

UART serial communication (Receiver)

1.0.0

Generated by Doxygen 1.8.18

Chapter 1

Data Structure Index

1.1 Data Structures

Here are the data structures with brief descriptions:

UART_ConfigType	??
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Chapter 2

File Index

2.1 File List

Here is a list of all documented files with brief descriptions:

DIO.c	DIO Module Source File for this program	??
DIO.h	DIO Module Header File for this program	??
interrupts.c	Interrupts Module Source File for this program	??
interrupts.h	Interrupts Module Header File for this program	??
PIN_config.h	PIN_config Module Header File for this program	??
PORT.c	PORT Module Source File for this program	??
PORT.h	PORT Module Header File for this program	??
PORT_config.h	PORT_config Module Header File for this program	??
RX.c	RX Source File for this program	??
std_types.h	Standard Types Header File for this program	??
UART.c	UART Module Source File for this program	??
UART.h	UART Module Header File for this program	??

Chapter 3

Data Structure Documentation

3.1 UART_ConfigType Struct Reference

Data Fields

- Mode **mode**
a user defined datatype to select the UART mode configuration
- uint8 **baud_rate**
a user defined datatype to select the UART baudrate configuration

The documentation for this struct was generated from the following file:

- **UART.h**

Chapter 4

File Documentation

4.1 DIO.c File Reference

DIO Module Source File for this program.

```
#include "DIO.h"  
#include <pic16f877a.h>
```

Functions

- void **write_pin** (uint8 port, uint8 pin, uint8 value)
Brief: This is a function to select certain pin of pins (0->7) of port of ports (A,B,C,D,E) to set the value (LOW , HIGH)
- void **toggle_pin** (uint8 port, uint8 pin)
Brief: This is a function to select certain pin of pins (0->7) of port of ports (A,B,C,D,E) to toggle it
- uint8 **read_pin** (uint8 port, uint8 pin)
Brief: This is function to select certain pin of pins (0->7) of port of ports (A,B,C,D,E) to get the value
- void **write_group_value** (uint8 port, uint8 group, uint8 value)
Brief: This is a function to select certain group of groups (FIRST_GROUP , SECOND_GROUP) of port of ports (A,B,C,D,E) to set a certain value
- void **write_port_value** (uint8 port, uint8 value)
Brief: This is a function to select certain port of ports (A,B,C,D,E) to set the value (any value)
- void **write_port** (uint8 port, uint8 value)
Brief: This is a function to select certain port of ports (A,B,C,D,E) to set the value (LOW , HIGH)
- void **toggle_port** (uint8 port)
Brief: This is a function to select certain port of ports (A,B,C,D,E) to toggle it
- void **write_group** (uint8 port, uint8 group, uint8 value)
Brief: This is a function to select certain group of groups (FIRST_GROUP , SECOND_GROUP) of port of ports (A,B,C,D,E) to set the value (LOW , HIGH)
- void **toggle_group** (uint8 port, uint8 group)
Brief: This is a function to select certain group of groups (FIRST_GROUP , SECOND_GROUP) of port of ports (A,B,C,D,E) to toggle it

4.1.1 Detailed Description

DIO Module Source File for this program.

Author

Nour

Date

27/7/2020

Version

1.0

4.1.2 Function Documentation

4.1.2.1 write_pin()

```
void write_pin (
    uint8 port,
    uint8 pin,
    uint8 value )
```

Brief: This is a function to select certain pin of pins (0->7) of port of ports (A,B,C,D,E) to set the value (LOW , HIGH)

Parameters

<i>port</i>	uint8 port to select port
<i>pin</i>	uint8 pin to select pin
<i>value</i>	uint8 value to select value

Returns

void

References HIGH, LOW, PORTA_CONFIG, PORTB_CONFIG, PORTC_CONFIG, PORTD_CONFIG, and PORTE_CONFIG.

4.1.2.2 toggle_pin()

```
void toggle_pin (
    uint8 port,
    uint8 pin )
```

Brief: This is a function to select certain pin of pins (0->7) of port of ports (A,B,C,D,E) to toggle it

Parameters

<i>port</i>	uint8 port to select port
<i>pin</i>	uint8 pin to select pin

Returns

void

References PORTA_CONFIG, PORTB_CONFIG, PORTC_CONFIG, PORTD_CONFIG, and PORTE_CONFIG.

