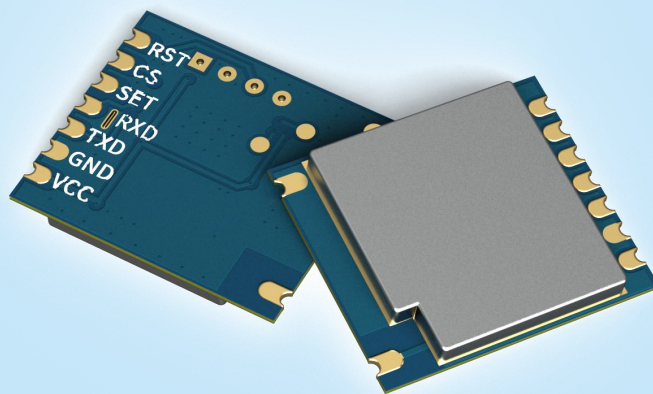


RF51422

- ANT+协议
- 串口无线收发模块

产品规格书



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注：文档修订记录

历史版本号	发布时间	修改内容
V1.0	2020-6	初次发布
V2.0	2020-8	增加模块协议

一、 产品描述

RF51422 模块是一款 UART 接口的 ANT+无线收发模块,内部使用了高性能的 SOC 芯片,集成了 ANT+协议栈。客户可通过标准的 UART 命令直接实现 ANT+设备间的数据收发通讯,主要应用于开发标准 ANT+协议的相关产品。此模块可以兼容市面上绝大部分的 ANT+协议设备。RF51422 严格使用无铅工艺生产和测试,符合 RoHS、Reach 的标准。

二、 产品特点

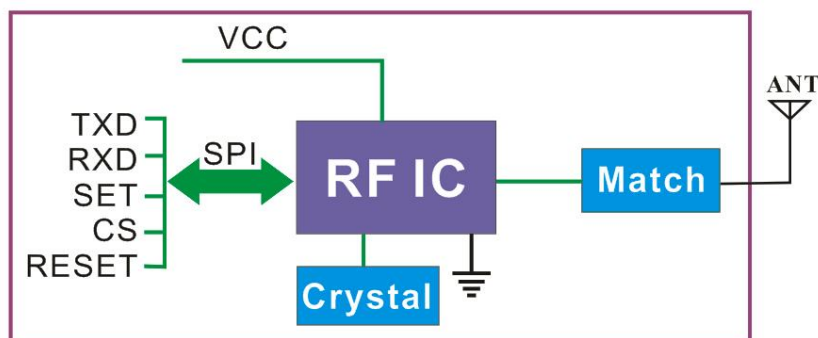
- 标准 ANT+ 协议接口
- 嵌入式小体积
- 支持串口固件升级
- 低功耗,高性价比

Configuration Messages		
Unassign Channel	Assign Channel	Set Channel ID
Channel Messaging Period	Channel Search Timeout	Channel RF Frequency
Set Network Key	Transmit Power	Search Waveform
Add Channel ID to List	Add Encryption ID to List	Config ID List
Config Encryption ID List	Set Channel Tx Power	Channel Low Priority Search Timeout
Enable Extended Messages	Lib Config	Frequency Agility
Proximity Search	Channel Search Priority	Configure Advanced Burst
Configure Event Filter	Configure Selective Data Updates	Set Selective Data Update (SDU) Mask
Enable Single Channel Encryption	Set Encryption Key	1.27 Set Encryption Info

三、 应用领域

- ANT+ 接收设备
- ANT+ 传感器
- 自行车传感器
- 运动传感器

四、 内部框图



五、性能参数

参 数	最 小	典 型	最 大	单 位	条 件
运 行 条 件					
工作电压范围	1.8	3.3	3.6	V	
工作温度范围	-40	25	85	℃	
电 流 消 耗					
发射电流		6.8	8	mA	@3.3V
接收电流		2.9		mA	@3.3V
休眠电流		0.26		mA	

六、功能描述

6.1 上电启动

模块上电后，通过串口输出启动消息(Start-up Message) 01 6F 20。之后，模块将自动打开通道 7 作为 ANT+设备扫描通道。此时如果有 ANT+设备在发射数据，串口将不断输出收到的数据。以下为收到一包数据的示例，数据解析请参考附录《ANT+ Message Protocol》。

Receive Example (HEX): 11 4E 07 01 02 03 04 05 06 07 08 C0 FA 8C 7B 45 20 AF B0

如果不需要此扫描通道，可通过 Close Channel 命令关闭该通道。

6.2 工作模式

模块的工作模式有 3 种，分别为正常工作模式、休眠模式和固件升级模式。

6.2.1 正常工作模式

正常工作模式用于收发数据。收到的数据通过串口输出，根据发射包协议将来自串口的数据发出。

正常工作模式下模块的串口参数固定为 Baud Rate = 115200, Data Bit = 8, Parity Bit = N, Stop Bit = 1。

6.2.2 休眠模式

上电后，拉低 CS 引脚，模块休眠；拉高或悬空 CS 引脚则模块进入正常工作模式。

6.3.3 固件升级(DFU)模式

通过以下两种方式模块将进入固件升级模式：

- 1) 先拉低 SET 引脚再给模块供电。
- 2) 正常工作模式下拉低 SET 引脚，再给 RESET 脚一个低脉冲，模块复位后进入 DFU 模式。
拉高或悬空 SET 引脚，上电或复位后则进入正常工作模式。

固件升级的具体步骤请参考《ANT+模块串口固件升级教程》。

6.3 打开一个接收通道的流程

要打开一个接收通道进行数据接收，可通过串口顺序发送以下命令：

- Set Network Key
TX(HEX):09 46 01 B9 A5 21 FB BD 72 C3 45
RX(HEX):03 40 01 46 00
- Set Channel Number (channel_assign)
TX(HEX):03 42 01 00 01 00
RX(HEX):03 40 01 42 00
- Set Channel ID
TX(HEX):05 51 01 FA 8C 7B 45
RX(HEX):03 40 01 51 00
- Set Channel RF frequency
TX(HEX):02 45 01 39
RX(HEX):03 40 01 45 00
- Set Channel period
TX(HEX):03 43 01 86 1f
RX(HEX):03 40 01 43 00
- Open Channel
TX(HEX):01 4B 01
RX(HEX):03 40 01 4B 00

6.4 打开一个发射通道的流程

要打开一个发射通道进行数据发送，可通过串口顺序发送以下命令：

- Set Network Key
TX(HEX):09 46 01 B9 A5 21 FB BD 72 C3 45
RX(HEX):03 40 01 46 00
- Set Channel Number (channel_assign)
TX(HEX):03 42 01 10 01
RX(HEX):03 40 01 42 00
- Set Channel ID
TX(HEX):05 51 01 FA 8C 7B 45
RX(HEX):03 40 01 51 00
- Set Channel RF frequency
TX(HEX):02 45 01 39
RX(HEX):03 40 01 45 00
- Set Channel period
TX(HEX):03 43 01 86 1f
RX(HEX):03 40 01 43 00
- Fill first frame
TX(HEX):09 4E 01 01 02 03 04 05 06 07 08
- Open Channel
TX(HEX):01 4B 01
RX(HEX):03 40 01 4B 00

