

Framework Serial Connectivity Interface (FSCI) for Bluetooth® Low Energy Host Stack



Contents

| | |
|---|-----------|
| Chapter 1 Introduction..... | 7 |
| 1.1 Scope and objective..... | 7 |
| 1.2 Audience description | 7 |
| 1.3 References..... | 7 |
| 1.4 Definitions, acronyms, and abbreviations..... | 7 |
| Chapter 2 Overview..... | 8 |
| 2.1 Bluetooth LE Host Stack interface set..... | 8 |
| 2.2 Basic requirements..... | 8 |
| 2.2.1 Interface description..... | 8 |
| 2.3 Overview and packet structure..... | 8 |
| Chapter 3 FSCI Messages Description..... | 10 |
| 3.1 L2CAP Credit Based Messages..... | 10 |
| 3.1.1 L2CAPCB.Confirm..... | 10 |
| 3.1.2 L2CAPCB-CancelConnection.Request..... | 15 |
| 3.1.3 L2CAPCB-ConnectLePsm.Request..... | 16 |
| 3.1.4 L2CAPCB-DeregisterLePsm.Request..... | 17 |
| 3.1.5 L2CAPCB-DisconnectLeCbChannel.Request..... | 17 |
| 3.1.6 L2CAPCB-LeCbData.Indication..... | 17 |
| 3.1.7 L2CAPCB-LePsmConnectionComplete.Indication..... | 18 |
| 3.1.8 L2CAPCB-LePsmConnectionRequest.Indication..... | 19 |
| 3.1.9 L2CAPCB-LePsmDisconnectNotification.Indication..... | 20 |
| 3.1.10 L2CAPCB-LocalCreditsNotification.Indication..... | 20 |
| 3.1.11 L2CAPCB-NoPeerCredits.Indication..... | 21 |
| 3.1.12 L2CAPCB-RegisterLePsm.Request..... | 21 |
| 3.1.13 L2CAPCB-SendLeCbData.Request..... | 22 |
| 3.1.14 L2CAPCB-SendLeCredit.Request..... | 22 |
| 3.1.15 L2CAPCB-RegisterLeCbCallbacks.Request..... | 23 |
| 3.2 GATT Messages..... | 23 |
| 3.2.1 GATT.Confirm..... | 23 |
| 3.2.2 GATTClient-DiscoverAllCharacteristicDescriptors.Request..... | 29 |
| 3.2.3 GATTClient-DiscoverAllCharacteristicsOfService.Request..... | 32 |
| 3.2.4 GATTClient-DiscoverAllPrimaryServices.Request..... | 37 |
| 3.2.5 GATTClient-DiscoverCharacteristicOfServiceByUuid.Request..... | 37 |
| 3.2.6 GATTClient-DiscoverPrimaryServicesByUuid.Request..... | 42 |
| 3.2.7 GATTClient-ExchangeMtu.Request..... | 42 |
| 3.2.8 GATTClient-FindIncludedServices.Request..... | 43 |
| 3.2.9 GATTClient-Indication.Indication..... | 47 |
| 3.2.10 GATTClient-Init.Request..... | 47 |
| 3.2.11 GATTClient-Notification.Indication..... | 48 |
| 3.2.12 GATTClient-ProcedureDiscoverAllCharacteristicDescriptors.Indication..... | 48 |
| 3.2.13 GATTClient-ProcedureDiscoverAllCharacteristics.Indication..... | 60 |
| 3.2.14 GATTClient-ProcedureDiscoverAllPrimaryServices.Indication..... | 70 |
| 3.2.15 GATTClient-ProcedureDiscoverCharacteristicByUuid.Indication..... | 83 |
| 3.2.16 GATTClient-ProcedureDiscoverPrimaryServicesByUuid.Indication..... | 95 |
| 3.2.17 GATTClient-ProcedureExchangeMtu.Indication..... | 108 |
| 3.2.18 GATTClient-ProcedureFindIncludedServices.Indication..... | 117 |
| 3.2.19 GATTClient-ProcedureReadCharacteristicDescriptor.Indication..... | 131 |

| | | |
|--------|--|-----|
| 3.2.20 | GATTClient-ProcedureReadCharacteristicValue.Indication..... | 141 |
| 3.2.21 | GATTClient-ProcedureReadMultipleCharacteristicValues.Indication..... | 152 |
| 3.2.22 | GATTClient-ProcedureReadUsingCharacteristicUuid.Indication..... | 162 |
| 3.2.23 | GATTClient-ProcedureWriteCharacteristicDescriptor.Indication..... | 171 |
| 3.2.24 | GATTClient-ProcedureWriteCharacteristicValue.Indication..... | 181 |
| 3.2.25 | GATTClient-ProcedureWriteCharacteristicValue.Indication..... | 190 |
| 3.2.26 | GATTClient-ReadCharacteristicDescriptor.Request..... | 199 |
| 3.2.27 | GATTClient-ReadCharacteristicValue.Request..... | 200 |
| 3.2.28 | GATTClient-ReadMultipleCharacteristicValues.Request..... | 202 |
| 3.2.29 | GATTClient-ReadUsingCharacteristicUuid.Request..... | 205 |
| 3.2.30 | GATTClient-RegisterIndicationCallback.Request..... | 206 |
| 3.2.31 | GATTClient-RegisterNotificationCallback.Request..... | 207 |
| 3.2.32 | GATTClient-RegisterProcedureCallback.Request..... | 207 |
| 3.2.33 | GATTClient-ResetProcedure.Request..... | 207 |
| 3.2.34 | GATTClient-WriteCharacteristicDescriptor.Request..... | 208 |
| 3.2.35 | GATTClient-WriteCharacteristicValue.Request..... | 209 |
| 3.2.36 | GATT-GetMtu.Request..... | 212 |
| 3.2.37 | GATT-GetMtu.Indication..... | 212 |
| 3.2.38 | GATT-Init.Request..... | 212 |
| 3.2.39 | GATTServer-AttributeRead.Indication..... | 213 |
| 3.2.40 | GATTServer-AttributeWritten.Indication..... | 213 |
| 3.2.41 | GATTServer-AttributeWrittenWithoutResponse.Indication..... | 214 |
| 3.2.42 | GATTServer-CharacteristicCccdWritten.Indication..... | 215 |
| 3.2.43 | GATTServer-Error.Indication..... | 215 |
| 3.2.44 | GATTServer-HandleValueConfirmation.Indication..... | 224 |
| 3.2.45 | GATTServer-Init.Request..... | 225 |
| 3.2.46 | GATTServer-LongCharacteristicWritten.Indication..... | 225 |
| 3.2.47 | GATTServer-MtuChanged.Indication..... | 226 |
| 3.2.48 | GATTServer-RegisterCallback.Request..... | 226 |
| 3.2.49 | GATTServer-RegisterHandlesForReadNotifications.Request..... | 227 |
| 3.2.50 | GATTServer-RegisterHandlesForWriteNotifications.Request..... | 227 |
| 3.2.51 | GATTServer-SendAttributeReadStatus.Request..... | 228 |
| 3.2.52 | GATTServer-SendAttributeWrittenStatus.Request..... | 228 |
| 3.2.53 | GATTServer-SendIndication.Request..... | 228 |
| 3.2.54 | GATTServer-SendInstantValueIndication.Request..... | 229 |
| 3.2.55 | GATTServer-SendInstantValueNotification.Request..... | 229 |
| 3.2.56 | GATTServer-SendNotification.Request..... | 230 |
| 3.3 | GATTDDB_App Messages..... | 230 |
| 3.3.1 | GATTDDB.Confirm..... | 230 |
| 3.3.2 | GATTDDBDynamic-AddCccd.Request..... | 239 |
| 3.3.3 | GATTDDBDynamic-AddCccd.Indication..... | 239 |
| 3.3.4 | GATTDDBDynamic-AddCharacteristicDeclarationAndValue.Request..... | 240 |
| 3.3.5 | GATTDDBDynamic-AddCharacteristicDeclarationAndValue.Indication..... | 242 |
| 3.3.6 | GATTDDBDynamic-AddCharacteristicDeclarationWithUniqueValue.Request..... | 242 |
| 3.3.7 | GATTDDBDynamic-AddCharacteristicDeclarationWithUniqueValue.Indication..... | 244 |
| 3.3.8 | GATTDDBDynamic-AddCharacteristicDescriptor.Request..... | 245 |
| 3.3.9 | GATTDDBDynamic-AddCharacteristicDescriptor.Indication..... | 246 |
| 3.3.10 | GATTDDBDynamic-AddIncludeDeclaration.Request..... | 247 |
| 3.3.11 | GATTDDBDynamic-AddIncludeDeclaration.Indication..... | 248 |
| 3.3.12 | GATTDDBDynamic-AddPrimaryServiceDeclaration.Request..... | 248 |
| 3.3.13 | GATTDDBDynamic-AddPrimaryServiceDeclaration.Indication..... | 249 |
| 3.3.14 | GATTDDBDynamic-AddSecondaryServiceDeclaration.Request..... | 249 |
| 3.3.15 | GATTDDBDynamic-AddSecondaryServiceDeclaration.Indication..... | 250 |
| 3.3.16 | GATTDDBDynamic-Init.Request..... | 250 |
| 3.3.17 | GATTDDBDynamic-ReleaseDatabase.Request..... | 250 |

| | |
|--|-----|
| 3.3.18 GATTDBDynamic-RemoveCharacteristic.Request..... | 251 |
| 3.3.19 GATTDBDynamic-RemoveService.Request..... | 251 |
| 3.3.20 GATTDB-FindCccdHandleForCharValueHandle.Request..... | 251 |
| 3.3.21 GATTDB-FindCccdHandleForCharValueHandle.Indication..... | 252 |
| 3.3.22 GATTDB-FindCharValueHandleInService.Request..... | 252 |
| 3.3.23 GATTDB-FindCharValueHandleInService.Indication..... | 253 |
| 3.3.24 GATTDB-FindDescriptorHandleForCharValueHandle.Request..... | 253 |
| 3.3.25 GATTDB-FindDescriptorHandleForCharValueHandle.Indication..... | 254 |
| 3.3.26 GATTDB-FindServiceHandle.Request..... | 254 |
| 3.3.27 GATTDB-FindServiceHandle.Indication..... | 255 |
| 3.3.28 GATTDB-Init.Request..... | 256 |
| 3.3.29 GATTDB-ReadAttribute.Request..... | 256 |
| 3.3.30 GATTDB-ReadAttribute.Indication..... | 256 |
| 3.3.31 GATTDB-WriteAttribute.Request..... | 257 |
| 3.4 GAP Messages..... | 257 |
| 3.4.1 BLE-HostInitialize.Request..... | 257 |
| 3.4.2 GAP.Confirm..... | 257 |
| 3.4.3 GAP-AcceptPairingRequest.Request..... | 265 |
| 3.4.4 GAP-AddDeviceToWhiteList.Request..... | 267 |
| 3.4.5 GAP-AdvertisingEventCommandFailed.Indication..... | 268 |
| 3.4.6 GAP-AdvertisingEventStateChanged.Indication..... | 276 |
| 3.4.7 GAP-Authorize.Request..... | 277 |
| 3.4.8 GAP-CheckIfBonded.Request..... | 277 |
| 3.4.9 GAP-CheckIfBonded.Indication..... | 278 |
| 3.4.10 GAP-CheckIndicationStatus.Request..... | 278 |
| 3.4.11 GAP-CheckIndicationStatus.Indication..... | 278 |
| 3.4.12 GAP-CheckNotificationStatus.Request..... | 279 |
| 3.4.13 GAP-CheckNotificationStatus.Indication..... | 279 |
| 3.4.14 GAP-ClearWhiteList.Request..... | 279 |
| 3.4.15 GAP-Connect.Request..... | 280 |
| 3.4.16 GAP-ConnectionEventAuthenticationRejected.Indication..... | 281 |
| 3.4.17 GAP-ConnectionEventConnected.Indication..... | 282 |
| 3.4.18 GAP-ConnectionEventDisconnected.Indication..... | 284 |
| 3.4.19 GAP-ConnectionEventEncryptionChanged.Indication..... | 292 |
| 3.4.20 GAP-ConnectionEventKeyExchangeRequest.Indication..... | 293 |
| 3.4.21 GAP-ConnectionEventKeysReceived.Indication..... | 293 |
| 3.4.22 GAP-ConnectionEventLeDataLengthChanged.Indication..... | 295 |
| 3.4.23 GAP-ConnectionEventLeScDisplayNumericValue.Indication..... | 296 |
| 3.4.24 GAP-ConnectionEventLeScKeyPressNotification.Indication..... | 296 |
| 3.4.25 GAP-ConnectionEventLeScOobDataRequest.Indication..... | 297 |
| 3.4.26 GAP-ConnectionEventLongTermKeyRequest.Indication..... | 297 |
| 3.4.27 GAP-ConnectionEventOobRequest.Indication..... | 298 |
| 3.4.28 GAP-ConnectionEventPairingComplete.Indication..... | 298 |
| 3.4.29 GAP-ConnectionEventPairingRequest.Indication..... | 307 |
| 3.4.30 GAP-ConnectionEventPairingResponse.Indication..... | 309 |
| 3.4.31 GAP-ConnectionEventParameterUpdateComplete.Indication..... | 311 |
| 3.4.32 GAP-ConnectionEventParameterUpdateRequest.Indication..... | 320 |
| 3.4.33 GAP-ConnectionEventPasskeyDisplay.Indication..... | 321 |
| 3.4.34 GAP-ConnectionEventPasskeyRequest.Indication..... | 321 |
| 3.4.35 GAP-ConnectionEventPowerReadFailure.Indication..... | 322 |
| 3.4.36 GAP-ConnectionEventRssiRead.Indication..... | 330 |
| 3.4.37 GAP-ConnectionEventSlaveSecurityRequest.Indication..... | 330 |
| 3.4.38 GAP-ConnectionEventTxPowerLevelRead.Indication..... | 331 |
| 3.4.39 GAP-ControllerReset.Request..... | 331 |
| 3.4.40 GAP-CreateRandomDeviceAddress.Request..... | 332 |

| | | |
|--------|---|-----|
| 3.4.41 | GAP-DenyLongTermKey.Request | 332 |
| 3.4.42 | GAP-Disconnect.Request | 333 |
| 3.4.43 | GAP-EnableControllerPrivacy.Request | 333 |
| 3.4.44 | GAP-EnableHostPrivacy.Request | 333 |
| 3.4.45 | GAP-EnableUpdateConnectionParameters.Request | 334 |
| 3.4.46 | GAP-EncryptLink.Request | 334 |
| 3.4.47 | GAP-EnterPasskey.Request | 335 |
| 3.4.48 | GAP-GenericEventAdvertisingDataSetupComplete.Indication | 335 |
| 3.4.49 | GAP-GenericEventAdvertisingParametersSetupComplete.Indication | 335 |
| 3.4.50 | GAP-GenericEventAdvertisingSetupFailed.Indication | 336 |
| 3.4.51 | GAP-GenericEventAdvTxPowerLevelRead.Indication | 344 |
| 3.4.52 | GAP-GenericEventControllerPrivacyStateChanged.Indication | 344 |
| 3.4.53 | GAP-GenericEventControllerResetComplete.Indication | 345 |
| 3.4.54 | GAP-GenericEventCreateConnectionCanceled.Indication | 345 |
| 3.4.55 | GAP-GenericEventDeviceAddedToWhiteList.Indication | 345 |
| 3.4.56 | GAP-GenericEventDeviceRemovedFromWhiteList.Indication | 346 |
| 3.4.57 | GAP-GenericEventInitializationComplete.Indication | 346 |
| 3.4.58 | GAP-GenericEventInternalError.Indication | 347 |
| 3.4.59 | GAP-GenericEventLeScLocalOobData.Indication | 358 |
| 3.4.60 | GAP-GenericEventPrivateResolvableAddressVerified.Indication | 358 |
| 3.4.61 | GAP-GenericEventPublicAddressRead.Indication | 358 |
| 3.4.62 | GAP-GenericEventRandomAddressReady.Indication | 359 |
| 3.4.63 | GAP-GenericEventRandomAddressSet.Indication | 359 |
| 3.4.64 | GAP-GenericEventTxPowerLevelSetComplete.Indication | 359 |
| 3.4.65 | GAP-GenericEventWhiteListCleared.Indication | 360 |
| 3.4.66 | GAP-GenericEventWhiteListSizeRead.Indication | 360 |
| 3.4.67 | GAP-GetBondedDeviceName.Request | 360 |
| 3.4.68 | GAP-GetBondedDeviceName.Indication | 361 |
| 3.4.69 | GAP-GetBondedDevicesCount.Request | 361 |
| 3.4.70 | GAP-GetBondedDevicesCount.Indication | 361 |
| 3.4.71 | GAP-GetBondedDevicesIdentityInformation.Request | 362 |
| 3.4.72 | GAP-GetBondedDevicesIdentityInformation.Indication | 362 |
| 3.4.73 | GAP-LeReadPhy.Request | 363 |
| 3.4.74 | GAP-LeScSetPeerOobData.Request | 363 |
| 3.4.75 | GAP-LeScPublicKeyRegenerated.Indication | 364 |
| 3.4.76 | GAP-LeScRegeneratePublicKey.Request | 364 |
| 3.4.77 | GAP-LeScSendKeypressNotificationPrivacy.Request | 364 |
| 3.4.78 | GAP-LeScGetLocalOobData.Request | 365 |
| 3.4.79 | GAP-LeScValidateNumericValue.Request | 365 |
| 3.4.80 | GAP-LeSetPhy.Request | 366 |
| 3.4.81 | GAP-LoadCustomPeerInformation.Request | 366 |
| 3.4.82 | GAP-LoadCustomPeerInformation.Indication | 367 |
| 3.4.83 | GAP-LoadEncryptionInformation.Request | 367 |
| 3.4.84 | GAP-LoadEncryptionInformation.Indication | 367 |
| 3.4.85 | GAP-Pair.Request | 368 |
| 3.4.86 | GAP-ProvideLongTermKey.Request | 370 |
| 3.4.87 | GAP-ProvideOob.Request | 370 |
| 3.4.88 | GAP-ReadPublicDeviceAddress.Request | 371 |
| 3.4.89 | GAP-ReadRadioPowerLevel.Request | 371 |
| 3.4.90 | GAP-ReadWhiteListSize.Request | 372 |
| 3.4.91 | GAP-RegisterDeviceSecurityRequirements.Request | 372 |
| 3.4.92 | GAP-RejectKeyExchangeRequest.Request | 374 |
| 3.4.93 | GAP-RejectPairing.Request | 374 |
| 3.4.94 | GAP-RejectPasskeyRequest.Request | 375 |
| 3.4.95 | GAP-RemoveAllBonds.Request | 376 |

| | |
|---|-----|
| 3.4.96 GAP-RemoveBond.Request..... | 376 |
| 3.4.97 GAP-RemoveDeviceFromWhiteList.Request..... | 376 |
| 3.4.98 GAP-SaveCccd.Request..... | 377 |
| 3.4.99 GAP-SaveCustomPeerInformation.Request..... | 377 |
| 3.4.100 GAP-SaveDeviceName.Request..... | 378 |
| 3.4.101 GAP-ScanningEventCommandFailed.Indication..... | 378 |
| 3.4.102 GAP-ScanningEventDeviceScanned.Indication..... | 387 |
| 3.4.103 GAP-ScanningEventStateChanged.Indication..... | 388 |
| 3.4.104 GAP-SendSlaveSecurityRequest.Request..... | 389 |
| 3.4.105 GAP-SendSmpKeys.Request..... | 389 |
| 3.4.106 GAP-SetAdvertisingData.Request..... | 391 |
| 3.4.107 GAP-SetAdvertisingParameters.Request..... | 396 |
| 3.4.108 GAP-SetDefaultPairingParameters.Request..... | 398 |
| 3.4.109 GAP-SetLocalPasskey.Request..... | 400 |
| 3.4.110 GAP-SetRandomAddress.Request..... | 401 |
| 3.4.111 GAP-SetScanMode.Request..... | 401 |
| 3.4.112 GAP-SetTxPowerLevel.Request..... | 403 |
| 3.4.113 GAP-StartAdvertising.Request..... | 404 |
| 3.4.114 GAP-StartScanning.Request..... | 404 |
| 3.4.115 GAP-StopAdvertising.Request..... | 406 |
| 3.4.116 GAP-StopScanning.Request..... | 406 |
| 3.4.117 GAP-UpdateConnectionParameters.Request..... | 406 |
| 3.4.118 Gap-UpdateLeDataLength.Request..... | 407 |
| 3.4.119 GAP-VerifyPrivateResolvableAddress.Request..... | 407 |
| 3.5 FSCI Messages..... | 408 |
| 3.5.1 FSCI-AllowDeviceToSleep.Request..... | 408 |
| 3.5.2 FSCI-AllowDeviceToSleep.Confirm..... | 408 |
| 3.5.3 FSCI-Error.Indication..... | 408 |
| 3.5.4 FSCI-GetWakeupReason.Request..... | 409 |
| 3.5.5 FSCI-GetWakeupReason.Response..... | 409 |
| 3.5.6 FSCI-WakeUp.Indication..... | 410 |

Chapter 4 Revision history.....411

Chapter 1

Introduction

This reference manual provides a detailed description of the Bluetooth® Low Energy Host Stack serial commands, communication packet structure, and usage of the Framework Serial Communication Interface (FSCI).

1.1 Scope and objective

This document describes the Bluetooth® LE Host Stack functionality through a serial communication interface to a host system. The typical serial interfaces are UART, SPI, and I2C. The typical applications employing the Bluetooth LE Host Stack FSCI functionality can be desktop applications, such as the NXP Test Tool for Connectivity Products, or embedded systems that have Bluetooth LE applications using Bluetooth LE stack services via FSCI.

1.2 Audience description

This reference manual is intended for profile designers, application designers, and users of the BLE Host Stack FSCI.

1.3 References

Table 1. References Table

| Title | Reference | Version | Location |
|---|------------|---------|--|
| Specification of the Bluetooth System | Core v5.0 | 2013 | www.bluetooth.org/en-us/specification/adopted-specifications |
| Bluetooth® Low Energy Host Stack API Reference Manual | BLEHSAPIRM | 2015 | Included in package |

1.4 Definitions, acronyms, and abbreviations

Table 2. Acronyms Table

| Term/Acronym | Definition |
|--------------|--|
| ATT | Attribute Protocol |
| BLE | Bluetooth Low Energy |
| FSCI | Framework Serial Communication Interface |
| GATT | Generic Attribute Profile |
| GATTDB | Generic Attribute Profile Database |
| GAP | Generic Access Profile |
| HCI | Host Controller Interface |
| L2CAP | Logical Link Control and Adaptation |
| L2CAP CB | Logical Link Control and Adaptation Credit Based |
| SM | Security Manager |

Chapter 2

Overview

The FSCI (Framework Serial Communication Interface) module supports interfacing the BLE Host Stack with a host or a PC tool (TestTool for Connectivity Products) using a serial communication line. If the FSCI is used with the NXP Test Tool for Connectivity products, this tool can use an XML file which contains a detailed meta-description for serial commands and events. This XML file is provided in software packages which include this document.

2.1 Bluetooth LE Host Stack interface set

The Bluetooth LE Host Stack layers that offer access using FSCI are GATT, GATTDB, L2CAP CB, and GAP. Each layer provides primitives that an upper layer (profile/application) uses to access services of that layer. This document includes a detailed list of the provided primitives.

2.2 Basic requirements

- IAR Embedded Workbench for ARM[®] architecture
- NXP development boards (to be loaded with the “ble_fsci_app” application)
- Optional Bluetooth LE sniffer for testing
- PC tool (TestTool for Connectivity Products) or another host processor capable of communicating through UART, USB, SPI, or I²C

2.2.1 Interface description

The FSCI module uses the Serial Manager and needs one of the following interfaces for communication:

- A 2-wire UART connection
- A 3-wire I²C connection
- A 5-wire SPI connection
- A USB connection

2.3 Overview and packet structure

The FSCI module sends and receives messages as shown in the below figure. This structure is not specific to a serial interface and is designed to offer the best communication reliability. The device is expecting messages in little-endian format and responds with messages in little-endian format.

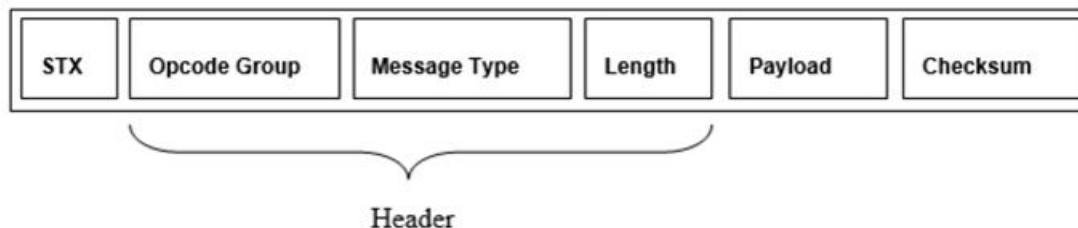


Figure 1. Packet Structure

Table 3. Packet Field Description

| Field Name | Length (bytes) | Description |
|--------------|----------------|--|
| STX | 1 | Used for synchronization over the serial interface. The value is always 0x02. |
| Opcode Group | 1 | Distinguishes between different layers (for example, GAP, GATT, and GATTDB). |
| Message Type | 1 | Specifies the exact message opcode that is contained in the packet. |
| Length | 2 | The length of the packet payload, excluding the header and the checksum. The length field content shall be provided in little endian format. |
| Payload | Variable | Payload of the actual message. |
| Checksum | 1 | Checksum field used to check the data integrity of the packet. |

Chapter 3

FSCI Messages Description

This chapter describes all L2CAP CB, GAP, GATT, and GATTDB commands (requests) and events (confirms and indications) in detail. The “BLE.xml” document found in the ble_fsci_app subfolder, and provides an XML representation of all these commands and events.

3.1 L2CAP Credit Based Messages

3.1.1 L2CAPCB.Confirm

Description

Status of the L2CAP request.

Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x42 |
| OpCode | 1 | 0x80 |
| Length | 1 | Length in bytes of the following parameters |
| Status | 2 | <p>The status of the L2CAP request</p> <p>Possible values:</p> <ul style="list-style-type: none"> • 0x0000: gBleSuccess_c • 0x0001: gBleInvalidParameter_c • 0x0002: gBleOverflow_c • 0x0003: gBleUnavailable_c • 0x0004: gBleFeatureNotSupported_c • 0x0005: gBleOutOfMemory_c • 0x0006: gBleAlreadyInitialized_c • 0x0007: gBleOsError_c • 0x0008: gBleUnexpectedError_c • 0x0009: gBleInvalidState_c • 0x0101: gHciUnknownHciCommand_c • 0x0102: gHciUnknownConnectionIdentifier_c • 0x0103: gHciHardwareFailure_c • 0x0104: gHciPageTimeout_c • 0x0105: gHciAuthenticationFailure_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0106: gHciPinOrKeyMissing_c • 0x0107: gHciMemoryCapacityExceeded_c • 0x0108: gHciConnectionTimeout_c • 0x0109: gHciConnectionLimitExceeded_c • 0x010A: gHciSynchronousConnectionLimitToADeviceExceeded_c • 0x010B: gHciAclConnectionAlreadyExists_c • 0x010C: gHciCommandDisallowed_c • 0x010D: gHciConnectionRejectedDueToLimitedResources_c • 0x010E: gHciConnectionRejectedDueToSecurityReasons_c • 0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c • 0x0110: gHciConnectionAcceptTimeoutExceeded_c • 0x0111: gHciUnsupportedFeatureOrParameterValue_c • 0x0112: gHciInvalidHciCommandParameters_c • 0x0113: gHciRemoteUserTerminatedConnection_c • 0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c • 0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c • 0x0116: gHciConnectionTerminatedByLocalHost_c • 0x0117: gHciRepeatedAttempts_c • 0x0118: gHciPairingNotAllowed_c • 0x0119: gHciUnknownLpmPdu_c • 0x011A: gHciUnsupportedRemoteFeature_c • 0x011B: gHciScoOffsetRejected_c • 0x011C: gHciScoIntervalRejected_c • 0x011D: gHciScoAirModeRejected_c • 0x011E: gHciInvalidLpmParameters_c • 0x011F: gHciUnspecifiedError_c • 0x0120: gHciUnsupportedLpmParameterValue_c • 0x0121: gHciRoleChangeNotAllowed_c • 0x0122: gHciLLResponseTimeout_c • 0x0123: gHciLmpErrorTransactionCollision_c • 0x0124: gHciLmpPduNotAllowed_c • 0x0125: gHciEncryptionModeNotAcceptable_c • 0x0126: gHciLinkKeyCannotBeChanged_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0127: gHciRequestedQosNotSupported_c • 0x0128: gHciInstantPassed_c • 0x0129: gHciPairingWithUnitKeyNotSupported_c • 0x012A: gHciDifferentTransactionCollision_c • 0x012B: gHciReserved_0x2B_c • 0x012C: gHciQosNotAcceptableParameter_c • 0x012D: gHciQosRejected_c • 0x012E: gHciChannelClassificationNotSupported_c • 0x012F: gHciInsufficientSecurity_c • 0x0130: gHciParameterOutOfMandatoryRange_c • 0x0131: gHciReserved_0x31_c • 0x0132: gHciRoleSwitchPending_c • 0x0133: gHciReserved_0x33_c • 0x0134: gHciReservedSlotViolation_c • 0x0135: gHciRoleSwitchFailed_c • 0x0136: gHciExtendedInquiryResponseTooLarge_c • 0x0137: gHciSecureSimplePairingNotSupportedByHost_c • 0x0138: gHciHostBusyPairing_c • 0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c • 0x013A: gHciControllerBusy_c • 0x013B: gHciUnacceptableConnectionParameters_c • 0x013C: gHciDirectedAdvertisingTimeout_c • 0x013D: gHciConnectionTerminatedDueToMicFailure_c • 0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c • 0x013F: gHciMacConnectionFailed_c • 0x0140: gHciCoarseClockAdjustmentRejected_c • 0x0141: gHciType0SubmapNotDefined_c • 0x0142: gHciUnknownAdvertisingIdentifier_c • 0x0143: gHciLimitReached_c • 0x0144: gHciOperationCancelledByHost_c • 0x01A0: gHciAlreadyInit_c • 0x01A1: gHciInvalidParameter_c • 0x01A2: gHciCallbackNotInstalled_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x01A3: gHciCallbackAlreadyInstalled_c • 0x01A4: gHciCommandNotSupported_c • 0x01A5: gHciEventNotSupported_c • 0x01A6: gHciTransportError_c • 0x03F0: gL2caAlreadyInit_c • 0x03F1: gL2caInsufficientResources_c • 0x03F2: gL2caCallbackNotInstalled_c • 0x03F3: gL2caCallbackAlreadyInstalled_c • 0x03F4: gL2caLePsmInvalid_c • 0x03F5: gL2caLePsmAlreadyRegistered_c • 0x03F6: gL2caLePsmNotRegistered_c • 0x03F7: gL2caLePsmInsufficientResources_c • 0x03F8: gL2caChannelInvalid_c • 0x03F9: gL2caChannelClosed_c • 0x03FA: gL2caChannelAlreadyConnected_c • 0x03FB: gL2caConnectionParametersRejected_c • 0x03FC: gL2caChannelBusy_c • 0x03FE: gL2caInvalidParameter_c • 0x03FF: gL2caError_c • 0x0401: gSmNullCBFunction_c • 0x0402: gSmCommandNotSupported_c • 0x0403: gSmUnexpectedCommand_c • 0x0404: gSmInvalidCommandCode_c • 0x0405: gSmInvalidCommandLength_c • 0x0406: gSmInvalidCommandParameter_c • 0x0407: gSmInvalidDeviceId_c • 0x0408: gSmInvalidInternalOperation_c • 0x0409: gSmInvalidConnectionHandle_c • 0x040A: gSmImproperKeyDistributionField_c • 0x040B: gSmUnexpectedKeyType_c • 0x040C: gSmUnexpectedPairingTerminationReason_c • 0x040D: gSmUnexpectedKeyset_c • 0x040E: gSmSmpTimeoutOccurred_c • 0x040F: gSmUnknownSmpPacketType_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0410: gSmInvalidSmpPacketLength_c • 0x0411: gSmInvalidSmpPacketParameter_c • 0x0412: gSmReceivedUnexpectedSmpPacket_c • 0x0413: gSmReceivedSmpPacketFromUnknownDevice_c • 0x0414: gSmReceivedUnexpectedHciEvent_c • 0x0415: gSmReceivedHciEventFromUnknownDevice_c • 0x0416: gSmInvalidHciEventParameter_c • 0x0417: gSmLlConnectionEncryptionInProgress_c • 0x0418: gSmLlConnectionEncryptionFailure_c • 0x0419: gSmInsufficientResources_c • 0x041A: gSmOobDataAddressMismatch_c • 0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c • 0x041C: gSmReceivedTimerEventForUnknownDevice_c • 0x041D: gSmUnattainableLocalDeviceSecRequirements_c • 0x041E: gSmUnattainableLocalDeviceMinKeySize_c • 0x041F: gSmUnattainableSlaveSecReqRequirements_c • 0x0431: gSmPairingErrorPasskeyEntryFailed_c • 0x0432: gSmPairingErrorConfirmValueFailed_c • 0x0433: gSmPairingErrorCommandNotSupported_c • 0x0434: gSmPairingErrorInvalidParameters_c • 0x0435: gSmPairingErrorUnknownReason_c • 0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c • 0x0461: gSmTbInvalidDataSignature_c • 0x0501: gAttInvalidHandle_c • 0x0502: gAttReadNotPermitted_c • 0x0503: gAttWriteNotPermitted_c • 0x0504: gAttInvalidPdu_c • 0x0505: gAttInsufficientAuthentication_c • 0x0506: gAttRequestNotSupported_c • 0x0507: gAttInvalidOffset_c • 0x0508: gAttInsufficientAuthorization_c • 0x0509: gAttPrepareQueueFull_c • 0x050A: gAttAttributeNotFound_c • 0x050B: gAttAttributeNotLong_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x050C: gAttInsufficientEncryptionKeySize_c • 0x050D: gAttInvalidAttributeValueLength_c • 0x050E: gAttUnlikelyor_c • 0x050F: gAttInsufficientEncryption_c • 0x0510: gAttUnsupportedGroupType_c • 0x0511: gAttInsufficientResources_c • 0x0601: gGattAnotherProcedureInProgress_c • 0x0602: gGattLongAttributePacketsCorrupted_c • 0x0603: gGattMultipleAttributesOverflow_c • 0x0604: gGattUnexpectedReadMultipleResponseLength_c • 0x0605: gGattInvalidValueLength_c • 0x0606: gGattServerTimeout_c • 0x0607: gGattIndicationAlreadyInProgress_c • 0x0608: gGattClientConfirmationTimeout_c • 0x0701: gGapAdvDataTooLong_c • 0x0702: gGapScanRspDataTooLong_c • 0x0703: gGapDeviceNotBonded_c • 0x0704: gGapAnotherProcedureInProgress_c • 0x0801: gDevDbCccdLimitReached_c • 0x0802: gDevDbCccdNotFound_c • 0x0901: gGattDbInvalidHandle_c • 0x0902: gGattDbCharacteristicNotFound_c • 0x0903: gGattDbCccdNotFound_c • 0x0904: gGattDbServiceNotFound_c • 0x0905: gGattDbDescriptorNotFound_c |

3.1.2 L2CAPCB-CancelConnection.Request

Description

Termination of an L2CAP channel.