4.1.2.3 read_pin()

```
uint8 read_pin (
    uint8 port,
    uint8 pin )
```

Brief: This is function to select certain pin of pins (0->7) of port of ports (A,B,C,D,E) to get the value

Parameters

<i>port</i>	uint8 port to select port
<i>pin</i>	uint8 pin to select pin

Returns

uint8 to get value of pin

References PORTA_CONFIG, PORTB_CONFIG, PORTC_CONFIG, PORTD_CONFIG, and PORTE_CONFIG.

4.1.2.4 write_group_value()

```
void write_group_value (
    uint8 port,
    uint8 group,
    uint8 value )
```

Brief: This is a function to select certain group of groups (FIRST_GROUP , SECOND_GROUP) of port of ports (A,B,C,D,E) to set a certain value

Parameters

<i>port</i>	uint8 port to select port
<i>group</i>	uint8 group to select group
<i>value</i>	uint8 value to select value

Returns

void

References PORTA_CONFIG, PORTB_CONFIG, PORTC_CONFIG, PORTD_CONFIG, and PORTE_CONFIG.

4.1.2.5 write_port_value()

```
void write_port_value (
    uint8 port,
    uint8 value )
```

Brief: This is a function to select certain port of ports (A,B,C,D,E) to set the value (any value)

Parameters

<i>port</i>	uint8 port to select port
<i>value</i>	uint8 value to select value

Returns

void

References PORTA_CONFIG, PORTB_CONFIG, PORTC_CONFIG, PORTD_CONFIG, and PORTE_CONFIG.

4.1.2.6 write_port()

```
void write_port (
    uint8 port,
    uint8 value )
```

Brief: This is a function to select certain port of ports (A,B,C,D,E) to set the value (LOW , HIGH)

Parameters

<i>port</i>	uint8 port to select port
<i>value</i>	uint8 value to select value

Returns

void

References HIGH, LOW, PORTA_CONFIG, PORTB_CONFIG, PORTC_CONFIG, PORTD_CONFIG, and PORTE_CONFIG.

4.1.2.7 toggle_port()

```
void toggle_port (
    uint8 port )
```

Brief: This is a function to select certain port of ports (A,B,C,D,E) to toggle it

Parameters

<i>port</i>	uint8 port to select port
-------------	---------------------------

Returns

void

References PORTA_CONFIG, PORTB_CONFIG, PORTC_CONFIG, PORTD_CONFIG, and PORTE_CONFIG.

4.1.2.8 write_group()

```
void write_group (
    uint8 port,
    uint8 group,
    uint8 value )
```

Brief: This is a function to select certain group of groups (FIRST_GROUP , SECOND_GROUP) of port of ports (A,B,C,D,E) to set the value (LOW , HIGH)

Parameters

<i>port</i>	uint8 port to select port
<i>group</i>	uint8 group to select group
<i>value</i>	uint8 value to select value

Returns

void

References HIGH, LOW, PORTB_CONFIG, PORTC_CONFIG, and PORTD_CONFIG.

4.1.2.9 toggle_group()

```
void toggle_group (
    uint8 port,
    uint8 group )
```

Brief: This is a function to select certain group of groups (FIRST_GROUP , SECOND_GROUP) of port of ports (A,B,C,D,E) to toggle it

Parameters

<i>port</i>	uint8 port to select port
<i>group</i>	uint8 group to select group

Returns

void

References PORTB_CONFIG, PORTC_CONFIG, and PORTD_CONFIG.

4.2 DIO.h File Reference

DIO Module Header File for this program.

```
#include "std_types.h"
#include "PORT_config.h"
#include "PIN_config.h"
```

Functions

- void **write_pin** (uint8 port, uint8 pin, uint8 value)

***Brief:** This is a function to select certain pin of pins (0->7) of port of ports (A,B,C,D,E) to set the value (LOW , HIGH)*
- void **toggle_pin** (uint8 port, uint8 pin)

***Brief:** This is a function to select certain pin of pins (0->7) of port of ports (A,B,C,D,E) to toggle it*
- uint8 **read_pin** (uint8 port, uint8 pin)

