EG06xK&Ex120K&EM060K Series USB Interface Descriptor Introduction

LTE-A Module Series

Version: 1.0.0

Date: 2021-12-16

Status: Preliminary

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About the Document

Revision History

Version	Date	Author	Description
-	2021-12-16	Jerry MENG	Creation of the document
1.0.0	2021-12-16	Jerry MENG	Preliminary

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1 Introduction

This document mainly introduces the USB descriptors of Quectel's EG06xK, Ex120K and EM060K series modules. Host generally identifies USB devices (modules) through descriptors, including device descriptor, configuration descriptor, interface descriptor, endpoint descriptor, and string descriptor (optional).

1.1. Applicable Modules

Table 1: Applicable Modules

Module Series	Module
EG06xK	EG065K-NA
	EG060K-EA
Ex120K	EM120K-GL
	EG120K-EA
EM060K	EM060K-GL

2 Overview

The brief introduction of USB descriptors is as follows.

Table 2: USB Descriptor Introduction

USB Descriptor	Function	Remark
device descriptor	Describes the general information of the USB device, including all device configurations, such as the USB protocol version number used by the USB device, device type, and other parameter information of the device	A device has only one device descriptor.
configuration descriptor	Describes the configuration information of a specific USB device, such as the number of supported interfaces, method of power supply etc.	A device can have multiple configuration descriptors. The number of interfaces supported by a configuration is determined by the *bNumInterfaces* of the configuration descriptor.
interface descriptor	Describes a specific interface of one specific configuration	When a configuration supports multiple interfaces, all endpoint descriptors of that interface are often returned as part of a configuration descriptor. The interface descriptor cannot be accessed directly using *GetDescriptor()* or *SetDescriptor()*.
endpoint descriptor	Describes the general information of USB endpoints	Each endpoint in the USB device has its own endpoint descriptor, the number of which is determined by the *bNumEndpoint* of the interface descriptor.
string descriptor (optional)	Saves some text information such as supplier name and product serial number	● The string descriptor consists of three fields in a fixed order. The total length of the descriptor is not fixed, and varies with the number of strings and the length of the information. ● Optional. If string descriptor is not

		supported, all string descriptor indexes in the device, configuration, and interface descriptors must be 0.

When the Host is connected to EG06xK, Ex120K and EM060K series modules, the module defaults to display 5 ports (see 0–4 as shown in the table below). All supported USB ports have different functions, see the table below for details.

Table 3: Module USB Interface Description

Interface No.	Interface Name	Description
0	DM interface	Diagnose port
1	NMEA interface	For GPS NMEA sentence outputting
2	AT interface	For AT command transmission
3	Modem interface	For PPP connection
4	Rmnet interface	Rmnet interface
5	ADB interface	Android debug bridge interface.
8,9	MBIM interface	MBIM interface
10,11	ECM interface	ECM interface

NOTE

ADB, MBIM and ECM interfaces are not enabled by default. Please contact Quectel Technical Supports to enable these, interfaces.

3 USB Descriptor

EG06xK, Ex120K and EM060K series modules are USB composite communication device. After the module's USB driver is installed in the Windows or Linux operating system, the operating system automatically reads the device descriptor and configuration descriptor of the module, and at the same time creates a specified interface based on the interface descriptor of the configuration descriptor.

This chapter mainly introduces the device descriptor, configuration descriptor, interface descriptor and endpoint descriptor of EG06xK, Ex120K and EM060K series modules (the string descriptor does not need to be used).

3.1. Device Descriptor

This chapter introduces the USB device descriptor of EG06xK, Ex120K and EM060K series modules.