Parameters

Table 4. L2CAPCB-CancelConnection.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|----------|
| OpGroup | 1 | 0x42 |

Table continues on the next page...

Table 4. L2CAPCB-CancelConnection.Request Parameters (continued)

| Parameter | Size (bytes) | Comments |
|--------------|--------------|--|
| OpCode | 1 | 0x06 |
| Length | 1 | Length in bytes of the following parameters |
| LePsm | 2 | Bluetooth SIG or Vendor LE_PSM |
| DeviceId | 1 | The DeviceId for which the command is intended |
| RefuseReason | 2 | Refuse reason Possible values: 0x0000: gSuccessful_c 0x0002: gLePsmNotSupported_c 0x0004: gNoResourcesAvailable_c 0x0005: gInsufficientAuthentication_c 0x0006: gInsufficientAuthorization_c 0x0007: gInsufficientEncryptionKeySize_c 0x0008: gInsufficientEncryption_c 0x0009: gInvalidSourceCid_c 0x000A: gSourceCidAlreadyAllocated_c 0x0100: gCommandRejected_c 0xFFFE: gResponseTimeout_c |

3.1.3 L2CAPCB-ConnectLePsm.Request

Description

L2CAP connect.

Parameters

Table 5. L2CAPCB-ConnectLePsm.Request Parameters

| Parameter | Size (bytes) | Comments |
|----------------|--------------|--|
| OpGroup | 1 | 0x42 |
| OpCode | 1 | |
| Length | 1 | Length in bytes of the following parameters |
| LePsm | 2 | Bluetooth SIG or Vendor LE_PSM |
| DeviceId | 1 | The DeviceId for which the command is intended |
| InitialCredits | 2 | Initial credits |

3.1.4 L2CAPCB-DeregisterLePsm.Request

Description

Deregister LePsm.

Parameters

Table 6. L2CAPCB-DeregisterLePsm.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x42 |
| OpCode | 1 | 0x03 |
| Length | 1 | Length in bytes of the following parameters |
| LePsm | 2 | Bluetooth SIG or Vendor LE_PSM |

3.1.5 L2CAPCB-DisconnectLeCbChannel.Request

Description

L2CAP disconnect.

Parameters

Table 7. L2CAPCB-DisconnectLeCbChannel.Request Parameters

| Parameter | Size (bytes) | Comments |
|------------|--------------|--|
| OpGroup | 1 | 0x42 |
| OpCode | 1 | 0x05 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | The DeviceId for which the command is intended |
| Channel Id | 2 | The L2CAP Channel Id assigned on the initiator |

3.1.6 L2CAPCB-LeCbData.Indication

Description

Data packet received through Credit-Based Channel.

Parameters

Table 8. L2CAPCB-LeCbData.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|----------|
| OpGroup | 1 | 0x42 |
| OpCode | 1 | 0x86 |

Table continues on the next page...

Table 8. L2CAPCB-LeCbData.Indication Parameters (continued)

| | | |
|--------------|--------------|---|
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | The DeviceId from which data packet is received |
| LePsm | 2 | Bluetooth SIG or Vendor LE_PSM |
| PacketLength | 2 | Length of the received data packet |
| Packet | PacketLength | The received data packet |

3.1.7 L2CAPCB-LePsmConnectionComplete.Indication

Description

Credit Based - Connection complete event.

Parameters

Table 9. L2CAPCB-LePsmConnectionComplete.Indication Parameters

| Parameter | Size (bytes) | Comments |
|------------------------|--------------|---|
| OpGroup | 1 | 0x42 |
| OpCode | 1 | 0x82 |
| Length | 1 | Length in bytes of the following parameters |
| InformationIncluded | 1 | Information is included or not |
| LeCbConnectionComplete | Variable | Connection complete event data Structure type parameter. See the detailed table below for parameter structure. |

Table 10. LeCbConnectionComplete Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| DeviceId | 1 | The DeviceId for which the command is intended |
| Channel Id | 2 | The L2CAP Channel Id assigned on the initiator |
| PeerMtu | 2 | Peer's MTU |
| PeerMps | 2 | Peer's MPS |
| InitialCredits | 2 | Initial credits |
| Result | 2 | Connection result Possible values: 0x0000: gSuccessful_c |

Table 10. LeCbConnectionComplete Parameter Structure (continued)

| | | |
|--|--|--|
| | | 0x0002: gLePsmNotSupported_c 0x0004: gNoResourcesAvailable_c 0x0005: gInsufficientAuthentication_c 0x0006: gInsufficientAuthorization_c 0x0007: gInsufficientEncryptionKeySize_c 0x0008: gInsufficientEncryption_c 0x0009: gInvalidSourceCid_c 0x000A: gSourceCidAlreadyAllocated_c 0x0100: gCommandRejected_c 0xFFFE: gResponseTimeout_c |
|--|--|--|

3.1.8 L2CAPCB-LePsmConnectionRequest.Indication

Description

Credit Based - Connection request event.

Parameters

Table 11. L2CAPCB-LePsmConnectionRequest.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------------------|--------------|--|
| OpGroup | 1 | 0x42 |
| OpCode | 1 | 0x81 |
| Length | 1 | Length in bytes of the following parameters |
| InformationIncluded | 1 | Information is included or not |
| LeCbConnectionRequest | Variable | Connection request event data Structure type parameter. See the detailed table below for parameter structure. |

Table 12. LeCbConnectionRequest Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| DeviceId | 1 | The DeviceId for which the command is intended |
| LePsm | 2 | Bluetooth SIG or Vendor LE_PSM |
| PeerMtu | 2 | Peer MTU |
| PeerMps | 2 | Peer MPS |
| InitialCredits | 2 | Initial credits |

3.1.9 L2CAPCB-LePsmDisconnectNotification.Indication

Description

Credit Based - Disconnection notification event.

Parameters

Table 13. L2CAPCB-LePsmDisconnectNotification.Indication Parameters

| Parameter | Size (bytes) | Comments |
|---------------------|--------------|---|
| OpGroup | 1 | 0x42 |
| OpCode | 1 | 0x83 |
| Length | 1 | Length in bytes of the following parameters |
| InformationIncluded | 1 | Information is included or not |
| LeCbDisconnection | Variable | Disconnection event data Structure type parameter. See the detailed table below for parameter structure. |

Table 14. LeCbDisconnection Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| DeviceId | 1 | The DeviceId for which the command is intended |
| Channel Id | 2 | The L2CAP Channel Id assigned on the initiator |

3.1.10 L2CAPCB-LocalCreditsNotification.Indication

Description

Credit Based - Local credits notification event.

Parameters

Table 15. L2CAPCB-LocalCreditsNotification.Indication Parameters

| Parameter | Size (bytes) | Comments |
|------------------------------|--------------|--|
| OpGroup | 1 | 0x42 |
| OpCode | 1 | 0x85 |
| Length | 1 | Length in bytes of the following parameters |
| InformationIncluded | 1 | Information is included or not |
| LeCbLocalCreditsNotification | Variable | Local credits notification event data Structure type parameter. See the detailed table below for parameter structure. |

Table 16. LeCbLocalCreditsNotification Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| DeviceId | 1 | The DeviceId for which the command is intended |
| Channel Id | 2 | The L2CAP Channel Id assigned on the initiator |
| LocalCredits | 2 | Local credits |

3.1.11 L2CAPCB-NoPeerCredits.Indication

Description

Credit Based - No peer credits event.

Parameters

Table 17. L2CAPCB-NoPeerCredits.Indication Parameters

| Parameter | Size (bytes) | Comments |
|---------------------|--------------|---|
| OpGroup | 1 | 0x42 |
| OpCode | 1 | 0x84 |
| Length | 1 | Length in bytes of the following parameters |
| InformationIncluded | 1 | Information is included or not |
| LeCbNoPeerCredits | Variable | No peer credits event data Structure type parameter. See the detailed table below for parameter structure. |

Table 18. LeCbNoPeerCredits Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| DeviceId | 1 | The DeviceId for which the command is intended |
| Channel Id | 2 | The L2CAP Channel Id assigned on the initiator |

3.1.12 L2CAPCB-RegisterLePsm.Request

Description

Register LePsm.

Parameters

Table 19. L2CAPCB-RegisterLeCbCallbacks.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x42 |
| OpCode | 1 | 0x02 |
| Length | 1 | Length in bytes of the following parameters |
| LePsm | 2 | Bluetooth SIG or Vendor LE_PSM |
| LePsmMtu | 2 | MTU value |

3.1.13 L2CAPCB-SendLeCbData.Request

Description

Sends a data packet through a Credit Based Channel.

Parameters

Table 20. L2CAPCB-SendLeCredit.Request Parameters

| Parameter | Size (bytes) | Comments |
|--------------|--------------|--|
| OpGroup | 1 | 0x42 |
| OpCode | 1 | 0x07 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | The DeviceId for which the command is intended |
| Channel Id | 2 | The L2CAP Channel Id assigned on the initiator |
| PacketLength | 2 | Length of the data packet to be sent |
| Packet | PacketLength | The data packet to be transmitted |

3.1.14 L2CAPCB-SendLeCredit.Request

Description

Sends credits to a device when capable of receiving additional LE-frames.

Parameters

Table 21. L2CAPCB-SendLeCredit.Request Parameters

| Parameters | Size (bytes) | Comments |
|------------|--------------|---|
| OpGroup | 1 | 0x42 |
| OpCode | 1 | 0x08 |
| Length | 1 | Length in bytes of the following parameters |

Table continues on the next page...

Table 21. L2CAPCB-SendLeCredit.Request Parameters (continued)

| Parameters | Size (bytes) | Comments |
|------------|--------------|--|
| DeviceId | 1 | The DeviceID to which credits are given |
| Channel Id | 2 | The L2CAP Channel Id assigned on the initiator |
| Credits | 2 | Number of credits to be given |

3.1.15 L2CAPCB-RegisterLeCbCallbacks.Request

Description

Registers callbacks for credit based data and control events on L2CAP.

Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x42 |
| OpCode | 1 | 0x01 |
| Length | 2 | 0x00 - This message does not have any parameters |

3.2 GATT Messages

3.2.1 GATT.Confirm

Description

Status of the GATT request.

Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x80 |
| Length | 1 | Length in bytes of the following parameters |
| Status | 2 | <p>The status of the GATT request</p> <p>Possible values:</p> <ul style="list-style-type: none"> • 0x0000: gBleSuccess_c • 0x0001: gBleInvalidParameter_c • 0x0002: gBleOverflow_c • 0x0003: gBleUnavailable_c • 0x0004: gBleFeatureNotSupported_c |

| Table continued from the previous page... | | |
|---|--------------|---|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0005: gBleOutOfMemory_c • 0x0006: gBleAlreadyInitialized_c • 0x0007: gBleOsError_c • 0x0008: gBleUnexpectedError_c • 0x0009: gBleInvalidState_c • 0x0101: gHciUnknownHciCommand_c • 0x0102: gHciUnknownConnectionIdentifier_c • 0x0103: gHciHardwareFailure_c • 0x0104: gHciPageTimeout_c • 0x0105: gHciAuthenticationFailure_c • 0x0106: gHciPinOrKeyMissing_c • 0x0107: gHciMemoryCapacityExceeded_c • 0x0108: gHciConnectionTimeout_c • 0x0109: gHciConnectionLimitExceeded_c • 0x010A: gHciSynchronousConnectionLimitToADeviceExceeded_c • 0x010B: gHciAclConnectionAlreadyExists_c • 0x010C: gHciCommandDisallowed_c • 0x010D: gHciConnectionRejectedDueToLimitedResources_c • 0x010E: gHciConnectionRejectedDueToSecurityReasons_c • 0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c • 0x0110: gHciConnectionAcceptTimeoutExceeded_c • 0x0111: gHciUnsupportedFeatureOrParameterValue_c • 0x0112: gHciInvalidHciCommandParameters_c • 0x0113: gHciRemoteUserTerminatedConnection_c • 0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c • 0x0116: gHciConnectionTerminatedByLocalHost_c • 0x0117: gHciRepeatedAttempts_c • 0x0118: gHciPairingNotAllowed_c • 0x0119: gHciUnknownLpmPdu_c • 0x011A: gHciUnsupportedRemoteFeature_c • 0x011B: gHciScoOffsetRejected_c • 0x011C: gHciScoIntervalRejected_c • 0x011D: gHciScoAirModeRejected_c • 0x011E: gHciInvalidLpmParameters_c • 0x011F: gHciUnspecifiedError_c • 0x0120: gHciUnsupportedLpmParameterValue_c • 0x0121: gHciRoleChangeNotAllowed_c • 0x0122: gHciLLResponseTimeout_c • 0x0123: gHciLmpErrorTransactionCollision_c • 0x0124: gHciLmpPduNotAllowed_c • 0x0125: gHciEncryptionModeNotAcceptable_c • 0x0126: gHciLinkKeyCannotBeChanged_c • 0x0127: gHciRequestedQosNotSupported_c • 0x0128: gHciInstantPassed_c • 0x0129: gHciPairingWithUnitKeyNotSupported_c • 0x012A: gHciDifferentTransactionCollision_c • 0x012B: gHciReserved_0x2B_c • 0x012C: gHciQosNotAcceptableParameter_c • 0x012D: gHciQosRejected_c • 0x012E: gHciChannelClassificationNotSupported_c • 0x012F: gHciInsufficientSecurity_c • 0x0130: gHciParameterOutOfMandatoryRange_c • 0x0131: gHciReserved_0x31_c • 0x0132: gHciRoleSwitchPending_c |

| Table continued from the previous page... | | |
|---|--------------|--|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0133: gHciReserved_0x33_c • 0x0134: gHciReservedSlotViolation_c • 0x0135: gHciRoleSwitchFailed_c • 0x0136: gHciExtendedInquiryResponseTooLarge_c • 0x0137: gHciSecureSimplePairingNotSupportedByHost_c • 0x0138: gHciHostBusyPairing_c • 0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c • 0x013A: gHciControllerBusy_c • 0x013B: gHciUnacceptableConnectionParameters_c • 0x013C: gHciDirectedAdvertisingTimeout_c • 0x013D: gHciConnectionTerminatedDueToMicFailure_c • 0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c • 0x013F: gHciMacConnectionFailed_c • 0x0140: gHciCoarseClockAdjustmentRejected_c • 0x0141: gHciType0SubmapNotDefined_c • 0x0142: gHciUnknownAdvertisingIdentifier_c • 0x0143: gHciLimitReached_c • 0x0144: gHciOperationCancelledByHost_c • 0x01A0: gHciAlreadyInit_c • 0x01A1: gHciInvalidParameter_c • 0x01A2: gHciCallbackNotInstalled_c • 0x01A3: gHciCallbackAlreadyInstalled_c • 0x01A4: gHciCommandNotSupported_c • 0x01A5: gHciEventNotSupported_c • 0x01A6: gHciTransportError_c • 0x03F0: gL2caAlreadyInit_c • 0x03F1: gL2caInsufficientResources_c • 0x03F2: gL2caCallbackNotInstalled_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x03F3: gL2caCallbackAlreadyInstalled_c • 0x03F4: gL2caLePsmInvalid_c • 0x03F5: gL2caLePsmAlreadyRegistered_c • 0x03F6: gL2caLePsmNotRegistered_c • 0x03F7: gL2caLePsmInsufficientResources_c • 0x03F8: gL2caChannelInvalid_c • 0x03F9: gL2caChannelClosed_c • 0x03FA: gL2caChannelAlreadyConnected_c • 0x03FB: gL2caConnectionParametersRejected_c • 0x03FC: gL2caChannelBusy_c • 0x03FE: gL2caInvalidParameter_c • 0x03FF: gL2caError_c • 0x0401: gSmNullCBFunction_c • 0x0402: gSmCommandNotSupported_c • 0x0403: gSmUnexpectedCommand_c • 0x0404: gSmInvalidCommandCode_c • 0x0405: gSmInvalidCommandLength_c • 0x0406: gSmInvalidCommandParameter_c • 0x0407: gSmInvalidDeviceId_c • 0x0408: gSmInvalidInternalOperation_c • 0x0409: gSmInvalidConnectionHandle_c • 0x040A: gSmImproperKeyDistributionField_c • 0x040B: gSmUnexpectedKeyType_c • 0x040C: gSmUnexpectedPairingTerminationReason_c • 0x040D: gSmUnexpectedKeyset_c • 0x040E: gSmSmpTimeoutOccurred_c • 0x040F: gSmUnknownSmpPacketType_c • 0x0410: gSmInvalidSmpPacketLength_c • 0x0411: gSmInvalidSmpPacketParameter_c • 0x0412: gSmReceivedUnexpectedSmpPacket_c • 0x0413: gSmReceivedSmpPacketFromUnknownDevice_c |

| Table continued from the previous page... | | |
|---|--------------|--|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0414: gSmReceivedUnexpectedHciEvent_c • 0x0415: gSmReceivedHciEventFromUnknownDevice_c • 0x0416: gSmInvalidHciEventParameter_c • 0x0417: gSmLlConnectionEncryptionInProgress_c • 0x0418: gSmLlConnectionEncryptionFailure_c • 0x0419: gSmInsufficientResources_c • 0x041A: gSmOobDataAddressMismatch_c • 0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c • 0x041C: gSmReceivedTimerEventForUnknownDevice_c • 0x041D: gSmUnattainableLocalDeviceSecRequirements_c • 0x041E: gSmUnattainableLocalDeviceMinKeySize_c • 0x041F: gSmUnattainableSlaveSecReqRequirements_c • 0x0431: gSmPairingErrorPasskeyEntryFailed_c • 0x0432: gSmPairingErrorConfirmValueFailed_c • 0x0433: gSmPairingErrorCommandNotSupported_c • 0x0434: gSmPairingErrorInvalidParameters_c • 0x0435: gSmPairingErrorUnknownReason_c • 0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c • 0x0461: gSmTbInvalidDataSignature_c • 0x0501: gAttInvalidHandle_c • 0x0502: gAttReadNotPermitted_c • 0x0503: gAttWriteNotPermitted_c • 0x0504: gAttInvalidPdu_c • 0x0505: gAttInsufficientAuthentication_c • 0x0506: gAttRequestNotSupported_c • 0x0507: gAttInvalidOffset_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0508: gAttInsufficientAuthorization_c • 0x0509: gAttPrepareQueueFull_c • 0x050A: gAttAttributeNotFound_c • 0x050B: gAttAttributeNotLong_c • 0x050C: gAttInsufficientEncryptionKeySize_c • 0x050D: gAttInvalidAttributeValueLength_c • 0x050E: gAttUnlikelyor_c • 0x050F: gAttInsufficientEncryption_c • 0x0510: gAttUnsupportedGroupType_c • 0x0511: gAttInsufficientResources_c • 0x0601: gGattAnotherProcedureInProgress_c • 0x0602: gGattLongAttributePacketsCorrupted_c • 0x0603: gGattMultipleAttributesOverflow_c • 0x0604: gGattUnexpectedReadMultipleResponseLength_c • 0x0605: gGattInvalidValueLength_c • 0x0606: gGattServerTimeout_c • 0x0607: gGattIndicationAlreadyInProgress_c • 0x0608: gGattClientConfirmationTimeout_c • 0x0701: gGapAdvDataTooLong_c • 0x0702: gGapScanRspDataTooLong_c • 0x0703: gGapDeviceNotBonded_c • 0x0704: gGapAnotherProcedureInProgress_c • 0x0801: gDevDbCccdLimitReached_c • 0x0802: gDevDbCccdNotFound_c • 0x0901: gGattDbInvalidHandle_c • 0x0902: gGattDbCharacteristicNotFound_c • 0x0903: gGattDbCccdNotFound_c • 0x0904: gGattDbServiceNotFound_c • 0x0905: gGattDbDescriptorNotFound_c |

3.2.2 GATTClient-DiscoverAllCharacteristicDescriptors.Request

Description

Initializes the Characteristic Descriptor Discovery procedure for a given Characteristic.

Parameters

Table 22. GATTClient-DiscoverAllCharacteristicDescriptors.Request Parameters

| Parameter | Size (bytes) | Comments |
|--------------------|--------------|---|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x0E |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID of the connected peer |
| Characteristic | Variable | The characteristic within which descriptors should be searched Structure type parameter. See the detailed table below for parameter structure. |
| EndingHandle | 2 | The last handle of the Characteristic |
| MaxNbOfDescriptors | 1 | Maximum number of descriptors to be filled |

Table 23. Characteristic Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Properties | 1 | Characteristic Properties as defined by GATT Possible values: 0x00: gNone_c (No Properties selected) 0x01: gBroadcast_c (Characteristic can be broadcast) 0x02: gRead_c (Characteristic can be read) 0x04: gWriteWithoutRsp_c (Characteristic can be written without response) 0x08: gWrite_c (Characteristic can be written with response) 0x10: gNotify_c (Characteristic can be notified) 0x20: gIndicate_c (Characteristic can be indicated) 0x40: gAuthSignedWrites_c (Characteristic can be written with signed data) 0x80: gExtendedProperties_c (Extended Characteristic properties) |

Table continues on the next page...

Table 23. Characteristic Parameter Structure (continued)

| | | |
|-----------------|----------|---|
| Value | Variable | Characteristic Value attribute Structure type parameter. See the detailed table below for parameter structure. |
| NbOfDescriptors | 1 | Size of the Characteristic Descriptors array |
| Descriptors | Variable | Characteristic Descriptors array Structure type parameter. See the detailed table below for parameter structure. |

Table 24. Value Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Handle | 2 | Attribute handle |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| ValueLength | 2 | Length of the attribute value array |
| MaxValueLength | 2 | Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed |
| Value | ValueLength | Attribute value array |

Table 25. Descriptors Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|---|
| Handle | 2 | Attribute handle |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits |

Table continues on the next page...

Table 25. Descriptors Parameter Structure (continued)

| | | |
|----------------|-------------|--|
| | | 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| ValueLength | 2 | Length of the attribute value array |
| MaxValueLength | 2 | Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed |
| Value | ValueLength | Attribute value array |

Table 26. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

Table 27. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

3.2.3 GATTClient-DiscoverAllCharacteristicsOfService.Request

Description

Initializes the Characteristic Discovery procedure for a given Service.

Parameters

Table 28. GATTClient-DiscoverAllCharacteristicsOfService.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x0C |
| Length | 1 | Length in bytes of the following parameters |

Table continues on the next page...

Table 28. GATTClient-DiscoverAllCharacteristicsOfService.Request Parameters (continued)

| | | |
|------------------------|----------|--|
| DeviceId | 1 | Device ID of the connected peer |
| Service | Variable | The service within which characteristics should be searched Structure type parameter. See the detailed table below for parameter structure. |
| MaxNbOfCharacteristics | 1 | Maximum number of characteristics to be filled |

Table 29. Service Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|----------------------|--------------|--|
| StartHandle | 2 | The handle of the Service Declaration attribute |
| EndHandle | 2 | The last handle belonging to this Service (followed by another Service declaration of the end of the database) |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| NbOfCharacteristics | 1 | Size of the Characteristic array |
| Characteristics | Variable | Characteristic array Structure type parameter. See the detailed table below for parameter structure. |
| NbOfIncludedServices | 1 | Size of the Included Services array |
| IncludedServices | Variable | Included Services array Structure type parameter. See the detailed table below for parameter structure. |

Table 30. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

Table 31. Characteristics Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|---|
| Properties | 1 | <p>Characteristic Properties as defined by GATT</p> <p>Possible values:</p> <p>0x00: gNone_c (No Properties selected)</p> <p>0x01: gBroadcast_c (Characteristic can be broadcast)</p> <p>0x02: gRead_c (Characteristic can be read)</p> <p>0x04: gWriteWithoutRsp_c (Characteristic can be written without response)</p> <p>0x08: gWrite_c (Characteristic can be written with response)</p> <p>0x10: gNotify_c (Characteristic can be notified)</p> <p>0x20: gIndicate_c (Characteristic can be indicated)</p> <p>0x40: gAuthSignedWrites_c (Characteristic can be written with signed data)</p> <p>0x80: gExtendedProperties_c (Extended Characteristic properties)</p> |
| Value | Variable | <p>Characteristic Value attribute</p> <p>Structure type parameter. See the detailed table below for parameter structure.</p> |
| NbOfDescriptors | 1 | Size of the Characteristic Descriptors array |
| Descriptors | Variable | <p>Characteristic Descriptors array</p> <p>Structure type parameter. See the detailed table below for parameter structure.</p> |

Table 32. IncludedServices Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|----------------------|--------------|--|
| StartHandle | 2 | The handle of the Service Declaration attribute |
| EndHandle | 2 | The last handle belonging to this Service (followed by another Service declaration of the end of the database) |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| NbOfCharacteristics | 1 | Size of the Characteristic array |
| NbOfIncludedServices | 1 | Size of the Included Services array |

Table 33. Value Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Handle | 2 | Attribute handle |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| ValueLength | 2 | Length of the attribute value array |
| MaxValueLength | 2 | Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed |
| Value | ValueLength | Attribute value array |

Table 34. Descriptors Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Handle | 2 | Attribute handle |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| ValueLength | 2 | Length of the attribute value array |
| MaxValueLength | 2 | Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed |
| Value | ValueLength | Attribute value array |

Table 35. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

Table 36. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

Table 37. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

3.2.4 GATTClient-DiscoverAllPrimaryServices.Request

Description

Initializes the Primary Service Discovery procedure.

Parameters

Table 38. GATTClient-DiscoverAllPrimaryServices.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------------|--------------|---|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x09 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID of the connected peer |
| MaxNbOfServices | 1 | Maximum number of services to be filled |

3.2.5 GATTClient-DiscoverCharacteristicOfServiceByUuid.Request

Description

Initializes the Characteristic Discovery procedure for a given Service, with a given UUID.

Parameters

Table 39. GATTClient-DiscoverCharacteristicOfServiceByUuid.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x0D |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID of the connected peer |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| Service | Variable | The service within which characteristics should be searched |

Table continues on the next page...

Table 39. GATTClient-DiscoverCharacteristicOfServiceByUuid.Request Parameters (continued)

| | | |
|------------------------|---|---|
| | | Structure type parameter. See the detailed table below for parameter structure. |
| MaxNbOfCharacteristics | 1 | Maximum number of characteristics to be filled |

Table 40. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

Table 41. Service Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|----------------------|--------------|--|
| StartHandle | 2 | The handle of the Service Declaration attribute |
| EndHandle | 2 | The last handle belonging to this Service (followed by another Service declaration of the end of the database) |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| NbOfCharacteristics | 1 | Size of the Characteristic array |
| Characteristics | Variable | Characteristic array Structure type parameter. See the detailed table below for parameter structure. |
| NbOfIncludedServices | 1 | Size of the Included Services array |
| IncludedServices | Variable | Included Services array Structure type parameter. See the detailed table below for parameter structure. |

Table 42. Characteristics Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|---|
| Properties | 1 | <p>Characteristic Properties as defined by GATT</p> <p>Possible values:</p> <p>0x00: gNone_c (No Properties selected)</p> <p>0x01: gBroadcast_c (Characteristic can be broadcast)</p> <p>0x02: gRead_c (Characteristic can be read)</p> <p>0x04: gWriteWithoutRsp_c (Characteristic can be written without response)</p> <p>0x08: gWrite_c (Characteristic can be written with response)</p> <p>0x10: gNotify_c (Characteristic can be notified)</p> <p>0x20: gIndicate_c (Characteristic can be indicated)</p> <p>0x40: gAuthSignedWrites_c (Characteristic can be written with signed data)</p> <p>0x80: gExtendedProperties_c (Extended Characteristic properties)</p> |
| Value | Variable | <p>Characteristic Value attribute</p> <p>Structure type parameter. See the detailed table below for parameter structure.</p> |
| NbOfDescriptors | 1 | Size of the Characteristic Descriptors array |
| Descriptors | Variable | <p>Characteristic Descriptors array</p> <p>Structure type parameter. See the detailed table below for parameter structure.</p> |

Table 43. IncludedServices Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|---|
| StartHandle | 2 | The handle of the Service Declaration attribute |

Table continues on the next page...

Table 43. IncludedServices Parameter Structure (continued)

| | | |
|----------------------|----------|--|
| EndHandle | 2 | The last handle belonging to this Service (followed by another Service declaration of the end of the database) |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| NbOfCharacteristics | 1 | Size of the Characteristic array |
| NbOfIncludedServices | 1 | Size of the Included Services array |

Table 44. Value Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Handle | 2 | Attribute handle |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| ValueLength | 2 | Length of the attribute value array |
| MaxValueLength | 2 | Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed |
| Value | ValueLength | Attribute value array |

Table 45. Descriptors Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Handle | 2 | Attribute handle |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| ValueLength | 2 | Length of the attribute value array |
| MaxValueLength | 2 | Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed |
| Value | ValueLength | Attribute value array |

Table 46. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

Table 47. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

Table 48. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

3.2.6 GATTClient-DiscoverPrimaryServicesByUuid.Request

Description

Initializes the Primary Service Discovery by UUID procedure.

Parameters

Table 49. GATTClient-DiscoverPrimaryServicesByUuid.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------------|--------------|--|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x0A |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID of the connected peer |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| MaxNbOfServices | 1 | Maximum number of services to be filled |

Table 50. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

3.2.7 GATTClient-ExchangeMtu.Request

Description

Initializes the MTU Exchange procedure.

Parameters

Table 51. GATTClient-ExchangeMtu.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|----------|
| OpGroup | 1 | 0x45 |

Table continues on the next page...

Table 51. GATTClient-ExchangeMtu.Request Parameters (continued)

| | | |
|----------|---|---|
| OpCode | 1 | 0x08 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID of the connected peer |

3.2.8 GATTClient-FindIncludedServices.Request

Description

Initializes the Find Included Services procedure.

Parameters

Table 52. GATTClient-FindIncludedServices.Request Parameters

| Parameter | Size (bytes) | Comments |
|-------------------------|--------------|---|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x0B |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID of the connected peer |
| Service | Variable | The service within which inclusions should be searched Structure type parameter. See the detailed table below for parameter structure. |
| MaxNbOfIncludedServices | 1 | Maximum number of included services to be filled |

Table 53. Service Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| StartHandle | 2 | The handle of the Service Declaration attribute |
| EndHandle | 2 | The last handle belonging to this Service (followed by another Service declaration of the end of the database) |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |

Table continues on the next page...

Table 53. Service Parameter Structure (continued)

| | | |
|----------------------|----------|--|
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| NbOfCharacteristics | 1 | Size of the Characteristic array |
| Characteristics | Variable | Characteristic array Structure type parameter. See the detailed table below for parameter structure. |
| NbOfIncludedServices | 1 | Size of the Included Services array |
| IncludedServices | Variable | Included Services array Structure type parameter. See the detailed table below for parameter structure. |

Table 54. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

Table 55. Characteristics Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|---|
| Properties | 1 | Characteristic Properties as defined by GATT Possible values: 0x00: gNone_c (No Properties selected) 0x01: gBroadcast_c (Characteristic can be broadcast) 0x02: gRead_c (Characteristic can be read) 0x04: gWriteWithoutRsp_c (Characteristic can be written without response) 0x08: gWrite_c (Characteristic can be written with response) 0x10: gNotify_c (Characteristic can be notified) |

Table continues on the next page...