***Brief:** This is function to select certain pin of pins (0->7) of port of ports (A,B,C,D,E) to get the value*
- void **write_group_value** (uint8 port, uint8 group, uint8 value)

***Brief:** This is a function to select certain group of groups (FIRST_GROUP , SECOND_GROUP) of port of ports (A,B,C,D,E) to set a certain value*
- void **write_port** (uint8 port, uint8 value)

***Brief:** This is a function to select certain port of ports (A,B,C,D,E) to set the value (LOW , HIGH)*
- void **toggle_port** (uint8 port)

***Brief:** This is a function to select certain port of ports (A,B,C,D,E) to toggle it*
- void **write_group** (uint8 port, uint8 group, uint8 value)

***Brief:** This is a function to select certain group of groups (FIRST_GROUP , SECOND_GROUP) of port of ports (A,B,C,D,E) to set the value (LOW , HIGH)*
- void **toggle_group** (uint8 port, uint8 group)

***Brief:** This is a function to select certain group of groups (FIRST_GROUP , SECOND_GROUP) of port of ports (A,B,C,D,E) to toggle it*
- void **write_port_value** (uint8 port, uint8 value)

***Brief:** This is a function to select certain port of ports (A,B,C,D,E) to set the value (any value)*

4.2.1 Detailed Description

DIO Module Header File for this program.

Author

Nour

Date

27/7/2020

Version

1.0

4.2.2 Function Documentation

4.2.2.1 write_pin()

```
void write_pin (
    uint8 port,
    uint8 pin,
    uint8 value )
```

Brief: This is a function to select certain pin of pins (0->7) of port of ports (A,B,C,D,E) to set the value (LOW , HIGH)

Parameters

<i>port</i>	uint8 port to select port
<i>pin</i>	uint8 pin to select pin
<i>value</i>	uint8 value to select value

Returns

void

References HIGH, LOW, PORTA_CONFIG, PORTB_CONFIG, PORTC_CONFIG, PORTD_CONFIG, and PORTE_CONFIG.

4.2.2.2 toggle_pin()

```
void toggle_pin (
    uint8 port,
    uint8 pin )
```


Brief: This is a function to select certain pin of pins (0->7) of port of ports (A,B,C,D,E) to toggle it

Parameters

<i>port</i>	uint8 port to select port
<i>pin</i>	uint8 pin to select pin

Returns

void

References PORTA_CONFIG, PORTB_CONFIG, PORTC_CONFIG, PORTD_CONFIG, and PORTE_CONFIG.

4.2.2.3 read_pin()

```
uint8 read_pin (
    uint8 port,
    uint8 pin )
```

Brief: This is function to select certain pin of pins (0->7) of port of ports (A,B,C,D,E) to get the value

Parameters

<i>port</i>	uint8 port to select port
<i>pin</i>	uint8 pin to select pin

Returns

uint8 to get value of pin

References PORTA_CONFIG, PORTB_CONFIG, PORTC_CONFIG, PORTD_CONFIG, and PORTE_CONFIG.

4.2.2.4 write_group_value()

```
void write_group_value (
    uint8 port,
    uint8 group,
    uint8 value )
```

Brief: This is a function to select certain group of groups (FIRST_GROUP , SECOND_GROUP) of port of ports (A,B,C,D,E) to set a certain value

Parameters

<i>port</i>	uint8 port to select port
<i>group</i>	uint8 group to select group
<i>value</i>	uint8 value to select value

Returns

void

References PORTA_CONFIG, PORTB_CONFIG, PORTC_CONFIG, PORTD_CONFIG, and PORTE_CONFIG.

4.2.2.5 write_port()

```
void write_port (
    uint8 port,
    uint8 value )
```

Brief: This is a function to select certain port of ports (A,B,C,D,E) to set the value (LOW , HIGH)

Parameters

<i>port</i>	uint8 port to select port
<i>value</i>	uint8 value to select value

Returns

void

References HIGH, LOW, PORTA_CONFIG, PORTB_CONFIG, PORTC_CONFIG, PORTD_CONFIG, and PORTE_CONFIG.

4.2.2.6 toggle_port()

```
void toggle_port (
    uint8 port )
```

Brief: This is a function to select certain port of ports (A,B,C,D,E) to toggle it

Parameters

<i>port</i>	uint8 port to select port
-------------	---------------------------

Returns

void

References PORTA_CONFIG, PORTB_CONFIG, PORTC_CONFIG, PORTD_CONFIG, and PORTE_CONFIG.