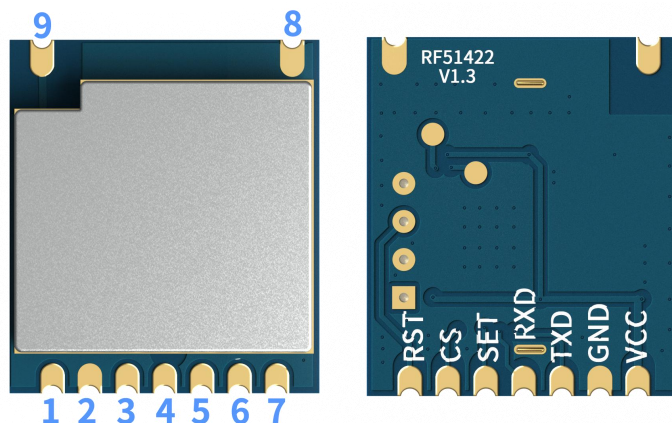
- Auto cycle TX and output EVENT_TX
RX(HEX):03 40 01 01 03 //EVENT_TX
- Close Channel
TX(HEX):01 4C 01
RX(HEX):03 40 01 01 07

6.5 打开一个扫描通道的流程

要打开一个接收通道进行数据扫描接收，可通过串口顺序发送以下命令：

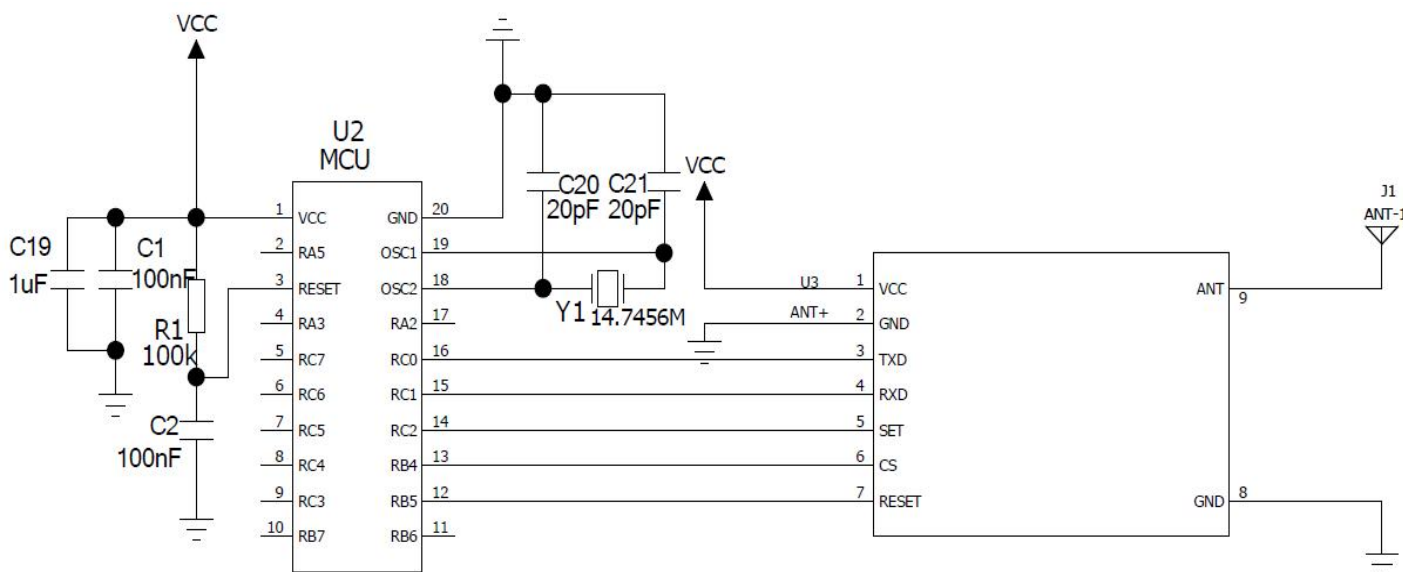
- Set Network Key
TX(HEX):09 46 01 B9 A5 21 FB BD 72 C3 45
RX(HEX):03 40 01 46 00
- Lib Config
TX(HEX):02 6E 00 C0
RX(HEX):03 40 00 6E 00
- Set Channel Number (channel_assign)
TX(HEX):03 42 00 00 01 01
RX(HEX):03 40 00 42 00
- Set Channel ID
TX(HEX):05 51 00 00 00 00 00
RX(HEX):03 40 00 51 00
- Set Channel RF frequency
TX(HEX):02 45 00 39
RX(HEX):03 40 00 45 00
- Set Channel period
TX(HEX):03 43 00 00 00
RX(HEX):03 40 00 43 00
- Search_channel_priority_set
TX(HEX):02 75 00 00
RX(HEX):03 40 00 75 00
- Search_waveform_set
TX(HEX):03 49 00 3C 01
RX(HEX):03 40 00 49 00
- Channel_rx_search_timeout_set
TX(HEX):02 44 00 00
RX(HEX):03 40 00 44 00
- Channel_low_priority_rx_search_timeout_set
TX(HEX):02 63 00 FF
RX(HEX):03 40 00 63 00
- Active_search_sharing_cycles_set
TX(HEX):02 81 00 00
RX(HEX):03 40 00 81 00
- Open Channel
TX(HEX):01 4B 00
RX(HEX):03 40 00 4B 00

七、脚位定义

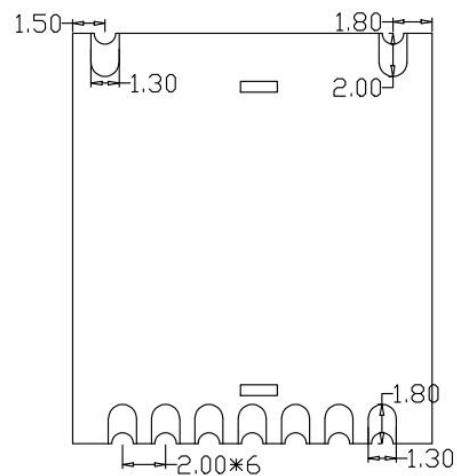
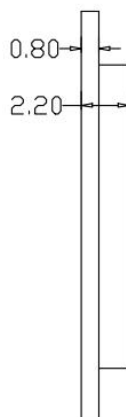
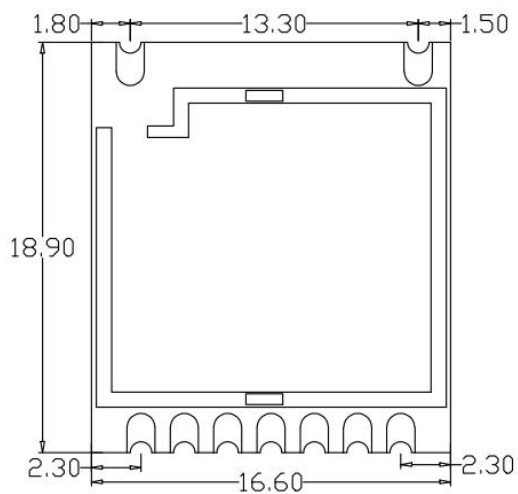


脚位编号	引脚定义	描 述
1	VCC	电源正极
2	GND	电源地
3	TXD	串口 TXD
4	RXD	串口 RXD
5	SET	进入 DFU（固件升级）模式控制脚，拉低该引脚，再给 RESET 脚一个低脉冲，模块重启后进入 DFU 模式。拉高或悬空该引脚，上电或复位则进入正常工作模式。
6	CS	休眠控制脚，拉低 CS 模块休眠，拉高或悬空则模块正常工作
7	RESET	拉低该引脚模块复位，拉高或悬空则模块正常工作
8	GND	电源地
9	ANT	天线接口

八、典型应用电路



九、机械尺寸(单位: mm, 误差±0.01mm)



ANT+ Message Protocol

1. UART Configuration

The parameters of UART are fix to:

Baud Rate	115200
Data Bit	8
Parity Bit	N
Stop Bit	1

2. Message Structure

A typical serial message between the host and ANT+ module has the following basic format.