Table 55. Characteristics Parameter Structure (continued)

| | | |
|-----------------|----------|---|
| | | 0x20: gIndicate_c (Characteristic can be indicated) 0x40: gAuthSignedWrites_c (Characteristic can be written with signed data) 0x80: gExtendedProperties_c (Extended Characteristic properties) |
| Value | Variable | Characteristic Value attribute Structure type parameter. See the detailed table below for parameter structure. |
| NbOfDescriptors | 1 | Size of the Characteristic Descriptors array |
| Descriptors | Variable | Characteristic Descriptors array Structure type parameter. See the detailed table below for parameter structure. |

Table 56. IncludedServices Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|----------------------|--------------|--|
| StartHandle | 2 | The handle of the Service Declaration attribute |
| EndHandle | 2 | The last handle belonging to this Service (followed by another Service declaration of the end of the database) |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| NbOfCharacteristics | 1 | Size of the Characteristic array |
| NbOfIncludedServices | 1 | Size of the Included Services array |

Table 57. Value Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Handle | 2 | Attribute handle |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| ValueLength | 2 | Length of the attribute value array |
| MaxValueLength | 2 | Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed |
| Value | ValueLength | Attribute value array |

Table 58. Descriptors Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Handle | 2 | Attribute handle |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| ValueLength | 2 | Length of the attribute value array |
| MaxValueLength | 2 | Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed |
| Value | ValueLength | Attribute value array |

Table 59. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

Table 60. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

Table 61. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

3.2.9 GATTClient-Indication.Indication

Description

GATT Client indication.

Parameters

Table 62. GATTClient-Indication.Indication Parameters

| Parameter | Size (bytes) | Comments |
|---------------------------|--------------|--|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x90 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the active connection |
| CharacteristicValueHandle | 2 | Handle of the Characteristic Value attribute to be indicated |
| ValueLength | 2 | Value array size |
| Value | ValueLength | The Characteristic value array |

3.2.10 GATTClient-Init.Request

Description

Initializes the GATT Client functionality.

Parameters**Table 63. GATTClient-Init.Request Parameters**

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x03 |
| Length | 1 | 0x00 - This message does not have any parameters |

3.2.11 GATTClient-Notification.Indication**Description**

GATT Client notification.

Parameters**Table 64. GATTClient-Notification.Indication Parameters**

| Parameter | Size (bytes) | Comments |
|---------------------------|--------------|---|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x8F |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the active connection |
| CharacteristicValueHandle | 2 | Handle of the Characteristic Value attribute to be notified |
| ValueLength | 2 | Value array size |
| Value | ValueLength | The Characteristic value array |

3.2.12 GATTClient-ProcedureDiscoverAllCharacteristicDescriptors.Indication**Description**

Specifies that the Characteristic Descriptor Discovery procedure for a given characteristic ended.

Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x88 |
| Length | 1 | Length in bytes of the following parameters |

Table continues on the next page...

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------------|--------------|--|
| DeviceId | 1 | Device ID identifying the active connection |
| ProcedureResult | 1 | <p>The result of the completed procedure</p> <p>Possible values:</p> <p>0x00: gGattProcSuccess_c (The procedure was completed successfully)</p> <p>0x01: gProcedureError_c (The procedure was terminated due to an error)</p> |
| Error | 2 | <p>If procedureResult is not gSuccess_c, this contains the error that terminated the procedure.</p> <p>Possible values:</p> <ul style="list-style-type: none"> • 0x0000: gBleSuccess_c • 0x0001: gBleInvalidParameter_c • 0x0002: gBleOverflow_c • 0x0003: gBleUnavailable_c • 0x0004: gBleFeatureNotSupported_c • 0x0005: gBleOutOfMemory_c • 0x0006: gBleAlreadyInitialized_c • 0x0007: gBleOsError_c • 0x0008: gBleUnexpectedError_c • 0x0009: gBleInvalidState_c • 0x0101: gHciUnknownHciCommand_c • 0x0102: gHciUnknownConnectionIdentifier_c • 0x0103: gHciHardwareFailure_c • 0x0104: gHciPageTimeout_c • 0x0105: gHciAuthenticationFailure_c • 0x0106: gHciPinOrKeyMissing_c • 0x0107: gHciMemoryCapacityExceeded_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0108: gHciConnectionTimeout_c • 0x0109: gHciConnectionLimitExceeded_c • 0x010A: gHciSynchronousConnectionLimitToADeviceExceeded_c • 0x010B: gHciAclConnectionAlreadyExists_c • 0x010C: gHciCommandDisallowed_c • 0x010D: gHciConnectionRejectedDueToLimitedResources_c • 0x010E: gHciConnectionRejectedDueToSecurityReasons_c • 0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c • 0x0110: gHciConnectionAcceptTimeoutExceeded_c • 0x0111: gHciUnsupportedFeatureOrParameterValue_c • 0x0112: gHciInvalidHciCommandParameters_c • 0x0113: gHciRemoteUserTerminatedConnection_c • 0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c • 0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c • 0x0116: gHciConnectionTerminatedByLocalHost_c • 0x0117: gHciRepeatedAttempts_c • 0x0118: gHciPairingNotAllowed_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0119: gHciUnknownLpmPdu_c • 0x011A: gHciUnsupportedRemoteFeature_c • 0x011B: gHciScoOffsetRejected_c • 0x011C: gHciScoIntervalRejected_c • 0x011D: gHciScoAirModeRejected_c • 0x011E: gHciInvalidLpmParameters_c • 0x011F: gHciUnspecifiedError_c • 0x0120: gHciUnsupportedLpmParameterValue_c • 0x0121: gHciRoleChangeNotAllowed_c • 0x0122: gHciLLResponseTimeout_c • 0x0123: gHciLmpErrorTransactionCollision_c • 0x0124: gHciLmpPduNotAllowed_c • 0x0125: gHciEncryptionModeNotAcceptable_c • 0x0126: gHciLinkKeyCannotBeChanged_c • 0x0127: gHciRequestedQosNotSupported_c • 0x0128: gHciInstantPassed_c • 0x0129: gHciPairingWithUnitKeyNotSupported_c • 0x012A: gHciDifferentTransactionCollision_c • 0x012B: gHciReserved_0x2B_c • 0x012C: gHciQosNotAcceptableParameter_c • 0x012D: gHciQosRejected_c • 0x012E: gHciChannelClassificationNotSupported_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x012F: gHciInsufficientSecurity_c • 0x0130: gHciParameterOutOfMandatoryRange_c • 0x0131: gHciReserved_0x31_c • 0x0132: gHciRoleSwitchPending_c • 0x0133: gHciReserved_0x33_c • 0x0134: gHciReservedSlotViolation_c • 0x0135: gHciRoleSwitchFailed_c • 0x0136: gHciExtendedInquiryResponseTooLarge_c • 0x0137: gHciSecureSimplePairingNotSupportedByHost_c • 0x0138: gHciHostBusyPairing_c • 0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c • 0x013A: gHciControllerBusy_c • 0x013B: gHciUnacceptableConnectionParameters_c • 0x013C: gHciDirectedAdvertisingTimeout_c • 0x013D: gHciConnectionTerminatedDueToMicFailure_c • 0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c • 0x013F: gHciMacConnectionFailed_c • 0x0140: gHciCoarseClockAdjustmentRejected_c • 0x0141: gHciType0SubmapNotDefined_c • 0x0142: gHciUnknownAdvertisingIdentifier_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0143: gHciLimitReached_c • 0x0144: gHciOperationCancelledByHost_c • 0x01A0: gHciAlreadyInit_c • 0x01A1: gHciInvalidParameter_c • 0x01A2: gHciCallbackNotInstalled_c • 0x01A3: gHciCallbackAlreadyInstalled_c • 0x01A4: gHciCommandNotSupported_c • 0x01A5: gHciEventNotSupported_c • 0x01A6: gHciTransportError_c • 0x03F0: gL2caAlreadyInit_c • 0x03F1: gL2caInsufficientResources_c • 0x03F2: gL2caCallbackNotInstalled_c • 0x03F3: gL2caCallbackAlreadyInstalled_c • 0x03F4: gL2caLePsmInvalid_c • 0x03F5: gL2caLePsmAlreadyRegistered_c • 0x03F6: gL2caLePsmNotRegistered_c • 0x03F7: gL2caLePsmInsufficientResources_c • 0x03F8: gL2caChannelInvalid_c • 0x03F9: gL2caChannelClosed_c • 0x03FA: gL2caChannelAlreadyConnected_c • 0x03FB: gL2caConnectionParametersRejected_c • 0x03FC: gL2caChannelBusy_c • 0x03FE: gL2caInvalidParameter_c • 0x03FF: gL2caError_c • 0x0401: gSmNullCBFunction_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0402: gSmCommandNotSupported_c • 0x0403: gSmUnexpectedCommand_c • 0x0404: gSmInvalidCommandCode_c • 0x0405: gSmInvalidCommandLength_c • 0x0406: gSmInvalidCommandParameter_c • 0x0407: gSmInvalidDeviceId_c • 0x0408: gSmInvalidInternalOperation_c • 0x0409: gSmInvalidConnectionHandle_c • 0x040A: gSmImproperKeyDistributionField_c • 0x040B: gSmUnexpectedKeyType_c • 0x040C: gSmUnexpectedPairingTerminationReason_c • 0x040D: gSmUnexpectedKeyset_c • 0x040E: gSmSmpTimeoutOccurred_c • 0x040F: gSmUnknownSmpPacketType_c • 0x0410: gSmInvalidSmpPacketLength_c • 0x0411: gSmInvalidSmpPacketParameter_c • 0x0412: gSmReceivedUnexpectedSmpPacket_c • 0x0413: gSmReceivedSmpPacketFromUnknownDevice_c • 0x0414: gSmReceivedUnexpectedHciEvent_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0415: gSmReceivedHciEventFromUnknownDevice_c • 0x0416: gSmInvalidHciEventParameter_c • 0x0417: gSmLlConnectionEncryptionInProgress_c • 0x0418: gSmLlConnectionEncryptionFailure_c • 0x0419: gSmInsufficientResources_c • 0x041A:gSmOobDataAddressMismatch_c • 0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c • 0x041C: gSmReceivedTimerEventForUnknownDevice_c • 0x041D: gSmUnattainableLocalDeviceSecRequirements_c • 0x041E: gSmUnattainableLocalDeviceMinKeySize_c • 0x041F: gSmUnattainableSlaveSecReqRequirements_c • 0x0431: gSmPairingErrorPasskeyEntryFailed_c • 0x0432: gSmPairingErrorConfirmValueFailed_c • 0x0433: gSmPairingErrorCommandNotSupported_c • 0x0434: gSmPairingErrorInvalidParameters_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0435: gSmPairingErrorUnknownReason_c • 0x0460: gSmTbResolvableAddressDoesNot MatchIrk_c • 0x0461: gSmTbInvalidDataSignature_c • 0x0501: gAttInvalidHandle_c • 0x0502: gAttReadNotPermitted_c • 0x0503: gAttWriteNotPermitted_c • 0x0504: gAttInvalidPdu_c • 0x0505: gAttInsufficientAuthentication_c • 0x0506: gAttRequestNotSupported_c • 0x0507: gAttInvalidOffset_c • 0x0508: gAttInsufficientAuthorization_c • 0x0509: gAttPrepareQueueFull_c • 0x050A: gAttAttributeNotFound_c • 0x050B: gAttAttributeNotLong_c • 0x050C: gAttInsufficientEncryptionKeySize_c • 0x050D: gAttInvalidAttributeValueLength_c • 0x050E: gAttUnlikelyor_c • 0x050F: gAttInsufficientEncryption_c • 0x0510: gAttUnsupportedGroupType_c • 0x0511: gAttInsufficientResources_c • 0x0601: gGattAnotherProcedureInProgress_ c • 0x0602: gGattLongAttributePacketsCorrupte d_c • 0x0603: gGattMultipleAttributesOverflow_c |

| Table continued from the previous page... | | |
|---|--------------|--|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0604: gGattUnexpectedReadMultipleResponseLength_c • 0x0605: gGattInvalidValueLength_c • 0x0606: gGattServerTimeout_c • 0x0607: gGattIndicationAlreadyInProgress_c • 0x0608: gGattClientConfirmationTimeout_c • 0x0701: gGapAdvDataTooLong_c • 0x0702: gGapScanRspDataTooLong_c • 0x0703: gGapDeviceNotBonded_c • 0x0704: gGapAnotherProcedureInProgress_c • 0x0801: gDevDbCccdLimitReached_c • 0x0802: gDevDbCccdNotFound_c • 0x0901: gGattDbInvalidHandle_c • 0x0902: gGattDbCharacteristicNotFound_c • 0x0903: gGattDbCccdNotFound_c • 0x0904: gGattDbServiceNotFound_c • 0x0905: gGattDbDescriptorNotFound_c |

Table 65. Characteristics Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|---|
| Properties | 1 | <p>Characteristic Properties as defined by GATT</p> <p>Possible values:</p> <p>0x00: gNone_c (No Properties selected)</p> <p>0x01: gBroadcast_c (Characteristic can be broadcast)</p> <p>0x02: gRead_c (Characteristic can be read)</p> |

Table continues on the next page...

Table 65. Characteristics Parameter Structure (continued)

| | | |
|-----------------|----------|--|
| | | 0x04: gWriteWithoutRsp_c (Characteristic can be written without response) 0x08: gWrite_c (Characteristic can be written with response) 0x10: gNotify_c (Characteristic can be notified) 0x20: gIndicate_c (Characteristic can be indicated) 0x40: gAuthSignedWrites_c (Characteristic can be written with signed data) 0x80: gExtendedProperties_c (Extended Characteristic properties) |
| Value | Variable | Characteristic Value attribute Structure type parameter. See the detailed table below for parameter structure. |
| NbOfDescriptors | 1 | Size of the Characteristic Descriptors array |
| Descriptors | Variable | Characteristic Descriptors array Structure type parameter. See the detailed table below for parameter structure. |

Table 66. Value Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Handle | 2 | Attribute handle |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |

Table continues on the next page...

Table 66. Value Parameter Structure (continued)

| | | |
|----------------|-------------|--|
| ValueLength | 2 | Length of the attribute value array |
| MaxValueLength | 2 | Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed |
| Value | ValueLength | Attribute value array |

Table 67. Descriptors Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Handle | 2 | Attribute handle |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| ValueLength | 2 | Length of the attribute value array |
| MaxValueLength | 2 | Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed |
| Value | ValueLength | Attribute value array |

Table 68. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

Table 69. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

3.2.13 GATTClient-ProcedureDiscoverAllCharacteristics.Indication

Description

Specifies that the Characteristic Discovery procedure for a given service ended.

Parameters

| Parameter | Size (bytes) | Comments |
|-----------------|--------------|---|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x86 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the active connection |
| ProcedureResult | 1 | <p>The result of the completed procedure</p> <p>Possible values:</p> <p>0x00: gGattProcSuccess_c (The procedure was completed successfully)</p> <p>0x01: gProcedureError_c (The procedure was terminated due to an error)</p> |
| Error | 2 | <p>If procedureResult is not gSuccess_c, this contains the error that terminated the procedure</p> <p>Possible values:</p> <ul style="list-style-type: none"> • 0x0000: gBleSuccess_c • 0x0001: gBleInvalidParameter_c • 0x0002: gBleOverflow_c • 0x0003: gBleUnavailable_c • 0x0004: gBleFeatureNotSupported_c • 0x0005: gBleOutOfMemory_c • 0x0006: gBleAlreadyInitialized_c • 0x0007: gBleOsError_c • 0x0008: gBleUnexpectedError_c • 0x0009: gBleInvalidState_c • 0x0101: gHciUnknownHciCommand_c • 0x0102: gHciUnknownConnectionIdentifier_c • 0x0103: gHciHardwareFailure_c • 0x0104: gHciPageTimeout_c • 0x0105: gHciAuthenticationFailure_c • 0x0106: gHciPinOrKeyMissing_c • 0x0107: gHciMemoryCapacityExceeded_c |

Table continues on the next page...

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0108: gHciConnectionTimeout_c • 0x0109: gHciConnectionLimitExceeded_c • 0x010A: gHciSynchronousConnectionLimitToADeviceExceeded_c • 0x010B: gHciAclConnectionAlreadyExists_c • 0x010C: gHciCommandDisallowed_c • 0x010D: gHciConnectionRejectedDueToLimitedResources_c • 0x010E: gHciConnectionRejectedDueToSecurityReasons_c • 0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c • 0x0110: gHciConnectionAcceptTimeoutExceeded_c • 0x0111: gHciUnsupportedFeatureOrParameterValue_c • 0x0112: gHciInvalidHciCommandParameters_c • 0x0113: gHciRemoteUserTerminatedConnection_c • 0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c • 0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c • 0x0116: gHciConnectionTerminatedByLocalHost_c • 0x0117: gHciRepeatedAttempts_c • 0x0118: gHciPairingNotAllowed_c • 0x0119: gHciUnknownLpmPdu_c • 0x011A: gHciUnsupportedRemoteFeature_c • 0x011B: gHciScoOffsetRejected_c • 0x011C: gHciScoIntervalRejected_c • 0x011D: gHciScoAirModeRejected_c • 0x011E: gHciInvalidLpmParameters_c • 0x011F: gHciUnspecifiedError_c • 0x0120: gHciUnsupportedLpmParameterValue_c • 0x0121: gHciRoleChangeNotAllowed_c • 0x0122: gHciLLResponseTimeout_c • 0x0123: gHciLmpErrorTransactionCollision_c |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|---|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0124: gHciLmpPduNotAllowed_c • 0x0125: gHciEncryptionModeNotAcceptable_c • 0x0126: gHciLinkKeyCannotBeChanged_c • 0x0127: gHciRequestedQosNotSupported_c • 0x0128: gHciInstantPassed_c • 0x0129: gHciPairingWithUnitKeyNotSupported_c • 0x012A: gHciDifferentTransactionCollision_c • 0x012B: gHciReserved_0x2B_c • 0x012C: gHciQosNotAcceptableParameter_c • 0x012D: gHciQosRejected_c • 0x012E: gHciChannelClassificationNotSupported_c • 0x012F: gHciInsufficientSecurity_c • 0x0130: gHciParameterOutOfMandatoryRange_c • 0x0131: gHciReserved_0x31_c • 0x0132: gHciRoleSwitchPending_c • 0x0133: gHciReserved_0x33_c • 0x0134: gHciReservedSlotViolation_c • 0x0135: gHciRoleSwitchFailed_c • 0x0136: gHciExtendedInquiryResponseTooLarge_c • 0x0137: gHciSecureSimplePairingNotSupportedByHost_c • 0x0138: gHciHostBusyPairing_c • 0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c • 0x013A: gHciControllerBusy_c • 0x013B: gHciUnacceptableConnectionParameters_c • 0x013C: gHciDirectedAdvertisingTimeout_c • 0x013D: gHciConnectionTerminatedDueToMicFailure_c • 0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c • 0x013F: gHciMacConnectionFailed_c • 0x0140: gHciCoarseClockAdjustmentRejected_c • 0x0141: gHciType0SubmapNotDefined_c |

Table continues on the next page...

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0142: gHciUnknownAdvertisingIdentifier_c • 0x0143: gHciLimitReached_c • 0x0144: gHciOperationCancelledByHost_c • 0x01A0: gHciAlreadyInit_c • 0x01A1: gHciInvalidParameter_c • 0x01A2: gHciCallbackNotInstalled_c • 0x01A3: gHciCallbackAlreadyInstalled_c • 0x01A4: gHciCommandNotSupported_c • 0x01A5: gHciEventNotSupported_c • 0x01A6: gHciTransportError_c • 0x03F0: gL2caAlreadyInit_c • 0x03F1: gL2caInsufficientResources_c • 0x03F2: gL2caCallbackNotInstalled_c • 0x03F3: gL2caCallbackAlreadyInstalled_c • 0x03F4: gL2caLePsmInvalid_c • 0x03F5: gL2caLePsmAlreadyRegistered_c • 0x03F6: gL2caLePsmNotRegistered_c • 0x03F7: gL2caLePsmInsufficientResources_c • 0x03F8: gL2caChannelInvalid_c • 0x03F9: gL2caChannelClosed_c • 0x03FA: gL2caChannelAlreadyConnected_c • 0x03FB: gL2caConnectionParametersRejected_c • 0x03FC: gL2caChannelBusy_c • 0x03FE: gL2caInvalidParameter_c • 0x03FF: gL2caError_c • 0x0401: gSmNullCBFunction_c • 0x0402: gSmCommandNotSupported_c • 0x0403: gSmUnexpectedCommand_c • 0x0404: gSmInvalidCommandCode_c • 0x0405: gSmInvalidCommandLength_c • 0x0406: gSmInvalidCommandParameter_c • 0x0407: gSmInvalidDeviceId_c • 0x0408: gSmInvalidInternalOperation_c |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|--|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0409: gSmInvalidConnectionHandle_c • 0x040A: gSmInproperKeyDistributionField_c • 0x040B: gSmUnexpectedKeyType_c • 0x040C: gSmUnexpectedPairingTerminationReason_c • 0x040D: gSmUnexpectedKeyset_c • 0x040E: gSmSmpTimeoutOccurred_c • 0x040F: gSmUnknownSmpPacketType_c • 0x0410: gSmInvalidSmpPacketLength_c • 0x0411: gSmInvalidSmpPacketParameter_c • 0x0412: gSmReceivedUnexpectedSmpPacket_c • 0x0413: gSmReceivedSmpPacketFromUnknownDevice_c • 0x0414: gSmReceivedUnexpectedHciEvent_c • 0x0415: gSmReceivedHciEventFromUnknownDevice_c • 0x0416: gSmInvalidHciEventParameter_c • 0x0417: gSmLIConnectionEncryptionInProgress_c • 0x0418: gSmLIConnectionEncryptionFailure_c • 0x0419: gSmInsufficientResources_c • 0x041A: gSmOobDataAddressMismatch_c • 0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c • 0x041C: gSmReceivedTimerEventForUnknownDevice_c • 0x041D: gSmUnattainableLocalDeviceSecRequirements_c • 0x041E: gSmUnattainableLocalDeviceMinKeySize_c • 0x041F: gSmUnattainableSlaveSecReqRequirements_c • 0x0431: gSmPairingErrorPasskeyEntryFailed_c • 0x0432: gSmPairingErrorConfirmValueFailed_c • 0x0433: gSmPairingErrorCommandNotSupported_c • 0x0434: gSmPairingErrorInvalidParameters_c • 0x0435: gSmPairingErrorUnknownReason_c • 0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c • 0x0461: gSmTbInvalidDataSignature_c • 0x0501: gAttInvalidHandle_c |

Table continues on the next page...

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0502: gAttReadNotPermitted_c • 0x0503: gAttWriteNotPermitted_c • 0x0504: gAttInvalidPdu_c • 0x0505: gAttInsufficientAuthentication_c • 0x0506: gAttRequestNotSupported_c • 0x0507: gAttInvalidOffset_c • 0x0508: gAttInsufficientAuthorization_c • 0x0509: gAttPrepareQueueFull_c • 0x050A: gAttAttributeNotFound_c • 0x050B: gAttAttributeNotLong_c • 0x050C: gAttInsufficientEncryptionKeySize_c • 0x050D: gAttInvalidAttributeValueLength_c • 0x050E: gAttUnlikelyor_c • 0x050F: gAttInsufficientEncryption_c • 0x0510: gAttUnsupportedGroupType_c • 0x0511: gAttInsufficientResources_c • 0x0601: gGattAnotherProcedureInProgress_c • 0x0602: gGattLongAttributePacketsCorrupted_c • 0x0603: gGattMultipleAttributesOverflow_c • 0x0604: gGattUnexpectedReadMultipleResponseLength_c • 0x0605: gGattInvalidValueLength_c • 0x0606: gGattServerTimeout_c • 0x0607: gGattIndicationAlreadyInProgress_c • 0x0608: gGattClientConfirmationTimeout_c • 0x0701: gGapAdvDataTooLong_c • 0x0702: gGapScanRspDataTooLong_c • 0x0703: gGapDeviceNotBonded_c • 0x0704: gGapAnotherProcedureInProgress_c • 0x0801: gDevDbCccdLimitReached_c • 0x0802: gDevDbCccdNotFound_c • 0x0901: gGattDbInvalidHandle_c • 0x0902: gGattDbCharacteristicNotFound_c |

Table continues on the next page...

| <i>Table continued from the previous page...</i> | | |
|--|--------------|--|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0903: gGattDbCccdNotFound_c • 0x0904: gGattDbServiceNotFound_c • 0x0905: gGattDbDescriptorNotFound_c |
| Service | Variable | The service within which characteristics were searched Structure type parameter. See the detailed table below for parameter structure. |

Table 70. Service Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|----------------------|--------------|--|
| StartHandle | 2 | The handle of the Service Declaration attribute |
| EndHandle | 2 | The last handle belonging to this Service (followed by another Service declaration of the end of the database) |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| NbOfCharacteristics | 1 | Size of the Characteristic array |
| Characteristics | Variable | Characteristic array Structure type parameter. See the detailed table below for parameter structure. |
| NbOfIncludedServices | 1 | Size of the Included Services array |
| IncludedServices | Variable | Included Services array Structure type parameter. See the detailed table below for parameter structure. |

Table 71. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

Table 72. Characteristics Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|---|
| Properties | 1 | <p>Characteristic Properties as defined by GATT</p> <p>Possible values:</p> <p>0x00: gNone_c (No Properties selected)</p> <p>0x01: gBroadcast_c (Characteristic can be broadcast)</p> <p>0x02: gRead_c (Characteristic can be read)</p> <p>0x04: gWriteWithoutRsp_c (Characteristic can be written without response)</p> <p>0x08: gWrite_c (Characteristic can be written with response)</p> <p>0x10: gNotify_c (Characteristic can be notified)</p> <p>0x20: gIndicate_c (Characteristic can be indicated)</p> <p>0x40: gAuthSignedWrites_c (Characteristic can be written with signed data)</p> <p>0x80: gExtendedProperties_c (Extended Characteristic properties)</p> |
| Value | Variable | <p>Characteristic Value attribute</p> <p>Structure type parameter. See the detailed table below for parameter structure.</p> |
| NbOfDescriptors | 1 | Size of the Characteristic Descriptors array |
| Descriptors | Variable | <p>Characteristic Descriptors array</p> <p>Structure type parameter. See the detailed table below for parameter structure.</p> |

Table 73. IncludedServices Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|----------------------|--------------|--|
| StartHandle | 2 | The handle of the Service Declaration attribute |
| EndHandle | 2 | The last handle belonging to this Service (followed by another Service declaration of the end of the database) |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| NbOfCharacteristics | 1 | Size of the Characteristic array |
| NbOfIncludedServices | 1 | Size of the Included Services array |

Table 74. Value Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Handle | 2 | Attribute handle |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| ValueLength | 2 | Length of the attribute value array |
| MaxValueLength | 2 | Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed |
| Value | ValueLength | Attribute value array |

Table 75. Descriptors Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Handle | 2 | Attribute handle |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| ValueLength | 2 | Length of the attribute value array |
| MaxValueLength | 2 | Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed |
| Value | ValueLength | Attribute value array |

Table 76. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

Table 77. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

Table 78. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

3.2.14 GATTClient-ProcedureDiscoverAllPrimaryServices.Indication

Description

Specifies that the Primary Service Discovery procedure ended.

Parameters

| Parameter | Size (bytes) | Comments |
|-----------------|--------------|--|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x83 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the active connection |
| ProcedureResult | 1 | The result of the completed procedure Possible values: 0x00: gGattProcSuccess_c (The procedure was completed successfully) 0x01: gProcedureError_c (The procedure was terminated due to an error) |
| Error | 2 | If procedureResult is not gSuccess_c, this contains the error that terminated the procedure. Possible values: <ul style="list-style-type: none"> • 0x0000: gBleSuccess_c • 0x0001: gBleInvalidParameter_c • 0x0002: gBleOverflow_c • 0x0003: gBleUnavailable_c • 0x0004: gBleFeatureNotSupported_c • 0x0005: gBleOutOfMemory_c • 0x0006: gBleAlreadyInitialized_c • 0x0007: gBleOsError_c • 0x0008: gBleUnexpectedError_c • 0x0009: gBleInvalidState_c • 0x0101: gHciUnknownHciCommand_c |

Table continues on the next page...

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0102: gHciUnknownConnectionIdentifier_c • 0x0103: gHciHardwareFailure_c • 0x0104: gHciPageTimeout_c • 0x0105: gHciAuthenticationFailure_c • 0x0106: gHciPinOrKeyMissing_c • 0x0107: gHciMemoryCapacityExceeded_c • 0x0108: gHciConnectionTimeout_c • 0x0109: gHciConnectionLimitExceeded_c • 0x010A: gHciSynchronousConnectionLimitToADeviceExceeded_c • 0x010B: gHciAclConnectionAlreadyExists_c • 0x010C: gHciCommandDisallowed_c • 0x010D: gHciConnectionRejectedDueToLimitedResources_c • 0x010E: gHciConnectionRejectedDueToSecurityReasons_c • 0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c • 0x0110: gHciConnectionAcceptTimeoutExceeded_c • 0x0111: gHciUnsupportedFeatureOrParameterValue_c • 0x0112: gHciInvalidHciCommandParameters_c • 0x0113: gHciRemoteUserTerminatedConnection_c |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|--|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c • 0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c • 0x0116: gHciConnectionTerminatedByLocalHost_c • 0x0117: gHciRepeatedAttempts_c • 0x0118: gHciPairingNotAllowed_c • 0x0119: gHciUnknownLpmPdu_c • 0x011A: gHciUnsupportedRemoteFeature_c • 0x011B: gHciScoOffsetRejected_c • 0x011C: gHciScoIntervalRejected_c • 0x011D: gHciScoAirModeRejected_c • 0x011E: gHciInvalidLpmParameters_c • 0x011F: gHciUnspecifiedError_c • 0x0120: gHciUnsupportedLpmParameterValue_c • 0x0121: gHciRoleChangeNotAllowed_c • 0x0122: gHciLLResponseTimeout_c • 0x0123: gHciLmpErrorTransactionCollision_c • 0x0124: gHciLmpPduNotAllowed_c • 0x0125: gHciEncryptionModeNotAcceptable_c • 0x0126: gHciLinkKeyCannotBeChanged_c • 0x0127: gHciRequestedQosNotSupported_c • 0x0128: gHciInstantPassed_c |

Table continues on the next page...