4.2.2.7 write_group()

```
void write_group (
    uint8 port,
    uint8 group,
    uint8 value )
```

Brief: This is a function to select certain group of groups (FIRST_GROUP , SECOND_GROUP) of port of ports (A,B,C,D,E) to set the value (LOW , HIGH)

Parameters

<i>port</i>	uint8 port to select port
<i>group</i>	uint8 group to select group
<i>value</i>	uint8 value to select value

Returns

void

References HIGH, LOW, PORTB_CONFIG, PORTC_CONFIG, and PORTD_CONFIG.

4.2.2.8 toggle_group()

```
void toggle_group (
    uint8 port,
    uint8 group )
```

Brief: This is a function to select certain group of groups (FIRST_GROUP , SECOND_GROUP) of port of ports (A,B,C,D,E) to toggle it

Parameters

<i>port</i>	uint8 port to select port
<i>group</i>	uint8 group to select group

Returns

void

References PORTB_CONFIG, PORTC_CONFIG, and PORTD_CONFIG.

4.2.2.9 write_port_value()

```
void write_port_value (
    uint8 port,
    uint8 value )
```

Brief: This is a function to select certain port of ports (A,B,C,D,E) to set the value (any value)

Parameters

<i>port</i>	uint8 port to select port
<i>value</i>	uint8 value to select value

Returns

void

References PORTA_CONFIG, PORTB_CONFIG, PORTC_CONFIG, PORTD_CONFIG, and PORTE_CONFIG.

4.3 interrupts.c File Reference

interrupts Module Source File for this program

```
#include <pic16f877a.h>
#include "std_types.h"
```

Functions

- void interrupt **ISR** (void)

Variables

- uint8 **receive_data**

4.3.1 Detailed Description

interrupts Module Source File for this program

Author

Nour

Date

17/9/2020

Version

1.0

4.4 interrupts.h File Reference

interrupts Module Header File for this program

Variables

- `uint8 receive_data`

4.4.1 Detailed Description

interrupts Module Header File for this program

Author

Nour

Date

17/9/2020

Version

1.0

4.5 PIN_config.h File Reference

PIN_config Module Header File for this program.

Macros

- `#define PIN0 0x01`
a preprocessor to define pin0
- `#define PIN1 0x02`
a preprocessor to define pin1
- `#define PIN2 0x04`
a preprocessor to define pin2
- `#define PIN3 0x08`
a preprocessor to define pin3
- `#define PIN4 0x10`
a preprocessor to define pin4
- `#define PIN5 0x20`
a preprocessor to define pin5
- `#define PIN6 0x40`
a preprocessor to define pin6
- `#define PIN7 0x80`
a preprocessor to define pin7
- `#define FIRST_GROUP 0x0F`
a preprocessor to define first group
- `#define SECOND_GROUP 0xF0`
a preprocessor to define second group

4.5.1 Detailed Description

PIN_config Module Header File for this program.

Author

Nour

Date

27/7/2020

Version

1.0

4.6 PORT.c File Reference

PORT Module Source File for this program.

```
#include "PORT.h"
#include <pic16f877a.h>
```

Functions

- void **set_pin_direction** (uint8 port, uint8 pin, uint8 direction)
Brief: This is a function to select certain pin of pins (0->7) of port of ports (A,B,C,D,E) to set the direction (INPUT , OUTPUT)
- void **set_port_direction** (uint8 port, uint8 direction)
Brief: This is a function to select certain port of ports (A,B,C,D,E) to set the direction (INPUT , OUTPUT)
- void **set_group_direction** (uint8 port, uint8 group, uint8 direction)
Brief: This is a function to select certain group of groups (FIRST_GROUP , SECOND_GROUP) of port of ports (A,B,C,D,E) to set the direction (INPUT , OUTPUT)

4.6.1 Detailed Description

PORT Module Source File for this program.