Byte0	Byte1	Byte2~ ByteN
MsgLength	Msg ID	Message Content (Bytes 0 – (N-1))

ANT+ Constants:

1. MAX_CHAN = 15 , number of supported channels.
2. MAX_NET = 8, number of supported networks.

3. Configuration Messages

1.1 Unassign Channel (0x41)

Format : 0x01+0x41+[Channel Number]

Parameters	Type	Range	Description
Channel Number	UCHAR	0..MAX_CHAN - 1	The channel to be unassigned.

Send Example (HEX): 01 41 00

1.2 Assign Channel (0x42)

Format : 0x03+0x42+[Channel Number]+[Channel Type]+[Network Number]+[Extended Assign't (optional)]

Parameters	Type	Range	Description
Channel Number	UCHAR	0..MAX_CHAN - 1	The channel number to be associated with the assigned channel. The channel number must be unique for every channel assigned on the module. The channel number must also be less than the maximum number of channels supported by the device.
Channel Type	UCHAR	As specified	Bidirectional Channels:

			0x00 – Receive Channel 0x10 – Transmit Channel Unidirectional Channels: 0x50 – Transmit Only Channel 0x40 – Receive Only Channel Shared Channels: 0x20 – Shared Bidirectional Receive Channel 0x30 – Shared Bidirectional Transmit Channel
Network Number	UCHAR	0..MAX_NET-1	Specifies the network to be used for this channel. Set this to 0, to use the default public network. See section 5.2.5 for more details.
Extended Assignment (optional)	UCHAR	As specified	0x01 – Background Scanning Enable 0x04 – Frequency Agility Enable 0x10 – Fast Channel Initiation Enable 0x20 – Asynchronous Transmission Enable All other bits are reserved

Send Example (HEX): 03 42 01 10 01

1.3 Set Channel ID (0x51)

Format : 0x05+0x51+[Channel Number]+[Device number(2 bytes)]+[Device Type ID]+[Trans. Type]

Parameters	Type	Bit Range	Range	Description
Channel Number	UCHAR	-	0..MAX_CHAN-1	The channel number
Device Number	USHORT (little endian)	-	0..65535	The device number. For a slave, use 0 to match any device number.
Device Type MSB Pairing Request	UCHAR (1bit)	7	0..1	Pairing Request. Set this bit on master to request pairing Set this bit on slave to find a pairing transmitter.
Device Type bits 0:6 Device type ID	UCHAR (7bits)	0-6	0..127	The device type. For a slave use 0 to match any device type.
Transmission Type	UCHAR	-	0..255	The transmission type. For a slave use 0 to receive from any transmission type.

Send Example (HEX): 05 51 01 FA 8C 7B 45

1.4 Channel Messaging Period (0x43)

Format : 0x03 + 0x43 + [Channel Number] + [Channel Period(2 bytes)]

Parameters	Type	Range	Default	Description
Channel Number	UCHAR	0..MAX_CHAN-1	-	The channel number

Messaging Period	USHORT (little endian)	0..65535	8192 (4Hz)	The channel messaging period in seconds * 32768. Maximum messaging period is ~2 seconds.
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Send Example (HEX): 03 43 01 86 1f

1.5 Channel Search Timeout (0x44)

Format : 0x02 + 0x44 + [Channel Number] + [Search Timeout]

Parameters	Type	Range	Default	Description
Channel Number	UCHAR	0..MAX_CHAN-1	-	The channel number
Search Timeout	UCHAR	0..255	10 (25 seconds)	The search timeout to be used by this channel for receive searching. Each count in this parameter is equivalent to 2.5 seconds. i.e. 240 = 600 seconds = 10 minutes 0 - disable high priority search mode* 255 - infinite search timeout* *except for AP1: 0 = 0*2.5s = immediate timeout. 255 = 255*2.5 ~ 10.5mins

Send Example (HEX): 02 44 00 0A

1.6 Channel RF Frequency (0x45)

Format : 0x02 + 0x45 + [Channel Number] + [RF Frequency]

Parameters	Type	Range	Default	Description
Channel Number	UCHAR	0..MAX_CHAN-1	-	The channel to be assigned.
Channel RF Frequency	UCHAR	0..124	66	Channel Frequency = 2400 MHz + Channel RF Frequency Number * 1.0 MHz

Send Example (HEX): 02 45 01 39

1.7 Set Network Key (0x46)

Format : 0x09 + 0x46 + [Network Number] + [Network Key(8 bytes)]

Parameters	Type	Range	Description
Network Number	UCHAR	0..MAX_NET-1	The network number
Network Key	UCHAR[8]	N/A	The 8 byte network key

Send Example (HEX): 09 46 01 B9 A5 21 FB BD 72 C3 45

1.8 Transmit Power (0x47)

Format : 0x02 + 0x47 + 0x00 + [TX Power]

Parameters	Type	Range	Default	Description
Filler	UCHAR	0	0	A filler 0 byte that must be included
Transmit Power	UCHAR	0..4	3 (0dBm)	0 : -20 dBm 1 : -12 dBm 2 : -4 dBm 3 : 0 dBm 4 : 4dbm

Send Example (HEX): 02 47 00 03

1.9 Search Waveform (0x49)

Format : 0x03 + 0x49 + [Channel Number] + [Waveform(2 bytes)]

Parameters	Type	Range	Default	Description
Channel Number	UCHAR	0..MAX_CHAN-1	-	The channel number.
Search Waveform	USHORT (little endian)	316 or 97	Refer to the table below	The search waveform to be set. One of these two values only.

Type	Search Waveform	Description
Standard Search Waveform	316	This is the standard search waveform value set as the default on ANT+ devices intended for coin cell battery operation (network processor and SoC devices) and is considered the ideal trade-off between average power consumption and acquisition time during a channel search.
Fast Search Waveform	97	This is an accelerated search waveform value set as the default on ANT+ devices intended for high power operation (typically used in phones) and is considered to be the lowest value which can be safely set on all ANT+ devices. Setting this on devices which do not default to this value will increase their power consumption during a search, and reduce the acquisition time of finding a master channel.

Send Example (HEX): 03 49 00 3C 01

The search waveform command controls the amount of time the radio hardware is active during a slave channel search, and consequently affects the balance between channel acquisition time and average power consumption

1.10 Add Channel ID to List (0x59)

Format : 0x06 + 0x59 + [Channel Number] + [Device number] + [Device Type ID] + [Trans. Type] + [List Index]

Parameters	Type	Bit Range	Range	Description
Channel Number	UCHAR	-	0..MAX_CHAN-1	The channel number
Device Number	USHORT (little endian)	-	0..65535	The device number.
Device Type ID	UCHAR (7bits)	0-6	0..127	The device type.
Transmission Type	UCHAR	-	0..255	The transmission type.
List Index	UCHAR	-	0..3	The index where the specified Channel ID is to be placed in the list.

