UART COMMUNICATION INTERFACE FOR SIGNAL GENERATOR /DOCUMENT

Revision: 0v1

Revision Date: 23.07.2024

PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY
Murat ALKAN **Intern Digital Design Engineer**	**Mehmet ATAY** **Digital Design Engineer**		

1. UART COMMUNICATION INTERFACE

UART is used for configuration, transmitting/receiving configuration information between the main controller of a system (e.g., an aircraft) and its peripherals.

1.1. UART Communication Features

UART communication features are shown in Table 1.

Table 1 UART Communication Features

Feature	Value
Data Bits	8
Parity	None
Start Bit	1
Stop Bit	1
Data Rate	115200bps
Transfer Mode	Full Duplex

1.2. UART Communication Protocol

UART will use the sent Waveform Type Data, Frequency and Phase Data in Table 2.

Table 2 UART Communication Protocol

Header1	Header2	MsgType	Len(MSB)	Len(LSB)	Data[n]	ChkSum (MSB)	ChkSum (LSB)
0xAA	0x55	(1Byte)	Data Length (n)+Checksum Length(2)		(n byte)	Header1+Header2+ MsgType+Len+ Data[0]+ Data[1]+… Data[n-1]	

1.3. UART Message Types

UART message types are shown in Table 3.

Table 3 UART Message Types

Message Name	Direction	Message Type	Data	Description	Response
Write Data	Controller => Signal Generator	0x99	(Waveform Type, Frequency and Phase Data) 7 Bytes	Write Waveform Type Data + Frequency Data + Phase Data	ACK
Read Data	Controller => Signal Generator	0x44	0 Byte		Data Response
Data Response	Signal Generator => Controller	0x58	(Waveform Type, Frequency and Phase Data) 7 Bytes	Data Response	-
ACK Message	Signal Generator => Controller	0x22	1 Byte	ACK	-
NACK Message	Signal Generator => Controller	0x11	1 Byte	NACK	-

1.4. UART Message Details

1.4.1. Waveform, Frequency and Phase Data Response

UART Waveform Type Data, Frequency and Phase Data details are shown in Table 6. Totally we have 7 bytes datas.

Table 2 Waveform Data, Frequency and Phase Data Message Details

Byte	Bit	Data	Length (in bit)	Notes
0	7-2	Reserved	6	Reserved
	1-0	Waveform Type	2	"00": Sine Wave "01": Triangular Wave "10": Square Wave "11": Sine Wave
1 - 4	31-28	Reserved	4	Reserved
	27-0	Frequency Data	28	Range: 0 to 268435455 Resolution: 0.279 Hz Max Value: 37,5 MHz Min Value: 0 Hz Unit: Hz
5 - 6	15-12	Reserved	4	Reserved
	11-0	Phase Data	12	Range: 0 to 2pi Resolution: 0.087890625 Max Value: 360 Min Value: 0 Unit: Degree