Author

Nour

Date

27/7/2020

Version

1.0

4.6.2 Function Documentation

4.6.2.1 set_pin_direction()

```
void set_pin_direction (
    uint8 port,
    uint8 pin,
    uint8 direction )
```

Brief: This is a function to select certain pin of pins (0->7) of port of ports (A,B,C,D,E) to set the direction (INPUT , OUTPUT)

Parameters

<i>port</i>	uint8 port to select port
<i>pin</i>	uint8 pin to select pin
<i>direction</i>	uint8 direction to select direction

Returns

void

References INPUT, OUTPUT, PORTA_CONFIG, PORTB_CONFIG, PORTC_CONFIG, PORTD_CONFIG, and P↔ORTE_CONFIG.

4.6.2.2 set_port_direction()

```
void set_port_direction (
    uint8 port,
    uint8 direction )
```

Brief: This is a function to select certain port of ports (A,B,C,D,E) to set the direction (INPUT , OUTPUT)

Parameters

<i>port</i>	uint8 port to select port
<i>direction</i>	uint8 direction to select direction

Returns

void

References INPUT, OUTPUT, PORTA_CONFIG, PORTB_CONFIG, PORTC_CONFIG, PORTD_CONFIG, and P↔ORTE_CONFIG.

4.6.2.3 set_group_direction()

```
void set_group_direction (
    uint8 port,
    uint8 group,
    uint8 direction )
```

Brief: This is a function to select certain group of groups (FIRST_GROUP , SECOND_GROUP) of port of ports (A,B,C,D,E) to set the direction (INPUT , OUTPUT)

Parameters

<i>port</i>	uint8 port to select port
<i>group</i>	uint8 group to select group
<i>direction</i>	uint8 direction to select direction

Returns

void

References INPUT, OUTPUT, PORTB_CONFIG, PORTC_CONFIG, and PORTD_CONFIG.

4.7 PORT.h File Reference

PORT Module Header File for this program.

```
#include "std_types.h"
#include "PORT_config.h"
#include "PIN_config.h"
```

Functions

- void **set_pin_direction** (uint8 port, uint8 pin, uint8 direction)
Brief: This is a function to select certain pin of pins (0->7) of port of ports (A,B,C,D,E) to set the direction (INPUT , OUTPUT)
- void **set_port_direction** (uint8 port, uint8 direction)
Brief: This is a function to select certain port of ports (A,B,C,D,E) to set the direction (INPUT , OUTPUT)
- void **set_group_direction** (uint8 port, uint8 group, uint8 direction)
Brief: This is a function to select certain group of groups (FIRST_GROUP , SECOND_GROUP) of port of ports (A,B,C,D,E) to set the direction (INPUT , OUTPUT)

4.7.1 Detailed Description

PORT Module Header File for this program.

Author

Nour

Date

27/7/2020

Version

1.0

4.7.2 Function Documentation

4.7.2.1 set_pin_direction()

```
void set_pin_direction (
    uint8 port,
    uint8 pin,
    uint8 direction )
```

Brief: This is a function to select certain pin of pins (0->7) of port of ports (A,B,C,D,E) to set the direction (INPUT , OUTPUT)

Parameters

<i>port</i>	uint8 port to select port
<i>pin</i>	uint8 pin to select pin
<i>direction</i>	uint8 direction to select direction

Returns

void

References INPUT, OUTPUT, PORTA_CONFIG, PORTB_CONFIG, PORTC_CONFIG, PORTD_CONFIG, and P↔ORTE_CONFIG.

4.7.2.2 set_port_direction()

```
void set_port_direction (
    uint8 port,
    uint8 direction )
```

Brief: This is a function to select certain port of ports (A,B,C,D,E) to set the direction (INPUT , OUTPUT)

Parameters

<i>port</i>	uint8 port to select port
<i>direction</i>	uint8 direction to select direction

Returns

void

References INPUT, OUTPUT, PORTA_CONFIG, PORTB_CONFIG, PORTC_CONFIG, PORTD_CONFIG, and P↔ORTE_CONFIG.

4.7.2.3 set_group_direction()

```
void set_group_direction (
    uint8 port,
    uint8 group,
    uint8 direction )
```

Brief: This is a function to select certain group of groups (FIRST_GROUP , SECOND_GROUP) of port of ports (A,B,C,D,E) to set the direction (INPUT , OUTPUT)

Parameters

<i>port</i>	uint8 port to select port
<i>group</i>	uint8 group to select group
<i>direction</i>	uint8 direction to select direction

Returns

void

References INPUT, OUTPUT, PORTB_CONFIG, PORTC_CONFIG, and PORTD_CONFIG.