Table 4: USB Device Descriptor

Parameter	Meaning	Value		
		Decimal	Hex	Description
bLength	Descriptor size; Unit: byte	18	0x12	18 bytes
bDescriptorType	Descriptor type	1	0x01	Device descriptor
bcdUSB	Version number of the USB specification for which the device is compliant	512	0x0200	USB version 2.0
bDeviceClass	Device class code	0	0x0	0
bDeviceSubClass	Device subclass code. Assigned by device class code	0	0x0	0
bDeviceProtocol	Protocol code	0	0x0	0
bMaxPacketSize0	Maximum packet size allowed for endpoint zero (0)	64	0x40	64 bytes

idVendor	Vendor identifier	11388	0x2C7C	Quectel Wireless Solutions Co., Ltd.
idProduct	Product identifier	779	0x030b	EG065K-NA EG060K-EA EM120K-GL EG120K-EA EM060K-GL
bcdDevice	Device factory number	1284	0x0504	1284
iManufacturer	Index of the string descriptor describing the manufacturer	1	0x01	“Quectel”
iProduct	Index of the string descriptor describing the product	2	0x02	“EG065K-NA” “EG060K-EA” “EM120K-GL” “EG120K-EA” “EM060K-GL”
iSerialNumber	Index of the string descriptor containing device's serial number	3	0x03	random string
bNumConfigurations	Number of device configuration descriptors	1	0x01	1

3.2. Configuration Descriptor

This chapter introduces the USB configuration descriptor of EG06xK, Ex120K and EM060K series modules.

Table 5: USB Configuration Descriptor

Parameter	Meaning	Value		
		Decimal	Hex	Description
bLength	Descriptor size; Unit: byte	9	0x09	9 bytes
bDescriptorType	Descriptor type	2	0x02	Configuration descriptor
wTotalLength	Total length of data returned for this configuration	209	0x00D1	428 bytes
bNumInterfaxe	Number of interfaces supported by this	5	0x05	5 interfaces

	configuration			
bConfigurationValue	Configuration value. Only used when the system software of a USB device driver needs it.	1	0x01	Configuration 1
iConfiguration	Index of the string descriptor describing this configuration	0	0x00	No string descriptor
bmAttributes	USB device characteristics	224	0xA0	224
bmAttributes.Reserved D7	The 7th byte of *bmAttributes* is reserved	1	0x01	1
bmAttributes.SelfPowered	Whether to power the USB device through USB_VBUS	0	0x00	0
bmAttributes.RemoteWakeup	Remote wakeup mode	1	0x01	1
bmAttributes.Reserved D4..0	The 4th byte of *bmAttributes* is reserved	0	0x00	0
bMaxPower	Amount of power required in this configuration when the USB device is fully operational, expressed in units of 2 mA.	250	0xFA	500 mA

3.3. Interface Descriptors

This chapter introduces the USB interface descriptors of EG06xK, Ex120K and EM060K series modules.

3.3.1. Interface 0 (DM Interface)

Table 6: Interface Descriptor of Interface 0

Parameter	Meaning	Value		
		Decimal	Hex	Description
bLength	Descriptor size; Unit: byte	9	0x09	9 bytes
bDescriptorType	Descriptor type	4	0x04	Interface descriptor
bInterfaceNumber	Interface number	0	0x00	0

bAlternateSetting	Used to identify different interface descriptors of the same interface	0	0x00	0
bNumEndpoints	Number of endpoints used by this interface	2	0x02	2 endpoints
bInterfaceClass	Interface class code	255	0xFF	255
bInterfaceSubClass	Interface subclass code	255	0xFF	255
bInterfaceProtocol	Interface protocol code	48	0x30	48
iInterface	Index of the string descriptor describing this interface	0	0x00	0

3.3.1.1. Endpoint Descriptor 0

Table 7: Endpoint Descriptor 0 of Interface 0

Parameter	Meaning	Value		
		Decimal	Hex	Description
bLength	Descriptor size; Unit: byte	7	0x07	7 bytes
bDescriptorType	Descriptor type	5	0x05	Endpoint descriptor
bEndpointAddress	Address of the endpoint	129	0x81	Direction = IN EndpointID = 129
bmAttributes	Two-bitmap describing the endpoint transfer type	2	0x02	TransferType = Bulk
wMaxPacketSize	The maximum packet size that this endpoint can send or receive. Unit: byte.	512	0x0200	512 bytes
bInterval	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