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0129: gHciPairingWithUnitKeyNotSupported_c • 0x012A: gHciDifferentTransactionCollision_c • 0x012B: gHciReserved_0x2B_c • 0x012C: gHciQosNotAcceptableParameter_c • 0x012D: gHciQosRejected_c • 0x012E: gHciChannelClassificationNotSupported_c • 0x012F: gHciInsufficientSecurity_c • 0x0130: gHciParameterOutOfMandatoryRange_c • 0x0131: gHciReserved_0x31_c • 0x0132: gHciRoleSwitchPending_c • 0x0133: gHciReserved_0x33_c • 0x0134: gHciReservedSlotViolation_c • 0x0135: gHciRoleSwitchFailed_c • 0x0136: gHciExtendedInquiryResponseTooLarge_c • 0x0137: gHciSecureSimplePairingNotSupportedByHost_c • 0x0138: gHciHostBusyPairing_c • 0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c • 0x013A: gHciControllerBusy_c • 0x013B: gHciUnacceptableConnectionParameters_c • 0x013C: gHciDirectedAdvertisingTimeout_c |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|--|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x013D: gHciConnectionTerminatedDueToMicFailure_c • 0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c • 0x013F: gHciMacConnectionFailed_c • 0x0140: gHciCoarseClockAdjustmentRejected_c • 0x0141: gHciType0SubmapNotDefined_c • 0x0142: gHciUnknownAdvertisingIdentifier_c • 0x0143: gHciLimitReached_c • 0x0144: gHciOperationCancelledByHost_c • 0x01A0: gHciAlreadyInit_c • 0x01A1: gHciInvalidParameter_c • 0x01A2: gHciCallbackNotInstalled_c • 0x01A3: gHciCallbackAlreadyInstalled_c • 0x01A4: gHciCommandNotSupported_c • 0x01A5: gHciEventNotSupported_c • 0x01A6: gHciTransportError_c • 0x03F0: gL2caAlreadyInit_c • 0x03F1: gL2caInsufficientResources_c • 0x03F2: gL2caCallbackNotInstalled_c • 0x03F3: gL2caCallbackAlreadyInstalled_c • 0x03F4: gL2caLePsmInvalid_c • 0x03F5: gL2caLePsmAlreadyRegistered_c • 0x03F6: gL2caLePsmNotRegistered_c |
| Table continues on the next page... | | |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x03F7: gL2caLePsmInsufficientResources_c • 0x03F8: gL2caChannelInvalid_c • 0x03F9: gL2caChannelClosed_c • 0x03FA: gL2caChannelAlreadyConnected_c • 0x03FB: gL2caConnectionParametersRejected_c • 0x03FC: gL2caChannelBusy_c • 0x03FE: gL2caInvalidParameter_c • 0x03FF: gL2caError_c • 0x0401: gSmNullCBFunction_c • 0x0402: gSmCommandNotSupported_c • 0x0403: gSmUnexpectedCommand_c • 0x0404: gSmInvalidCommandCode_c • 0x0405: gSmInvalidCommandLength_c • 0x0406: gSmInvalidCommandParameter_c • 0x0407: gSmInvalidDeviceId_c • 0x0408: gSmInvalidInternalOperation_c • 0x0409: gSmInvalidConnectionHandle_c • 0x040A: gSmImproperKeyDistributionField_c • 0x040B: gSmUnexpectedKeyType_c • 0x040C: gSmUnexpectedPairingTerminationReason_c • 0x040D: gSmUnexpectedKeyset_c • 0x040E: gSmSmpTimeoutOccurred_c |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|---|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x040F: gSmUnknownSmpPacketType_c • 0x0410: gSmInvalidSmpPacketLength_c • 0x0411: gSmInvalidSmpPacketParameter_c • 0x0412: gSmReceivedUnexpectedSmpPacket_c • 0x0413: gSmReceivedSmpPacketFromUnknownDevice_c • 0x0414: gSmReceivedUnexpectedHciEvent_c • 0x0415: gSmReceivedHciEventFromUnknownDevice_c • 0x0416: gSmInvalidHciEventParameter_c • 0x0417: gSmLlConnectionEncryptionInProgress_c • 0x0418: gSmLlConnectionEncryptionFailure_c • 0x0419: gSmInsufficientResources_c • 0x041A: gSmOobDataAddressMismatch_c • 0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c • 0x041C: gSmReceivedTimerEventForUnknownDevice_c • 0x041D: gSmUnattainableLocalDeviceSecRequirements_c |
| Table continues on the next page... | | |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x041E: gSmUnattainableLocalDeviceMinKeySize_c • 0x041F: gSmUnattainableSlaveSecReqRequirements_c • 0x0431: gSmPairingErrorPasskeyEntryFailed_c • 0x0432: gSmPairingErrorConfirmValueFailed_c • 0x0433: gSmPairingErrorCommandNotSupported_c • 0x0434: gSmPairingErrorInvalidParameters_c • 0x0435: gSmPairingErrorUnknownReason_c • 0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c • 0x0461: gSmTbInvalidDataSignature_c • 0x0501: gAttInvalidHandle_c • 0x0502: gAttReadNotPermitted_c • 0x0503: gAttWriteNotPermitted_c • 0x0504: gAttInvalidPdu_c • 0x0505: gAttInsufficientAuthentication_c • 0x0506: gAttRequestNotSupported_c • 0x0507: gAttInvalidOffset_c • 0x0508: gAttInsufficientAuthorization_c • 0x0509: gAttPrepareQueueFull_c • 0x050A: gAttAttributeNotFound_c • 0x050B: gAttAttributeNotLong_c |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|--|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x050C: gAttInsufficientEncryptionKeySize_c • 0x050D: gAttInvalidAttributeValueLength_c • 0x050E: gAttUnlikelyor_c • 0x050F: gAttInsufficientEncryption_c • 0x0510: gAttUnsupportedGroupType_c • 0x0511: gAttInsufficientResources_c • 0x0601: gGattAnotherProcedureInProgress_c • 0x0602: gGattLongAttributePacketsCorrupted_c • 0x0603: gGattMultipleAttributesOverflow_c • 0x0604: gGattUnexpectedReadMultipleResponseLength_c • 0x0605: gGattInvalidValueLength_c • 0x0606: gGattServerTimeout_c • 0x0607: gGattIndicationAlreadyInProgress_c • 0x0608: gGattClientConfirmationTimeout_c • 0x0701: gGapAdvDataTooLong_c • 0x0702: gGapScanRspDataTooLong_c • 0x0703: gGapDeviceNotBonded_c • 0x0704: gGapAnotherProcedureInProgress_c • 0x0801: gDevDbCccdLimitReached_c • 0x0802: gDevDbCccdNotFound_c • 0x0901: gGattDbInvalidHandle_c |

Table continues on the next page...

| <i>Table continued from the previous page...</i> | | |
|--|--------------|---|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0902: gGattDbCharacteristicNotFound_c • 0x0903: gGattDbCccdNotFound_c • 0x0904: gGattDbServiceNotFound_c • 0x0905: gGattDbDescriptorNotFound_c |
| NbOfDiscoveredServices | 1 | Number of discovered services |
| DiscoveredServices | Variable | Discovered services Structure type parameter. See the detailed table below for parameter structure. |

Table 79. DiscoveredServices Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|----------------------|--------------|--|
| StartHandle | 2 | The handle of the Service Declaration attribute |
| EndHandle | 2 | The last handle belonging to this Service (followed by another Service declaration of the end of the database) |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| NbOfCharacteristics | 1 | Size of the Characteristic array |
| Characteristics | Variable | Characteristic array Structure type parameter. See the detailed table below for parameter structure. |
| NbOfIncludedServices | 1 | Size of the Included Services array |

Table continues on the next page...

Table 79. DiscoveredServices Parameter Structure (continued)

| | | |
|------------------|----------|--|
| IncludedServices | Variable | Included Services array Structure type parameter. See the detailed table below for parameter structure. |
|------------------|----------|--|

Table 80. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

Table 81. Characteristics Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Properties | 1 | Characteristic Properties as defined by GATT Possible values: 0x00: gNone_c (No Properties selected) 0x01: gBroadcast_c (Characteristic can be broadcast) 0x02: gRead_c (Characteristic can be read) 0x04: gWriteWithoutRsp_c (Characteristic can be written without response) 0x08: gWrite_c (Characteristic can be written with response) 0x10: gNotify_c (Characteristic can be notified) 0x20: gIndicate_c (Characteristic can be indicated) 0x40: gAuthSignedWrites_c (Characteristic can be written with signed data) 0x80: gExtendedProperties_c (Extended Characteristic properties) |
| Value | Variable | Characteristic Value attribute Structure type parameter. See the detailed table below for parameter structure. |

Table continues on the next page...

Table 81. Characteristics Parameter Structure (continued)

| | | |
|-----------------|----------|---|
| NbOfDescriptors | 1 | Size of the Characteristic Descriptors array |
| Descriptors | Variable | Characteristic Descriptors array Structure type parameter. See the detailed table below for parameter structure. |

Table 82. IncludedServices Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|----------------------|--------------|--|
| StartHandle | 2 | The handle of the Service Declaration attribute |
| EndHandle | 2 | The last handle belonging to this Service (followed by another Service declaration of the end of the database) |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| NbOfCharacteristics | 1 | Size of the Characteristic array |
| NbOfIncludedServices | 1 | Size of the Included Services array |

Table 83. Value Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Handle | 2 | Attribute handle |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value |

Table continues on the next page...

Table 83. Value Parameter Structure (continued)

| | | |
|----------------|-------------|--|
| | | "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| ValueLength | 2 | Length of the attribute value array |
| MaxValueLength | 2 | Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed |
| Value | ValueLength | Attribute value array |

Table 84. Descriptors Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Handle | 2 | Attribute handle |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| ValueLength | 2 | Length of the attribute value array |
| MaxValueLength | 2 | Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed |
| Value | ValueLength | Attribute value array |

Table 85. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

Table 86. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

Table 87. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

3.2.15 GATTClient-ProcedureDiscoverCharacteristicByUuid.Indication

Description

Specifies that the Characteristic Discovery procedure for a given service (with a given UUID) ended.

Parameters

| Parameter | Size (bytes) | Comments |
|-----------------|--------------|---|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x83 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the active connection |
| ProcedureResult | 1 | The result of the completed procedure Possible values: 0x00: gGattProcSuccess_c (The procedure was completed successfully) 0x01: gProcedureError_c (The procedure was terminated due to an error) |
| Error | 2 | If procedureResult is not gSuccess_c, this contains the error that terminated the procedure. Possible values: <ul style="list-style-type: none"> 0x0000: gBleSuccess_c 0x0001: gBleInvalidParameter_c |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|--|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0002: gBleOverflow_c • 0x0003: gBleUnavailable_c • 0x0004: gBleFeatureNotSupported_c • 0x0005: gBleOutOfMemory_c • 0x0006: gBleAlreadyInitialized_c • 0x0007: gBleOsError_c • 0x0008: gBleUnexpectedError_c • 0x0009: gBleInvalidState_c • 0x0101: gHciUnknownHciCommand_c • 0x0102: gHciUnknownConnectionIdentifier_c • 0x0103: gHciHardwareFailure_c • 0x0104: gHciPageTimeout_c • 0x0105: gHciAuthenticationFailure_c • 0x0106: gHciPinOrKeyMissing_c • 0x0107: gHciMemoryCapacityExceeded_c • 0x0108: gHciConnectionTimeout_c • 0x0109: gHciConnectionLimitExceeded_c • 0x010A: gHciSynchronousConnectionLimitToADeviceExceeded_c • 0x010B: gHciAclConnectionAlreadyExists_c • 0x010C: gHciCommandDisallowed_c • 0x010D: gHciConnectionRejectedDueToLimitedResources_c • 0x010E: gHciConnectionRejectedDueToSecurityReasons_c |
| Table continues on the next page... | | |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c • 0x0110: gHciConnectionAcceptTimeoutExceeded_c • 0x0111: gHciUnsupportedFeatureOrParameterValue_c • 0x0112: gHciInvalidHciCommandParameters_c • 0x0113: gHciRemoteUserTerminatedConnection_c • 0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c • 0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c • 0x0116: gHciConnectionTerminatedByLocalHost_c • 0x0117: gHciRepeatedAttempts_c • 0x0118: gHciPairingNotAllowed_c • 0x0119: gHciUnknownLpmPdu_c • 0x011A: gHciUnsupportedRemoteFeature_c • 0x011B: gHciScoOffsetRejected_c • 0x011C: gHciScoIntervalRejected_c • 0x011D: gHciScoAirModeRejected_c • 0x011E: gHciInvalidLpmParameters_c • 0x011F: gHciUnspecifiedError_c • 0x0120: gHciUnsupportedLpmParameterValue_c |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|--|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0121: gHciRoleChangeNotAllowed_c • 0x0122: gHciLLResponseTimeout_c • 0x0123: gHciLmpErrorTransactionCollision_c • 0x0124: gHciLmpPduNotAllowed_c • 0x0125: gHciEncryptionModeNotAcceptable_c • 0x0126: gHciLinkKeyCannotBeChanged_c • 0x0127: gHciRequestedQosNotSupported_c • 0x0128: gHciInstantPassed_c • 0x0129: gHciPairingWithUnitKeyNotSupported_c • 0x012A: gHciDifferentTransactionCollision_c • 0x012B: gHciReserved_0x2B_c • 0x012C: gHciQosNotAcceptableParameter_c • 0x012D: gHciQosRejected_c • 0x012E: gHciChannelClassificationNotSupported_c • 0x012F: gHciInsufficientSecurity_c • 0x0130: gHciParameterOutOfMandatoryRange_c • 0x0131: gHciReserved_0x31_c • 0x0132: gHciRoleSwitchPending_c • 0x0133: gHciReserved_0x33_c • 0x0134: gHciReservedSlotViolation_c • 0x0135: gHciRoleSwitchFailed_c |
| Table continues on the next page... | | |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0136: gHciExtendedInquiryResponseTooLarge_c • 0x0137: gHciSecureSimplePairingNotSupportedByHost_c • 0x0138: gHciHostBusyPairing_c • 0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c • 0x013A: gHciControllerBusy_c • 0x013B: gHciUnacceptableConnectionParameters_c • 0x013C: gHciDirectedAdvertisingTimeout_c • 0x013D: gHciConnectionTerminatedDueToMicFailure_c • 0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c • 0x013F: gHciMacConnectionFailed_c • 0x0140: gHciCoarseClockAdjustmentRejected_c • 0x0141: gHciType0SubmapNotDefined_c • 0x0142: gHciUnknownAdvertisingIdentifier_c • 0x0143: gHciLimitReached_c • 0x0144: gHciOperationCancelledByHost_c • 0x01A0: gHciAlreadyInit_c • 0x01A1: gHciInvalidParameter_c • 0x01A2: gHciCallbackNotInstalled_c • 0x01A3: gHciCallbackAlreadyInstalled_c |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|--|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x01A4: gHciCommandNotSupported_c • 0x01A5: gHciEventNotSupported_c • 0x01A6: gHciTransportError_c • 0x03F0: gL2caAlreadyInit_c • 0x03F1: gL2caInsufficientResources_c • 0x03F2: gL2caCallbackNotInstalled_c • 0x03F3: gL2caCallbackAlreadyInstalled_c • 0x03F4: gL2caLePsmInvalid_c • 0x03F5: gL2caLePsmAlreadyRegistered_c • 0x03F6: gL2caLePsmNotRegistered_c • 0x03F7: gL2caLePsmInsufficientResources_c • 0x03F8: gL2caChannelInvalid_c • 0x03F9: gL2caChannelClosed_c • 0x03FA: gL2caChannelAlreadyConnected_c • 0x03FB: gL2caConnectionParametersRejected_c • 0x03FC: gL2caChannelBusy_c • 0x03FE: gL2caInvalidParameter_c • 0x03FF: gL2caError_c • 0x0401: gSmNullCBFunction_c • 0x0402: gSmCommandNotSupported_c • 0x0403: gSmUnexpectedCommand_c • 0x0404: gSmInvalidCommandCode_c • 0x0405: gSmInvalidCommandLength_c |
| Table continues on the next page... | | |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0406: gSmInvalidCommandParameter_c • 0x0407: gSmInvalidDeviceId_c • 0x0408: gSmInvalidInternalOperation_c • 0x0409: gSmInvalidConnectionHandle_c • 0x040A: gSmImproperKeyDistributionField_c • 0x040B: gSmUnexpectedKeyType_c • 0x040C: gSmUnexpectedPairingTerminationReason_c • 0x040D: gSmUnexpectedKeyset_c • 0x040E: gSmSmpTimeoutOccurred_c • 0x040F: gSmUnknownSmpPacketType_c • 0x0410: gSmInvalidSmpPacketLength_c • 0x0411: gSmInvalidSmpPacketParameter_c • 0x0412: gSmReceivedUnexpectedSmpPacket_c • 0x0413: gSmReceivedSmpPacketFromUnknownDevice_c • 0x0414: gSmReceivedUnexpectedHciEvent_c • 0x0415: gSmReceivedHciEventFromUnknownDevice_c • 0x0416: gSmInvalidHciEventParameter_c • 0x0417: gSmLlConnectionEncryptionInProgress_c |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|---|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0418: gSmLlConnectionEncryptionFailure_c • 0x0419: gSmInsufficientResources_c • 0x041A: gSmOobDataAddressMismatch_c • 0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c • 0x041C: gSmReceivedTimerEventForUnknownDevice_c • 0x041D: gSmUnattainableLocalDeviceSecRequirements_c • 0x041E: gSmUnattainableLocalDeviceMinKeySize_c • 0x041F: gSmUnattainableSlaveSecReqRequirements_c • 0x0431: gSmPairingErrorPasskeyEntryFailed_c • 0x0432: gSmPairingErrorConfirmValueFailed_c • 0x0433: gSmPairingErrorCommandNotSupported_c • 0x0434: gSmPairingErrorInvalidParameters_c • 0x0435: gSmPairingErrorUnknownReason_c • 0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c • 0x0461: gSmTbInvalidDataSignature_c |
| Table continues on the next page... | | |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0501: gAttInvalidHandle_c • 0x0502: gAttReadNotPermitted_c • 0x0503: gAttWriteNotPermitted_c • 0x0504: gAttInvalidPdu_c • 0x0505: gAttInsufficientAuthentication_c • 0x0506: gAttRequestNotSupported_c • 0x0507: gAttInvalidOffset_c • 0x0508: gAttInsufficientAuthorization_c • 0x0509: gAttPrepareQueueFull_c • 0x050A: gAttAttributeNotFound_c • 0x050B: gAttAttributeNotLong_c • 0x050C: gAttInsufficientEncryptionKeySize_c • 0x050D: gAttInvalidAttributeValueLength_c • 0x050E: gAttUnlikelyor_c • 0x050F: gAttInsufficientEncryption_c • 0x0510: gAttUnsupportedGroupType_c • 0x0511: gAttInsufficientResources_c • 0x0601: gGattAnotherProcedureInProgress_c • 0x0602: gGattLongAttributePacketsCorrupted_c • 0x0603: gGattMultipleAttributesOverflow_c • 0x0604: gGattUnexpectedReadMultipleResponseLength_c • 0x0605: gGattInvalidValueLength_c • 0x0606: gGattServerTimeout_c |

Table continues on the next page...

| <i>Table continued from the previous page...</i> | | |
|--|--------------|--|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0607: gGattIndicationAlreadyInProgress_c • 0x0608: gGattClientConfirmationTimeout_c • 0x0701: gGapAdvDataTooLong_c • 0x0702: gGapScanRspDataTooLong_c • 0x0703: gGapDeviceNotBonded_c • 0x0704: gGapAnotherProcedureInProgress_c • 0x0801: gDevDbCccdLimitReached_c • 0x0802: gDevDbCccdNotFound_c • 0x0901: gGattDbInvalidHandle_c • 0x0902: gGattDbCharacteristicNotFound_c • 0x0903: gGattDbCccdNotFound_c • 0x0904: gGattDbServiceNotFound_c • 0x0905: gGattDbDescriptorNotFound_c |
| NbOfDiscoveredServices | 1 | Number of discovered services |
| DiscoveredServices | Variable | Discovered services Structure type parameter. See the detailed table below for parameter structure. |

Table 88. Characteristic Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Properties | 1 | Characteristic Properties as defined by GATT Possible values: 0x00: gNone_c (No Properties selected) 0x01: gBroadcast_c (Characteristic can be broadcast) 0x02: gRead_c (Characteristic can be read) |

Table continues on the next page...

Table 88. Characteristic Parameter Structure (continued)

| | | |
|-----------------|----------|--|
| | | 0x04: gWriteWithoutRsp_c (Characteristic can be written without response) 0x08: gWrite_c (Characteristic can be written with response) 0x10: gNotify_c (Characteristic can be notified) 0x20: gIndicate_c (Characteristic can be indicated) 0x40: gAuthSignedWrites_c (Characteristic can be written with signed data) 0x80: gExtendedProperties_c (Extended Characteristic properties) |
| Value | Variable | Characteristic Value attribute Structure type parameter. See the detailed table below for parameter structure. |
| NbOfDescriptors | 1 | Size of the Characteristic Descriptors array |
| Descriptors | Variable | Characteristic Descriptors array Structure type parameter. See the detailed table below for parameter structure. |

Table 89. Value Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Handle | 2 | Attribute handle |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |

Table continues on the next page...

Table 89. Value Parameter Structure (continued)

| | | |
|----------------|-------------|--|
| ValueLength | 2 | Length of the attribute value array |
| MaxValueLength | 2 | Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed |
| Value | ValueLength | Attribute value array |

Table 90. Descriptors Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Handle | 2 | Attribute handle |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| ValueLength | 2 | Length of the attribute value array |
| MaxValueLength | 2 | Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed |
| Value | ValueLength | Attribute value array |

Table 91. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

Table 92. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

3.2.16 GATTClient- ProcedureDiscoverPrimaryServicesByUuid.Indication

Description

Specifies that the Primary Service Discovery by UUID procedure ended.

Parameters

| Parameter | Size (bytes) | Comments |
|-----------------|--------------|--|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x84 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the active connection |
| ProcedureResult | 1 | The result of the completed procedure Possible values: 0x00: gGattProcSuccess_c (The procedure was completed successfully) 0x01: gProcedureError_c (The procedure was terminated due to an error) |
| Error | 2 | If procedureResult is not gSuccess_c, this contains the error that terminated the procedure. Possible values: <ul style="list-style-type: none"> • 0x0000: gBleSuccess_c • 0x0001: gBleInvalidParameter_c • 0x0002: gBleOverflow_c • 0x0003: gBleUnavailable_c • 0x0004: gBleFeatureNotSupported_c • 0x0005: gBleOutOfMemory_c • 0x0006: gBleAlreadyInitialized_c • 0x0007: gBleOsError_c • 0x0008: gBleUnexpectedError_c • 0x0009: gBleInvalidState_c • 0x0101: gHciUnknownHciCommand_c |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|---|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0102: gHciUnknownConnectionIdentifier_c • 0x0103: gHciHardwareFailure_c • 0x0104: gHciPageTimeout_c • 0x0105: gHciAuthenticationFailure_c • 0x0106: gHciPinOrKeyMissing_c • 0x0107: gHciMemoryCapacityExceeded_c • 0x0108: gHciConnectionTimeout_c • 0x0109: gHciConnectionLimitExceeded_c • 0x010A: gHciSynchronousConnectionLimitToADeviceExceeded_c • 0x010B: gHciAclConnectionAlreadyExists_c • 0x010C: gHciCommandDisallowed_c • 0x010D: gHciConnectionRejectedDueToLimitedResources_c • 0x010E: gHciConnectionRejectedDueToSecurityReasons_c • 0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c • 0x0110: gHciConnectionAcceptTimeoutExceeded_c • 0x0111: gHciUnsupportedFeatureOrParameterValue_c • 0x0112: gHciInvalidHciCommandParameters_c • 0x0113: gHciRemoteUserTerminatedConnection_c |
| Table continues on the next page... | | |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c • 0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c • 0x0116: gHciConnectionTerminatedByLocalHost_c • 0x0117: gHciRepeatedAttempts_c • 0x0118: gHciPairingNotAllowed_c • 0x0119: gHciUnknownLpmPdu_c • 0x011A: gHciUnsupportedRemoteFeature_c • 0x011B: gHciScoOffsetRejected_c • 0x011C: gHciScoIntervalRejected_c • 0x011D: gHciScoAirModeRejected_c • 0x011E: gHciInvalidLpmParameters_c • 0x011F: gHciUnspecifiedError_c • 0x0120: gHciUnsupportedLpmParameterValue_c • 0x0121: gHciRoleChangeNotAllowed_c • 0x0122: gHciLLResponseTimeout_c • 0x0123: gHciLmpErrorTransactionCollision_c • 0x0124: gHciLmpPduNotAllowed_c • 0x0125: gHciEncryptionModeNotAcceptable_c • 0x0126: gHciLinkKeyCannotBeChanged_c • 0x0127: gHciRequestedQosNotSupported_c • 0x0128: gHciInstantPassed_c |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|---|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0129: gHciPairingWithUnitKeyNotSupported_c • 0x012A: gHciDifferentTransactionCollision_c • 0x012B: gHciReserved_0x2B_c • 0x012C: gHciQosNotAcceptableParameter_c • 0x012D: gHciQosRejected_c • 0x012E: gHciChannelClassificationNotSupported_c • 0x012F: gHciInsufficientSecurity_c • 0x0130: gHciParameterOutOfMandatoryRange_c • 0x0131: gHciReserved_0x31_c • 0x0132: gHciRoleSwitchPending_c • 0x0133: gHciReserved_0x33_c • 0x0134: gHciReservedSlotViolation_c • 0x0135: gHciRoleSwitchFailed_c • 0x0136: gHciExtendedInquiryResponseTooLarge_c • 0x0137: gHciSecureSimplePairingNotSupportedByHost_c • 0x0138: gHciHostBusyPairing_c • 0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c • 0x013A: gHciControllerBusy_c • 0x013B: gHciUnacceptableConnectionParameters_c • 0x013C: gHciDirectedAdvertisingTimeout_c |
| Table continues on the next page... | | |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x013D: gHciConnectionTerminatedDueToMicFailure_c • 0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c • 0x013F: gHciMacConnectionFailed_c • 0x0140: gHciCoarseClockAdjustmentRejected_c • 0x0141: gHciType0SubmapNotDefined_c • 0x0142: gHciUnknownAdvertisingIdentifier_c • 0x0143: gHciLimitReached_c • 0x0144: gHciOperationCancelledByHost_c • 0x01A0: gHciAlreadyInit_c • 0x01A1: gHciInvalidParameter_c • 0x01A2: gHciCallbackNotInstalled_c • 0x01A3: gHciCallbackAlreadyInstalled_c • 0x01A4: gHciCommandNotSupported_c • 0x01A5: gHciEventNotSupported_c • 0x01A6: gHciTransportError_c • 0x03F0: gL2caAlreadyInit_c • 0x03F1: gL2caInsufficientResources_c • 0x03F2: gL2caCallbackNotInstalled_c • 0x03F3: gL2caCallbackAlreadyInstalled_c • 0x03F4: gL2caLePsmInvalid_c • 0x03F5: gL2caLePsmAlreadyRegistered_c • 0x03F6: gL2caLePsmNotRegistered_c |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|--|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x03F7: gL2caLePsmInsufficientResources_c • 0x03F8: gL2caChannelInvalid_c • 0x03F9: gL2caChannelClosed_c • 0x03FA: gL2caChannelAlreadyConnected_c • 0x03FB: gL2caConnectionParametersRejected_c • 0x03FC: gL2caChannelBusy_c • 0x03FE: gL2caInvalidParameter_c • 0x03FF: gL2caError_c • 0x0401: gSmNullCBFunction_c • 0x0402: gSmCommandNotSupported_c • 0x0403: gSmUnexpectedCommand_c • 0x0404: gSmInvalidCommandCode_c • 0x0405: gSmInvalidCommandLength_c • 0x0406: gSmInvalidCommandParameter_c • 0x0407: gSmInvalidDeviceId_c • 0x0408: gSmInvalidInternalOperation_c • 0x0409: gSmInvalidConnectionHandle_c • 0x040A: gSmImproperKeyDistributionField_c • 0x040B: gSmUnexpectedKeyType_c • 0x040C: gSmUnexpectedPairingTerminationReason_c • 0x040D: gSmUnexpectedKeyset_c • 0x040E: gSmSmpTimeoutOccurred_c |
| Table continues on the next page... | | |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x040F: gSmUnknownSmpPacketType_c • 0x0410: gSmInvalidSmpPacketLength_c • 0x0411: gSmInvalidSmpPacketParameter_c • 0x0412: gSmReceivedUnexpectedSmpPacket_c • 0x0413: gSmReceivedSmpPacketFromUnknownDevice_c • 0x0414: gSmReceivedUnexpectedHciEvent_c • 0x0415: gSmReceivedHciEventFromUnknownDevice_c • 0x0416: gSmInvalidHciEventParameter_c • 0x0417: gSmLlConnectionEncryptionInProgress_c • 0x0418: gSmLlConnectionEncryptionFailure_c • 0x0419: gSmInsufficientResources_c • 0x041A: gSmOobDataAddressMismatch_c • 0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c • 0x041C: gSmReceivedTimerEventForUnknownDevice_c • 0x041D: gSmUnattainableLocalDeviceSecRequirements_c |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|--|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x041E: gSmUnattainableLocalDeviceMinKeySize_c • 0x041F: gSmUnattainableSlaveSecReqRequirements_c • 0x0431: gSmPairingErrorPasskeyEntryFailed_c • 0x0432: gSmPairingErrorConfirmValueFailed_c • 0x0433: gSmPairingErrorCommandNotSupported_c • 0x0434: gSmPairingErrorInvalidParameters_c • 0x0435: gSmPairingErrorUnknownReason_c • 0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c • 0x0461: gSmTbInvalidDataSignature_c • 0x0501: gAttInvalidHandle_c • 0x0502: gAttReadNotPermitted_c • 0x0503: gAttWriteNotPermitted_c • 0x0504: gAttInvalidPdu_c • 0x0505: gAttInsufficientAuthentication_c • 0x0506: gAttRequestNotSupported_c • 0x0507: gAttInvalidOffset_c • 0x0508: gAttInsufficientAuthorization_c • 0x0509: gAttPrepareQueueFull_c • 0x050A: gAttAttributeNotFound_c • 0x050B: gAttAttributeNotLong_c |
| Table continues on the next page... | | |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x050C: gAttInsufficientEncryptionKeySize_c • 0x050D: gAttInvalidAttributeValueLength_c • 0x050E: gAttUnlikelyor_c • 0x050F: gAttInsufficientEncryption_c • 0x0510: gAttUnsupportedGroupType_c • 0x0511: gAttInsufficientResources_c • 0x0601: gGattAnotherProcedureInProgress_c • 0x0602: gGattLongAttributePacketsCorrupted_c • 0x0603: gGattMultipleAttributesOverflow_c • 0x0604: gGattUnexpectedReadMultipleResponseLength_c • 0x0605: gGattInvalidValueLength_c • 0x0606: gGattServerTimeout_c • 0x0607: gGattIndicationAlreadyInProgress_c • 0x0608: gGattClientConfirmationTimeout_c • 0x0701: gGapAdvDataTooLong_c • 0x0702: gGapScanRspDataTooLong_c • 0x0703: gGapDeviceNotBonded_c • 0x0704: gGapAnotherProcedureInProgress_c • 0x0801: gDevDbCccdLimitReached_c • 0x0802: gDevDbCccdNotFound_c • 0x0901: gGattDbInvalidHandle_c |

Table continues on the next page...

| <i>Table continued from the previous page...</i> | | |
|--|--------------|---|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0902: gGattDbCharacteristicNotFound_c • 0x0903: gGattDbCccdNotFound_c • 0x0904: gGattDbServiceNotFound_c • 0x0905: gGattDbDescriptorNotFound_c |
| NbOfDiscoveredServices | 1 | Number of discovered services |
| DiscoveredServices | Variable | Discovered services Structure type parameter. See the detailed table below for parameter structure. |

Table 93. DiscoveredServices Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|----------------------|--------------|--|
| StartHandle | 2 | The handle of the Service Declaration attribute |
| EndHandle | 2 | The last handle belonging to this Service (followed by another Service declaration of the end of the database) |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| NbOfCharacteristics | 1 | Size of the Characteristic array |
| Characteristics | Variable | Characteristic array Structure type parameter. See the detailed table below for parameter structure. |
| NbOfIncludedServices | 1 | Size of the Included Services array |

Table continues on the next page...

Table 93. DiscoveredServices Parameter Structure (continued)

| | | |
|------------------|----------|--|
| IncludedServices | Variable | Included Services array Structure type parameter. See the detailed table below for parameter structure. |
|------------------|----------|--|

Table 94. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

Table 95. Characteristics Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Properties | 1 | Characteristic Properties as defined by GATT Possible values: 0x00: gNone_c (No Properties selected) 0x01: gBroadcast_c (Characteristic can be broadcast) 0x02: gRead_c (Characteristic can be read) 0x04: gWriteWithoutRsp_c (Characteristic can be written without response) 0x08: gWrite_c (Characteristic can be written with response) 0x10: gNotify_c (Characteristic can be notified) 0x20: gIndicate_c (Characteristic can be indicated) 0x40: gAuthSignedWrites_c (Characteristic can be written with signed data) 0x80: gExtendedProperties_c (Extended Characteristic properties) |
| Value | Variable | Characteristic Value attribute Structure type parameter. See the detailed table below for parameter structure. |

Table continues on the next page...

Table 95. Characteristics Parameter Structure (continued)

| | | |
|-----------------|----------|---|
| NbOfDescriptors | 1 | Size of the Characteristic Descriptors array |
| Descriptors | Variable | Characteristic Descriptors array Structure type parameter. See the detailed table below for parameter structure. |

Table 96. IncludedServices Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|----------------------|--------------|--|
| StartHandle | 2 | The handle of the Service Declaration attribute |
| EndHandle | 2 | The last handle belonging to this Service (followed by another Service declaration of the end of the database) |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| NbOfCharacteristics | 1 | Size of the Characteristic array |
| NbOfIncludedServices | 1 | Size of the Included Services array |

Table 97. Value Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Handle | 2 | Attribute handle |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value |

Table continues on the next page...

Table 97. Value Parameter Structure (continued)

| | | |
|----------------|-------------|--|
| | | "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| ValueLength | 2 | Length of the attribute value array |
| MaxValueLength | 2 | Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed |
| Value | ValueLength | Attribute value array |

Table 98. Descriptors Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Handle | 2 | Attribute handle |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| ValueLength | 2 | Length of the attribute value array |
| MaxValueLength | 2 | Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed |
| Value | ValueLength | Attribute value array |

Table 99. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

Table 100. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

Table 101. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

3.2.17 GATTClient-ProcedureExchangeMtu.Indication

Description

Specifies that the MTU exchange period ended.

Parameters

| Parameter | Size (bytes) | Comments |
|-----------------|--------------|---|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x85 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the active connection |
| ProcedureResult | 1 | The result of the completed procedure Possible values: 0x00: gGattProcSuccess_c (The procedure was completed successfully) 0x01: gProcedureError_c (The procedure was terminated due to an error) |
| Error | 2 | If procedureResult is not gSuccess_c, this contains the error that terminated the procedure. Possible values: <ul style="list-style-type: none"> 0x0000: gBleSuccess_c 0x0001: gBleInvalidParameter_c |

Table continues on the next page...