4.8 PORT_config.h File Reference

PORT_config Module Header File for this program.

Macros

- **#define PORTA_CONFIG 1**
a preprocessor to define portA
- **#define PORTB_CONFIG 2**
a preprocessor to define portB
- **#define PORTC_CONFIG 3**
a preprocessor to define portC
- **#define PORTD_CONFIG 4**
a preprocessor to define portD
- **#define PORTE_CONFIG 5**
a preprocessor to define portE

4.8.1 Detailed Description

PORT_config Module Header File for this program.

Author

Nour

Date

27/7/2020

Version

1.0

4.9 RX.c File Reference

RX Source File for this program.

```
#include <xc.h>
#include "UART.h"
#include "PORT.h"
#include "DIO.h"
#include "interrupts.h"
```

Functions

- void **main** (void)

4.9.1 Detailed Description

RX Source File for this program.

Author

Nour

Date

17/9/2020

Version

1.0

4.10 std_types.h File Reference

Standard Types Header File for this program.

Macros

- #define **LOW** 0u
a preprocessor to define low
- #define **HIGH** 1u
a preprocessor to define high
- #define **FALSE** 0u
a preprocessor to define false
- #define **TRUE** 1u
a preprocessor to define true
- #define **INPUT** 1u
a preprocessor to define input
- #define **OUTPUT** 0u
a preprocessor to define output
- #define **NULL_PTR** (void *)0
a preprocessor to define null pointer

Typedefs

- typedef unsigned char **uint8**
a user defined datatype to define uint8
- typedef unsigned short **uint16**
a user defined datatype to define uint16
- typedef unsigned long **uint32**
a user defined datatype to define uint32

4.10.1 Detailed Description

Standard Types Header File for this program.

Author

Nour

Date

16/9/2019

Version

1.0

4.11 UART.c File Reference

UART Module Source File for this program.

```
#include <pic16f877a.h>
#include "UART.h"
```

Functions

- void **UART_init** (**UART_ConfigType** *Config_Ptr)
***Brief:** This is UART Module Initialization Function*
- void **UART_Transmit** (**uint8** data)
***Brief:** This is function to transmit data*

4.11.1 Detailed Description

UART Module Source File for this program.

Author

Nour

Date

17/9/2020

Version

1.0

4.11.2 Function Documentation

4.11.2.1 UART_init()

```
void UART_init (
    UART_ConfigType * Config_Ptr )
```

Brief: This is UART Module Initialization Function

Parameters

<i>Config_Ptr</i>	UART_ConfigType (p. ??) * Config_Ptr to select Config_Ptr
-------------------	---

Returns

void

4.11.2.2 UART_Transmit()

```
void UART_Transmit (
    uint8 data )
```

Brief: This is function to transmit data

Parameters

<i>data</i>	uint8 data to select transmitted data using UART
-------------	--

Returns

void

4.12 UART.h File Reference

UART Module Header File for this program.

```
#include "std_types.h"
```

Data Structures

- struct **UART_ConfigType**

Enumerations

- enum **Mode** { **TX**, **RX** }

Functions

UART_ConfigType

UART_ConfigTypee responsible for dynamic configuration of UART module

- void **UART_init** (**UART_ConfigType** *Config_Ptr)
Brief: This is UART Module Initialization Function
- void **UART_Transmit** (**uint8** data)
Brief: This is function to transmit data

4.12.1 Detailed Description

UART Module Header File for this program.

Author

Nour

Date

17/9/2020

Version

1.0

4.12.2 Function Documentation

4.12.2.1 UART_init()

```
void UART_init (
    UART_ConfigType * Config_Ptr )
```

Brief: This is UART Module Initialization Function

Parameters

<i>Config_Ptr</i>	UART_ConfigType (p. ??) * Config_Ptr to select Config_Ptr
-------------------	--

Returns

void

4.12.2.2 UART_Transmit()

```
void UART_Transmit (
    uint8 data )
```

Brief: This is function to transmit data**Parameters**

<i>data</i>	uint8 data to select transmitted data using UART
-------------	--

Returns

void