Send Example (HEX):

This message shares its message ID with the “Add Encryption ID to List” command. Please note this message is only used for **slave** channels. On ANT+ encrypted master channels the “Add Encryption ID to List” command behaviour described in 9.5.2.11 applies instead.

1.11 Add Encryption ID to List (0x59)

Format : 0x06 + 0x59 + [Channel Number] + [Encryption ID(4 bytes)] + [List Index]

Parameters	Type	Range	Description
Channel Number	UCHAR	0..MAX_CHAN-1	The channel number
Encryption ID	UCHAR[4]	N/A	The unique 4 byte identifier of the negotiating slave
List Index	UCHAR	0..3	The index where the specified Encryption ID is to be placed in the list.

Send Example (HEX):

This message shares its message ID with the “Add Channel ID to List” command. Please note this message is only used for encrypted ANT+ master channels. On slave channels the “Add Channel ID” command behaviour described in section 9.5.2.10 applies instead.

1.12 Config ID List (0x5A)

Format : 0x03 + 0x5A + [Channel Number] + [List Size] + [Exclude]

Parameters	Type	Bit Range	Range	Description
Channel Number	UCHAR	-	0..MAX_CHAN-1	The channel number
List Size	UCHAR	-	0-4	The size of the inclusion/exclusion list
Exclude	UCHAR	-	0-1	Sets the list as include (0) or exclude (1)

Send Example (HEX): 03 5A 00 01 00

This message shares its message ID with the “Config Encryption List ID” command. Please note this message is only used for ANT+ slave channels. On encrypted ANT+ master channels the “Config Encryption List ID” command behaviour applies instead.

This message is sent to ANT+ to configure the inclusion/exclusion list. The list size determines which channel IDs in the list are to be used; setting a size of 0 disables the inclusion/exclusion list, while setting a size of N includes the IDs stored at list indices 1-N (section 9.5.2.10). The exclude variable determines whether the IDs are to be found or to be ignored when the device is searching.

1.13 Config Encryption ID List (0x5A)

Format : 0x03 + 0x5A + [Channel Number] + [List Size] + [List Type]

Parameters	Type	Range	Description
Channel Number	UCHAR	0..MAX_CHAN-1	The channel number
List Size	UCHAR	0..4	The size of the encryption whitelist or blacklist
List Type	UCHAR	As specified	The whitelist will only allow slave encryption IDs on the list to negotiate successfully and the blacklist will never allow slave encryption IDs on the list to negotiate successfully: 0x00 – Whitelist 0x01 – Blacklist

Send Example (HEX): 03 5A 00 01 00

This message shares its message ID with the “Config List ID” command. Please note this message is only used for encrypted ANT+ master channels. On slave channels the “Config List ID” command behaviour applies instead. This message is sent to ANT+ to configure the whitelist/blacklist for the encrypted ANT+ master channel. The list size determines which encryption IDs in the list are to be used; setting a size of 0 disables the whitelist/blacklist, while setting a size of N includes the IDs stored at list indices 1-N (section 9.5.2.11). The list type variable determines whether the slave encryption IDs are to be whitelisted as the only devices allowed to negotiate, or blacklisted as the only devices immediately rejected by the encrypted ANT+ master channel.

1.14 Set Channel Tx Power (0x60)

Format : 0x02 + 0x60 + [Channel Number] + [Transmit Power]

Parameters	Type	Range	Description
Channel Number	UCHAR	0..MAX_CHAN-1	The channel number

Transmit Power	UCHAR	0..4	0 : -20 dBm 1 : -12 dBm 2 : -4 dBm 3 : 0 dBm 4 : 4dbm
----------------	-------	------	---

Send Example (HEX) : 02 60 00 03

This message is sent to the module to set the transmit power level for a specified channel.

1.15 Channel Low Priority Search Timeout (0x63)

Format : 0x02 + 0x63 + [Channel Number] + [Search Timeout]

Parameters	Type	Range	Default	Description
Channel Number	UCHAR	0..MAX_CHAN-1	-	The channel number
Search Timeout	UCHAR	0..255	2 (5 seconds)	The search timeout to be used with by this channel for receive searching. Each count in this parameter is equivalent to 2.5 seconds. i.e. 240 = 600 seconds = 10 minutes A value of 0 will result in no low priority search. A value of 255 specifies infinite search time-out.

Send Example (HEX) : 02 63 00 02

This message is sent to ANT+ to configure the duration the receiver will search for a channel in low priority mode before switching to high priority mode. Unlike high priority mode, a low priority search will not interrupt other open channels on the device while searching. If the low-priority search times out, the module will switch to high priority mode until it either times out or the device is found.

1.16 Enable Extended Messages (0x66)

Format : 0x02 + 0x66 + 0x00 + [Enable]

Parameters	Type	Range	Default	Description
Filler	UCHAR	0	0	A filler 0 byte that must be included
Enable	UCHAR	0..1	0	0 – Disable 1 – Enable

Send Example (HEX) : 02 66 00 01

This message is sent to ANT+ to enable or disable the extended Rx messages on the module. When this setting is enabled ANT+ will include the channel ID with the data messages.

1.17 Lib Config (0x6E)

Format : 0x02 + 0x6E + 0x00 + [Lib Config]

Parameters	Type	Range	Description
Filler	UCHAR	0	A filler 0 byte that must be included
Lib Config	UCHAR	As specified	0 – Disabled 0x20 – Enables Rx Timestamp Output 0x40 – Enables RSSI Output 0x80 – Enables Channel ID Output Other entries are combinations of set and cleared states

Send Example (HEX) : 02 6E 00 C0

This message is sent to ANT+ to enable or disable the extended Rx messages on the module. When this setting is enabled ANT+ will include the channel ID, RSSI, or timestamp data with the data messages.

1.18 Frequency Agility (0x70)

Format : 0x04 + 0x70 + [Channel Number] + [Freq1] + [Freq2] + [Freq3]

Parameters	Type	Range	Default	Description
Channel Number	UCHAR	0..MAX_CHAN-1	-	The channel number
ucFrequency1	UCHAR	0-124	3	Sets operating frequency 1 parameter for ANT+ frequency Agility.
ucFrequency2	UCHAR	0-124	39	Sets operating frequency 2 parameter for ANT+ frequency Agility.
ucFrequency3	UCHAR	0-124	75	Sets operating frequency 3 parameter for ANT+ frequency Agility.

Send Example (HEX) : 04 70 00 03 27 4B

This function configures the three operating RF frequencies for ANT+ frequency agility mode and should be used in conjunction with the ANT+_AssignChannel() extended byte (section 9.5.2.2). Should not be used with shared, or Tx/Rx only channel types.

1.19 Proximity Search (0x71)

Format : 0x02 + 0x71 + [Channel Number] + [Search Threshold]

Parameters	Type	Range	Default	Description
Channel Number	UCHAR	0..MAX_CHAN-1	-	The channel number

ucSearchThreshold	UCHAR	0-10	0	Sets the proximity threshold bin: 0 – disabled 1:10 – closest to farthest
-------------------	-------	------	---	---

Send Example (HEX) : 02 71 00 01

1.20 Channel Search Priority (0x75)

Format : 0x02 + 0x75 + [Channel Number] + [Search Priority]

Parameters	Type	Range	Default	Description
Channel Number	UCHAR	0..MAX_CHAN-1	-	The channel number
Search Priority	UCHAR	0...255	0	The search priority to be used for this channel. Higher numbers are given higher priority.