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0002: gBleOverflow_c • 0x0003: gBleUnavailable_c • 0x0004: gBleFeatureNotSupported_c • 0x0005: gBleOutOfMemory_c • 0x0006: gBleAlreadyInitialized_c • 0x0007: gBleOsError_c • 0x0008: gBleUnexpectedError_c • 0x0009: gBleInvalidState_c • 0x0101: gHciUnknownHciCommand_c • 0x0102: gHciUnknownConnectionIdentifier_c • 0x0103: gHciHardwareFailure_c • 0x0104: gHciPageTimeout_c • 0x0105: gHciAuthenticationFailure_c • 0x0106: gHciPinOrKeyMissing_c • 0x0107: gHciMemoryCapacityExceeded_c • 0x0108: gHciConnectionTimeout_c • 0x0109: gHciConnectionLimitExceeded_c • 0x010A: gHciSynchronousConnectionLimitToADeviceExceeded_c • 0x010B: gHciAclConnectionAlreadyExists_c • 0x010C: gHciCommandDisallowed_c • 0x010D: gHciConnectionRejectedDueToLimitedResources_c • 0x010E: gHciConnectionRejectedDueToSecurityReasons_c |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|--|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c • 0x0110: gHciConnectionAcceptTimeoutExceeded_c • 0x0111: gHciUnsupportedFeatureOrParameterValue_c • 0x0112: gHciInvalidHciCommandParameters_c • 0x0113: gHciRemoteUserTerminatedConnection_c • 0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c • 0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c • 0x0116: gHciConnectionTerminatedByLocalHost_c • 0x0117: gHciRepeatedAttempts_c • 0x0118: gHciPairingNotAllowed_c • 0x0119: gHciUnknownLpmPdu_c • 0x011A: gHciUnsupportedRemoteFeature_c • 0x011B: gHciScoOffsetRejected_c • 0x011C: gHciScoIntervalRejected_c • 0x011D: gHciScoAirModeRejected_c • 0x011E: gHciInvalidLpmParameters_c • 0x011F: gHciUnspecifiedError_c • 0x0120: gHciUnsupportedLpmParameterValue_c |
| Table continues on the next page... | | |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0121: gHciRoleChangeNotAllowed_c • 0x0122: gHciLLResponseTimeout_c • 0x0123: gHciLmpErrorTransactionCollision_c • 0x0124: gHciLmpPduNotAllowed_c • 0x0125: gHciEncryptionModeNotAcceptable_c • 0x0126: gHciLinkKeyCannotBeChanged_c • 0x0127: gHciRequestedQosNotSupported_c • 0x0128: gHciInstantPassed_c • 0x0129: gHciPairingWithUnitKeyNotSupported_c • 0x012A: gHciDifferentTransactionCollision_c • 0x012B: gHciReserved_0x2B_c • 0x012C: gHciQosNotAcceptableParameter_c • 0x012D: gHciQosRejected_c • 0x012E: gHciChannelClassificationNotSupported_c • 0x012F: gHciInsufficientSecurity_c • 0x0130: gHciParameterOutOfMandatoryRange_c • 0x0131: gHciReserved_0x31_c • 0x0132: gHciRoleSwitchPending_c • 0x0133: gHciReserved_0x33_c • 0x0134: gHciReservedSlotViolation_c • 0x0135: gHciRoleSwitchFailed_c |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|---|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0136: gHciExtendedInquiryResponseTooLarge_c • 0x0137: gHciSecureSimplePairingNotSupportedByHost_c • 0x0138: gHciHostBusyPairing_c • 0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c • 0x013A: gHciControllerBusy_c • 0x013B: gHciUnacceptableConnectionParameters_c • 0x013C: gHciDirectedAdvertisingTimeout_c • 0x013D: gHciConnectionTerminatedDueToMicFailure_c • 0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c • 0x013F: gHciMacConnectionFailed_c • 0x0140: gHciCoarseClockAdjustmentRejected_c • 0x0141: gHciType0SubmapNotDefined_c • 0x0142: gHciUnknownAdvertisingIdentifier_c • 0x0143: gHciLimitReached_c • 0x0144: gHciOperationCancelledByHost_c • 0x01A0: gHciAlreadyInit_c • 0x01A1: gHciInvalidParameter_c • 0x01A2: gHciCallbackNotInstalled_c • 0x01A3: gHciCallbackAlreadyInstalled_c |
| Table continues on the next page... | | |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x01A4: gHciCommandNotSupported_c • 0x01A5: gHciEventNotSupported_c • 0x01A6: gHciTransportError_c • 0x03F0: gL2caAlreadyInit_c • 0x03F1: gL2caInsufficientResources_c • 0x03F2: gL2caCallbackNotInstalled_c • 0x03F3: gL2caCallbackAlreadyInstalled_c • 0x03F4: gL2caLePsmInvalid_c • 0x03F5: gL2caLePsmAlreadyRegistered_c • 0x03F6: gL2caLePsmNotRegistered_c • 0x03F7: gL2caLePsmInsufficientResources_c • 0x03F8: gL2caChannelInvalid_c • 0x03F9: gL2caChannelClosed_c • 0x03FA: gL2caChannelAlreadyConnected_c • 0x03FB: gL2caConnectionParametersRejected_c • 0x03FC: gL2caChannelBusy_c • 0x03FE: gL2caInvalidParameter_c • 0x03FF: gL2caError_c • 0x0401: gSmNullCBFunction_c • 0x0402: gSmCommandNotSupported_c • 0x0403: gSmUnexpectedCommand_c • 0x0404: gSmInvalidCommandCode_c • 0x0405: gSmInvalidCommandLength_c |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|---|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0406: gSmInvalidCommandParameter_c • 0x0407: gSmInvalidDeviceId_c • 0x0408: gSmInvalidInternalOperation_c • 0x0409: gSmInvalidConnectionHandle_c • 0x040A: gSmImproperKeyDistributionField_c • 0x040B: gSmUnexpectedKeyType_c • 0x040C: gSmUnexpectedPairingTerminationReason_c • 0x040D: gSmUnexpectedKeyset_c • 0x040E: gSmSmpTimeoutOccurred_c • 0x040F: gSmUnknownSmpPacketType_c • 0x0410: gSmInvalidSmpPacketLength_c • 0x0411: gSmInvalidSmpPacketParameter_c • 0x0412: gSmReceivedUnexpectedSmpPacket_c • 0x0413: gSmReceivedSmpPacketFromUnknownDevice_c • 0x0414: gSmReceivedUnexpectedHciEvent_c • 0x0415: gSmReceivedHciEventFromUnknownDevice_c • 0x0416: gSmInvalidHciEventParameter_c • 0x0417: gSmLlConnectionEncryptionInProgress_c |
| Table continues on the next page... | | |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0418: gSmLlConnectionEncryptionFailure_c • 0x0419: gSmInsufficientResources_c • 0x041A: gSmOobDataAddressMismatch_c • 0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c • 0x041C: gSmReceivedTimerEventForUnknownDevice_c • 0x041D: gSmUnattainableLocalDeviceSecRequirements_c • 0x041E: gSmUnattainableLocalDeviceMinKeySize_c • 0x041F: gSmUnattainableSlaveSecReqRequirements_c • 0x0431: gSmPairingErrorPasskeyEntryFailed_c • 0x0432: gSmPairingErrorConfirmValueFailed_c • 0x0433: gSmPairingErrorCommandNotSupported_c • 0x0434: gSmPairingErrorInvalidParameters_c • 0x0435: gSmPairingErrorUnknownReason_c • 0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c • 0x0461: gSmTbInvalidDataSignature_c |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|---|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0501: gAttInvalidHandle_c • 0x0502: gAttReadNotPermitted_c • 0x0503: gAttWriteNotPermitted_c • 0x0504: gAttInvalidPdu_c • 0x0505: gAttInsufficientAuthentication_c • 0x0506: gAttRequestNotSupported_c • 0x0507: gAttInvalidOffset_c • 0x0508: gAttInsufficientAuthorization_c • 0x0509: gAttPrepareQueueFull_c • 0x050A: gAttAttributeNotFound_c • 0x050B: gAttAttributeNotLong_c • 0x050C: gAttInsufficientEncryptionKeySize_c • 0x050D: gAttInvalidAttributeValueLength_c • 0x050E: gAttUnlikelyor_c • 0x050F: gAttInsufficientEncryption_c • 0x0510: gAttUnsupportedGroupType_c • 0x0511: gAttInsufficientResources_c • 0x0601: gGattAnotherProcedureInProgress_c • 0x0602: gGattLongAttributePacketsCorrupted_c • 0x0603: gGattMultipleAttributesOverflow_c • 0x0604: gGattUnexpectedReadMultipleResponseLength_c • 0x0605: gGattInvalidValueLength_c • 0x0606: gGattServerTimeout_c |

Table continues on the next page...

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|------------------------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0607: gGattIndicationAlreadyInProgress_c • 0x0608: gGattClientConfirmationTimeout_c • 0x0701: gGapAdvDataTooLong_c • 0x0702: gGapScanRspDataTooLong_c • 0x0703: gGapDeviceNotBonded_c • 0x0704: gGapAnotherProcedureInProgress_c • 0x0801: gDevDbCccdLimitReached_c • 0x0802: gDevDbCccdNotFound_c • 0x0901: gGattDbInvalidHandle_c • 0x0902: gGattDbCharacteristicNotFound_c • 0x0903: gGattDbCccdNotFound_c • 0x0904: gGattDbServiceNotFound_c • 0x0905: gGattDbDescriptorNotFound_c |
| NbOfDiscoveredServices | 1 | Number of discovered services |
| DiscoveredServices | Variable | Discovered services Structure type parameter. See the detailed table below for parameter structure. |

3.2.18 GATTClient-ProcedureFindIncludedServices.Indication

Description

Specifies that the Find Included Services procedure ended.

Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|----------|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x85 |

Table continues on the next page...

| <i>Table continued from the previous page...</i> | | |
|--|--------------|---|
| Parameter | Size (bytes) | Comments |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the active connection |
| ProcedureResult | 1 | <p>The result of the completed procedure</p> <p>Possible values:</p> <p>0x00: gGattProcSuccess_c (The procedure was completed successfully)</p> <p>0x01: gProcedureError_c (The procedure was terminated due to an error)</p> |
| Error | 2 | <p>If procedureResult is not gSuccess_c, this contains the error that terminated the procedure</p> <p>Possible values:</p> <ul style="list-style-type: none"> • 0x0000: gBleSuccess_c • 0x0001: gBleInvalidParameter_c • 0x0002: gBleOverflow_c • 0x0003: gBleUnavailable_c • 0x0004: gBleFeatureNotSupported_c • 0x0005: gBleOutOfMemory_c • 0x0006: gBleAlreadyInitialized_c • 0x0007: gBleOsError_c • 0x0008: gBleUnexpectedError_c • 0x0009: gBleInvalidState_c • 0x0101: gHciUnknownHciCommand_c • 0x0102: gHciUnknownConnectionIdentifier_c • 0x0103: gHciHardwareFailure_c • 0x0104: gHciPageTimeout_c • 0x0105: gHciAuthenticationFailure_c • 0x0106: gHciPinOrKeyMissing_c |

Table continues on the next page...

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0107: gHciMemoryCapacityExceeded_c • 0x0108: gHciConnectionTimeout_c • 0x0109: gHciConnectionLimitExceeded_c • 0x010A: gHciSynchronousConnectionLimitToADeviceExceeded_c • 0x010B: gHciAclConnectionAlreadyExists_c • 0x010C: gHciCommandDisallowed_c • 0x010D: gHciConnectionRejectedDueToLimitedResources_c • 0x010E: gHciConnectionRejectedDueToSecurityReasons_c • 0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c • 0x0110: gHciConnectionAcceptTimeoutExceeded_c • 0x0111: gHciUnsupportedFeatureOrParameterValue_c • 0x0112: gHciInvalidHciCommandParameters_c • 0x0113: gHciRemoteUserTerminatedConnection_c • 0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c • 0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|---|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0116: gHciConnectionTerminatedByLocalHost_c • 0x0117: gHciRepeatedAttempts_c • 0x0118: gHciPairingNotAllowed_c • 0x0119: gHciUnknownLpmPdu_c • 0x011A: gHciUnsupportedRemoteFeature_c • 0x011B: gHciScoOffsetRejected_c • 0x011C: gHciScoIntervalRejected_c • 0x011D: gHciScoAirModeRejected_c • 0x011E: gHciInvalidLpmParameters_c • 0x011F: gHciUnspecifiedError_c • 0x0120: gHciUnsupportedLpmParameterValue_c • 0x0121: gHciRoleChangeNotAllowed_c • 0x0122: gHciLLResponseTimeout_c • 0x0123: gHciLmpErrorTransactionCollision_c • 0x0124: gHciLmpPduNotAllowed_c • 0x0125: gHciEncryptionModeNotAcceptable_c • 0x0126: gHciLinkKeyCannotBeChanged_c • 0x0127: gHciRequestedQosNotSupported_c • 0x0128: gHciInstantPassed_c • 0x0129: gHciPairingWithUnitKeyNotSupported_c • 0x012A: gHciDifferentTransactionCollision_c |

Table continues on the next page...

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x012B: gHciReserved_0x2B_c • 0x012C: gHciQosNotAcceptableParameter_c • 0x012D: gHciQosRejected_c • 0x012E: gHciChannelClassificationNotSupported_c • 0x012F: gHciInsufficientSecurity_c • 0x0130: gHciParameterOutOfMandatoryRange_c • 0x0131: gHciReserved_0x31_c • 0x0132: gHciRoleSwitchPending_c • 0x0133: gHciReserved_0x33_c • 0x0134: gHciReservedSlotViolation_c • 0x0135: gHciRoleSwitchFailed_c • 0x0136: gHciExtendedInquiryResponseTooLarge_c • 0x0137: gHciSecureSimplePairingNotSupportedByHost_c • 0x0138: gHciHostBusyPairing_c • 0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c • 0x013A: gHciControllerBusy_c • 0x013B: gHciUnacceptableConnectionParameters_c • 0x013C: gHciDirectedAdvertisingTimeout_c • 0x013D: gHciConnectionTerminatedDueToMicFailure_c • 0x013E: gHciConnectionFailedToBeEstablished_c |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|--|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c • 0x013F: gHciMacConnectionFailed_c • 0x0140: gHciCoarseClockAdjustmentRejected_c • 0x0141: gHciType0SubmapNotDefined_c • 0x0142: gHciUnknownAdvertisingIdentifier_c • 0x0143: gHciLimitReached_c • 0x0144: gHciOperationCancelledByHost_c • 0x01A0: gHciAlreadyInit_c • 0x01A1: gHciInvalidParameter_c • 0x01A2: gHciCallbackNotInstalled_c • 0x01A3: gHciCallbackAlreadyInstalled_c • 0x01A4: gHciCommandNotSupported_c • 0x01A5: gHciEventNotSupported_c • 0x01A6: gHciTransportError_c • 0x03F0: gL2caAlreadyInit_c • 0x03F1: gL2caInsufficientResources_c • 0x03F2: gL2caCallbackNotInstalled_c • 0x03F3: gL2caCallbackAlreadyInstalled_c • 0x03F4: gL2caLePsmInvalid_c • 0x03F5: gL2caLePsmAlreadyRegistered_c • 0x03F6: gL2caLePsmNotRegistered_c • 0x03F7: gL2caLePsmInsufficientResources_c |
| Table continues on the next page... | | |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x03F8: gL2caChannelInvalid_c • 0x03F9: gL2caChannelClosed_c • 0x03FA: gL2caChannelAlreadyConnected_c • 0x03FB: gL2caConnectionParametersRejected_c • 0x03FC: gL2caChannelBusy_c • 0x03FE: gL2caInvalidParameter_c • 0x03FF: gL2caError_c • 0x0401: gSmNullCBFunction_c • 0x0402: gSmCommandNotSupported_c • 0x0403: gSmUnexpectedCommand_c • 0x0404: gSmInvalidCommandCode_c • 0x0405: gSmInvalidCommandLength_c • 0x0406: gSmInvalidCommandParameter_c • 0x0407: gSmInvalidDeviceId_c • 0x0408: gSmInvalidInternalOperation_c • 0x0409: gSmInvalidConnectionHandle_c • 0x040A: gSmImproperKeyDistributionField_c • 0x040B: gSmUnexpectedKeyType_c • 0x040C: gSmUnexpectedPairingTerminationReason_c • 0x040D: gSmUnexpectedKeyset_c • 0x040E: gSmSmpTimeoutOccurred_c • 0x040F: gSmUnknownSmpPacketType_c |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|--|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0410: gSmInvalidSmpPacketLength_c • 0x0411: gSmInvalidSmpPacketParameter_c • 0x0412: gSmReceivedUnexpectedSmpPacket_c • 0x0413: gSmReceivedSmpPacketFromUnknownDevice_c • 0x0414: gSmReceivedUnexpectedHciEvent_c • 0x0415: gSmReceivedHciEventFromUnknownDevice_c • 0x0416: gSmInvalidHciEventParameter_c • 0x0417: gSmLlConnectionEncryptionInProgress_c • 0x0418: gSmLlConnectionEncryptionFailure_c • 0x0419: gSmInsufficientResources_c • 0x041A: gSmOobDataAddressMismatch_c • 0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c • 0x041C: gSmReceivedTimerEventForUnknownDevice_c • 0x041D: gSmUnattainableLocalDeviceSecRequirements_c • 0x041E: gSmUnattainableLocalDeviceMinKeySize_c |
| Table continues on the next page... | | |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x041F: gSmUnattainableSlaveSecReqRequirements_c • 0x0431: gSmPairingErrorPasskeyEntryFailed_c • 0x0432: gSmPairingErrorConfirmValueFailed_c • 0x0433: gSmPairingErrorCommandNotSupported_c • 0x0434: gSmPairingErrorInvalidParameters_c • 0x0435: gSmPairingErrorUnknownReason_c • 0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c • 0x0461: gSmTbInvalidDataSignature_c • 0x0501: gAttInvalidHandle_c • 0x0502: gAttReadNotPermitted_c • 0x0503: gAttWriteNotPermitted_c • 0x0504: gAttInvalidPdu_c • 0x0505: gAttInsufficientAuthentication_c • 0x0506: gAttRequestNotSupported_c • 0x0507: gAttInvalidOffset_c • 0x0508: gAttInsufficientAuthorization_c • 0x0509: gAttPrepareQueueFull_c • 0x050A: gAttAttributeNotFound_c • 0x050B: gAttAttributeNotLong_c • 0x050C: gAttInsufficientEncryptionKeySize_c |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|--|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x050D: gAttInvalidAttributeValueLength_c • 0x050E: gAttUnlikelyor_c • 0x050F: gAttInsufficientEncryption_c • 0x0510: gAttUnsupportedGroupType_c • 0x0511: gAttInsufficientResources_c • 0x0601: gGattAnotherProcedureInProgress_c • 0x0602: gGattLongAttributePacketsCorrupted_c • 0x0603: gGattMultipleAttributesOverflow_c • 0x0604: gGattUnexpectedReadMultipleResponseLength_c • 0x0605: gGattInvalidValueLength_c • 0x0606: gGattServerTimeout_c • 0x0607: gGattIndicationAlreadyInProgress_c • 0x0608: gGattClientConfirmationTimeout_c • 0x0701: gGapAdvDataTooLong_c • 0x0702: gGapScanRspDataTooLong_c • 0x0703: gGapDeviceNotBonded_c • 0x0704: gGapAnotherProcedureInProgress_c • 0x0801: gDevDbCccdLimitReached_c • 0x0802: gDevDbCccdNotFound_c • 0x0901: gGattDbInvalidHandle_c • 0x0902: gGattDbCharacteristicNotFound_c |
| Table continues on the next page... | | |

| <i>Table continued from the previous page...</i> | | |
|--|--------------|--|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0903: gGattDbCccdNotFound_c • 0x0904: gGattDbServiceNotFound_c • 0x0905: gGattDbDescriptorNotFound_c |
| Service | Variable | <p>The service within which inclusions were searched</p> <p>Structure type parameter. See the detailed table below for parameter structure.</p> |

Table 102. Service Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|----------------------|--------------|---|
| StartHandle | 2 | The handle of the Service Declaration attribute |
| EndHandle | 2 | The last handle belonging to this Service (followed by another Service declaration of the end of the database) |
| UuidType | 1 | <p>UUID type</p> <p>Possible values:</p> <p>0x01: Uuid16Bits</p> <p>0x02: Uuid128Bits</p> <p>0x03: Uuid32Bits</p> |
| Uuid | Variable | <p>UUID value</p> <p>"Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.</p> |
| NbOfCharacteristics | 1 | Size of the Characteristic array |
| Characteristics | Variable | <p>Characteristic array</p> <p>Structure type parameter. See the detailed table below for parameter structure.</p> |
| NbOfIncludedServices | 1 | Size of the Included Services array |
| IncludedServices | Variable | Included Services array |

Table 102. Service Parameter Structure (continued)

| | | |
|--|--|---|
| | | Structure type parameter. See the detailed table below for parameter structure. |
|--|--|---|

Table 103. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

Table 104. Characteristics Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|---|
| Properties | 1 | <p>Characteristic Properties as defined by GATT</p> <p>Possible values:</p> <p>0x00: gNone_c (No Properties selected)</p> <p>0x01: gBroadcast_c (Characteristic can be broadcast)</p> <p>0x02: gRead_c (Characteristic can be read)</p> <p>0x04: gWriteWithoutRsp_c (Characteristic can be written without response)</p> <p>0x08: gWrite_c (Characteristic can be written with response)</p> <p>0x10: gNotify_c (Characteristic can be notified)</p> <p>0x20: gIndicate_c (Characteristic can be indicated)</p> <p>0x40: gAuthSignedWrites_c (Characteristic can be written with signed data)</p> <p>0x80: gExtendedProperties_c (Extended Characteristic properties)</p> |
| Value | Variable | <p>Characteristic Value attribute</p> <p>Structure type parameter. See the detailed table below for parameter structure.</p> |

Table continues on the next page...

Table 104. Characteristics Parameter Structure (continued)

| | | |
|-----------------|----------|---|
| NbOfDescriptors | 1 | Size of the Characteristic Descriptors array |
| Descriptors | Variable | Characteristic Descriptors array Structure type parameter. See the detailed table below for parameter structure. |

Table 105. IncludedServices Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|----------------------|--------------|--|
| StartHandle | 2 | The handle of the Service Declaration attribute |
| EndHandle | 2 | The last handle belonging to this Service (followed by another Service declaration of the end of the database) |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| NbOfCharacteristics | 1 | Size of the Characteristic array |
| NbOfIncludedServices | 1 | Size of the Included Services array |

Table 106. Value Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Handle | 2 | Attribute handle |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value |

Table continues on the next page...

Table 106. Value Parameter Structure (continued)

| | | |
|----------------|-------------|--|
| | | "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| ValueLength | 2 | Length of the attribute value array |
| MaxValueLength | 2 | Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed |
| Value | ValueLength | Attribute value array |

Table 107. Descriptors Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Handle | 2 | Attribute handle |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| ValueLength | 2 | Length of the attribute value array |
| MaxValueLength | 2 | Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed |
| Value | ValueLength | Attribute value array |

Table 108. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

Table 109. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

Table 110. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

3.2.19 GATTClient-ProcedureReadCharacteristicDescriptor.Indication

Description

Specifies that the Characteristic Descriptor Read procedure for a given characteristic's descriptor ended.

Parameters

| Parameter | Size (bytes) | Comments |
|-----------------|--------------|--|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x8D |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the active connection |
| ProcedureResult | 1 | The result of the completed procedure Possible values: 0x00: gGattProcSuccess_c (The procedure was completed successfully) 0x01: gProcedureError_c (The procedure was terminated due to an error) |
| Error | 2 | If procedureResult is not gSuccess_c, this contains the error that terminated the procedure Possible values: 0x0000: gBleSuccess_c • 0x0001: gBleInvalidParameter_c |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|--|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0002: gBleOverflow_c • 0x0003: gBleUnavailable_c • 0x0004: gBleFeatureNotSupported_c • 0x0005: gBleOutOfMemory_c • 0x0006: gBleAlreadyInitialized_c • 0x0007: gBleOsError_c • 0x0008: gBleUnexpectedError_c • 0x0009: gBleInvalidState_c • 0x0101: gHciUnknownHciCommand_c • 0x0102: gHciUnknownConnectionIdentifier_c • 0x0103: gHciHardwareFailure_c • 0x0104: gHciPageTimeout_c • 0x0105: gHciAuthenticationFailure_c • 0x0106: gHciPinOrKeyMissing_c • 0x0107: gHciMemoryCapacityExceeded_c • 0x0108: gHciConnectionTimeout_c • 0x0109: gHciConnectionLimitExceeded_c • 0x010A: gHciSynchronousConnectionLimitToADeviceExceeded_c • 0x010B: gHciAclConnectionAlreadyExists_c • 0x010C: gHciCommandDisallowed_c • 0x010D: gHciConnectionRejectedDueToLimitedResources_c • 0x010E: gHciConnectionRejectedDueToSecurityReasons_c |
| Table continues on the next page... | | |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c • 0x0110: gHciConnectionAcceptTimeoutExceeded_c • 0x0111: gHciUnsupportedFeatureOrParameterValue_c • 0x0112: gHciInvalidHciCommandParameters_c • 0x0113: gHciRemoteUserTerminatedConnection_c • 0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c • 0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c • 0x0116: gHciConnectionTerminatedByLocalHost_c • 0x0117: gHciRepeatedAttempts_c • 0x0118: gHciPairingNotAllowed_c • 0x0119: gHciUnknownLpmPdu_c • 0x011A: gHciUnsupportedRemoteFeature_c • 0x011B: gHciScoOffsetRejected_c • 0x011C: gHciScoIntervalRejected_c • 0x011D: gHciScoAirModeRejected_c • 0x011E: gHciInvalidLpmParameters_c • 0x011F: gHciUnspecifiedError_c • 0x0120: gHciUnsupportedLpmParameterValue_c |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|--|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0121: gHciRoleChangeNotAllowed_c • 0x0122: gHciLLResponseTimeout_c • 0x0123: gHciLmpErrorTransactionCollision_c • 0x0124: gHciLmpPduNotAllowed_c • 0x0125: gHciEncryptionModeNotAcceptable_c • 0x0126: gHciLinkKeyCannotBeChanged_c • 0x0127: gHciRequestedQosNotSupported_c • 0x0128: gHciInstantPassed_c • 0x0129: gHciPairingWithUnitKeyNotSupported_c • 0x012A: gHciDifferentTransactionCollision_c • 0x012B: gHciReserved_0x2B_c • 0x012C: gHciQosNotAcceptableParameter_c • 0x012D: gHciQosRejected_c • 0x012E: gHciChannelClassificationNotSupported_c • 0x012F: gHciInsufficientSecurity_c • 0x0130: gHciParameterOutOfMandatoryRange_c • 0x0131: gHciReserved_0x31_c • 0x0132: gHciRoleSwitchPending_c • 0x0133: gHciReserved_0x33_c • 0x0134: gHciReservedSlotViolation_c • 0x0135: gHciRoleSwitchFailed_c |

Table continues on the next page...

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0136: gHciExtendedInquiryResponseTooLarge_c • 0x0137: gHciSecureSimplePairingNotSupportedByHost_c • 0x0138: gHciHostBusyPairing_c • 0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c • 0x013A: gHciControllerBusy_c • 0x013B: gHciUnacceptableConnectionParameters_c • 0x013C: gHciDirectedAdvertisingTimeout_c • 0x013D: gHciConnectionTerminatedDueToMicFailure_c • 0x013E: gHciConnectionFailedToBeEstablished_c • 0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c • 0x013F: gHciMacConnectionFailed_c • 0x0140: gHciCoarseClockAdjustmentRejected_c • 0x0141: gHciType0SubmapNotDefined_c • 0x0142: gHciUnknownAdvertisingIdentifier_c • 0x0143: gHciLimitReached_c • 0x0144: gHciOperationCancelledByHost_c • 0x01A0: gHciAlreadyInit_c • 0x01A1: gHciInvalidParameter_c • 0x01A2: gHciCallbackNotInstalled_c |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|---|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x01A3: gHciCallbackAlreadyInstalled_c • 0x01A4: gHciCommandNotSupported_c • 0x01A5: gHciEventNotSupported_c • 0x01A6: gHciTransportError_c • 0x03F0: gL2caAlreadyInit_c • 0x03F1: gL2caInsufficientResources_c • 0x03F2: gL2caCallbackNotInstalled_c • 0x03F3: gL2caCallbackAlreadyInstalled_c • 0x03F4: gL2caLePsmInvalid_c • 0x03F5: gL2caLePsmAlreadyRegistered_c • 0x03F6: gL2caLePsmNotRegistered_c • 0x03F7: gL2caLePsmInsufficientResources_c • 0x03F8: gL2caChannelInvalid_c • 0x03F9: gL2caChannelClosed_c • 0x03FA: gL2caChannelAlreadyConnected_c • 0x03FB: gL2caConnectionParametersRejected_c • 0x03FC: gL2caChannelBusy_c • 0x03FE: gL2caInvalidParameter_c • 0x03FF: gL2caError_c • 0x0401: gSmNullCBFunction_c • 0x0402: gSmCommandNotSupported_c • 0x0403: gSmUnexpectedCommand_c • 0x0404: gSmInvalidCommandCode_c |
| Table continues on the next page... | | |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0405: gSmInvalidCommandLength_c • 0x0406: gSmInvalidCommandParameter_c • 0x0407: gSmInvalidDeviceId_c • 0x0408: gSmInvalidInternalOperation_c • 0x0409: gSmInvalidConnectionHandle_c • 0x040A: gSmImproperKeyDistributionField_c • 0x040B: gSmUnexpectedKeyType_c • 0x040C: gSmUnexpectedPairingTerminationReason_c • 0x040D: gSmUnexpectedKeyset_c • 0x040E: gSmSmpTimeoutOccurred_c • 0x040F: gSmUnknownSmpPacketType_c • 0x0410: gSmInvalidSmpPacketLength_c • 0x0411: gSmInvalidSmpPacketParameter_c • 0x0412: gSmReceivedUnexpectedSmpPacket_c • 0x0413: gSmReceivedSmpPacketFromUnknownDevice_c • 0x0414: gSmReceivedUnexpectedHciEvent_c • 0x0415: gSmReceivedHciEventFromUnknownDevice_c • 0x0416: gSmInvalidHciEventParameter_c |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|---|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0417: gSmLlConnectionEncryptionInProgress_c • 0x0418: gSmLlConnectionEncryptionFailure_c • 0x0419: gSmInsufficientResources_c • 0x041A: gSmOobDataAddressMismatch_c • 0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c • 0x041C: gSmReceivedTimerEventForUnknownDevice_c • 0x041D: gSmUnattainableLocalDeviceSecRequirements_c • 0x041E: gSmUnattainableLocalDeviceMinKeySize_c • 0x041F: gSmUnattainableSlaveSecReqRequirements_c • 0x0431: gSmPairingErrorPasskeyEntryFailed_c • 0x0432: gSmPairingErrorConfirmValueFailed_c • 0x0433: gSmPairingErrorCommandNotSupported_c • 0x0434: gSmPairingErrorInvalidParameters_c • 0x0435: gSmPairingErrorUnknownReason_c • 0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c |
| Table continues on the next page... | | |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0461: gSmTbInvalidDataSignature_c • 0x0501: gAttInvalidHandle_c • 0x0502: gAttReadNotPermitted_c • 0x0503: gAttWriteNotPermitted_c • 0x0504: gAttInvalidPdu_c • 0x0505: gAttInsufficientAuthentication_c • 0x0506: gAttRequestNotSupported_c • 0x0507: gAttInvalidOffset_c • 0x0508: gAttInsufficientAuthorization_c • 0x0509: gAttPrepareQueueFull_c • 0x050A: gAttAttributeNotFound_c • 0x050B: gAttAttributeNotLong_c • 0x050C: gAttInsufficientEncryptionKeySize_c • 0x050D: gAttInvalidAttributeValueLength_c • 0x050E: gAttUnlikelyor_c • 0x050F: gAttInsufficientEncryption_c • 0x0510: gAttUnsupportedGroupType_c • 0x0511: gAttInsufficientResources_c • 0x0601: gGattAnotherProcedureInProgress_c • 0x0602: gGattLongAttributePacketsCorrupted_c • 0x0603: gGattMultipleAttributesOverflow_c • 0x0604: gGattUnexpectedReadMultipleResponseLength_c |

Table continues on the next page...

| <i>Table continued from the previous page...</i> | | |
|--|--------------|---|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0605: gGattInvalidValueLength_c • 0x0606: gGattServerTimeout_c • 0x0607: gGattIndicationAlreadyInProgress_c • 0x0608: gGattClientConfirmationTimeout_c • 0x0701: gGapAdvDataTooLong_c • 0x0702: gGapScanRspDataTooLong_c • 0x0703: gGapDeviceNotBonded_c • 0x0704: gGapAnotherProcedureInProgress_c • 0x0801: gDevDbCccdLimitReached_c • 0x0802: gDevDbCccdNotFound_c • 0x0901: gGattDbInvalidHandle_c • 0x0902: gGattDbCharacteristicNotFound_c • 0x0903: gGattDbCccdNotFound_c • 0x0904: gGattDbServiceNotFound_c • 0x0905: gGattDbDescriptorNotFound_c |
| Descriptor | Variable | <p>The characteristic descriptor whose value was read</p> <p>Structure type parameter. See the detailed table below for parameter structure.</p> |

Table 111. Descriptor Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|---|
| Handle | 2 | Attribute handle |
| UuidType | 1 | <p>UUID type</p> <p>Possible values:</p> <p>0x01: Uuid16Bits</p> <p>0x02: Uuid128Bits</p> |

Table continues on the next page...

Table 111. Descriptor Parameter Structure (continued)

| | | |
|----------------|-------------|--|
| | | 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| ValueLength | 2 | Length of the attribute value array |
| MaxValueLength | 2 | Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed |
| Value | ValueLength | Attribute value array |

Table 112. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

3.2.20 GATTClient-ProcedureReadCharacteristicValue.Indication

Description

Specifies that the Characteristic Read procedure for a given characteristic ended.

Parameters

| Parameter | Size (bytes) | Comments |
|-----------------|--------------|--|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x89 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the active connection |
| ProcedureResult | 1 | The result of the completed procedure Possible values: 0x00: gGattProcSuccess_c (The procedure was completed successfully) 0x01: gProcedureError_c (The procedure was terminated due to an error) |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|---|
| Parameter | Size (bytes) | Comments |
| Error | 2 | <p>If procedureResult is not gSuccess_c, this contains the error that terminated the procedure</p> <p>Possible values:</p> <ul style="list-style-type: none"> • 0x0000: gBleSuccess_c • 0x0001: gBleInvalidParameter_c • 0x0002: gBleOverflow_c • 0x0003: gBleUnavailable_c • 0x0004: gBleFeatureNotSupported_c • 0x0005: gBleOutOfMemory_c • 0x0006: gBleAlreadyInitialized_c • 0x0007: gBleOsError_c • 0x0008: gBleUnexpectedError_c • 0x0009: gBleInvalidState_c • 0x0101: gHciUnknownHciCommand_c • 0x0102: gHciUnknownConnectionIdentifier_c • 0x0103: gHciHardwareFailure_c • 0x0104: gHciPageTimeout_c • 0x0105: gHciAuthenticationFailure_c • 0x0106: gHciPinOrKeyMissing_c • 0x0107: gHciMemoryCapacityExceeded_c • 0x0108: gHciConnectionTimeout_c • 0x0109: gHciConnectionLimitExceeded_c • 0x010A: gHciSynchronousConnectionLimitToADeviceExceeded_c • 0x010B: gHciAclConnectionAlreadyExists_c • 0x010C: gHciCommandDisallowed_c |

Table continues on the next page...

