  
Peripheral Data Width: Byte  
Memory Data Width: Byte

### USART3\_RX: DMA1\_Channel3 DMA request Settings:

Mode: Normal  
Peripheral Increment: Disable  
Memory Increment: **Enable \***  
Peripheral Data Width: Byte  
Memory Data Width: Byte

### USART3\_TX: DMA1\_Channel2 DMA request Settings:

Mode: Normal  
Peripheral Increment: Disable  
Memory Increment: **Enable \***

Peripheral Data Width: Byte  
Memory Data Width: Byte

*ADC1: DMA1\_Channel1 DMA request Settings:*

Mode: **Circular \***  
Peripheral Increment: Disable  
Memory Increment: **Enable \***  
Peripheral Data Width: Half Word  
Memory Data Width: Half Word

### 6.3. NVIC configuration

Interrupt Table	Enable	Preenmption Priority	SubPriority
Non maskable interrupt	true	0	0
Hard fault interrupt	true	0	0
Memory management fault	true	0	0
Prefetch fault, memory access fault	true	0	0
Undefined instruction or illegal state	true	0	0
System service call via SWI instruction	true	0	0
Debug monitor	true	0	0
Pendable request for system service	true	0	0
System tick timer	true	0	0
DMA1 channel1 global interrupt	true	0	0
DMA1 channel2 global interrupt	true	0	0
DMA1 channel3 global interrupt	true	0	0
DMA1 channel4 global interrupt	true	0	0
DMA1 channel5 global interrupt	true	0	0
PVD interrupt through EXTI line 16	unused		
Flash global interrupt	unused		
RCC global interrupt	unused		
ADC1 and ADC2 global interrupts	unused		
USART1 global interrupt	unused		
USART3 global interrupt	unused		

\* User modified value

## ***7. Power Consumption Calculator report***

### 7.1. Microcontroller Selection

Series	STM32F1
Line	STM32F103
MCU	STM32F103ZETx
Datasheet	14611_Rev12

### 7.2. Parameter Selection

Temperature	25
Vdd	3.3

## 8. Software Project

### 8.1. Project Settings

Name	Value
Project Name	Hal_STM32_Cleaner
Project Folder	E:\GitHub\Pacey_Project\Hal_STM32_Cleaner\Driver\HAL
Toolchain / IDE	MDK-ARM V5
Firmware Package Name and Version	STM32Cube FW_F1 V1.6.0

### 8.2. Code Generation Settings

Name	Value
STM32Cube Firmware Library Package	Copy only the necessary library files
Generate peripheral initialization as a pair of '.c/.h' files	Yes
Backup previously generated files when re-generating	No
Delete previously generated files when not re-generated	Yes
Set all free pins as analog (to optimize the power consumption)	Yes