Send Example (HEX) : 02 75 00 01

This message is used to configure the search priority of the channel. If a channel has a higher search priority, it will preempt lower search priority search channels that are already in progress. A pre-empted search will resume when the higher priority search has either acquired a connection, or timed out. This functionality is primarily for determining precedence with multiple search channels that cannot co-exist (Search channels with different networks or RF frequency settings).

Example:

If both channel 0 and channel 1 have a search priority of 0, then whichever channel goes to search first is the search channel and the other channel must wait until it is finished before searching. If channel 1 has a search priority of 2 and channel 0 has a search priority of 0, then channel 1 will become the search channel anytime it goes to search, forcing channel 0 to wait until channel 1 has either acquired a device, or times out.

1.21 Configure Advanced Burst (0x78)

Format : 0x0C + 0x78 + 0x00 + Enable + [Max Packet Length] + [Required Features(3 bytes)] + [Optional Features(3 bytes)] + [Optional Stall Count / Retry Count Extension]

Parameters	Type	Range	Description
Filler	UCHAR	0	A filler 0 byte that must be included
Enable	UCHAR	0..1	Enables/disables advanced burst mode. Advanced burst is disabled by default. 0x00 – Disable 0x01 – Enable
Max Packet Length	UCHAR	As specified	Specifies the maximum burst packet size that will be sent or received by the device:

			0x01 – 8 byte 0x02 – 16 byte 0x03 – 24 byte
Required Features	ULONG (3 bytes, little endian)	As specified	Required advanced burst features. See "Supported Features" field in section 9.5.7.7 for a list of available features.
Optional Features	ULONG (3 bytes, little endian)	As specified	Optional advanced burst features. See "Supported Features" field in section 9.5.7.7 for a list of available features.
Stall Count (optional)	USHORT (little endian)	0..65535	Number of stall packets that will be sent before a transfer enters the retry count. Each packet corresponds to ~3ms. Typical default value is 3210 to provide ~10s of stalling. This byte is optional and does not need to be included
Retry Count Extension (optional)	UCHAR	0..255	Number of retry count cycle (5 retries) extensions. Typical default value is 4, providing 20 retries. This byte is optional and does not need to be included

Send Example (HEX) : 0C 78 00 01 01 00 00 00 00 00 00 8A 0C 03

This message is sent to ANT+ to enable and configure advanced burst. Advanced burst provides enhancements to the burst transfer mechanism, by increasing the transfer speed and providing additional features to improve the efficiency of transfers.

1.22 Configure Event Filter (0x79)

Format : 0x03 + 0x79 + 0x00 + [Event Filter(2 bytes)]

Parameters	Type	Range	Description
Filler	UCHAR	0	A filler 0 byte that must be included
Event Filter	USHORT (2 bytes, little endian)	0..65535	The Event Filter bit fields is as follows: Bit 0 – Filter event 1 (RESPONSE_NO_ERROR) Bit 1 – Filter event 2 (EVENT_RX_SEARCH_TIMEOUT) ... Bit N – Filter event (N+1) where N is max 15 Setting a bit to 1 applies a filter to the corresponding event.

Send Example (HEX):

This message is sent to ANT+ to apply a filter to specified events. Event filtering allows the host to prevent specific ANT+ events from being sent from the ANT+ device to the host.

1.23 Configure Selective Data Updates (0x7A)

Format : 0x02 + 0x7A + [Channel Number] + [Selected Data]

Parameters	Type	Range	Description
Channel Number	UCHAR	0..MAX_CHAN-1	The channel number that SDU mask applies to.

Selected Data	UCHAR	N/A	The Selected Data bit fields is as follows: - Bits 0-4: SDU Mask Number (cannot exceed MAX_SDU_MASKS) - Bits 5-6: Reserved set to 0 - Bit 7: 0 -> Filter Broadcast messages only 1 -> Filter Broadcast and Acknowledged Messages A value of 0xFF disables the SDU Mask for the specified channel
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Send Example (HEX):

1.24 Set Selective Data Update (SDU) Mask (0x7B)

Format : 0x09 + 0x7B + [SDU Mask Number] + [SDU Mask (8 bytes)]

Parameters	Type	Range	Description
SDU Mask Number	UCHAR	0..MAX_SDU_MASKS-1	The SDU mask number to be associated with the SDU Mask
SDU Mask (8 bytes)	UCHAR[8]	N/A	Sets the bits in an 8-byte message that should be compared for selective data update purposes. 0 – Ignore 1 – Compare and send data update when this data changes

Send Example (HEX):

This message is sent to ANT+ to define a selective data update mask. Selective data update masks consist of an 8 byte bit field, where each bit indicates whether to ignore or process data in the corresponding bit locations in the payload of a received data message. For example, consider the following SDU mask: 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0xFF

Setting this Mask value would indicate that the application should only be notified if any bit in the last byte in a standard message payload changes.

1.25 Enable Single Channel Encryption (0x7D)

Format : 0x04 + 0x7D + [Channel Number] + [Encryption Mode] + [Volatile Key Index] + [Decimation Rate]

Parameters	Type	Range	Description
Channel Number	UCHAR	0..MAX_CHAN-1	The channel number

Encryption Mode	UCHAR	As specified	The "include user data" option will pass a user data field to the master with the encryption negotiation: 0x00 – Disable 0x01 – Enable 0x02 – Enable and Include User Information String
Volatile Key Index	UCHAR	0	Specifies which active encryption key (stored in volatile memory) to reference for this channel
Decimation Rate	UCHAR	1..255	Division of the master channel rate by the slave's tracking channel rate

Send Example (HEX):

This message is sent to ANT+ to enable encryption/decryption of an ANT+ channel using 128-bit AES-CTR. Advanced burst mode MUST be enabled on both the master and slave nodes before single channel encryption can be enabled;

1.26 Set Encryption Key (0x7E)

Format : 0x11 + 0x7E + [Volatile Key Index] + [Encryption Key (16 bytes)]

Parameters	Type	Range	Description
Volatile Key Index	UCHAR	0	The reference index of the key in volatile memory to be set
Encryption Key	UCHAR[16]	N/A	The 128-bit secret key to be set

Send Example (HEX):

This message is sent to set the specified key location with a 16-byte encryption key which will be used for ANT+ single channel encryption/decryption. Note that only one volatile key index is available on current parts, and this parameter must therefore be set to zero.