3.3.1.2. Endpoint Descriptor 1

Table 8: Endpoint Descriptor 1 of Interface 0

Parameter	Meaning	Value		
		Decimal	Hex	Description
bLength	Descriptor size; Unit: byte	7	0x07	7 bytes
bDescriptorType	Descriptor type	5	0x05	Endpoint descriptor
bEndpointAddress	Address of the endpoint	1	0x01	Direction = OUT EndpointID = 1
bmAttributes	Two-bitmap describing the endpoint transfer type	2	0x02	TransferType = Bulk
wMaxPacketSize	The maximum packet size that this endpoint can send or receive. Unit: byte.	512	0x0200	512 bytes
bInterval	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

3.3.2. Interface 1 (NMEA Interface)

Table 9: Interface Descriptor of Interface 1

Parameter	Meaning	Value		
		Decimal	Hex	Description
bLength	Descriptor size; Unit: byte	9	0x09	9 bytes
bDescriptorType	Descriptor type	4	0x04	Interface descriptor
bInterfaceNumber	Interface number	1	0x01	1
bAlternateSetting	Used to identify different interface descriptors of the same interface	0	0x00	0
bNumEndpoints	Number of endpoints used by this interface	3	0x03	3 endpoints
bInterfaceClass	Interface class code	255	0xFF	255

bInterfaceSubClass	Interface subclass code	255	0xFF	255
bInterfaceProtocol	Interface protocol code	96	0x60	96
iInterface	Index of the string descriptor describing this interface	0	0x00	0

3.3.2.1. Endpoint Descriptor 0

Table 10: Endpoint Descriptor 0 of Interface 1

Parameter	Meaning	Value		
		Decimal	Hex	Description
bLength	Descriptor size; Unit: byte	7	0x07	7 bytes
bDescriptorType	Descriptor type	5	0x05	Endpoint descriptor
bEndpointAddress	Address of the endpoint	131	0x83	Direction = IN EndpointID = 3
bmAttributes	Two-bitmap describing the endpoint transfer type	3	0x03	TransferType = Interrupt
wMaxPacketSize	The maximum packet size that this endpoint can send or receive. Unit: byte.	10	0x0A	10 bytes
bInterval	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	9	0x09	9 ms

3.3.2.2. Endpoint Descriptor 1

Table 11: Endpoint Descriptor 1 of Interface 1

Parameter	Meaning	Value		
		Decimal	Hex	Description
bLength	Descriptor size; Unit: byte	7	0x07	7 bytes
bDescriptorType	Descriptor type	5	0x05	Endpoint descriptor

bEndpointAddress	Address of the endpoint	130	0x82	Direction = OUT EndpointID = 2
bmAttributes	Two-bitmap describing the endpoint transfer type	2	0x02	TransferType = Bulk
wMaxPacketSize	The maximum packet size that this endpoint can send or receive. Unit: byte.	512	0x0200	512 bytes
bInterval	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

3.3.2.3. Endpoint Descriptor 2

Table 12: Endpoint Descriptor 2 of Interface 1

Parameter	Meaning	Value		
		Decimal	Hex	Description
bLength	Descriptor size; Unit: byte	7	0x07	7 bytes
bDescriptorType	Descriptor type	5	0x05	Endpoint descriptor
bEndpointAddress	Address of the endpoint	2	0x02	Direction = OUT EndpointID = 2
bmAttributes	Two-bitmap describing the endpoint transfer type	2	0x02	TransferType = Bulk
wMaxPacketSize	The maximum packet size that this endpoint can send or receive. Unit: byte.	512	0x0200	512 bytes
bInterval	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

3.3.3. Interface 2 (AT Interface)

Table 13: Interface Descriptor of Interface 2

Parameter	Meaning	Value		
		Decimal	Hex	Description
bLength	Descriptor size; Unit: byte	9	0x09	9 bytes
bDescriptorType	Descriptor type	4	0x04	Interface descriptor
bInterfaceNumber	Interface number	2	0x02	2
bAlternateSetting	Used to identify different interface descriptors of the same interface	0	0x00	0
bNumEndpoints	Number of endpoints used by this interface	3	0x03	3 endpoints
bInterfaceClass	Interface class code	255	0xFF	255
bInterfaceSubClass	Interface subclass code	255	0xFF	255
bInterfaceProtocol	Interface protocol code	40	0x40	0x40
iInterface	Index of the string descriptor describing this interface	0	0x00	0x00

