

Testing Script Parameters

Command	Meaning	Value-1 Range
0	Set Modem/Packet type	0 = GFSK 1 = LORA
1	Set transmit Power	0 = 10 (DBM) 1 = 14 2 = 15 3 = 17 4 = 20 5 = 22
2	Set Frequency	150 000 000 - 960 000 000 (Hz)
3	Calibrate	0 = 64 KHz RC Oscillator 1 = 13 MHz RC Oscillator 2 = Phase-locked loop 3 = Analog-to-Digital pulse 4 = Analog-to-Digital BulkM 5 = Analog-to-Digital BulkP 6 = Image 7 = All
4	Calibrate image	150 - 960 (Lower bound)
5	Set Over-Current-Protection	0 - 63 (Multiply by 2.5 for mA)
6	Set trimming capacitors	0-47 [XTA=11.3+value_1*0.47]
7	Set Lora CRC	0 = CRC Disabled 1 = CRC Active
8	Set Lora invert iq (for gateway compatability)	0 = Invert iq Disable 1 = Invert iq Active
9	Set Lora header type	0 = Explicit 1 = Implicit
10	Set Lora Payload length	0-255 (bytes)
11	Set Lora Preamble length	10-65535 (symbols)
12	Set Lora Spreadfactor	5-12
13	Set Lora Bandwidth	6 = 500 (kHz) 5 = 250 4 = 125 3 = 62 10 = 41 2 = 31 9 = 20 1 = 15 8 = 10 0 = 7
14	Forward error correction code rate	1 = 4/5 2 = 4/6 3 = 4/7 4 = 4/8
15	Low Data Rate Optimization	0 = Lora Disabled 1 = Lora Active
16	Auto Low Data Rate Optimization	0 = auto Lora Disabled 1 = auto Lora Active
17	GFSK Preamble length	8-65535 (bits)
18	GFSK Preamble Detection	0 = Detector off 4 = Detect minimum 8 bits 5 = Detect minimum 16 bits 6 = Detect minimum 24 bits 7 = Detect minimum 32 bits

Remark Before Use:
Each value must be separated by a space when entered into the Arduino IDE Serial Monitor. There is a limit of 9 values which can be entered using the Serial Monitor.

Ex. 37 1 2 3 4 5 6 7 8 9
Will transmit the message...
1-2-3-4-5-6-7-8-9

Value-2 Range

150-960 (Upper bound)
0-47 [XTA=11.3+value_2*0.47]

Command	Meaning	Value_1 Range				
38	Set Lora Symbol Timeout	0-248				
39	Set Receive Timeout	0-262 142 (ms) or 16 777 215 for rx_continuous				
40	Read Receive Buffer	N/A				
41	Set Receive Buffer Base Address	0-255				
42	Set chip to Receive mode	N/A				
43	Set chip to Receive mode with duty cycling	value_1 = Receive mode time value_2 = Sleep time				
44	Set chip to Standby mode	0 = 13 MHz RC Oscillator 1 = XOSC				
45	Set Receive/Transmit Fallback Mode	32 = Standby (13 MHz Oscillator) 48 = Standby (XOSC) 64 = Frequency Synthesis Mode				
46	Set chip into sleep mode	0 = Cold Start 4 = Warm Start				
47	Wakeup chip	N/A				
48	Set personalized CAD Parameters Refer to section 13.4.7	Value_1 0 = 1 (symbol) 1 = 2 2 = 4 3 = 8 4 = 16	Value_2 0-255 (cad detect peak)	Value_3 0-255 (Cad detect min)	Value_4 0 = CAD only 1 = Rx 16 = LBT (fallback mode)	Value_5 = cad timeout (ms) (32 bit integer maximum)
49	Channel Activity detection	0 = with personalized cad parameters 1 = with best known parameters (Note: only bandwidths 500 kHz and 125 kHz have best known settings for spreadfactors 7 through 12 (AN1200H8))				
50	Set Frequency Synthesis	N/A	Datasheet: 13.1.3			
51	Set TX continuous wave	N/A	Datasheet: 13.1.9			
52	Set TX infinite preamble	N/A	Datasheet: 13.1.10			
53	Get interrupts	N/A				
54	Clear interrupts	N/A				
55	Get time on air	N/A				
56	Get API Status	N/A				
57	Get Chip Status	N/A	0 = OK 1 = Unsupported Feature 2 = Unknown Value 3 = Error			
58	Get Device Errors	N/A	Datasheet: 13.5.1			
59	Check Receive Buffer	N/A	Datasheet: 13.5.3			
60	Check Lora Packet	N/A				
61	Check GFSK Packet	N/A				
62	Check Payload Length	N/A				
63	Check Preamble Length	N/A				
64	Get Lora Parameters from header of received packet	N/A				
65	Get Packet type / Modem	N/A				
66	Get Lora statistics	N/A				
67	Get GFSK Statistics	N/A				
68	Reset Statistics	N/A				
69	Get Lora Sync Word	N/A				
70	Get GFSK Sync Word	N/A				

Default Settings after Initialization

Parameter	Setting
Transmit buffer base address	0
Receive buffer base address	0
Transmit Timeout	SX126X - MAX_TIMEOUT_IN_MS
Receive Timeout	SX126X - RX - SINGLE_MODE
Frequency	915 000 000 (Hz)
If TCXO → dio3 set as control	1.7V with timeout 320ms
Calibration	All
cfg - rx - boosted	ON
Receive / Transmit Fallback Mode	Standby (XOSC)
Startup Mode	Standby (XOSC)
Transmit Power	14 (DBM)

Startup Recommendations

Set Modem (Command 0)

Set Payload Length According to the modem (Command 10 or 23)

Set Receive Mode for Receiver (Command 42)

Transmit with Transmitter (Command 37)

Note for GFSK Modulation:

- Use Rx - continuous by executing command 39 16777215
- Sync Word must be configured, or else received data will be incorrect
- Gaussian Filter must be configured, the largest is the safest option
- Sync word cannot be all zero's
- All Sync word bytes must be filled

The GFSK Modem tended to be unpredictable when I was testing it.

These recommendations made it work for me, don't interpret them as requirements.

Lora Parameters	Setting
Auto low data rate optimization	OFF
Sync Word	0x14 (20)
Spreadfactor	7
Bandwidth	500 (KHz)
Code Rate	4/8
Low Data Rate Optimization	OFF
Preamble Length	16 (symbols)
Header Type	Explicit
Payload Length	0 (bytes)
CRC	ON
Invert IQ	OFF
Symbol Number Timeout	0
GFSK Parameters	Setting
Bit Rate	600 (bps)
Frequency Deviation	600 (Hz)
Pulse Shape	OFF
Bandwidth	373 600 (Hz)
Preamble Length	32 (bits)
Preamble Detector	OFF
Sync Word Length	64 (bits)
Address Filtering	OFF
Header Type	Fixed Packet Length
Payload Length	0 (bytes)
CRC	OFF
DC Free Whitening	OFF