1.27 Set Encryption Info (0x7F)

Encryption ID Format : 0x05 + 0x7F + [Set Parameter] + Data String (4 bytes)

User Information String Format : 0x14 + 0x7F + [Set Parameter] + Data String (19bytes)

Random Number Seed Format : 0x11 + 0x7F + [Set Parameter] + Data String (16 bytes)

Parameters	Type	Range	Description
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Set Parameter	UCHAR	N/A	Determines the value being set by the string parameter: 0x00 – Encryption ID 0x01 – User Information String 0x02 – Random Number Seed
Data String	UCHAR[4] or UCHAR[19] or UCHAR[16]	N/A	The Encryption ID of the device to be set or the user information string to be set or the random number seed to be set depending on the set parameter operation requested respectively: Encryption ID - 4 Bytes User Information String - 19 Bytes Random Number Seed - 16 Bytes

Send Example (HEX):

4. Notifications

2.1 Start-up Message(0x6F)

Format : 0x01 + 0x6F + [Start-up Message]

Parameters	Type	Range	Description
Start-up Message	UCHAR	0..255	The Start-up Message bit field is as follows: 0x00 – POWER_ON_RESET Bit 0 – HARDWARE_RESET_LINE Bit 1 – WATCH_DOG_RESET Bit 5 – COMMAND_RESET Bit 6 – SYNCHRONOUS_RESET Bit 7 – SUSPEND_RESET Other bits are reserved

Receive Example (HEX): 01 6F 20

5. Control Messages

3.1 Reset System (0x4A)

Format : 0x01 + 0x4A + 0x00

Parameters	Type	Range	Description
Filler	UCHAR	0	

Send Example (HEX): 01 41 00

This message is sent to the module to reset the system and put it in a known, low-power state.

Execution of this command terminates all channels. All information previously configured in the system can no longer be considered valid.

3.2 Open Channel (0x4B)

Format : 0x01 + 0x4B + [Channel Number]

Parameters	Type	Range	Description
Channel Number	UCHAR	0..MAX_CHAN-1	The number of the channel to be opened

Send Example (HEX) : 01 4B 01

This message is sent to the module to open a channel that has been previously assigned and configured with the configuration messages outline in prior sections. Execution of this command causes the channel to commence operation, and either data messages or events begin to be issued in association with this channel.

3.3 Close Channel (0x4C)

Format : 0x01 + 0x4C + [Channel Number]

Parameters	Type	Range	Description
Channel Number	UCHAR	0..MAX_CHAN-1	The number of the channel to be closed

Send Example (HEX) : 01 4C 01

This message is sent to close a channel that has been previously opened. The host will initially receive a RESPONSE_NO_ERROR message indicating the message was successfully received by ANT+. The actual closing of the channel will be indicated by an EVENT_CHANNEL_CLOSED, and the host should wait for this message before performing any other operations on the channel. When a channel is closed it remains assigned with all associated parameters remaining valid. The channel may be reopened at any time with the Open Channel Command.

3.4 Request Message (0x4D)

Format : [Varies] + 0x4D + [Channel Number/Sub Message ID] + [Requested Message ID] +
 [Additional fields used with some requests]

Parameters	Type	Range	Description
Channel Number/Sub Message ID	UCHAR	0..MAX_CHAN-1	The channel number associated with the message request, or sub message ID for commands that apply to the whole device. If requesting Advanced Burst Capabilities/Configuration, instead of channel number, set to: 0x00 – Request Advanced Burst Capabilities 0x01 – Request Advanced Burst Current Configuration
Message ID Requested	UCHAR	Refer to Requested Response Messages	ID of the message being requested

Send Example (HEX): 02 4D 00 3E

Receive Example (HEX): 0A 3E 46 57 3A 76 32 2E 34 2E 33 00

This message is sent to the device to request a specific information message from the device. Valid messages include channel status, channel ID, ANT+ version, capabilities, advanced burst capabilities/configuration, and event filter. Requesting one of these messages causes ANT+ to send the appropriate response message. Please see these messages for specific details.

3.5 Open Rx Scan Mode (0x5B)

Format : [Varies] + 0x5B + 0x00 + [Synchronous Channel Packets Only (optional)]

Parameters	Type	Range	Description
Filler	UCHAR	0	Filler byte
Synchronous Channel Packets Only(optional)	UCHAR	0..1 (optional)	0 – Default configuration. 1 – Allow synchronous channel packets only.

Send Example (HEX): 02 5B 00 00

This message is sent to the module in order to open channel 0 in continuous scan mode. Channel 0 should have been previously assigned and configured as a slave receive channel. Execution of this command causes channel 0 to commence operation in continuous scanning mode.

6. Data Messages

4.1 Broadcast Data (0x4E)

Format : [Varies] + 0x4E + [Channel Number] + [Payload(8 bytes)] + [Extended Data(optional)]

Note: Extended Data Refer to section 7.1.1 of “ANT+_Message_Protocol_and_Usage_Rev_5.1”.

Parameters	Type	Range	Description
Channel Number	UCHAR	0..MAX_CHAN-1	The channel the data is for/from
Data 0	UCHAR	0..255	The first data byte
..			
Data 7	UCHAR	0..255	The eighth data byte
Flag Byte (optional)	UCHAR	Refer to section 7.1.1	Indicates presence of extended data bytes
Extended Data Bytes (optional)	Varies, Refer to section 7.1.1	Refer to section 7.1.1	Optional extended messages bytes. Only included if flag byte indicates their presence. Refer to section 7.1.1 for more information on the possible extended data bytes.

Send Example (HEX): 09 4E 01 01 02 03 04 05 06 07 08

Receive Example (HEX): 11 4E 07 01 02 03 04 05 06 07 08 C0 FA 8C 7B 45 20 B5 B0

Receive Example (HEX): 11 4E 07 80 FF FF FF 19 93 4B C7 C0 01 00 7B 01 20 BD B0

4.2 Acknowledged Data (0x4F)

Format : [Varies] + 0x4F + [Channel Number] + [Payload(8 bytes)] + [Extended Data(optional)]

Note: Extended Data Refer to section 7.1.1 of “ANT+_Message_Protocol_and_Usage_Rev_5.1”.

Parameters	Type	Range	Description
Channel Number	UCHAR	0..MAX_CHAN-1	The channel the data is for/from
Data 0	UCHAR	0..255	The first data byte
..			
Data 7	UCHAR	0..255	The eighth data byte
Flag Byte (optional)	UCHAR	Refer to section 7.1.1	Indicates presence of extended data bytes

Extended Data Bytes (optional)	Varies, Refer to section 7.1.1	Refer to section 7.1.1	Optional extended messages bytes. Only included if flag byte indicates their presence. Refer to section 7.1.1 for more information on the possible extended data bytes.
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Send Example (HEX):

4.3 Burst Data (0x50)

Format : [Varies] + 0x50 + [Sequence/Channel Number] + [Payload(8 bytes)] + [Extended Data(optional)]

Note: Extended Data Refer to section 7.1.1 of “ANT+_Message_Protocol_and_Usage_Rev_5.1”.

Parameters	Type	Range	Description
Sequence Number	UCHAR (Bits 7:5)	As specified	The upper 3 bits of this byte are used as a sequence number to ensure transfer integrity (see below).
Channel Number	UCHAR (Bits 4:0)	0..MAX_CHAN-1	The lower 5 bits represent the channel number that the burst transfer is taking place on.
Data 0	UCHAR	0..255	The first data byte
..			
Data 7	UCHAR	0..255	The eighth data byte
Flag Byte (optional)	UCHAR	Refer to section 7.1.1	Indicates presence of extended data bytes
Extended Data Bytes (optional)	Varies, Refer to section 7.1.1	Refer to section 7.1.1	Optional extended messages bytes. Only included if flag byte indicates its presence. Refer to section 7.1.1 for more information on the possible extended data bytes.

Send Example (HEX):

4.4 Advanced Burst Data (0x72)

Format : [Varies] + 0x72 + [Sequence/Channel Number] + [Payload (N bytes)]

Parameters	Type	Range	Description
Sequence Number	UCHAR (Bits 7:5)	As specified	The upper 3 bits of this byte are used as a sequence number to ensure transfer integrity (see Section 9.5.5.3 for details on the sequence number).