3.3.3.1. Endpoint Descriptor 0

Table 14: Endpoint Descriptor 0 of Interface 2

Parameter	Meaning	Value		
		Decimal	Hex	Description
bLength	Descriptor size; Unit: byte	7	0x07	7 bytes
bDescriptorType	Descriptor type	5	0x05	Endpoint descriptor
bEndpointAddress	Address of the endpoint	133	0x85	Direction = IN EndpointID = 5
bmAttributes	Two-bitmap describing the endpoint transfer type	3	0x03	TransferType = Interrupt
wMaxPacketSize	The maximum packet size that	10	0x0A	10 bytes

	this endpoint can send or receive. Unit: byte.			
bInterval	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	9	0x09	9 ms

3.3.3.2. Endpoint Descriptor 1

Table 15: Endpoint Descriptor 1 of Interface 2

Parameter	Meaning	Value		
		Decimal	Hex	Description
bLength	Descriptor size; Unit: byte	7	0x07	7 bytes
bDescriptorType	Descriptor type	5	0x05	Endpoint descriptor
bEndpointAddress	Address of the endpoint	132	0x84	Direction = IN EndpointID = 4
bmAttributes	Two-bitmap describing the endpoint transfer type	2	0x02	TransferType = Bulk
wMaxPacketSize	The maximum packet size that this endpoint can send or receive. Unit: byte.	512	0x0200	512 bytes
bInterval	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

3.3.3.3. Endpoint Descriptor 2

Table 16: Endpoint Descriptor 2 of Interface 2

Parameter	Meaning	Value		
		Decimal	Hex	Description
bLength	Descriptor size; Unit: byte	7	0x07	7 bytes
bDescriptorType	Descriptor type	5	0x05	Endpoint descriptor

bEndpointAddress	Address of the endpoint	3	0x03	Direction = OUT EndpointID = 3
bmAttributes	Two-bitmap describing the endpoint transfer type	2	0x02	TransferType = Bulk
wMaxPacketSize	The maximum packet size that this endpoint can send or receive. Unit: byte.	512	0x0200	512 bytes
bInterval	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

3.3.4. Interface 3 (Modem Interface)

Table 17: Interface Descriptor of Interface 3

Parameter	Meaning	Value		
		Decimal	Hex	Description
bLength	Descriptor size; Unit: byte	9	0x09	9 bytes
bDescriptorType	Descriptor type	4	0x04	Interface descriptor
bInterfaceNumber	Interface's number	3	0x03	3
bAlternateSetting	Used to identify different interface descriptors of the same interface	0	0x00	0
bNumEndpoints	Number of endpoints used by this interface	3	0x03	3 endpoints
bInterfaceClass	Interface class code	255	0xFF	255
bInterfaceSubClass	Interface subclass code	255	0xFF	255
bInterfaceProtocol	Interface protocol code	96	0x40	96
iInterface	Index of the string descriptor describing this interface	0	0x00	0

3.3.4.1. Endpoint Descriptor 0

Table 18: Endpoint Descriptor 0 of Interface 3

Parameter	Meaning	Value		
		Decimal	Hex	Description
bLength	Descriptor size; Unit: byte	7	0x07	7 bytes
bDescriptorType	Descriptor type	5	0x05	Endpoint descriptor
bEndpointAddress	Address of the endpoint	135	0x87	Direction = IN EndpointID = 7
bmAttributes	Two-bitmap describing the endpoint transfer type	3	0x03	TransferType = Interrupt
wMaxPacketSize	The maximum packet size that this endpoint can send or receive. Unit: byte.	10	0x0A	10 bytes
bInterval	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	9	0x09	9 ms