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x010D: gHciConnectionRejectedDueToLimitedResources_ • 0x010E: gHciConnectionRejectedDueToSecurityReasons_ • 0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_ • 0x0110: gHciConnectionAcceptTimeoutExceeded_ • 0x0111: gHciUnsupportedFeatureOrParameterValue_ • 0x0112: gHciInvalidHciCommandParameters_ • 0x0113: gHciRemoteUserTerminatedConnection_ • 0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_ • 0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_ • 0x0116: gHciConnectionTerminatedByLocalHost_ • 0x0117: gHciRepeatedAttempts_ • 0x0118: gHciPairingNotAllowed_ • 0x0119: gHciUnknownLpmPdu_ • 0x011A: gHciUnsupportedRemoteFeature_ • 0x011B: gHciScoOffsetRejected_ • 0x011C: gHciScoIntervalRejected_ • 0x011D: gHciScoAirModeRejected_ • 0x011E: gHciInvalidLpmParameters_ |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|--|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x011F: gHciUnspecifiedError_ • 0x0120: gHciUnsupportedLpmParameterValue_ • 0x0121: gHciRoleChangeNotAllowed_ • 0x0122: gHciLLResponseTimeout_ • 0x0123: gHciLmpErrorTransactionCollision_ • 0x0124: gHciLmpPduNotAllowed_ • 0x0125: gHciEncryptionModeNotAcceptable_ • 0x0126: gHciLinkKeyCannotBeChanged_ • 0x0127: gHciRequestedQosNotSupported_ • 0x0128: gHciInstantPassed_ • 0x0129: gHciPairingWithUnitKeyNotSupported_ • 0x012A: gHciDifferentTransactionCollision_ • 0x012B: gHciReserved_0x2B_ • 0x012C: gHciQosNotAcceptableParameter_ • 0x012D: gHciQosRejected_ • 0x012E: gHciChannelClassificationNotSupported_ • 0x012F: gHciInsufficientSecurity_ • 0x0130: gHciParameterOutOfMandatoryRange_ • 0x0131: gHciReserved_0x31_ • 0x0132: gHciRoleSwitchPending_ • 0x0133: gHciReserved_0x33_ • 0x0134: gHciReservedSlotViolation_ |
| Table continues on the next page... | | |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0135: gHciRoleSwitchFailed_ • 0x0136: gHciExtendedInquiryResponseTooLarge_ • 0x0137: gHciSecureSimplePairingNotSupportedByHost_ • 0x0138: gHciHostBusyPairing_ • 0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_ • 0x013A: gHciControllerBusy_ • 0x013B: gHciUnacceptableConnectionParameters_ • 0x013C: gHciDirectedAdvertisingTimeout_ • 0x013D: gHciConnectionTerminatedDueToMicFailure_ • 0x013E: gHciConnectionFailedToBeEstablished_ • 0x013F: gHciMacConnectionFailed_ • 0x0140: gHciCoarseClockAdjustmentRejected_ • 0x01A0: gHciAlreadyInit_ • 0x01A1: gHciInvalidParameter_ • 0x01A2: gHciCallbackNotInstalled_ • 0x01A3: gHciCallbackAlreadyInstalled_ • 0x01A4: gHciCommandNotSupported_ • 0x01A5: gHciEventNotSupported_ • 0x01A6: gHciTransportError_ • 0x03F0: gL2caAlreadyInit_ • 0x03F1: gL2caInsufficientResources_ |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|---|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x03F2: gL2caCallbackNotInstalled_ • 0x03F3: gL2caCallbackAlreadyInstalled_ • 0x03F4: gL2caLePsmInvalid_ • 0x03F5: gL2caLePsmAlreadyRegistered_ • 0x03F6: gL2caLePsmNotRegistered_ • 0x03F7: gL2caLePsmInsufficientResources_ • 0x03F8: gL2caChannelInvalid_ • 0x03F9: gL2caChannelClosed_ • 0x03FA: gL2caChannelAlreadyConnected_ • 0x03FB: gL2caConnectionParametersRejected_ • 0x03FC: gL2caChannelBusy_ • 0x03FE: gL2caInvalidParameter_ • 0x03FF: gL2caError_ • 0x0401: gSmNullCBFunction_ • 0x0402: gSmCommandNotSupported_ • 0x0403: gSmUnexpectedCommand_ • 0x0404: gSmInvalidCommandCode_ • 0x0405: gSmInvalidCommandLength_ • 0x0406: gSmInvalidCommandParameter_ • 0x0407: gSmInvalidDeviceId_ • 0x0408: gSmInvalidInternalOperation_ • 0x0409: gSmInvalidConnectionHandle_ |
| Table continues on the next page... | | |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x040A: gSmInproperKeyDistributionField_ • 0x040B: gSmUnexpectedKeyType_ • 0x040C: gSmUnexpectedPairingTerminationReason_ • 0x040D: gSmUnexpectedKeyset_ • 0x040E: gSmSmpTimeoutOccurred_ • 0x040F: gSmUnknownSmpPacketType_ • 0x0410: gSmInvalidSmpPacketLength_ • 0x0411: gSmInvalidSmpPacketParameter_ • 0x0412: gSmReceivedUnexpectedSmpPacket_ • 0x0413: gSmReceivedSmpPacketFromUnknownDevice_ • 0x0414: gSmReceivedUnexpectedHciEvent_ • 0x0415: gSmReceivedHciEventFromUnknownDevice_ • 0x0416: gSmInvalidHciEventParameter_ • 0x0417: gSmLlConnectionEncryptionInProgress_ • 0x0418: gSmLlConnectionEncryptionFailure_ • 0x0419: gSmInsufficientResources_ • 0x041A: gSmOobDataAddressMismatch_ • 0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_ |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|---|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x041C: gSmReceivedTimerEventForUnknownDevice_ • 0x041D: gSmUnattainableLocalDeviceSecRequirements_ • 0x041E: gSmUnattainableLocalDeviceMinKeySize_ • 0x041F: gSmUnattainableSlaveSecReqRequirements_ • 0x0431: gSmPairingErrorPasskeyEntryFailed_ • 0x0432: gSmPairingErrorConfirmValueFailed_ • 0x0433: gSmPairingErrorCommandNotSupported_ • 0x0434: gSmPairingErrorInvalidParameters_ • 0x0435: gSmPairingErrorUnknownReason_ • 0x0460: gSmTbResolvableAddressDoesNotMatchIr_ • 0x0461: gSmTbInvalidDataSignature_ • 0x0501: gAttInvalidHandle_ • 0x0502: gAttReadNotPermitted_ • 0x0503: gAttWriteNotPermitted_ • 0x0504: gAttInvalidPdu_ • 0x0505: gAttInsufficientAuthentication_ • 0x0506: gAttRequestNotSupported_ • 0x0507: gAttInvalidOffset_ • 0x0508: gAttInsufficientAuthorization_ |
| Table continues on the next page... | | |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0509: gAttPrepareQueueFull_ • 0x050A: gAttAttributeNotFound_ • 0x050B: gAttAttributeNotLong_ • 0x050C: gAttInsufficientEncryptionKeySize_ • 0x050D: gAttInvalidAttributeValueLength_ • 0x050E: gAttUnlikelyor_ • 0x050F: gAttInsufficientEncryption_ • 0x0510: gAttUnsupportedGroupType_ • 0x0511: gAttInsufficientResources_ • 0x0601: gGattAnotherProcedureInProgress_ • 0x0602: gGattLongAttributePacketsCorrupted_ • 0x0603: gGattMultipleAttributesOverflow_ • 0x0604: gGattUnexpectedReadMultipleResponseLength_ • 0x0605: gGattInvalidValueLength_ • 0x0606: gGattServerTimeout_ • 0x0607: gGattIndicationAlreadyInProgress_ • 0x0608: gGattClientConfirmationTimeout_ • 0x0701: gGapAdvDataTooLong_ • 0x0702: gGapScanRspDataTooLong_ • 0x0703: gGapDeviceNotBonded_ • 0x0801: gDevDbCccdLimitReached_ • 0x0802: gDevDbCccdNotFound_ • 0x0901: gGattDbInvalidHandle_ • 0x0902: gGattDbCharacteristicNotFound_ |

Table continues on the next page...

| <i>Table continued from the previous page...</i> | | |
|--|--------------|--|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0903: gGattDbCccdNotFound_ • 0x0904: gGattDbServiceNotFound_ • 0x0905: gGattDbDescriptorNotFound_c |
| Characteristic | Variable | The characteristic whose value was read Structure type parameter. See the detailed table below for parameter structure. |

Table 113. Characteristic Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Properties | 1 | Characteristic Properties as defined by GATT Possible values: 0x00: gNone_c (No Properties selected) 0x01: gBroadcast_c (Characteristic can be broadcast) 0x02: gRead_c (Characteristic can be read) 0x04: gWriteWithoutRsp_c (Characteristic can be written without response) 0x08: gWrite_c (Characteristic can be written with response) 0x10: gNotify_c (Characteristic can be notified) 0x20: gIndicate_c (Characteristic can be indicated) 0x40: gAuthSignedWrites_c (Characteristic can be written with signed data) 0x80: gExtendedProperties_c (Extended Characteristic properties) |
| Value | Variable | Characteristic Value attribute Structure type parameter. See the detailed table below for parameter structure. |

Table continues on the next page...

Table 113. Characteristic Parameter Structure (continued)

| | | |
|-----------------|----------|---|
| NbOfDescriptors | 1 | Size of the Characteristic Descriptors array |
| Descriptors | Variable | Characteristic Descriptors array Structure type parameter. See the detailed table below for parameter structure. |

Table 114. Value Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Handle | 2 | Attribute handle |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| ValueLength | 2 | Length of the attribute value array |
| MaxValueLength | 2 | Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed |
| Value | ValueLength | Attribute value array |

Table 115. Descriptors Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Handle | 2 | Attribute handle |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value |

Table continues on the next page...

Table 115. Descriptors Parameter Structure (continued)

| | | |
|----------------|-------------|--|
| | | "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| ValueLength | 2 | Length of the attribute value array |
| MaxValueLength | 2 | Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed |
| Value | ValueLength | Attribute value array |

Table 116. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

Table 117. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

3.2.21 GATTClient-ProcedureReadMultipleCharacteristicValues.Indication

Description

Specifies that the Characteristic Read Multiple procedure ended.

Parameters

Table 118. GATTClient-ProcedureReadMultipleCharacteristicValues.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------------|--------------|---|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x8B |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the active connection |
| ProcedureResult | 1 | The result of the completed procedure |

Table continues on the next page...

Table 118. GATTClient-ProcedureReadMultipleCharacteristicValues.Indication Parameters (continued)

| | | |
|-------|---|--|
| | | <p>Possible values:</p> <p>0x00: gGattProcSuccess_c (The procedure was completed successfully)</p> <p>0x01: gProcedureError_c (The procedure was terminated due to an error)</p> |
| Error | 2 | <p>If procedureResult is not gSuccess_c, this contains the error that terminated the procedure</p> <p>Possible values:</p> <p>0x0000: gBleSuccess_c</p> <p>0x0001: gBleInvalidParameter_c</p> <p>0x0002: gBleOverflow_c</p> <p>0x0003: gBleUnavailable_c</p> <p>0x0004: gBleFeatureNotSupported_c</p> <p>0x0005: gBleOutOfMemory_c</p> <p>0x0006: gBleAlreadyInitialized_c</p> <p>0x0007: gBleOsError_c</p> <p>0x0008: gBleUnexpectedError_c</p> <p>0x0009: gBleInvalidState_c</p> <p>0x0101: gHciUnknownHciCommand_c</p> <p>0x0102: gHciUnknownConnectionIdentifier_c</p> <p>0x0103: gHciHardwareFailure_c</p> <p>0x0104: gHciPageTimeout_c</p> <p>0x0105: gHciAuthenticationFailure_c</p> <p>0x0106: gHciPinOrKeyMissing_c</p> <p>0x0107: gHciMemoryCapacityExceeded_c</p> <p>0x0108: gHciConnectionTimeout_c</p> <p>0x0109: gHciConnectionLimitExceeded_c</p> <p>0x010A: gHciSynchronousConnectionLimitToADeviceExceeded_c</p> <p>0x010B: gHciAclConnectionAlreadyExists_c</p> <p>0x010C: gHciCommandDisallowed_c</p> |

Table continues on the next page...

Table 118. GATTClient-ProcedureReadMultipleCharacteristicValues.Indication Parameters (continued)

| | | |
|--|--|---|
| | | 0x010D: gHciConnectionRejectedDueToLimitedResources_c 0x010E: gHciConnectionRejectedDueToSecurityReasons_c 0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c 0x0110: gHciConnectionAcceptTimeoutExceeded_c 0x0111: gHciUnsupportedFeatureOrParameterValue_c 0x0112: gHciInvalidHciCommandParameters_c 0x0113: gHciRemoteUserTerminatedConnection_c 0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c 0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c 0x0116: gHciConnectionTerminatedByLocalHost_c 0x0117: gHciRepeatedAttempts_c 0x0118: gHciPairingNotAllowed_c 0x0119: gHciUnknownLpmPdu_c 0x011A: gHciUnsupportedRemoteFeature_c 0x011B: gHciScoOffsetRejected_c 0x011C: gHciScoIntervalRejected_c 0x011D: gHciScoAirModeRejected_c 0x011E: gHciInvalidLpmParameters_c 0x011F: gHciUnspecifiedError_c 0x0120: gHciUnsupportedLpmParameterValue_c 0x0121: gHciRoleChangeNotAllowed_c |
|--|--|---|

Table continues on the next page...

Table 118. GATTClient-ProcedureReadMultipleCharacteristicValues.Indication Parameters (continued)

| | | |
|--|--|---|
| | | 0x0122: gHciLLResponseTimeout_c |
| | | 0x0123: gHciLmpErrorTransactionCollision_c |
| | | 0x0124: gHciLmpPduNotAllowed_c |
| | | 0x0125: gHciEncryptionModeNotAcceptable_c |
| | | 0x0126: gHciLinkKeyCannotBeChanged_c |
| | | 0x0127: gHciRequestedQosNotSupported_c |
| | | 0x0128: gHciInstantPassed_c |
| | | 0x0129: gHciPairingWithUnitKeyNotSupported_c |
| | | 0x012A: gHciDifferentTransactionCollision_c |
| | | 0x012B: gHciReserved_0x2B_c |
| | | 0x012C: gHciQosNotAcceptableParameter_c |
| | | 0x012D: gHciQosRejected_c |
| | | 0x012E: gHciChannelClassificationNotSupported_c |
| | | 0x012F: gHciInsufficientSecurity_c |
| | | 0x0130: gHciParameterOutOfMandatoryRange_c |
| | | 0x0131: gHciReserved_0x31_c |
| | | 0x0132: gHciRoleSwitchPending_c |
| | | 0x0133: gHciReserved_0x33_c |
| | | 0x0134: gHciReservedSlotViolation_c |
| | | 0x0135: gHciRoleSwitchFailed_c |
| | | 0x0136: gHciExtendedInquiryResponseTooLarge_c |
| | | 0x0137: gHciSecureSimplePairingNotSupportedByHost_c |
| | | 0x0138: gHciHostBusyPairing_c |

Table continues on the next page...

Table 118. GATTClient-ProcedureReadMultipleCharacteristicValues.Indication Parameters (continued)

| | | |
|--|--|---|
| | | 0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c 0x013A: gHciControllerBusy_c 0x013B: gHciUnacceptableConnectionParameters_c 0x013C: gHciDirectedAdvertisingTimeout_c 0x013D: gHciConnectionTerminatedDueToMicFailure_c 0x013E: gHciConnectionFailedToBeEstablished_c 0x013F: gHciMacConnectionFailed_c 0x0140: gHciCoarseClockAdjustmentRejected_c 0x01A0: gHciAlreadyInit_c 0x01A1: gHciInvalidParameter_c 0x01A2: gHciCallbackNotInstalled_c 0x01A3: gHciCallbackAlreadyInstalled_c 0x01A4: gHciCommandNotSupported_c 0x01A5: gHciEventNotSupported_c 0x01A6: gHciTransportError_c 0x03F0: gL2caAlreadyInit_c 0x03F1: gL2caInsufficientResources_c 0x03F2: gL2caCallbackNotInstalled_c 0x03F3: gL2caCallbackAlreadyInstalled_c 0x03F4: gL2caLePsmInvalid_c 0x03F5: gL2caLePsmAlreadyRegistered_c 0x03F6: gL2caLePsmNotRegistered_c 0x03F7: gL2caLePsmInsufficientResources_c 0x03F8: gL2caChannelInvalid_c 0x03F9: gL2caChannelClosed_c 0x03FA: gL2caChannelAlreadyConnected_c |
|--|--|---|

Table continues on the next page...

Table 118. GATTClient-ProcedureReadMultipleCharacteristicValues.Indication Parameters (continued)

| | | |
|--|--|--|
| | | 0x03FB: gL2caConnectionParametersRejected_c 0x03FC: gL2caChannelBusy_c 0x03FE: gL2caInvalidParameter_c 0x03FF: gL2caError_c 0x0401: gSmNullCBFunction_c 0x0402: gSmCommandNotSupported_c 0x0403: gSmUnexpectedCommand_c 0x0404: gSmInvalidCommandCode_c 0x0405: gSmInvalidCommandLength_c 0x0406: gSmInvalidCommandParameter_c 0x0407: gSmInvalidDeviceId_c 0x0408: gSmInvalidInternalOperation_c 0x0409: gSmInvalidConnectionHandle_c 0x040A: gSmImproperKeyDistributionField_c 0x040B: gSmUnexpectedKeyType_c 0x040C: gSmUnexpectedPairingTerminationReason_c 0x040D: gSmUnexpectedKeyset_c 0x040E: gSmSmpTimeoutOccurred_c 0x040F: gSmUnknownSmpPacketType_c 0x0410: gSmInvalidSmpPacketLength_c 0x0411: gSmInvalidSmpPacketParameter_c 0x0412: gSmReceivedUnexpectedSmpPacket_c 0x0413: gSmReceivedSmpPacketFromUnknownDevice_c 0x0414: gSmReceivedUnexpectedHciEvent_c 0x0415: gSmReceivedHciEventFromUnknownDevice_c 0x0416: gSmInvalidHciEventParameter_c |
|--|--|--|

Table continues on the next page...

Table 118. GATTClient-ProcedureReadMultipleCharacteristicValues.Indication Parameters (continued)

| | | |
|--|--|--|
| | | 0x0417: gSmLlConnectionEncryptionInProgress_c |
| | | 0x0418: gSmLlConnectionEncryptionFailure_c |
| | | 0x0419: gSmInsufficientResources_c |
| | | 0x041A: gSmOobDataAddressMismatch_c |
| | | 0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c |
| | | 0x041C: gSmReceivedTimerEventForUnknownDevice_c |
| | | 0x041D: gSmUnattainableLocalDeviceSecRequirements_c |
| | | 0x041E: gSmUnattainableLocalDeviceMinKeySize_c |
| | | 0x041F: gSmUnattainableSlaveSecReqRequirements_c |
| | | 0x0431: gSmPairingErrorPasskeyEntryFailed_c |
| | | 0x0432: gSmPairingErrorConfirmValueFailed_c |
| | | 0x0433: gSmPairingErrorCommandNotSupported_c |
| | | 0x0434: gSmPairingErrorInvalidParameters_c |
| | | 0x0435: gSmPairingErrorUnknownReason_c |
| | | 0x0460: gSmTbResolvableAddressDoesNotMatch_c |
| | | 0x0461: gSmTbInvalidDataSignature_c |
| | | 0x0501: gAttInvalidHandle_c |
| | | 0x0502: gAttReadNotPermitted_c |
| | | 0x0503: gAttWriteNotPermitted_c |
| | | 0x0504: gAttInvalidPdu_c |

Table continues on the next page...

Table 118. GATTClient-ProcedureReadMultipleCharacteristicValues.Indication Parameters (continued)

| | | |
|--|--|--|
| | | 0x0505: gAttInsufficientAuthentication_c |
| | | 0x0506: gAttRequestNotSupported_c |
| | | 0x0507: gAttInvalidOffset_c |
| | | 0x0508: gAttInsufficientAuthorization_c |
| | | 0x0509: gAttPrepareQueueFull_c |
| | | 0x050A: gAttAttributeNotFound_c |
| | | 0x050B: gAttAttributeNotLong_c |
| | | 0x050C: gAttInsufficientEncryptionKeySize_c |
| | | 0x050D: gAttInvalidAttributeValueLength_c |
| | | 0x050E: gAttUnlikelyor_c |
| | | 0x050F: gAttInsufficientEncryption_c |
| | | 0x0510: gAttUnsupportedGroupType_c |
| | | 0x0511: gAttInsufficientResources_c |
| | | 0x0601: gGattAnotherProcedureInProgress_c |
| | | 0x0602: gGattLongAttributePacketsCorrupted_c |
| | | 0x0603: gGattMultipleAttributesOverflow_c |
| | | 0x0604: gGattUnexpectedReadMultipleResponseLength_c |
| | | 0x0605: gGattInvalidValueLength_c |
| | | 0x0606: gGattServerTimeout_c |
| | | 0x0607: gGattIndicationAlreadyInProgress_c |
| | | 0x0608: gGattClientConfirmationTimeout_c |
| | | 0x0701: gGapAdvDataTooLong_c |
| | | 0x0702: gGapScanRspDataTooLong_c |
| | | 0x0703: gGapDeviceNotBonded_c |
| | | 0x0801: gDevDbCccdLimitReached_c |
| | | 0x0802: gDevDbCccdNotFound_c |
| | | 0x0901: gGattDbInvalidHandle_c |
| | | 0x0902: gGattDbCharacteristicNotFound_c |

Table continues on the next page...

Table 118. GATTClient-ProcedureReadMultipleCharacteristicValues.Indication Parameters (continued)

| | | |
|---------------------|----------|---|
| | | 0x0903: gGattDbCccdNotFound_c 0x0904: gGattDbServiceNotFound_c 0x0905: gGattDbDescriptorNotFound_c |
| NbOfCharacteristics | 1 | Number of characteristics whose values were read |
| Characteristics | Variable | Characteristics whose values were read Structure type parameter. See the detailed table below for parameter structure. |

Table 119. Characteristics Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Properties | 1 | Characteristic Properties as defined by GATT Possible values: 0x00: gNone_c (No Properties selected) 0x01: gBroadcast_c (Characteristic can be broadcast) 0x02: gRead_c (Characteristic can be read) 0x04: gWriteWithoutRsp_c (Characteristic can be written without response) 0x08: gWrite_c (Characteristic can be written with response) 0x10: gNotify_c (Characteristic can be notified) 0x20: gIndicate_c (Characteristic can be indicated) 0x40: gAuthSignedWrites_c (Characteristic can be written with signed data) 0x80: gExtendedProperties_c (Extended Characteristic properties) |
| Value | Variable | Characteristic Value attribute Structure type parameter. See the detailed table below for parameter structure. |

Table continues on the next page...

Table 119. Characteristics Parameter Structure (continued)

| | | |
|-----------------|----------|---|
| NbOfDescriptors | 1 | Size of the Characteristic Descriptors array |
| Descriptors | Variable | Characteristic Descriptors array Structure type parameter. See the detailed table below for parameter structure. |

Table 120. Value Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Handle | 2 | Attribute handle |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| ValueLength | 2 | Length of the attribute value array |
| MaxValueLength | 2 | Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed |
| Value | ValueLength | Attribute value array |

Table 121. Descriptors Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Handle | 2 | Attribute handle |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value |

Table continues on the next page...

Table 121. Descriptors Parameter Structure (continued)

| | | |
|----------------|-------------|--|
| | | "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| ValueLength | 2 | Length of the attribute value array |
| MaxValueLength | 2 | Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed |
| Value | ValueLength | Attribute value array |

Table 122. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

Table 123. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

3.2.22 GATTClient-ProcedureReadUsingCharacteristicUuid.Indication

Description

Specifies that the Characteristic Read by UUID procedure ended.

Parameters

| Parameter | Size (bytes) | Comments |
|-----------------|--------------|---|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x8A |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the active connection |
| ProcedureResult | 1 | The result of the completed procedure Possible values: |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|---|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x00: gGattProcSuccess_c (The procedure was completed successfully) • 0x01: gProcedureError_c (The procedure was terminated due to an error) |
| Error | 2 | <p>If procedureResult is not gSuccess_c, this contains the error that terminated the procedure</p> <p>Possible values:</p> <ul style="list-style-type: none"> • 0x0000: gBleSuccess_c • 0x0001: gBleInvalidParameter_c • 0x0002: gBleOverflow_c • 0x0003: gBleUnavailable_c • 0x0004: gBleFeatureNotSupported_c • 0x0005: gBleOutOfMemory_c • 0x0006: gBleAlreadyInitialized_c • 0x0007: gBleOsError_c • 0x0008: gBleUnexpectedError_c • 0x0009: gBleInvalidState_c • 0x0101: gHciUnknownHciCommand_c • 0x0102: gHciUnknownConnectionIdentifier_c • 0x0103: gHciHardwareFailure_c • 0x0104: gHciPageTimeout_c • 0x0105: gHciAuthenticationFailure_c • 0x0106: gHciPinOrKeyMissing_c • 0x0107: gHciMemoryCapacityExceeded_c • 0x0108: gHciConnectionTimeout_c • 0x0109: gHciConnectionLimitExceeded_c |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|---|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x010A: gHciSynchronousConnectionLimitToADeviceExceeded_c • 0x010B: gHciAclConnectionAlreadyExists_c • 0x010C: gHciCommandDisallowed_c • 0x010D: gHciConnectionRejectedDueToLimitedResources_c • 0x010E: gHciConnectionRejectedDueToSecurityReasons_c • 0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c • 0x0110: gHciConnectionAcceptTimeoutExceeded_c • 0x0111: gHciUnsupportedFeatureOrParameterValue_c • 0x0112: gHciInvalidHciCommandParameters_c • 0x0113: gHciRemoteUserTerminatedConnection_c • 0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c • 0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c • 0x0116: gHciConnectionTerminatedByLocalHost_c • 0x0117: gHciRepeatedAttempts_c • 0x0118: gHciPairingNotAllowed_c • 0x0119: gHciUnknownLpmPdu_c |
| Table continues on the next page... | | |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x011A: gHciUnsupportedRemoteFeature_c • 0x011B: gHciScoOffsetRejected_c • 0x011C: gHciScoIntervalRejected_c • 0x011D: gHciScoAirModeRejected_c • 0x011E: gHciInvalidLpmParameters_c • 0x011F: gHciUnspecifiedError_c • 0x0120: gHciUnsupportedLpmParameterValue_c • 0x0121: gHciRoleChangeNotAllowed_c • 0x0122: gHciLLResponseTimeout_c • 0x0123: gHciLmpErrorTransactionCollision_c • 0x0124: gHciLmpPduNotAllowed_c • 0x0125: gHciEncryptionModeNotAcceptable_c • 0x0126: gHciLinkKeyCannotBeChanged_c • 0x0127: gHciRequestedQosNotSupported_c • 0x0128: gHciInstantPassed_c • 0x0129: gHciPairingWithUnitKeyNotSupported_c • 0x012A: gHciDifferentTransactionCollision_c • 0x012B: gHciReserved_0x2B_c • 0x012C: gHciQosNotAcceptableParameter_c • 0x012D: gHciQosRejected_c • 0x012E: gHciChannelClassificationNotSupported_c |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|---|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x012F: gHciInsufficientSecurity_c • 0x0130: gHciParameterOutOfMandatoryRange_c • 0x0131: gHciReserved_0x31_c • 0x0132: gHciRoleSwitchPending_c • 0x0133: gHciReserved_0x33_c • 0x0134: gHciReservedSlotViolation_c • 0x0135: gHciRoleSwitchFailed_c • 0x0136: gHciExtendedInquiryResponseTooLarge_c • 0x0137: gHciSecureSimplePairingNotSupportedByHost_c • 0x0138: gHciHostBusyPairing_c • 0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c • 0x013A: gHciControllerBusy_c • 0x013B: gHciUnacceptableConnectionParameters_c • 0x013C: gHciDirectedAdvertisingTimeout_c • 0x013D: gHciConnectionTerminatedDueToMicFailure_c • 0x013E: gHciConnectionFailedToBeEstablished_c • 0x013E: gHciConnectionFailedToBeEstablished_c • 0x013F: gHciMacConnectionFailed_c • 0x0140: gHciCoarseClockAdjustmentRejected_c |
| Table continues on the next page... | | |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0141: gHciType0SubmapNotDefined_c • 0x0142: gHciUnknownAdvertisingIdentifier_c • 0x0143: gHciLimitReached_c • 0x0144: gHciOperationCancelledByHost_c • 0x01A0: gHciAlreadyInit_c • 0x01A1: gHciInvalidParameter_c • 0x01A2: gHciCallbackNotInstalled_c • 0x01A3: gHciCallbackAlreadyInstalled_c • 0x01A4: gHciCommandNotSupported_c • 0x01A5: gHciEventNotSupported_c • 0x01A6: gHciTransportError_c • 0x03F0: gL2caAlreadyInit_c • 0x03F1: gL2caInsufficientResources_c • 0x03F2: gL2caCallbackNotInstalled_c • 0x03F3: gL2caCallbackAlreadyInstalled_c • 0x03F4: gL2caLePsmInvalid_c • 0x03F5: gL2caLePsmAlreadyRegistered_c • 0x03F6: gL2caLePsmNotRegistered_c • 0x03F7: gL2caLePsmInsufficientResources_c • 0x03F8: gL2caChannelInvalid_c • 0x03F9: gL2caChannelClosed_c • 0x03FA: gL2caChannelAlreadyConnected_c • 0x03FB: gL2caConnectionParametersRejected_c |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|---|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x03FC: gL2caChannelBusy_c • 0x03FE: gL2caInvalidParameter_c • 0x03FF: gL2caError_c • 0x0401: gSmNullCBFunction_c • 0x0402: gSmCommandNotSupported_c • 0x0403: gSmUnexpectedCommand_c • 0x0404: gSmInvalidCommandCode_c • 0x0405: gSmInvalidCommandLength_c • 0x0406: gSmInvalidCommandParameter_c • 0x0407: gSmInvalidDeviceId_c • 0x0408: gSmInvalidInternalOperation_c • 0x0409: gSmInvalidConnectionHandle_c • 0x040A: gSmImproperKeyDistributionField_c • 0x040B: gSmUnexpectedKeyType_c • 0x040C: gSmUnexpectedPairingTerminationReason_c • 0x040D: gSmUnexpectedKeyset_c • 0x040E: gSmSmpTimeoutOccurred_c • 0x040F: gSmUnknownSmpPacketType_c • 0x0410: gSmInvalidSmpPacketLength_c • 0x0411: gSmInvalidSmpPacketParameter_c • 0x0412: gSmReceivedUnexpectedSmpPacket_c |
| Table continues on the next page... | | |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0413: gSmReceivedSmpPacketFromUnknownDevice_c • 0x0414: gSmReceivedUnexpectedHciEvent_c • 0x0415: gSmReceivedHciEventFromUnknownDevice_c • 0x0416: gSmInvalidHciEventParameter_c • 0x0417: gSmLlConnectionEncryptionInProgress_c • 0x0418: gSmLlConnectionEncryptionFailure_c • 0x0419: gSmInsufficientResources_c • 0x041A: gSmOobDataAddressMismatch_c • 0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c • 0x041C: gSmReceivedTimerEventForUnknownDevice_c • 0x041D: gSmUnattainableLocalDeviceSecRequirements_c • 0x041E: gSmUnattainableLocalDeviceMinKeySize_c • 0x041F: gSmUnattainableSlaveSecReqRequirements_c • 0x0431: gSmPairingErrorPasskeyEntryFailed_c • 0x0432: gSmPairingErrorConfirmValueFailed_c |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|---|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0433: gSmPairingErrorCommandNotSupported_c • 0x0434: gSmPairingErrorInvalidParameters_c • 0x0435: gSmPairingErrorUnknownReason_c • 0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c • 0x0461: gSmTbInvalidDataSignature_c • 0x0501: gAttInvalidHandle_c • 0x0502: gAttReadNotPermitted_c • 0x0503: gAttWriteNotPermitted_c • 0x0504: gAttInvalidPdu_c • 0x0505: gAttInsufficientAuthentication_c • 0x0506: gAttRequestNotSupported_c • 0x0507: gAttInvalidOffset_c • 0x0508: gAttInsufficientAuthorization_c • 0x0509: gAttPrepareQueueFull_c • 0x050A: gAttAttributeNotFound_c • 0x050B: gAttAttributeNotLong_c • 0x050C: gAttInsufficientEncryptionKeySize_c • 0x050D: gAttInvalidAttributeValueLength_c • 0x050E: gAttUnlikelyor_c • 0x050F: gAttInsufficientEncryption_c • 0x0510: gAttUnsupportedGroupType_c • 0x0511: gAttInsufficientResources_c |
| Table continues on the next page... | | |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|---------------|---------------|--|
| | | <ul style="list-style-type: none"> • 0x0601: gGattAnotherProcedureInProgress_c • 0x0602: gGattLongAttributePacketsCorrupted_c • 0x0603: gGattMultipleAttributesOverflow_c • 0x0604: gGattUnexpectedReadMultipleResponseLength_c • 0x0605: gGattInvalidValueLength_c • 0x0606: gGattServerTimeout_c • 0x0607: gGattIndicationAlreadyInProgress_c • 0x0608: gGattClientConfirmationTimeout_c • 0x0701: gGapAdvDataTooLong_c • 0x0702: gGapScanRspDataTooLong_c • 0x0703: gGapDeviceNotBonded_c • 0x0704: gGapAnotherProcedureInProgress_c • 0x0801: gDevDbCccdLimitReached_c • 0x0802: gDevDbCccdNotFound_c • 0x0901: gGattDbInvalidHandle_c • 0x0902: gGattDbCharacteristicNotFound_c • 0x0903: gGattDbCccdNotFound_c • 0x0904: gGattDbServiceNotFound_c • 0x0905: gGattDbDescriptorNotFound_c |
| NbOfReadBytes | 2 | The number of bytes that were read |
| ReadBytes | NbOfReadBytes | The bytes that were read |

3.2.23 GATTClient-ProcedureWriteCharacteristicDescriptor.Indication

Description

Specifies that the Characteristic Descriptor Write procedure for a given characteristic's descriptor ended.