Channel Number	UCHAR (Bits 4:0)	0..MAX_CHAN-1	The lower 5 bits represent the channel number that the burst transfer is taking place on.
Data 0	UCHAR	0..255	The first data byte
..			
Data N	UCHAR	0..255	The last data byte.

Send Example (HEX):

5 Channel Response / Event (0x40)

5.1 Channel Event

Format : 0x03 + 0x40 + [Channel Number] + 0x01 + [Event Code] + [Optional Extended Event Parameters]

Receive Example (HEX): 03 40 07 01 07 //EVENT_CHANNEL_CLOSED

Receive Example (HEX): 03 40 01 01 03 //EVENT_TX

5.2 Channel Response

Format : 0x03 + 0x40 + [Channel Number] + [Initiating Message ID]+ [Response Code]

Parameters	Type	Range	Description
Channel Number	UCHAR	0.. MAX_CHAN-1	The channel number of the channel associated with the event.
Message ID	UCHAR	0..255	ID of the message being responded too. This is set to 1 for an RF Event. (Message codes prefixed by EVENT_)
Message Code	enum	0..255	The response code or event code for a specific response or event

Message Codes (Event Code/ Response Code)

Name	Value	Description
RESPONSE_NO_ERROR	0 (0x00)	Returned on a successful operation
EVENT_RX_SEARCH_TIMEOUT	1 (0x01)	A receive channel has timed out on searching. The search is terminated, and the channel has been automatically closed. In order to restart the search the Open Channel message must be sent again.
EVENT_RX_FAIL	2 (0x02)	A receive channel missed a message which it was expecting. This happens when a slave is tracking a master and is expecting a message at the set message rate.
EVENT_TX	3 (0x03)	A Broadcast message has been transmitted successfully. This event should be

		used to send the next message for transmission to the ANT+ device if the node is setup as a master.
EVENT_TRANSFER_RX_FAILED	4 (0x04)	A receive transfer has failed. This occurs when a Burst Transfer Message was incorrectly received.
EVENT_TRANSFER_TX_COMPLETE D	5 (0x05)	An Acknowledged Data message or a Burst Transfer sequence has been completed successfully. When transmitting Acknowledged Data or Burst Transfer, there is no EVENT_TX message.
EVENT_TRANSFER_TX_FAILED	6 (0x06)	An Acknowledged Data message, or a Burst Transfer Message has been initiated and the transmission failed to complete successfully
EVENT_CHANNEL_CLOSED	7 (0x07)	The channel has been successfully closed. When the Host sends a message to close a channel, it first receives a RESPONSE_NO_ERROR to indicate that the message was successfully received by ANT+; however, EVENT_CHANNEL_CLOSED is the actual indication of the closure of the channel. As such, the Host must use this event message rather than the RESPONSE_NO_ERROR message to let a channel state machine continue.
EVENT_RX_FAIL_GO_TO_SEARCH	8 (0x08)	The channel has dropped to search mode after missing too many messages.
EVENT_CHANNEL_COLLISION	9 (0x09)	Two channels have drifted into each other and overlapped in time on the device causing one channel to be blocked.
EVENT_TRANSFER_TX_START	10 (0x0A)	Sent after a burst transfer begins, effectively on the next channel period after the burst transfer message has been sent to the device.
EVENT_TRANSFER_NEXT_DATA_BLOCK	17 (0x11)	Returned to indicate a data block release on the burst buffer.
CHANNEL_IN_WRONG_STATE	21 (0x15)	Returned on attempt to perform an action on a channel that is not valid for the channel's state
CHANNEL_NOT_OPENED	22 (0x16)	Attempted to transmit data on an unopened channel
CHANNEL_ID_NOT_SET	24 (0x18)	Returned on attempt to open a channel before setting a valid ID
CLOSE_ALL_CHANNELS	25 (0x19)	Returned when an OpenRxScanMode() command is sent while other channels are open.
TRANSFER_IN_PROGRESS	31 (0x1F)	Returned on an attempt to communicate on a channel with a transmit transfer in progress.
TRANSFER_SEQUENCE_NUMBER_ERROR	32 (0x20)	Returned when sequence number is out of order on a Burst Transfer
TRANSFER_IN_ERROR	33 (0x21)	Returned when a burst message passes the sequence number check but will not be transmitted due to other reasons.
MESSAGE_SIZE_EXCEEDS_LIMIT	39 (0x27)	Returned if a data message is provided that is too large.
INVALID_MESSAGE	40 (0x28)	Returned when message has invalid parameters
INVALID_NETWORK_NUMBER	41 (0x29)	Returned when an invalid network number is provided. As mentioned earlier, valid network numbers are between 0 and MAX_NET-1.
INVALID_LIST_ID	48 (0x30)	Returned when the provided list ID or size exceeds the limit.
INVALID_SCAN_TX_CHANNEL	49 (0x31)	Returned when attempting to transmit on ANT+ channel 0 in scan mode.
INVALID_PARAMETER_PROVIDED	51 (0x33)	Returned when invalid configuration commands are requested
EVENT_QUE_OVERFLOW	53 (0x35)	May be possible when using synchronous serial port, or using all channels on a slow asynchronous connection. Indicates that one or more events were lost due to excessive latency in reading events out over the serial port. This typically

		happens if the serial queue is full.
ENCRYPT_NEGOTIATION_SUCCESS	56 (0x38)	When an ANT+ slave has negotiated successfully with an encrypted ANT+ master this event is passed to both the master and the slave.
ENCRYPT_NEGOTIATION_FAIL	57 (0x39)	When an ANT+ slave fails negotiation with an encrypted ANT+ master this event is passed to both the master and the slave. This can occur due to configuration mismatch, poor RF, mismatched encryption keys, or white/blacklisting by the master.

6 Requested Response Messages

6.1 Channel Status (0x52)

Format : 0x02 + 0x52 + [Channel Number] + [Channel Status]

Parameters	Type	Range	Description
Channel Number	UCHAR	0..MAX_CHAN-1	The channel number
Channel Status	UCHAR	Bits 4:7	Channel type : 0 Bidirectional Slave Channel 1 Bidirectional Master Channel 2 Shared Bidirectional Slave Channel 3 Shared Bidirectional Master Channel 4 Slave Receive Only Channel (diagnostic) 5 Master Transmit Only Channel (legacy)
		Bits 2:3	Network number
		Bits 0:1	Channel State: Un-Assigned = 0 Assigned = 1 Searching = 2 Tracking = 3

Send Example (HEX): 02 4D 01 52

Receive Example (HEX): 02 52 01 11

Send Example (HEX): 02 4D 07 52

Receive Example (HEX): 02 52 07 02

6.2 Channel ID (0x51)

Format : 0x05 + 0x51 + [Channel Number] + [Device number(2 bytes)] + [Device Type ID] + [Trans.Type]

Parameters	Type	Range	Description
Channel Number	UCHAR	0..MAX_CHAN-1	The channel number
Device Number	USHORT(little endian)	0..65535	The device number

Device Type ID	UCHAR	0..127	The device type
Transmission Type	UCHAR	0..255	The transmission type

Send Example (HEX): 02 4D 01 51

Receive Example (HEX): 05 51 01 FA 8C 7B 45

6.3 ANT+ Version (0x3E)

Format : [Varies] + 0x3E + [Version (Nbytes)]

Parameters	Type	Description
Version Message	char[]	Variable length string.