3.3.4.2. Endpoint Descriptor 1

Table 19: Endpoint Descriptor 1 of Interface 3

Parameter	Meaning	Value		
		Decimal	Hex	Description
bLength	Descriptor size; Unit: byte	7	0x07	7 bytes
bDescriptorType	Descriptor type	5	0x05	Endpoint descriptor
bEndpointAddress	Address of the endpoint	134	0x86	Direction = IN EndpointID = 6
bmAttributes	Two-bitmap describing the endpoint transfer type	2	0x02	TransferType = Bulk
wMaxPacketSize	The maximum packet size that this endpoint can send or receive. Unit: byte.	512	0x0200	512 bytes

bInterval	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

3.3.4.3. Endpoint Descriptor 2

Table 20: Endpoint Descriptor 2 of Interface 3

Parameter	Meaning	Value		
		Decimal	Hex	Description
bLength	Descriptor size; Unit: byte	7	0x07	7 bytes
bDescriptorType	Descriptor type	5	0x05	Endpoint descriptor
bEndpointAddress	Address of the endpoint	4	0x04	Direction = OUT EndpointID = 4
bmAttributes	Two-bitmap describing the endpoint transfer type	2	0x02	TransferType = Bulk
wMaxPacketSize	The maximum packet size that this endpoint can send or receive. Unit: byte.	512	0x0200	512 bytes
bInterval	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

3.3.5. Interface 4 (Rmnet Interface)

Table 21: Interface Descriptor of Interface 4

Parameter	Meaning	Value		
		Decimal	Hex	Description
bLength	Descriptor size; Unit: byte	9	0x09	9 bytes
bDescriptorType	Descriptor type	4	0x04	Interface descriptor
bInterfaceNumber	Interface's number	4	0x04	4

bAlternateSetting	Used to identify different interface descriptors of the same interface	0	0x00	0
bNumEndpoints	Number of endpoints used by this interface	3	0x03	3 endpoints
bInterfaceClass	Interface class code	255	0xFF	255
bInterfaceSubClass	Interface subclass code	255	0xFF	255
bInterfaceProtocol	Interface protocol code	80	0x50	80
iInterface	Index of the string descriptor describing this interface	6	0x06	"RmNet"

3.3.5.1. Endpoint Descriptor 0

Table 22: Endpoint Descriptor 0 of Interface 4

Parameter	Meaning	Value		
		Decimal	Hex	Description
bLength	Descriptor size; Unit: byte	7	0x07	7 bytes
bDescriptorType	Descriptor type	5	0x05	Endpoint descriptor
bEndpointAddress	Address of the endpoint	136	0x88	Direction = IN EndpointID = 8
bmAttributes	Two-bitmap describing the endpoint transfer type	3	0x03	TransferType = Interrupt
wMaxPacketSize	The maximum packet size that this endpoint can send or receive. Unit: byte.	8	0x0008	8 bytes
bInterval	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	9	0x09	9 ms

3.3.5.2. Endpoint Descriptor 1

Table 23: Endpoint Descriptor 1 of Interface 4

Parameter	Meaning	Value		
		Decimal	Hex	Description
bLength	Descriptor size; Unit: byte	7	0x07	7 bytes
bDescriptorType	Descriptor type	5	0x05	Endpoint descriptor
bEndpointAddress	Address of the endpoint	142	0x8E	Direction = IN EndpointID = 14
bmAttributes	Two-bitmap describing the endpoint transfer type	2	0x02	TransferType = Bulk
wMaxPacketSize	The maximum packet size that this endpoint can send or receive. Unit: byte.	512	0x0200	512 bytes
bInterval	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