Parameters

| Parameter | Size (bytes) | Comments |
|-----------------|--------------|--|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x8E |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the active connection |
| ProcedureResult | 1 | <p>The result of the completed procedure</p> <p>Possible values:</p> <p>0x00: gGattProcSuccess_c (The procedure was completed successfully)</p> <p>0x01: gProcedureError_c (The procedure was terminated due to an error)</p> |
| Error | 2 | <p>If procedureResult is not gSuccess_c, this contains the error that terminated the procedure</p> <p>Possible values:</p> <ul style="list-style-type: none"> • 0x0000: gBleSuccess_c • 0x0001: gBleInvalidParameter_c • 0x0002: gBleOverflow_c • 0x0003: gBleUnavailable_c • 0x0004: gBleFeatureNotSupported_c • 0x0005: gBleOutOfMemory_c • 0x0006: gBleAlreadyInitialized_c • 0x0007: gBleOsError_c • 0x0008: gBleUnexpectedError_c • 0x0009: gBleInvalidState_c • 0x0101: gHciUnknownHciCommand_c • 0x0102: gHciUnknownConnectionIdentifier_c • 0x0103: gHciHardwareFailure_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0104: gHciPageTimeout_c • 0x0105: gHciAuthenticationFailure_c • 0x0106: gHciPinOrKeyMissing_c • 0x0107: gHciMemoryCapacityExceeded_c • 0x0108: gHciConnectionTimeout_c • 0x0109: gHciConnectionLimitExceeded_c • 0x010A: gHciSynchronousConnectionLimitToADeviceExceeded_c • 0x010B: gHciAclConnectionAlreadyExists_c • 0x010C: gHciCommandDisallowed_c • 0x010D: gHciConnectionRejectedDueToLimitedResources_c • 0x010E: gHciConnectionRejectedDueToSecurityReasons_c • 0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c • 0x0110: gHciConnectionAcceptTimeoutExceeded_c • 0x0111: gHciUnsupportedFeatureOrParameterValue_c • 0x0112: gHciInvalidHciCommandParameters_c • 0x0113: gHciRemoteUserTerminatedConnection_c • 0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c |

| Table continued from the previous page... | | |
|---|--------------|--|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c • 0x0116: gHciConnectionTerminatedByLocalHost_c • 0x0117: gHciRepeatedAttempts_c • 0x0118: gHciPairingNotAllowed_c • 0x0119: gHciUnknownLpmPdu_c • 0x011A: gHciUnsupportedRemoteFeature_c • 0x011B: gHciScoOffsetRejected_c • 0x011C: gHciScoIntervalRejected_c • 0x011D: gHciScoAirModeRejected_c • 0x011E: gHciInvalidLpmParameters_c • 0x011F: gHciUnspecifiedError_c • 0x0120: gHciUnsupportedLpmParameterValue_c • 0x0121: gHciRoleChangeNotAllowed_c • 0x0122: gHciLLResponseTimeout_c • 0x0123: gHciLmpErrorTransactionCollision_c • 0x0124: gHciLmpPduNotAllowed_c • 0x0125: gHciEncryptionModeNotAcceptable_c • 0x0126: gHciLinkKeyCannotBeChanged_c • 0x0127: gHciRequestedQosNotSupported_c • 0x0128: gHciInstantPassed_c • 0x0129: gHciPairingWithUnitKeyNotSupported_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x012A: gHciDifferentTransactionCollision_c • 0x012B: gHciReserved_0x2B_c • 0x012C: gHciQosNotAcceptableParameter_c • 0x012D: gHciQosRejected_c • 0x012E: gHciChannelClassificationNotSupported_c • 0x012F: gHciInsufficientSecurity_c • 0x0130: gHciParameterOutOfMandatoryRange_c • 0x0131: gHciReserved_0x31_c • 0x0132: gHciRoleSwitchPending_c • 0x0133: gHciReserved_0x33_c • 0x0134: gHciReservedSlotViolation_c • 0x0135: gHciRoleSwitchFailed_c • 0x0136: gHciExtendedInquiryResponseTooLarge_c • 0x0137: gHciSecureSimplePairingNotSupportedByHost_c • 0x0138: gHciHostBusyPairing_c • 0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c • 0x013A: gHciControllerBusy_c • 0x013B: gHciUnacceptableConnectionParameters_c • 0x013C: gHciDirectedAdvertisingTimeout_c • 0x013D: gHciConnectionTerminatedDueToMicFailure_c • 0x013E: gHciConnectionFailedToBeEstablished_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c • 0x013F: gHciMacConnectionFailed_c • 0x0140: gHciCoarseClockAdjustmentRejected_c • 0x0141: gHciType0SubmapNotDefined_c • 0x0142: gHciUnknownAdvertisingIdentifier_c • 0x0143: gHciLimitReached_c • 0x0144: gHciOperationCancelledByHost_c • 0x01A0: gHciAlreadyInit_c • 0x01A1: gHciInvalidParameter_c • 0x01A2: gHciCallbackNotInstalled_c • 0x01A3: gHciCallbackAlreadyInstalled_c • 0x01A4: gHciCommandNotSupported_c • 0x01A5: gHciEventNotSupported_c • 0x01A6: gHciTransportError_c • 0x03F0: gL2caAlreadyInit_c • 0x03F1: gL2caInsufficientResources_c • 0x03F2: gL2caCallbackNotInstalled_c • 0x03F3: gL2caCallbackAlreadyInstalled_c • 0x03F4: gL2caLePsmInvalid_c • 0x03F5: gL2caLePsmAlreadyRegistered_c • 0x03F6: gL2caLePsmNotRegistered_c • 0x03F7: gL2caLePsmInsufficientResources_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x03F8: gL2caChannelInvalid_c • 0x03F9: gL2caChannelClosed_c • 0x03FA: gL2caChannelAlreadyConnected_c • 0x03FB: gL2caConnectionParametersRejected_c • 0x03FC: gL2caChannelBusy_c • 0x03FE: gL2caInvalidParameter_c • 0x03FF: gL2caError_c • 0x0401: gSmNullCBFunction_c • 0x0402: gSmCommandNotSupported_c • 0x0403: gSmUnexpectedCommand_c • 0x0404: gSmInvalidCommandCode_c • 0x0405: gSmInvalidCommandLength_c • 0x0406: gSmInvalidCommandParameter_c • 0x0407: gSmInvalidDeviceId_c • 0x0408: gSmInvalidInternalOperation_c • 0x0409: gSmInvalidConnectionHandle_c • 0x040A: gSmImproperKeyDistributionField_c • 0x040B: gSmUnexpectedKeyType_c • 0x040C: gSmUnexpectedPairingTerminationReason_c • 0x040D: gSmUnexpectedKeyset_c • 0x040E: gSmSmpTimeoutOccurred_c • 0x040F: gSmUnknownSmpPacketType_c • 0x0410: gSmInvalidSmpPacketLength_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0411: gSmInvalidSmpPacketParameter_c • 0x0412: gSmReceivedUnexpectedSmpPacket_c • 0x0413: gSmReceivedSmpPacketFromUnknownDevice_c • 0x0414: gSmReceivedUnexpectedHciEvent_c • 0x0415: gSmReceivedHciEventFromUnknownDevice_c • 0x0416: gSmInvalidHciEventParameter_c • 0x0417: gSmLlConnectionEncryptionInProgress_c • 0x0418: gSmLlConnectionEncryptionFailure_c • 0x0419: gSmInsufficientResources_c • 0x041A: gSmOobDataAddressMismatch_c • 0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c • 0x041C: gSmReceivedTimerEventForUnknownDevice_c • 0x041D: gSmUnattainableLocalDeviceSecRequirements_c • 0x041E: gSmUnattainableLocalDeviceMinKeySize_c • 0x041F: gSmUnattainableSlaveSecReqRequirements_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0431: gSmPairingErrorPasskeyEntryFailed_c • 0x0432: gSmPairingErrorConfirmValueFailed_c • 0x0433: gSmPairingErrorCommandNotSupported_c • 0x0434: gSmPairingErrorInvalidParameters_c • 0x0435: gSmPairingErrorUnknownReason_c • 0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c • 0x0461: gSmTbInvalidDataSignature_c • 0x0501: gAttInvalidHandle_c • 0x0502: gAttReadNotPermitted_c • 0x0503: gAttWriteNotPermitted_c • 0x0504: gAttInvalidPdu_c • 0x0505: gAttInsufficientAuthentication_c • 0x0506: gAttRequestNotSupported_c • 0x0507: gAttInvalidOffset_c • 0x0508: gAttInsufficientAuthorization_c • 0x0509: gAttPrepareQueueFull_c • 0x050A: gAttAttributeNotFound_c • 0x050B: gAttAttributeNotLong_c • 0x050C: gAttInsufficientEncryptionKeySize_c • 0x050D: gAttInvalidAttributeValueLength_c • 0x050E: gAttUnlikely_c • 0x050F: gAttInsufficientEncryption_c |

| Table continued from the previous page... | | |
|---|--------------|---|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0510: gAttUnsupportedGroupType_c • 0x0511: gAttInsufficientResources_c • 0x0601: gGattAnotherProcedureInProgress_c • 0x0602: gGattLongAttributePacketsCorrupted_c • 0x0603: gGattMultipleAttributesOverflow_c • 0x0604: gGattUnexpectedReadMultipleResponseLength_c • 0x0605: gGattInvalidValueLength_c • 0x0606: gGattServerTimeout_c • 0x0607: gGattIndicationAlreadyInProgress_c • 0x0608: gGattClientConfirmationTimeout_c • 0x0701: gGapAdvDataTooLong_c • 0x0702: gGapScanRspDataTooLong_c • 0x0703: gGapDeviceNotBonded_c • 0x0704: gGapAnotherProcedureInProgress_c • 0x0801: gDevDbCccdLimitReached_c • 0x0802: gDevDbCccdNotFound_c • 0x0901: gGattDbInvalidHandle_c • 0x0902: gGattDbCharacteristicNotFound_c • 0x0903: gGattDbCccdNotFound_c • 0x0904: gGattDbServiceNotFound_c • 0x0905: gGattDbDescriptorNotFound_c |

3.2.24 GATTClient-ProcedureWriteCharacteristicValue.Indication

Description

Specifies that the Characteristic Write procedure for a given characteristic ended.

Parameters

| Parameter | Size (bytes) | Comments |
|-----------------|--------------|---|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x8C |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the active connection |
| ProcedureResult | 1 | The result of the completed procedure Possible values: 0x00: gGattProcSuccess_c (The procedure was completed successfully) 0x01: gProcedureError_c (The procedure was terminated due to an error) |
| Error | 2 | If procedureResult is not gSuccess_c, this contains the error that terminated the procedure Possible values: <ul style="list-style-type: none"> • 0x0000: gBleSuccess_c • 0x0001: gBleInvalidParameter_c • 0x0002: gBleOverflow_c • 0x0003: gBleUnavailable_c • 0x0004: gBleFeatureNotSupported_c • 0x0005: gBleOutOfMemory_c • 0x0006: gBleAlreadyInitialized_c • 0x0007: gBleOsError_c • 0x0008: gBleUnexpectedError_c • 0x0009: gBleInvalidState_c • 0x0101: gHciUnknownHciCommand_c |

| Table continued from the previous page... | | |
|---|--------------|---|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0102: gHciUnknownConnectionIdentifier_c • 0x0103: gHciHardwareFailure_c • 0x0104: gHciPageTimeout_c • 0x0105: gHciAuthenticationFailure_c • 0x0106: gHciPinOrKeyMissing_c • 0x0107: gHciMemoryCapacityExceeded_c • 0x0108: gHciConnectionTimeout_c • 0x0109: gHciConnectionLimitExceeded_c • 0x010A: gHciSynchronousConnectionLimitToADeviceExceeded_c • 0x010B: gHciAclConnectionAlreadyExists_c • 0x010C: gHciCommandDisallowed_c • 0x010D: gHciConnectionRejectedDueToLimitedResources_c • 0x010E: gHciConnectionRejectedDueToSecurityReasons_c • 0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c • 0x0110: gHciConnectionAcceptTimeoutExceeded_c • 0x0111: gHciUnsupportedFeatureOrParameterValue_c • 0x0112: gHciInvalidHciCommandParameters_c • 0x0113: gHciRemoteUserTerminatedConnection_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c • 0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c • 0x0116: gHciConnectionTerminatedByLocalHost_c • 0x0117: gHciRepeatedAttempts_c • 0x0118: gHciPairingNotAllowed_c • 0x0119: gHciUnknownLpmPdu_c • 0x011A: gHciUnsupportedRemoteFeature_c • 0x011B: gHciScoOffsetRejected_c • 0x011C: gHciScoIntervalRejected_c • 0x011D: gHciScoAirModeRejected_c • 0x011E: gHciInvalidLpmParameters_c • 0x011F: gHciUnspecifiedError_c • 0x0120: gHciUnsupportedLpmParameterValue_c • 0x0121: gHciRoleChangeNotAllowed_c • 0x0122: gHciLLResponseTimeout_c • 0x0123: gHciLmpErrorTransactionCollision_c • 0x0124: gHciLmpPduNotAllowed_c • 0x0125: gHciEncryptionModeNotAcceptable_c • 0x0126: gHciLinkKeyCannotBeChanged_c • 0x0127: gHciRequestedQosNotSupported_c • 0x0128: gHciInstantPassed_c |

| Table continued from the previous page... | | |
|---|--------------|--|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0129: gHciPairingWithUnitKeyNotSupported_c • 0x012A: gHciDifferentTransactionCollision_c • 0x012B: gHciReserved_0x2B_c • 0x012C: gHciQosNotAcceptableParameter_c • 0x012D: gHciQosRejected_c • 0x012E: gHciChannelClassificationNotSupported_c • 0x012F: gHciInsufficientSecurity_c • 0x0130: gHciParameterOutOfMandatoryRange_c • 0x0131: gHciReserved_0x31_c • 0x0132: gHciRoleSwitchPending_c • 0x0133: gHciReserved_0x33_c • 0x0134: gHciReservedSlotViolation_c • 0x0135: gHciRoleSwitchFailed_c • 0x0136: gHciExtendedInquiryResponseTooLarge_c • 0x0137: gHciSecureSimplePairingNotSupportedByHost_c • 0x0138: gHciHostBusyPairing_c • 0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c • 0x013A: gHciControllerBusy_c • 0x013B: gHciUnacceptableConnectionParameters_c • 0x013C: gHciDirectedAdvertisingTimeout_c • 0x013D: gHciConnectionTerminatedDueToMicFailure_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x013E: gHciConnectionFailedToBeEstablished_c • 0x013F: gHciMacConnectionFailed_c • 0x0140: gHciCoarseClockAdjustmentRejected_c • 0x0141: gHciType0SubmapNotDefined_c • 0x0142: gHciUnknownAdvertisingIdentifier_c • 0x0143: gHciLimitReached_c • 0x0144: gHciOperationCancelledByHost_c • 0x01A0: gHciAlreadyInit_c • 0x01A1: gHciInvalidParameter_c • 0x01A2: gHciCallbackNotInstalled_c • 0x01A3: gHciCallbackAlreadyInstalled_c • 0x01A4: gHciCommandNotSupported_c • 0x01A5: gHciEventNotSupported_c • 0x01A6: gHciTransportError_c • 0x03F0: gL2caAlreadyInit_c • 0x03F1: gL2caInsufficientResources_c • 0x03F2: gL2caCallbackNotInstalled_c • 0x03F3: gL2caCallbackAlreadyInstalled_c • 0x03F4: gL2caLePsmInvalid_c • 0x03F5: gL2caLePsmAlreadyRegistered_c • 0x03F6: gL2caLePsmNotRegistered_c • 0x03F7: gL2caLePsmInsufficientResources_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x03F8: gL2caChannelInvalid_c • 0x03F9: gL2caChannelClosed_c • 0x03FA: gL2caChannelAlreadyConnected_c • 0x03FB: gL2caConnectionParametersRejected_c • 0x03FC: gL2caChannelBusy_c • 0x03FE: gL2caInvalidParameter_c • 0x03FF: gL2caError_c • 0x0401: gSmNullCBFunction_c • 0x0402: gSmCommandNotSupported_c • 0x0403: gSmUnexpectedCommand_c • 0x0404: gSmInvalidCommandCode_c • 0x0405: gSmInvalidCommandLength_c • 0x0406: gSmInvalidCommandParameter_c • 0x0407: gSmInvalidDeviceId_c • 0x0408: gSmInvalidInternalOperation_c • 0x0409: gSmInvalidConnectionHandle_c • 0x040A: gSmImproperKeyDistributionField_c • 0x040B: gSmUnexpectedKeyType_c • 0x040C: gSmUnexpectedPairingTerminationReason_c • 0x040D: gSmUnexpectedKeyset_c • 0x040E: gSmSmpTimeoutOccurred_c • 0x040F: gSmUnknownSmpPacketType_c • 0x0410: gSmInvalidSmpPacketLength_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0411: gSmInvalidSmpPacketParameter_c • 0x0412: gSmReceivedUnexpectedSmpPacket_c • 0x0413: gSmReceivedSmpPacketFromUnknownDevice_c • 0x0414: gSmReceivedUnexpectedHciEvent_c • 0x0415: gSmReceivedHciEventFromUnknownDevice_c • 0x0416: gSmInvalidHciEventParameter_c • 0x0417: gSmLlConnectionEncryptionInProgress_c • 0x0418: gSmLlConnectionEncryptionFailure_c • 0x0419: gSmInsufficientResources_c • 0x041A: gSmOobDataAddressMismatch_c • 0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c • 0x041C: gSmReceivedTimerEventForUnknownDevice_c • 0x041D: gSmUnattainableLocalDeviceSecRequirements_c • 0x041E: gSmUnattainableLocalDeviceMinKeySize_c • 0x041F: gSmUnattainableSlaveSecReqRequirements_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0431: gSmPairingErrorPasskeyEntryFailed_c • 0x0432: gSmPairingErrorConfirmValueFailed_c • 0x0433: gSmPairingErrorCommandNotSupported_c • 0x0434: gSmPairingErrorInvalidParameters_c • 0x0435: gSmPairingErrorUnknownReason_c • 0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c • 0x0461: gSmTbInvalidDataSignature_c • 0x0501: gAttInvalidHandle_c • 0x0502: gAttReadNotPermitted_c • 0x0503: gAttWriteNotPermitted_c • 0x0504: gAttInvalidPdu_c • 0x0505: gAttInsufficientAuthentication_c • 0x0506: gAttRequestNotSupported_c • 0x0507: gAttInvalidOffset_c • 0x0508: gAttInsufficientAuthorization_c • 0x0509: gAttPrepareQueueFull_c • 0x050A: gAttAttributeNotFound_c • 0x050B: gAttAttributeNotLong_c • 0x050C: gAttInsufficientEncryptionKeySize_c • 0x050D: gAttInvalidAttributeValueLength_c • 0x050E: gAttUnlikelyor_c • 0x050F: gAttInsufficientEncryption_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0510: gAttUnsupportedGroupType_c • 0x0511: gAttInsufficientResources_c • 0x0601: gGattAnotherProcedureInProgress_c • 0x0602: gGattLongAttributePacketsCorrupted_c • 0x0603: gGattMultipleAttributesOverflow_c • 0x0604: gGattUnexpectedReadMultipleResponseLength_c • 0x0605: gGattInvalidValueLength_c • 0x0606: gGattServerTimeout_c • 0x0607: gGattIndicationAlreadyInProgress_c • 0x0608: gGattClientConfirmationTimeout_c • 0x0701: gGapAdvDataTooLong_c • 0x0702: gGapScanRspDataTooLong_c • 0x0703: gGapDeviceNotBonded_c • 0x0704: gGapAnotherProcedureInProgress_c • 0x0801: gDevDbCccdLimitReached_c • 0x0802: gDevDbCccdNotFound_c • 0x0901: gGattDbInvalidHandle_c • 0x0902: gGattDbCharacteristicNotFound_c • 0x0903: gGattDbCccdNotFound_c • 0x0904: gGattDbServiceNotFound_c • 0x0905: gGattDbDescriptorNotFound_c |

3.2.25 GATTClient-ProcedureWriteCharacteristicValue.Indication

Description

Specifies that the Characteristic Write procedure for a given characteristic ended.

Parameters

| Parameter | Size (bytes) | Comments |
|-----------------|--------------|--|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x8C |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the active connection |
| ProcedureResult | 1 | <p>The result of the completed procedure</p> <p>Possible values:</p> <p>0x00: gGattProcSuccess_c (The procedure was completed successfully)</p> <p>0x01: gProcedureError_c (The procedure was terminated due to an error)</p> |
| Error | 2 | <p>If procedureResult is not gSuccess_c, this contains the error that terminated the procedure</p> <p>Possible values:</p> <ul style="list-style-type: none"> • 0x0000: gBleSuccess_c • 0x0001: gBleInvalidParameter_c • 0x0002: gBleOverflow_c • 0x0003: gBleUnavailable_c • 0x0004: gBleFeatureNotSupported_c • 0x0005: gBleOutOfMemory_c • 0x0006: gBleAlreadyInitialized_c • 0x0007: gBleOsError_c • 0x0008: gBleUnexpectedError_c • 0x0009: gBleInvalidState_c • 0x0101: gHciUnknownHciCommand_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0102: gHciUnknownConnectionIdentifier_c • 0x0103: gHciHardwareFailure_c • 0x0104: gHciPageTimeout_c • 0x0105: gHciAuthenticationFailure_c • 0x0106: gHciPinOrKeyMissing_c • 0x0107: gHciMemoryCapacityExceeded_c • 0x0108: gHciConnectionTimeout_c • 0x0109: gHciConnectionLimitExceeded_c • 0x010A: gHciSynchronousConnectionLimitToADeviceExceeded_c • 0x010B: gHciAclConnectionAlreadyExists_c • 0x010C: gHciCommandDisallowed_c • 0x010D: gHciConnectionRejectedDueToLimitedResources_c • 0x010E: gHciConnectionRejectedDueToSecurityReasons_c • 0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c • 0x0110: gHciConnectionAcceptTimeoutExceeded_c • 0x0111: gHciUnsupportedFeatureOrParameterValue_c • 0x0112: gHciInvalidHciCommandParameters_c • 0x0113: gHciRemoteUserTerminatedConnection_c |

| Table continued from the previous page... | | |
|---|--------------|--|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c • 0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c • 0x0116: gHciConnectionTerminatedByLocalHost_c • 0x0117: gHciRepeatedAttempts_c • 0x0118: gHciPairingNotAllowed_c • 0x0119: gHciUnknownLpmPdu_c • 0x011A: gHciUnsupportedRemoteFeature_c • 0x011B: gHciScoOffsetRejected_c • 0x011C: gHciScoIntervalRejected_c • 0x011D: gHciScoAirModeRejected_c • 0x011E: gHciInvalidLpmParameters_c • 0x011F: gHciUnspecifiedError_c • 0x0120: gHciUnsupportedLpmParameterValue_c • 0x0121: gHciRoleChangeNotAllowed_c • 0x0122: gHciLLResponseTimeout_c • 0x0123: gHciLmpErrorTransactionCollision_c • 0x0124: gHciLmpPduNotAllowed_c • 0x0125: gHciEncryptionModeNotAcceptable_c • 0x0126: gHciLinkKeyCannotBeChanged_c • 0x0127: gHciRequestedQosNotSupported_c • 0x0128: gHciInstantPassed_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0129: gHciPairingWithUnitKeyNotSupported_c • 0x012A: gHciDifferentTransactionCollision_c • 0x012B: gHciReserved_0x2B_c • 0x012C: gHciQosNotAcceptableParameter_c • 0x012D: gHciQosRejected_c • 0x012E: gHciChannelClassificationNotSupported_c • 0x012F: gHciInsufficientSecurity_c • 0x0130: gHciParameterOutOfMandatoryRange_c • 0x0131: gHciReserved_0x31_c • 0x0132: gHciRoleSwitchPending_c • 0x0133: gHciReserved_0x33_c • 0x0134: gHciReservedSlotViolation_c • 0x0135: gHciRoleSwitchFailed_c • 0x0136: gHciExtendedInquiryResponseTooLarge_c • 0x0137: gHciSecureSimplePairingNotSupportedByHost_c • 0x0138: gHciHostBusyPairing_c • 0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c • 0x013A: gHciControllerBusy_c • 0x013B: gHciUnacceptableConnectionParameters_c • 0x013C: gHciDirectedAdvertisingTimeout_c • 0x013D: gHciConnectionTerminatedDueToMicFailure_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x013E: gHciConnectionFailedToBeEstablished_c • 0x013F: gHciMacConnectionFailed_c • 0x0140: gHciCoarseClockAdjustmentRejected_c • 0x0141: gHciType0SubmapNotDefined_c • 0x0142: gHciUnknownAdvertisingIdentifier_c • 0x0143: gHciLimitReached_c • 0x0144: gHciOperationCancelledByHost_c • 0x01A0: gHciAlreadyInit_c • 0x01A1: gHciInvalidParameter_c • 0x01A2: gHciCallbackNotInstalled_c • 0x01A3: gHciCallbackAlreadyInstalled_c • 0x01A4: gHciCommandNotSupported_c • 0x01A5: gHciEventNotSupported_c • 0x01A6: gHciTransportError_c • 0x03F0: gL2caAlreadyInit_c • 0x03F1: gL2caInsufficientResources_c • 0x03F2: gL2caCallbackNotInstalled_c • 0x03F3: gL2caCallbackAlreadyInstalled_c • 0x03F4: gL2caLePsmInvalid_c • 0x03F5: gL2caLePsmAlreadyRegistered_c • 0x03F6: gL2caLePsmNotRegistered_c • 0x03F7: gL2caLePsmInsufficientResources_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x03F8: gL2caChannelInvalid_c • 0x03F9: gL2caChannelClosed_c • 0x03FA: gL2caChannelAlreadyConnected_c • 0x03FB: gL2caConnectionParametersRejected_c • 0x03FC: gL2caChannelBusy_c • 0x03FE: gL2caInvalidParameter_c • 0x03FF: gL2caError_c • 0x0401: gSmNullCBFunction_c • 0x0402: gSmCommandNotSupported_c • 0x0403: gSmUnexpectedCommand_c • 0x0404: gSmInvalidCommandCode_c • 0x0405: gSmInvalidCommandLength_c • 0x0406: gSmInvalidCommandParameter_c • 0x0407: gSmInvalidDeviceId_c • 0x0408: gSmInvalidInternalOperation_c • 0x0409: gSmInvalidConnectionHandle_c • 0x040A: gSmImproperKeyDistributionField_c • 0x040B: gSmUnexpectedKeyType_c • 0x040C: gSmUnexpectedPairingTerminationReason_c • 0x040D: gSmUnexpectedKeyset_c • 0x040E: gSmSmpTimeoutOccurred_c • 0x040F: gSmUnknownSmpPacketType_c • 0x0410: gSmInvalidSmpPacketLength_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0411: gSmInvalidSmpPacketParameter_c • 0x0412: gSmReceivedUnexpectedSmpPacket_c • 0x0413: gSmReceivedSmpPacketFromUnknownDevice_c • 0x0414: gSmReceivedUnexpectedHciEvent_c • 0x0415: gSmReceivedHciEventFromUnknownDevice_c • 0x0416: gSmInvalidHciEventParameter_c • 0x0417: gSmLlConnectionEncryptionInProgress_c • 0x0418: gSmLlConnectionEncryptionFailure_c • 0x0419: gSmInsufficientResources_c • 0x041A: gSmOobDataAddressMismatch_c • 0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c • 0x041C: gSmReceivedTimerEventForUnknownDevice_c • 0x041D: gSmUnattainableLocalDeviceSecRequirements_c • 0x041E: gSmUnattainableLocalDeviceMinKeySize_c • 0x041F: gSmUnattainableSlaveSecReqRequirements_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0431: gSmPairingErrorPasskeyEntryFailed_c • 0x0432: gSmPairingErrorConfirmValueFailed_c • 0x0433: gSmPairingErrorCommandNotSupported_c • 0x0434: gSmPairingErrorInvalidParameters_c • 0x0435: gSmPairingErrorUnknownReason_c • 0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c • 0x0461: gSmTbInvalidDataSignature_c • 0x0501: gAttInvalidHandle_c • 0x0502: gAttReadNotPermitted_c • 0x0503: gAttWriteNotPermitted_c • 0x0504: gAttInvalidPdu_c • 0x0505: gAttInsufficientAuthentication_c • 0x0506: gAttRequestNotSupported_c • 0x0507: gAttInvalidOffset_c • 0x0508: gAttInsufficientAuthorization_c • 0x0509: gAttPrepareQueueFull_c • 0x050A: gAttAttributeNotFound_c • 0x050B: gAttAttributeNotLong_c • 0x050C: gAttInsufficientEncryptionKeySize_c • 0x050D: gAttInvalidAttributeValueLength_c • 0x050E: gAttUnlikely_c • 0x050F: gAttInsufficientEncryption_c |

| Table continued from the previous page... | | |
|---|--------------|---|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0510: gAttUnsupportedGroupType_c • 0x0511: gAttInsufficientResources_c • 0x0601: gGattAnotherProcedureInProgress_c • 0x0602: gGattLongAttributePacketsCorrupted_c • 0x0603: gGattMultipleAttributesOverflow_c • 0x0604: gGattUnexpectedReadMultipleResponseLength_c • 0x0605: gGattInvalidValueLength_c • 0x0606: gGattServerTimeout_c • 0x0607: gGattIndicationAlreadyInProgress_c • 0x0608: gGattClientConfirmationTimeout_c • 0x0701: gGapAdvDataTooLong_c • 0x0702: gGapScanRspDataTooLong_c • 0x0703: gGapDeviceNotBonded_c • 0x0704: gGapAnotherProcedureInProgress_c • 0x0801: gDevDbCccdLimitReached_c • 0x0802: gDevDbCccdNotFound_c • 0x0901: gGattDbInvalidHandle_c • 0x0902: gGattDbCharacteristicNotFound_c • 0x0903: gGattDbCccdNotFound_c • 0x0904: gGattDbServiceNotFound_c • 0x0905: gGattDbDescriptorNotFound_c |

3.2.26 GATTClient-ReadCharacteristicDescriptor.Request

Description

Initializes the Characteristic Descriptor Read procedure for a given Characteristic Descriptor.

Parameters

Table 124. GATTClient-ReadCharacteristicDescriptor.Request Parameters

| Parameter | Size (bytes) | Comments |
|--------------|--------------|---|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x13 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID of the connected peer |
| Descriptor | Variable | The characteristic descriptor whose value must be read Structure type parameter. See the detailed table below for parameter structure. |
| MaxReadBytes | 2 | Maximum number of bytes to be read |

Table 125. Descriptor Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Handle | 2 | Attribute handle |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| ValueLength | 2 | Length of the attribute value array |
| MaxValueLength | 2 | Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed |
| Value | ValueLength | Attribute value array |

Table 126. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

3.2.27 GATTClient-ReadCharacteristicValue.Request

Description

Initializes the Characteristic Read procedure for a given Characteristic.

Parameters

Table 127. GATTClient-ReadCharacteristicValue.Request Parameters

| Parameter | Size (bytes) | Comments |
|----------------|--------------|--|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x0F |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID of the connected peer |
| Characteristic | Variable | The characteristic whose value must be read Structure type parameter. See the detailed table below for parameter structure. |
| MaxReadBytes | 2 | Maximum number of bytes to be read |

Table 128. Characteristic Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|---|
| Properties | 1 | Characteristic Properties as defined by GATT Possible values: 0x00: gNone_c (No Properties selected) 0x01: gBroadcast_c (Characteristic can be broadcast) 0x02: gRead_c (Characteristic can be read) 0x04: gWriteWithoutRsp_c (Characteristic can be written without response) |

Table continues on the next page...

Table 128. Characteristic Parameter Structure (continued)

| | | |
|-----------------|----------|---|
| | | 0x08: gWrite_c (Characteristic can be written with response) 0x10: gNotify_c (Characteristic can be notified) 0x20: gIndicate_c (Characteristic can be indicated) 0x40: gAuthSignedWrites_c (Characteristic can be written with signed data) 0x80: gExtendedProperties_c (Extended Characteristic properties) |
| Value | Variable | Characteristic Value attribute Structure type parameter. See the detailed table below for parameter structure. |
| NbOfDescriptors | 1 | Size of the Characteristic Descriptors array |
| Descriptors | Variable | Characteristic Descriptors array Structure type parameter. See the detailed table below for parameter structure. |

Table 129. Value Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Handle | 2 | Attribute handle |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| ValueLength | 2 | Length of the attribute value array |
| MaxValueLength | 2 | Maximum length of the attribute value array; if this is set to 0, then the |

Table continues on the next page...