Send Example (HEX): 02 4D 00 3E

Receive Example (HEX): 0A 3E 46 57 3A 76 32 2E 34 2E 33 00

The version message returns an N-byte null-terminated version string, corresponding to the ANT+ host interface version.

6.4 Capabilities (0x54)

Format : 0x08 + 0x54 + [Max Channels] + [Max Networks] + [Standard Options] + [Advanced Options] + [Advanced Options 2] + [SensRcore Channels] + [Advanced Options 3] + [Advanced Options 4]

Parameters	Type	Range	Description
Max Channels	UCHAR	0..MAX_CHAN	Returns the number of ANT+ channels available
Max Networks	UCHAR	0..MAX_NET-1	Returns the number of networks available
Standard Options	UCHAR	0..255	The Standard Options bit field is encoded as follows: Bit 0 - CAPABILITIES_NO_RECEIVE_CHANNELS Bit 1 - CAPABILITIES_NO_TRANSMIT_CHANNELS Bit 2 - CAPABILITIES_NO_RECEIVE_MESSAGES Bit 3 - CAPABILITIES_NO_TRANSMIT_MESSAGES Bit 4 - CAPABILITIES_NO_ACKD_MESSAGES Bit 5 - CAPABILITIES_NO_BURST_MESSAGES Other bits are reserved
Advanced Options	UCHAR	0..255	The Advanced Options bit field is encoded as follows: Bit 1 - CAPABILITIES_NETWORK_ENABLED Bit 3 - CAPABILITIES_SERIAL_NUMBER_ENABLED Bit 4 - CAPABILITIES_PER_CHANNEL_TX_POWER_ENABLED Bit 5 - CAPABILITIES_LOW_PRIORITY_SEARCH_ENABLED Bit 6 - CAPABILITIES_SCRIPT_ENABLED Bit 7 - CAPABILITIES_SEARCH_LIST_ENABLED Other bits are reserved
Advanced Options 2	UCHAR	0..255	The Advanced Options 2 bit field is encoded as follows: Bit 0 - CAPABILITIES_LED_ENABLED

			Bit 1 - CAPABILITIES_EXT_MESSAGE_ENABLED Bit 2 - CAPABILITIES_SCAN_MODE_ENABLED Bit 3 - Reserved Bit 4 - CAPABILITIES_PROX_SEARCH_ENABLED Bit 5 - CAPABILITIES_EXT_ASSIGN_ENABLED Bit 6 - CAPABILITIES_FS_ANTFS_ENABLED Bit 7 - CAPABILITIES_FIT1_ENABLED
Max SensRcore Channels	UCHAR	0..255	Returns the number of SensRcore channels available.
Advanced Options 3	UCHAR	0..255	The Advanced Options 3 bit field is encoded as follows: Bit 0 - CAPABILITIES_ADVANCED_BURST_ENABLED Bit 1 - CAPABILITIES_EVENT_BUFFERING_ENABLED Bit 2 - CAPABILITIES_EVENT_FILTERING_ENABLED Bit 3 - CAPABILITIES_HIGH_DUTY_SEARCH_ENABLED Bit 4 - CAPABILITIES_SEARCH_SHARING_ENABLED Bit 5 - Reserved. Bit 6 - CAPABILITIES_SELECTIVE_DATA_UPDATES_ENABLED Bit 7 - CAPABILITIES_ENCRYPTED_CHANNEL_ENABLED
Advanced Options 4	UCHAR	0..255	The Advanced Options 4 bit field is encoded as follows: Bit 0 - CAPABILITIES_RFACTIVE_NOTIFICATION_ENABLED Other bits are reserved

Send Example (HEX): 02 4D 00 54

Receive Example (HEX): 08 54 0F 08 00 B2 36 00 F4 01

6.5 Advanced Burst Capabilities (0x78)

Format : 0x05 + 0x78 + 0x00 + [Supported Max Packet Length] + [Supported Features(3 bytes)]

Parameters	Type	Range	Description
Message Type	UCHAR	0	If this field is set to 0, this message contains the capabilities of the device for advanced burst.
Supported Max Packet Length	UCHAR	As specified	Specifies the maximum burst packet size that can be sent or received by the device: 0x01 – 8-byte 0x02 – 16-byte 0x03 – 24-byte
Supported Features	ULONG(3 bytes, little endian)	As specified	The Supported Options bitfield is encoded as follows: Bit 0 – ADV_BURST_FREQUENCY_HOP_ENABLED Other bits are reserved – set to zero.

This message returns a summary of the ANT+ device's advanced burst capabilities.

6.6 Advanced Burst Current Configuration (0x78)

Format : 0x0C + 0x78 + 0x01 + Enable + [MaxPacket Length] + [RequiredFeatures(3 bytes)] + [OptionalFeatures(3 bytes)] + [Optional Stall Count / Retry Count Extension]

Message Type	UCHAR	1	If this field is set to 1, this message contains the current advanced burst configuration.
Enable	UCHAR	0..1	Specifies whether advanced burst is enabled or disabled: 0x00 – Disabled 0x01 - Enabled
Max Packet Length	UCHAR	As specified	Specifies the maximum burst packet size that will be sent or received by the device: 0x01: 8 byte 0x02: 16 byte 0x03: 24 byte
Required Features	ULONG (3 bytes, little endian)	As specified	Required advanced burst features. See "Supported Features" field in section 9.5.7.7 for a list of available features.
Optional Features	ULONG (3 bytes, little endian)	As specified	Optional advanced burst features. See "Supported Features" field in section 9.5.7.7 for a list of available features.
Stall Count (optional)	USHORT (little endian)	0..65535	Number of stall packets that will be sent before a transfer enters the retry count. Each packet corresponds to ~3ms. Typical default value is 3210 to provide ~10s of stalling.
Retry Count Extension (optional)	UCHAR	0..255	Number of retry count (5 retries) cycle extensions. Typical default value is 4, providing 20 retries.

Send Example (HEX): 02 4D 00 78

Receive Example (HEX): 0C 78 01 00 03 00 00 00 00 00 8A 0C 03

This message returns the current advanced burst configuration, as set by the Configure Advanced Burst Command (0x78)

6.7 Event Filter (0x79)

Format : 0x03 + 0x79 + 0x00 + [Event Filter(2 bytes)]

Parameters	Type	Range	Description
Channel Number	UCHAR	0	Set to 0x00
Event Filter	USHORT (2 bytes, little endian)	0..65535	The Event Filter bit fields is as follows: Bit 0 – Filter event 1 (RESPONSE_NO_ERROR) Bit 1 – Filter event 2 (EVENT_RX_SEARCH_TIMEOUT) ...

			Bit N – Filter event (N+1) where N is max 15 Setting a bit to 1 applies a filter to the corresponding event.
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Send Example (HEX): 02 4D 00 79

Receive Example (HEX): 03 79 00 00 00

The Event Filter message returns the current event filter settings. These settings may be configured using the Configure Event Filter command.

Note:

1. This file is refer to the file “ANT+_Message_Protocol_and_Usage_Rev_5.1”. More details on ANT and ANT+ can refer to that file.
2. All the refer section 9.5.x.x means the section on “ANT+_Message_Protocol_and_Usage_Rev_5.1”.