3.3.5.3. Endpoint Descriptor 2

Table 24: Endpoint Descriptor 2 of Interface 4

Parameter	Meaning	Value		
		Decimal	Hex	Description
bLength	Descriptor size; Unit: byte	7	0x07	7 bytes
bDescriptorType	Descriptor type	5	0x05	Endpoint descriptor
bEndpointAddress	Address of the endpoint	15	0x0F	Direction = OUT EndpointID = 15
bmAttributes	Two-bitmap describing the endpoint transfer type	2	0x02	TransferType = Bulk
wMaxPacketSize	The maximum packet size that this endpoint can send or receive. Unit: byte.	512	0x0200	512 bytes

bInterval	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

3.3.6. Interface 5 (ADB Interface)

Table 25: Interface Descriptor of Interface 5

Parameter	Meaning	Value		
		Decimal	Hex	Description
bLength	Descriptor size; Unit: byte	9	0x09	9 bytes
bDescriptorType	Descriptor type	4	0x04	Interface descriptor
bInterfaceNumber	Interface's number	5	0x05	5
bAlternateSetting	Used to identify different interface descriptors of the same interface	0	0x00	0
bNumEndpoints	Number of endpoints used by this interface	2	0x02	2 endpoints
bInterfaceClass	Interface class code	255	0xFF	255
bInterfaceSubClass	Interface subclass code	66	0x42	66
bInterfaceProtocol	Interface protocol code	1	0x01	1
iInterface	Index of the string descriptor describing this interface	7	0x07	"ADB Interface"

3.3.6.1. Endpoint Descriptor 0

Table 26: Endpoint Descriptor 0 of Interface 5

Parameter	Meaning	Value		
		Decimal	Hex	Description
bLength	Descriptor size; Unit: byte	7	0x07	7 bytes

bDescriptorType	Descriptor type	5	0x05	Endpoint descriptor
bEndpointAddress	Address of the endpoint	5	0x05	Direction = OUT EndpointID = 5
bmAttributes	Two-bitmap describing the endpoint transfer type	2	0x02	TransferType = Bulk
wMaxPacketSize	The maximum packet size that this endpoint can send or receive. Unit: byte.	512	0x0200	512 bytes
bInterval	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

3.3.6.2. Endpoint Descriptor 1

Table 27: Endpoint Descriptor 1 of Interface 5

Parameter	Meaning	Value		
		Decimal	Hex	Description
bLength	Descriptor size; Unit: byte	7	0x07	7 bytes
bDescriptorType	Descriptor type	5	0x05	Endpoint descriptor
bEndpointAddress	Address of the endpoint	138	0x89	Direction = IN EndpointID = 9
bmAttributes	Two-bitmap describing the endpoint transfer type.	2	0x02	TransferType = Bulk
wMaxPacketSize	The maximum packet size that this endpoint can send or receive. Unit: byte.	512	0x0200	512 bytes
bInterval	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

3.3.7. Interface 8,9 (MBIM Interface)

Table 28: Interface Descriptor of Interface 8

Parameter	Meaning	Value		
		Decimal	Hex	Description
bLength	Descriptor size; Unit: byte	9	0x09	9 bytes
bDescriptorType	Descriptor type	4	0x04	Interface descriptor
bInterfaceNumber	Interface's number	8	0x08	8
bAlternateSetting	Used to identify different interface descriptors of the same interface	0	0x00	0
bNumEndpoints	Number of endpoints used by this interface	1	0x01	1 endpoint
bInterfaceClass	Interface class code	2	0x02	2
bInterfaceSubClass	Interface subclass code	14	0x0E	14
bInterfaceProtocol	Interface protocol code	0	0x00	0
iInterface	Index of the string descriptor describing this interface	6	0x06	“EG065K-NA” “EG060K-EA” “EM120K-GL” “EG120K-EA” “EM060K-GL”

3.3.7.1. Endpoint Descriptor 0 of Interface 8

Table 29: Endpoint Descriptor 0 of Interface 8

Parameter	Meaning	Value		
		Decimal	Hex	Description
bLength	Descriptor size; Unit: byte	7	0x07	7 bytes
bDescriptorType	Descriptor type	5	0x05	Endpoint descriptor
bEndpointAddress	Address of the endpoint	136	0x88	Direction = IN

				EndpointID = 8
bmAttributes	Two-bitmap describing the endpoint transfer type	3	0x03	TransferType = Interrupt
wMaxPacketSize	The maximum packet size that this endpoint can send or receive. Unit: byte.	64	0x0040	64 bytes
bInterval	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	9	0x09	9 milliseconds

Table 30: Interface Descriptor of Interface 9 (alternate setting 0)

Parameter	Meaning	Value		
		Decimal	Hex	Description
bLength	Descriptor size; Unit: byte	9	0x09	9 bytes
bDescriptorType	Descriptor type	4	0x04	Interface descriptor
bInterfaceNumber	Interface's number	9	0x09	9
bAlternateSetting	Used to identify different interface descriptors of the same interface	0	0x00	0
bNumEndpoints	Number of endpoints used by this interface	0	0x00	0 endpoint
bInterfaceClass	Interface class code	10	0x0A	10
bInterfaceSubClass	Interface subclass code	0	0x00	0
bInterfaceProtocol	Interface protocol code	2	0x02	2
iInterface	Index of the string descriptor describing this interface	0	0x00	0

Table 31: Interface Descriptor of Interface 9 (alternate setting 1)

Parameter	Meaning	Value		
		Decimal	Hex	Description

bLength	Descriptor size; Unit: byte	9	0x09	9 bytes
bDescriptorType	Descriptor type	4	0x04	Interface descriptor
bInterfaceNumber	Interface's number	9	0x09	9
bAlternateSetting	Used to identify different interface descriptors of the same interface	1	0x01	1
bNumEndpoints	Number of endpoints used by this interface	2	0x02	2 endpoints
bInterfaceClass	Interface class code	10	0x0A	10
bInterfaceSubClass	Interface subclass code	0	0x00	0
bInterfaceProtocol	Interface protocol code	2	0x02	2
iInterface	Index of the string descriptor describing this interface	7	0x07	"MBIM Data"

3.3.7.2. Endpoint Descriptor 0 of Interface 9

Table 32: Endpoint Descriptor 0 of Interface 9

Parameter	Meaning	Value		
		Decimal	Hex	Description
bLength	Descriptor size; Unit: byte	7	0x07	7 bytes
bDescriptorType	Descriptor type	5	0x05	Endpoint descriptor
bEndpointAddress	Address of the endpoint	142	0x8E	Direction = IN EndpointID = 14
bmAttributes	Two-bitmap describing the endpoint transfer type	2	0x02	TransferType = Bulk
wMaxPacketSize	The maximum packet size that this endpoint can send or receive. Unit: byte.	512	0x0200	512 bytes
bInterval	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

3.3.7.3. Endpoint Descriptor 1 of Interface 9

Table 33: Endpoint Descriptor 1 of Interface 9

Parameter	Meaning	Value		
		Decimal	Hex	Description
bLength	Descriptor size; Unit: byte	7	0x07	7 bytes
bDescriptorType	Descriptor type	5	0x05	Endpoint descriptor
bEndpointAddress	Address of the endpoint	15	0x0F	Direction = OUT EndpointID = 15
bmAttributes	Two-bitmap describing the endpoint transfer type	2	0x02	TransferType = Bulk
wMaxPacketSize	The maximum packet size that this endpoint can send or receive. Unit: byte.	512	0x0200	512 bytes
bInterval	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

3.3.8. Interface 10,11 (ECM Interface)

Table 34: Interface Descriptor of Interface 10

Parameter	Meaning	Value		
		Decimal	Hex	Description
bLength	Descriptor size; Unit: byte	9	0x09	9 bytes
bDescriptorType	Descriptor type	4	0x04	Interface descriptor
bInterfaceNumber	Interface's number	10	0x0A	10
bAlternateSetting	Used to identify different interface descriptors of the same interface	0	0x00	0
bNumEndpoints	Number of endpoints used by this interface	1	0x01	1 endpoint

bInterfaceClass	Interface class code	2	0x02	2
bInterfaceSubClass	Interface subclass code	6	0x06	6
bInterfaceProtocol	Interface protocol code	0	0x00	0
iInterface	Index of the string descriptor describing this interface	6	0x06	"CDC Ethernet Control Model (ECM)"

3.3.8.1. Endpoint Descriptor 0 of Interface 10

Table 35: Endpoint Descriptor 0 of Interface 10

Parameter	Meaning	Value		
		Decimal	Hex	Description
bLength	Descriptor size; Unit: byte	7	0x07	7 bytes
bDescriptorType	Descriptor type	5	0x05	Endpoint descriptor
bEndpointAddress	Address of the endpoint	136	0x88	Direction = IN EndpointID = 8
bmAttributes	Two-bitmap describing the endpoint transfer type	3	0x03	TransferType = Interrupt
wMaxPacketSize	The maximum packet size that this endpoint can send or receive. Unit: byte.	16	0x0010	16 bytes
bInterval	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	9	0x09	9 milliseconds

Table 36: Interface Descriptor of Interface 11 (alternate setting 0)

Parameter	Meaning	Value		
		Decimal	Hex	Description
bLength	Descriptor size; Unit: byte	9	0x09	9 bytes
bDescriptorType	Descriptor type	4	0x04	Interface descriptor

bInterfaceNumber	Interface's number	11	0x0B	11
bAlternateSetting	Used to identify different interface descriptors of the same interface	0	0x00	0
bNumEndpoints	Number of endpoints used by this interface	0	0x00	0 endpoints
bInterfaceClass	Interface class code	10	0x0A	10
bInterfaceSubClass	Interface subclass code	0	0x00	0
bInterfaceProtocol	Interface protocol code	0	0x00	0
iInterface	Index of the string descriptor describing this interface	0	0x00	0

Table 37: Interface Descriptor of Interface 11 (alternate setting 1)

Parameter	Meaning	Value		
		Decimal	Hex	Description
bLength	Descriptor size; Unit: byte	9	0x09	9 bytes
bDescriptorType	Descriptor type	4	0x04	Interface descriptor
bInterfaceNumber	Interface's number	11	0x0B	11
bAlternateSetting	Used to identify different interface descriptors of the same interface	1	0x01	1
bNumEndpoints	Number of endpoints used by this interface	2	0x02	2 endpoints
bInterfaceClass	Interface class code	10	0x0A	10
bInterfaceSubClass	Interface subclass code	0	0x00	0
bInterfaceProtocol	Interface protocol code	2	0x02	2
iInterface	Index of the string descriptor describing this interface	7	0x07	" CDC Ethernet Data"

3.3.8.2. Endpoint Descriptor 0 of Interface 11

Table 38: Endpoint Descriptor 0 of Interface 11

Parameter	Meaning	Value		
		Decimal	Hex	Description
bLength	Descriptor size; Unit: byte	7	0x07	7 bytes
bDescriptorType	Descriptor type	5	0x05	Endpoint descriptor
bEndpointAddress	Address of the endpoint	142	0x8E	Direction = IN EndpointID = 14
bmAttributes	Two-bitmap describing the endpoint transfer type	2	0x02	TransferType = Bulk
wMaxPacketSize	The maximum packet size that this endpoint can send or receive. Unit: byte.	512	0x0200	512 bytes
bInterval	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

3.3.8.3. Endpoint Descriptor 1 of Interface 11

Table 39: Endpoint Descriptor 1 of Interface 11

Parameter	Meaning	Value		
		Decimal	Hex	Description
bLength	Descriptor size; Unit: byte	7	0x07	7 bytes
bDescriptorType	Descriptor type	5	0x05	Endpoint descriptor
bEndpointAddress	Address of the endpoint	15	0x0F	Direction = OUT EndpointID = 15
bmAttributes	Two-bitmap describing the endpoint transfer type	2	0x02	TransferType = Bulk
wMaxPacketSize	The maximum packet size that this endpoint can send or receive. Unit: byte.	512	0x0200	512 bytes

bInterval	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

4 Appendix References

Table 40: Terms and Abbreviations

Abbreviation	Description
ADB	Android Debug Bridge
CDC	Communications Device Class
ECM	Ethernet Networking Control Model
GPS	Global Positioning System
IAD	Interface Association Descriptor
LTE	(Long-Term Evolution) a 4G mobile communications standard
MBIM	Mobile Broadband Interface Model
NMEA	NMEA (National Marine Electronics Association) 0183 Interface Standard
PPP	Point to Point Protocol
USB	Universal Serial Bus