Table 129. Value Parameter Structure (continued)

| | | |
|-------|-------------|---|
| | | attribute's length is fixed and cannot be changed |
| Value | ValueLength | Attribute value array |

Table 130. Descriptors Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Handle | 2 | Attribute handle |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| ValueLength | 2 | Length of the attribute value array |
| MaxValueLength | 2 | Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed |
| Value | ValueLength | Attribute value array |

Table 131. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

Table 132. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

3.2.28 GATTClient-ReadMultipleCharacteristicValues.Request

Description

Initializes the Characteristic Read Multiple procedure.

Parameters

Table 133. GATTClient-ReadMultipleCharacteristicValues.Request Parameters

| Parameter | Size (bytes) | Comments |
|---------------------|--------------|---|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x11 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID of the connected peer |
| NbOfCharacteristics | 1 | Number of characteristics in the array |
| Characteristics | Variable | Array of the characteristics whose values are to be read Structure type parameter. See the detailed table below for parameter structure. |

Table 134. Characteristics Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Properties | 1 | Characteristic Properties as defined by GATT Possible values: 0x00: gNone_c (No Properties selected) 0x01: gBroadcast_c (Characteristic can be broadcast) 0x02: gRead_c (Characteristic can be read) 0x04: gWriteWithoutRsp_c (Characteristic can be written without response) 0x08: gWrite_c (Characteristic can be written with response) 0x10: gNotify_c (Characteristic can be notified) 0x20: gIndicate_c (Characteristic can be indicated) 0x40: gAuthSignedWrites_c (Characteristic can be written with signed data) 0x80: gExtendedProperties_c (Extended Characteristic properties) |

Table continues on the next page...

Table 134. Characteristics Parameter Structure (continued)

| | | |
|-----------------|----------|---|
| Value | Variable | Characteristic Value attribute Structure type parameter. See the detailed table below for parameter structure. |
| NbOfDescriptors | 1 | Size of the Characteristic Descriptors array |
| Descriptors | Variable | Characteristic Descriptors array Structure type parameter. See the detailed table below for parameter structure. |

Table 135. Value Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Handle | 2 | Attribute handle |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| ValueLength | 2 | Length of the attribute value array |
| MaxValueLength | 2 | Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed |
| Value | ValueLength | Attribute value array |

Table 136. Descriptors Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|---|
| Handle | 2 | Attribute handle |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits |

Table continues on the next page...

Table 136. Descriptors Parameter Structure (continued)

| | | |
|----------------|-------------|--|
| | | 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| ValueLength | 2 | Length of the attribute value array |
| MaxValueLength | 2 | Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed |
| Value | ValueLength | Attribute value array |

Table 137. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

Table 138. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

3.2.29 GATTClient-ReadUsingCharacteristicUuid.Request

Description

Initializes the Characteristic Read by Uuid procedure.

Parameters

Table 139. GATTClient-ReadUsingCharacteristicUUID.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x10 |
| Length | 1 | Length in bytes of the following parameters |

Table continues on the next page...

Table 139. GATTClient-ReadUsingCharacteristicUUID.Request Parameters (continued)

| | | |
|---------------------|----------|--|
| DeviceId | 1 | Device ID of the connected peer |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| HandleRangeIncluded | 1 | Boolean value which indicates if handle range is included or not |
| HandleRange | Variable | Handle range for the search Structure type parameter. See the detailed table below for parameter structure. |
| MaxReadBytes | 2 | Maximum number of bytes to be read |

Table 140. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

Table 141. HandleRange Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--------------|
| StartHandle | 2 | Start handle |
| EndHandle | 2 | End handle |

3.2.30 GATTClient-RegisterIndicationCallback.Request

Description

Installs the application callback for Server Indications.

Parameters

Table 142. GATTClient-RegisterIndicationCallback.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|----------|
|-----------|--------------|----------|

Table continues on the next page...

Table 142. GATTClient-RegisterIndicationCallback.Request Parameters (continued)

| | | |
|---------|---|--|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x07 |
| Length | 1 | 0x00 - This message does not have any parameters |

3.2.31 GATTClient-RegisterNotificationCallback.Request

Description

Installs the application callback for Server Notifications.

Parameters

Table 143. GATTClient-RegisterNotificationCallback.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x06 |
| Length | 1 | 0x00 - This message does not have any parameters |

3.2.32 GATTClient-RegisterProcedureCallback.Request

Description

Installs the application callback for the GATT Client module Procedures.

Parameters

Table 144. GATTClient-RegisterProcedureCallback.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x05 |
| Length | 1 | 0x00 - This message does not have any parameters |

3.2.33 GATTClient-ResetProcedure.Request

Description

Resets any ongoing GATT Client procedure.

Parameters

Table 145. GATTClient-ResetProcedure.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|----------|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x04 |

Table continues on the next page...

Table 145. GATTClient-ResetProcedure.Request Parameters (continued)

| | | |
|--------|---|--|
| Length | 1 | 0x00 - This message does not have any parameters |
|--------|---|--|

3.2.34 GATTClient-WriteCharacteristicDescriptor.Request

Description

Initializes the Characteristic Descriptor Write procedure for a given Characteristic Descriptor.

Parameters

Table 146. GATTClient-WriteCharacteristicDescriptor.Request Parameters

| Parameter | Size (bytes) | Comments |
|-------------|--------------|--|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x14 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID of the connected peer |
| Descriptor | Variable | The characteristic descriptor whose value must be written Structure type parameter. See the detailed table below for parameter structure. |
| ValueLength | 2 | Number of bytes to be written |
| Value | ValueLength | Array of bytes to be written |

Table 147. Descriptor Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Handle | 2 | Attribute handle |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| ValueLength | 2 | Length of the attribute value array |

Table continues on the next page...

Table 147. Descriptor Parameter Structure (continued)

| | | |
|----------------|-------------|--|
| MaxValueLength | 2 | Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed |
| Value | ValueLength | Attribute value array |

Table 148. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

3.2.35 GATTClient-WriteCharacteristicValue.Request

Description

Initializes the Characteristic Write procedure for a given Characteristic.

Parameters

Table 149. GATTClient-WriteCharacteristicValue.Request Parameters

| Parameter | Size (bytes) | Comments |
|------------------------|--------------|---|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x12 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID of the connected peer |
| Characteristic | Variable | The characteristic whose value must be written Structure type parameter. See the detailed table below for parameter structure. |
| ValueLength | 2 | Number of bytes to be written |
| Value | ValueLength | Array of bytes to be written |
| WithoutResponse | 1 | Indicates if a Write Command will be used |
| SignedWrite | 1 | Indicates if a Signed Write will be performed |
| ReliableLongCharWrites | 1 | Indicates Reliable Long Writes |
| Csrk | 16 | The CSRK if signedWrite is TRUE, ignored otherwise |

Table 150. Characteristic Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|---|
| Properties | 1 | <p>Characteristic Properties as defined by GATT</p> <p>Possible values:</p> <p>0x00: gNone_c (No Properties selected)</p> <p>0x01: gBroadcast_c (Characteristic can be broadcast)</p> <p>0x02: gRead_c (Characteristic can be read)</p> <p>0x04: gWriteWithoutRsp_c (Characteristic can be written without response)</p> <p>0x08: gWrite_c (Characteristic can be written with response)</p> <p>0x10: gNotify_c (Characteristic can be notified)</p> <p>0x20: gIndicate_c (Characteristic can be indicated)</p> <p>0x40: gAuthSignedWrites_c (Characteristic can be written with signed data)</p> <p>0x80: gExtendedProperties_c (Extended Characteristic properties)</p> |
| Value | Variable | <p>Characteristic Value attribute</p> <p>Structure type parameter. See the detailed table below for parameter structure.</p> |
| NbOfDescriptors | 1 | Size of the Characteristic Descriptors array |
| Descriptors | Variable | <p>Characteristic Descriptors array</p> <p>Structure type parameter. See the detailed table below for parameter structure.</p> |

Table 151. Value Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Handle | 2 | Attribute handle |
| UuidType | 1 | <p>UUID type</p> <p>Possible values:</p> |

Table continues on the next page...

Table 151. Value Parameter Structure (continued)

| | | |
|----------------|-------------|--|
| | | 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| ValueLength | 2 | Length of the attribute value array |
| MaxValueLength | 2 | Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed |
| Value | ValueLength | Attribute value array |

Table 152. Descriptors Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Handle | 2 | Attribute handle |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| ValueLength | 2 | Length of the attribute value array |
| MaxValueLength | 2 | Maximum length of the attribute value array; if this is set to 0, then the attribute's length is fixed and cannot be changed |
| Value | ValueLength | Attribute value array |

Table 153. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|----------|
|----------|---------------------|--------------|----------|

Table continues on the next page...

Table 153. Uuid Parameter Structure (continued)

| | | | |
|------|-------------|----|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

Table 154. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

3.2.36 GATT-GetMtu.Request

Description

Retrieves the MTU used with a given connected device.

Parameters

Table 155. GATT-GetMtu.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x02 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID of the connected peer |

3.2.37 GATT-GetMtu.Indication

Description

Specifies the MTU used with a given connected device.

Parameters

Table 156. GATT-GetMtu.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x81 |
| Length | 1 | Length in bytes of the following parameters |
| Mtu | 2 | MTU value |

3.2.38 GATT-Init.Request

Description

Initializes the GATT module.

Parameters

Table 157. GATT-Init.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x01 |
| Length | 1 | 0x00 - This message does not have any parameters |

3.2.39 GATTServer-AttributeRead.Indication

Description

GATT Server attribute read.

Parameters

Table 158. GATTServer-AttributeRead.Indication Parameters

| Parameter | Size (bytes) | Comments |
|--------------------|--------------|---|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x98 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the active connection |
| AttributeReadEvent | Variable | Attribute read event Structure type parameter. See the detailed table below for parameter structure. |

Table 159. AttributeReadEvent Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|-------------------------|
| Handle | 2 | Handle of the attribute |

3.2.40 GATTServer-AttributeWritten.Indication

Description

GATT Server attribute written.

Parameters

Table 160. GATTServer-AttributeWritten.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|----------|
| OpGroup | 1 | 0x45 |

Table continues on the next page...

Table 160. GATTServer-AttributeWritten.Indication Parameters (continued)

| | | |
|-----------------------|----------|--|
| OpCode | 1 | 0x93 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the active connection |
| AttributeWrittenEvent | Variable | Attribute written event Structure type parameter. See the detailed table below for parameter structure. |

Table 161. AttributeWrittenEvent Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|---|
| Handle | 2 | Handle of the attribute |
| ValueLength | 2 | Length of the attribute value array |
| Value | ValueLength | Attribute value array attempted to be written |

3.2.41 GATTServer-AttributeWrittenWithoutResponse.Indication

Description

GATT Server attribute written without response.

Parameters

Table 162. GATTServer-AttributeWrittenWithoutResponse.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------------------|--------------|--|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x95 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the active connection |
| AttributeWrittenEvent | Variable | Attribute written event Structure type parameter. See the detailed table below for parameter structure. |

Table 163. AttributeWrittenEvent Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|-------------------------|
| Handle | 2 | Handle of the attribute |

Table continues on the next page...

Table 163. AttributeWrittenEvent Parameter Structure (continued)

| | | |
|-------------|-------------|---|
| ValueLength | 2 | Length of the attribute value array |
| Value | ValueLength | Attribute value array attempted to be written |

3.2.42 GATTServer-CharacteristicCccdWritten.Indication

Description

GATT Server characteristic cccd written.

Parameters

Table 164. GATTServer-CharacteristicCccdWritten.Indication Parameters

| Parameter | Size (bytes) | Comments |
|----------------------|--------------|--|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x94 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the active connection |
| CharCccdWrittenEvent | Variable | Characteristic cccd written event Structure type parameter. See the detailed table below for parameter structure. |

Table 165. CharCccdWrittenEvent Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|---|
| Handle | 2 | Handle of the CCCD attribute |
| NewCccd | 1 | New value of the CCCD Possible values: 0x00: gCccdEmpty_c 0x01: gCccdNotification_c 0x02: gCccdIndication_c |

3.2.43 GATTServer-Error.Indication

Description

GATT Server error.

Parameters

Table 166. GATTServer-Error.Indication Parameters

| Parameter | Size (bytes) | Comments |
|----------------|--------------|--|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x96 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the active connection |
| ProcedureError | Variable | Procedure error Structure type parameter. See the detailed table below for parameter structure. |

| Procedure Error Structure Parameter | Size (bytes) | Comments |
|-------------------------------------|--------------|--|
| ProcedureType | 1 | Procedure that generated error Possible values: 0x00: gSendAttributeWrittenStatus_c (Procedure initiated by GattServer_SendAttributeWrittenStatus) 0x01: gSendAttributeReadStatus_c (Procedure initiated by GattServer_SendAttributeReadStatus) 0x02: gSendNotification_c (Procedure initiated by GattServer_SendNotification) 0x03: gSendIndication_c (Procedure initiated by GattServer_SendIndication) |
| Error | 2 | Error generated Possible values: <ul style="list-style-type: none"> • 0x0000: gBleSuccess_c • 0x0001: gBleInvalidParameter_c • 0x0002: gBleOverflow_c • 0x0003: gBleUnavailable_c • 0x0004: gBleFeatureNotSupported_c • 0x0005: gBleOutOfMemory_c • 0x0006: gBleAlreadyInitialized_c • 0x0007: gBleOsError_c |

Table continued from the previous page...

| Procedure Error Structure Parameter | Size (bytes) | Comments |
|-------------------------------------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0008: gBleUnexpectedError_c • 0x0009: gBleInvalidState_c • 0x0101: gHciUnknownHciCommand_c • 0x0102: gHciUnknownConnectionIdentifier_c • 0x0103: gHciHardwareFailure_c • 0x0104: gHciPageTimeout_c • 0x0105: gHciAuthenticationFailure_c • 0x0106: gHciPinOrKeyMissing_c • 0x0107: gHciMemoryCapacityExceeded_c • 0x0108: gHciConnectionTimeout_c • 0x0109: gHciConnectionLimitExceeded_c • 0x010A: gHciSynchronousConnectionLimitToADeviceExceeded_c • 0x010B: gHciAclConnectionAlreadyExists_c • 0x010C: gHciCommandDisallowed_c • 0x010D: gHciConnectionRejectedDueToLimitedResources_c • 0x010E: gHciConnectionRejectedDueToSecurityReasons_c • 0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c • 0x0110: gHciConnectionAcceptTimeoutExceeded_c • 0x0111: gHciUnsupportedFeatureOrParameterValue_c |

| Table continued from the previous page... | | |
|---|--------------|--|
| Procedure Error Structure Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0112: gHciInvalidHciCommandParameters_c • 0x0113: gHciRemoteUserTerminatedConnection_c • 0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c • 0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c • 0x0116: gHciConnectionTerminatedByLocalHost_c • 0x0117: gHciRepeatedAttempts_c • 0x0118: gHciPairingNotAllowed_c • 0x0119: gHciUnknownLpmPdu_c • 0x011A: gHciUnsupportedRemoteFeature_c • 0x011B: gHciScoOffsetRejected_c • 0x011C: gHciScoIntervalRejected_c • 0x011D: gHciScoAirModeRejected_c • 0x011E: gHciInvalidLpmParameters_c • 0x011F: gHciUnspecifiedError_c • 0x0120: gHciUnsupportedLpmParameterValue_c • 0x0121: gHciRoleChangeNotAllowed_c • 0x0122: gHciLLResponseTimeout_c • 0x0123: gHciLmpErrorTransactionCollision_c • 0x0124: gHciLmpPduNotAllowed_c • 0x0125: gHciEncryptionModeNotAcceptable_c |

Table continued from the previous page...

| Procedure Error Structure Parameter | Size (bytes) | Comments |
|-------------------------------------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0126: gHciLinkKeyCannotBeChanged_c • 0x0127: gHciRequestedQosNotSupported_c • 0x0128: gHciInstantPassed_c • 0x0129: gHciPairingWithUnitKeyNotSupported_c • 0x012A: gHciDifferentTransactionCollision_c • 0x012B: gHciReserved_0x2B_c • 0x012C: gHciQosNotAcceptableParameter_c • 0x012D: gHciQosRejected_c • 0x012E: gHciChannelClassificationNotSupported_c • 0x012F: gHciInsufficientSecurity_c • 0x0130: gHciParameterOutOfMandatoryRange_c • 0x0131: gHciReserved_0x31_c • 0x0132: gHciRoleSwitchPending_c • 0x0133: gHciReserved_0x33_c • 0x0134: gHciReservedSlotViolation_c • 0x0135: gHciRoleSwitchFailed_c • 0x0136: gHciExtendedInquiryResponseTooLarge_c • 0x0137: gHciSecureSimplePairingNotSupportedByHost_c • 0x0138: gHciHostBusyPairing_c • 0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c • 0x013A: gHciControllerBusy_c |

Table continued from the previous page...

| Procedure Error Structure Parameter | Size (bytes) | Comments |
|-------------------------------------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x013B: gHciUnacceptableConnectionParameters_c • 0x013C: gHciDirectedAdvertisingTimeout_c • 0x013D: gHciConnectionTerminatedDueToMicFailure_c • 0x013E: gHciConnectionFailedToBeEstablished_c • 0x013F: gHciMacConnectionFailed_c • 0x0140: gHciCoarseClockAdjustmentRejected_c • 0x01A0: gHciAlreadyInit_c • 0x01A1: gHciInvalidParameter_c • 0x01A2: gHciCallbackNotInstalled_c • 0x01A3: gHciCallbackAlreadyInstalled_c • 0x01A4: gHciCommandNotSupported_c • 0x01A5: gHciEventNotSupported_c • 0x01A6: gHciTransportError_c • 0x03F0: gL2caAlreadyInit_c • 0x03F1: gL2caInsufficientResources_c • 0x03F2: gL2caCallbackNotInstalled_c • 0x03F3: gL2caCallbackAlreadyInstalled_c • 0x03F4: gL2caLePsmInvalid_c • 0x03F5: gL2caLePsmAlreadyRegistered_c • 0x03F6: gL2caLePsmNotRegistered_c • 0x03F7: gL2caLePsmInsufficientResources_c |

Table continued from the previous page...

| Procedure Error Structure Parameter | Size (bytes) | Comments |
|-------------------------------------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x03F8: gL2caChannelInvalid_c • 0x03F9: gL2caChannelClosed_c • 0x03FA: gL2caChannelAlreadyConnected_c • 0x03FB: gL2caConnectionParametersRejected_c • 0x03FC: gL2caChannelBusy_c • 0x03FE: gL2caInvalidParameter_c • 0x03FF: gL2caError_c • 0x0401: gSmNullCBFunction_c • 0x0402: gSmCommandNotSupported_c • 0x0403: gSmUnexpectedCommand_c • 0x0404: gSmInvalidCommandCode_c • 0x0405: gSmInvalidCommandLength_c • 0x0406: gSmInvalidCommandParameter_c • 0x0407: gSmInvalidDeviceId_c • 0x0408: gSmInvalidInternalOperation_c • 0x0409: gSmInvalidConnectionHandle_c • 0x040A: gSmImproperKeyDistributionField_c • 0x040B: gSmUnexpectedKeyType_c • 0x040C: gSmUnexpectedPairingTerminationReason_c • 0x040D: gSmUnexpectedKeyset_c • 0x040E: gSmSmpTimeoutOccurred_c • 0x040F: gSmUnknownSmpPacketType_c • 0x0410: gSmInvalidSmpPacketLength_c |

Table continued from the previous page...

| Procedure Error Structure Parameter | Size (bytes) | Comments |
|-------------------------------------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0411: gSmInvalidSmpPacketParameter_c • 0x0412: gSmReceivedUnexpectedSmpPacket_c • 0x0413: gSmReceivedSmpPacketFromUnknownDevice_c • 0x0414: gSmReceivedUnexpectedHciEvent_c • 0x0415: gSmReceivedHciEventFromUnknownDevice_c • 0x0416: gSmInvalidHciEventParameter_c • 0x0417: gSmLlConnectionEncryptionInProgress_c • 0x0418: gSmLlConnectionEncryptionFailure_c • 0x0419: gSmInsufficientResources_c • 0x041A: gSmOobDataAddressMismatch_c • 0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c • 0x041C: gSmReceivedTimerEventForUnknownDevice_c • 0x041D: gSmUnattainableLocalDeviceSecRequirements_c • 0x041E: gSmUnattainableLocalDeviceMinKeySize_c • 0x041F: gSmUnattainableSlaveSecReqRequirements_c |

Table continued from the previous page...

| Procedure Error Structure Parameter | Size (bytes) | Comments |
|-------------------------------------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0431: gSmPairingErrorPasskeyEntryFailed_c • 0x0432: gSmPairingErrorConfirmValueFailed_c • 0x0433: gSmPairingErrorCommandNotSupported_c • 0x0434: gSmPairingErrorInvalidParameters_c • 0x0435: gSmPairingErrorUnknownReason_c • 0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c • 0x0461: gSmTbInvalidDataSignature_c • 0x0501: gAttInvalidHandle_c • 0x0502: gAttReadNotPermitted_c • 0x0503: gAttWriteNotPermitted_c • 0x0504: gAttInvalidPdu_c • 0x0505: gAttInsufficientAuthentication_c • 0x0506: gAttRequestNotSupported_c • 0x0507: gAttInvalidOffset_c • 0x0508: gAttInsufficientAuthorization_c • 0x0509: gAttPrepareQueueFull_c • 0x050A: gAttAttributeNotFound_c • 0x050B: gAttAttributeNotLong_c • 0x050C: gAttInsufficientEncryptionKeySize_c • 0x050D: gAttInvalidAttributeValueLength_c • 0x050E: gAttUnlikely_c • 0x050F: gAttInsufficientEncryption_c |

| Table continued from the previous page... | | |
|---|--------------|---|
| Procedure Error Structure Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0510: gAttUnsupportedGroupType_c • 0x0511: gAttInsufficientResources_c • 0x0601: gGattAnotherProcedureInProgress_c • 0x0602: gGattLongAttributePacketsCorrupted_c • 0x0603: gGattMultipleAttributesOverflow_c • 0x0604: gGattUnexpectedReadMultipleResponseLength_c • 0x0605: gGattInvalidValueLength_c • 0x0606: gGattServerTimeout_c • 0x0607: gGattIndicationAlreadyInProgress_c • 0x0608: gGattClientConfirmationTimeout_c • 0x0701: gGapAdvDataTooLong_c • 0x0702: gGapScanRspDataTooLong_c • 0x0703: gGapDeviceNotBonded_c • 0x0801: gDevDbCccdLimitReached_c • 0x0802: gDevDbCccdNotFound_c • 0x0901: gGattDbInvalidHandle_c • 0x0902: gGattDbCharacteristicNotFound_c • 0x0903: gGattDbCccdNotFound_c • 0x0904: gGattDbServiceNotFound_c • 0x0905: gGattDbDescriptorNotFound_c |

3.2.44 GATTServer-HandleValueConfirmation.Indication

Description

GATT Server handle value confirmation.

Parameters**Table 167. GATTServer-HandleValueConfirmation.Indication Parameters**

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x92 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the active connection |

3.2.45 GATTServer-Init.Request

Description

Initializes the GATT Server module.

Parameters**Table 168. GATTServer-Init.Request Parameters**

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x15 |
| Length | 1 | 0x00 - This message does not have any parameters |

3.2.46 GATTServer-LongCharacteristicWritten.Indication

Description

GATT Server long characteristic written.

Parameters**Table 169. GATTServer-LongCharacteristicWritten.Indication Parameters**

| Parameter | Size (bytes) | Comments |
|--------------------------------|--------------|--|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x97 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the active connection |
| LongCharacteristicWrittenEvent | Variable | Long characteristic written event Structure type parameter. See the detailed table below for parameter structure. |

Table 170. LongCharacteristicWrittenEvent Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|------------------------------------|
| Handle | 2 | Handle of the characteristic value |
| ValueLength | 2 | Length of the characteristic value |
| Value | ValueLength | Characteristic value array |

3.2.47 GATTServer-MtuChanged.Indication

Description

GATT Server MTU changed indication.

Parameters

Table 171. GATTServer-MtuChanged.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------------|--------------|--|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x91 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the active connection |
| MtuChangedEvent | Variable | Mtu changed event Structure type parameter. See the detailed table below for parameter structure. |

Table 172. MtuChangedEvent Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|---|
| NewMtu | 2 | Value of the agreed ATT_MTU for this connection |

3.2.48 GATTServer-RegisterCallback.Request

Description

Installs an application callback for the GATT Server module.

Parameters

Table 173. GATTServer-RegisterCallback.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x16 |
| Length | 1 | 0x00 - This message does not have any parameters |

3.2.49 GATTServer-RegisterHandlesForReadNotifications.Request

Description

Registers the attribute handles that will be notified through the GATT Server callback when a GATT Client attempts to read the attributes' values.

Parameters

Table 174. GATTServer-RegisterHandlesForReadNotifications.Request Parameters

| Parameter | Size (bytes) | Comments |
|------------------|--------------|--|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x1D |
| Length | 1 | Length in bytes of the following parameters |
| HandleCount | 1 | Number of handles in array |
| AttributeHandles | Variable | Statically allocated array of handles Structure type parameter. See the detailed table below for parameter structure. |

Table 175. AttributeHandles Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|------------------|
| Handle | 2 | Attribute handle |

3.2.50 GATTServer-RegisterHandlesForWriteNotifications.Request

Description

Registers the attribute handles that will be notified through the GATT Server callback when a GATT Client attempts to modify the attributes' values.

Parameters

Table 176. GATTServer-RegisterHandlesForWriteNotifications.Request Parameters

| Parameter | Size (bytes) | Comments |
|------------------|--------------|--|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x17 |
| Length | 1 | Length in bytes of the following parameters |
| HandleCount | 1 | Number of handles in array |
| AttributeHandles | Variable | Statically allocated array of handles Structure type parameter. See the detailed table below for parameter structure. |

Table 177. AttributeHandles Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|------------------|
| Handle | 2 | Attribute handle |

3.2.51 GATTServer-SendAttributeReadStatus.Request

Description

Responds to an intercepted attribute read operation.

Parameters

Table 178. GATTServer-SendAttributeReadStatus.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------------|--------------|---|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x1E |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | The device ID of the connected peer |
| AttributeHandle | 2 | The attribute handle that was read |
| Status | 1 | The status of the read operation |

3.2.52 GATTServer-SendAttributeWrittenStatus.Request

Description

Responds to a Control Point write operation.

Parameters

Table 179. GATTServer-SendAttributeWrittenStatus.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------------|--------------|---|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x18 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | The device ID of the connected peer |
| AttributeHandle | 2 | The attribute handle that was written |
| Status | 1 | The status of the write operation |

3.2.53 GATTServer-SendIndication.Request

Description

Sends an indication to a peer GATT Client.

Parameters

Table 180. GATTServer-SendIndication.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x1A |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | The device ID of the connected peer |
| Handle | 2 | Handle of the Value of the Characteristic to be indicated |

3.2.54 GATTServer-SendInstantValueIndication.Request

Description

Sends an indication to a peer GATT Client with data given as parameter, ignoring the GATT Database.

Parameters

Table 181. GATTServer-SendInstantValueIndication.Request Parameters

| Parameter | Size (bytes) | Comments |
|-------------|--------------|---|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x1C |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | The device ID of the connected peer |
| Handle | 2 | Handle of the Value of the Characteristic to be indicated |
| ValueLength | 2 | Length of data to be indicated |
| Value | ValueLength | Data to be indicated |

3.2.55 GATTServer-SendInstantValueNotification.Request

Description

Sends a notification to a peer GATT Client with data given as parameter, ignoring the GATT Database.

Parameters

Table 182. GATTServer-SendInstantValueNotification.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x1B |
| Length | 1 | Length in bytes of the following parameters |

Table continues on the next page...

Table 182. GATTServer-SendInstantValueNotification.Request Parameters (continued)

| | | |
|-------------|-------------|--|
| DeviceId | 1 | The device ID of the connected peer |
| Handle | 2 | Handle of the Value of the Characteristic to be notified |
| ValueLength | 2 | Length of data to be notified |
| Value | ValueLength | Data to be notified |

3.2.56 GATTServer-SendNotification.Request

Description

Sends a notification to a peer GATT Client.

Parameters

Table 183. GATTServer-SendNotification.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x45 |
| OpCode | 1 | 0x19 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | The device ID of the connected peer |
| Handle | 2 | Handle of the Value of the Characteristic to be notified |

3.3 GATTDB_App Messages

3.3.1 GATTDB.Confirm

Description

Status of the GATT Database (application) request.

Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x46 |
| OpCode | 1 | 0x80 |
| Length | 1 | Length in bytes of the following parameters |
| Status | 2 | cid="1VACBF"> The status of the GATT Database request Possible values: |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0000: gBleSuccess_c • 0x0001: gBleInvalidParameter_c • 0x0002: gBleOverflow_c • 0x0003: gBleUnavailable_c • 0x0004: gBleFeatureNotSupported_c • 0x0005: gBleOutOfMemory_c • 0x0006: gBleAlreadyInitialized_c • 0x0007: gBleOsError_c • 0x0008: gBleUnexpectedError_c • 0x0009: gBleInvalidState_c • 0x0101: gHciUnknownHciCommand_c • 0x0102: gHciUnknownConnectionIdentifier_c • 0x0103: gHciHardwareFailure_c • 0x0104: gHciPageTimeout_c • 0x0105: gHciAuthenticationFailure_c • 0x0106: gHciPinOrKeyMissing_c • 0x0107: gHciMemoryCapacityExceeded_c • 0x0108: gHciConnectionTimeout_c • 0x0109: gHciConnectionLimitExceeded_c • 0x010A: gHciSynchronousConnectionLimitToADeviceExceeded_c • 0x010B: gHciAclConnectionAlreadyExists_c • 0x010C: gHciCommandDisallowed_c • 0x010D: gHciConnectionRejectedDueToLimitedResources_c • 0x010E: gHciConnectionRejectedDueToSecurityReasons_c |

| Table continued from the previous page... | | |
|---|--------------|--|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c • 0x0110: gHciConnectionAcceptTimeoutExceeded_c • 0x0111: gHciUnsupportedFeatureOrParameterValue_c • 0x0112: gHciInvalidHciCommandParameters_c • 0x0113: gHciRemoteUserTerminatedConnection_c • 0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c • 0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c • 0x0116: gHciConnectionTerminatedByLocalHost_c • 0x0117: gHciRepeatedAttempts_c • 0x0118: gHciPairingNotAllowed_c • 0x0119: gHciUnknownLpmPdu_c • 0x011A: gHciUnsupportedRemoteFeature_c • 0x011B: gHciScoOffsetRejected_c • 0x011C: gHciScoIntervalRejected_c • 0x011D: gHciScoAirModeRejected_c • 0x011E: gHciInvalidLpmParameters_c • 0x011F: gHciUnspecifiedError_c • 0x0120: gHciUnsupportedLpmParameterValue_c • 0x0121: gHciRoleChangeNotAllowed_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0122: gHciLLResponseTimeout_c • 0x0123: gHciLmpErrorTransactionCollision_c • 0x0124: gHciLmpPduNotAllowed_c • 0x0125: gHciEncryptionModeNotAcceptable_c • 0x0126: gHciLinkKeyCannotBeChanged_c • 0x0127: gHciRequestedQosNotSupported_c • 0x0128: gHciInstantPassed_c • 0x0129: gHciPairingWithUnitKeyNotSupported_c • 0x012A: gHciDifferentTransactionCollision_c • 0x012B: gHciReserved_0x2B_c • 0x012C: gHciQosNotAcceptableParameter_c • 0x012D: gHciQosRejected_c • 0x012E: gHciChannelClassificationNotSupported_c • 0x012F: gHciInsufficientSecurity_c • 0x0130: gHciParameterOutOfMandatoryRange_c • 0x0131: gHciReserved_0x31_c • 0x0132: gHciRoleSwitchPending_c • 0x0133: gHciReserved_0x33_c • 0x0134: gHciReservedSlotViolation_c • 0x0135: gHciRoleSwitchFailed_c • 0x0136: gHciExtendedInquiryResponseTooLarge_c |

| Table continued from the previous page... | | |
|---|--------------|--|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0137: gHciSecureSimplePairingNotSupportedByHost_c • 0x0138: gHciHostBusyPairing_c • 0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c • 0x013A: gHciControllerBusy_c • 0x013B: gHciUnacceptableConnectionParameters_c • 0x013C: gHciDirectedAdvertisingTimeout_c • 0x013D: gHciConnectionTerminatedDueToMicFailure_c • 0x013E: gHciConnectionFailedToBeEstablished_c • 0x013E: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c • 0x013F: gHciMacConnectionFailed_c • 0x0140: gHciCoarseClockAdjustmentRejected_c • 0x0141: gHciType0SubmapNotDefined_c • 0x0142: gHciUnknownAdvertisingIdentifier_c • 0x0143: gHciLimitReached_c • 0x0144: gHciOperationCancelledByHost_c • 0x01A0: gHciAlreadyInit_c • 0x01A1: gHciInvalidParameter_c • 0x01A2: gHciCallbackNotInstalled_c • 0x01A3: gHciCallbackAlreadyInstalled_c • 0x01A4: gHciCommandNotSupported_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x01A5: gHciEventNotSupported_c • 0x01A6: gHciTransportError_c • 0x03F0: gL2caAlreadyInit_c • 0x03F1: gL2caInsufficientResources_c • 0x03F2: gL2caCallbackNotInstalled_c • 0x03F3: gL2caCallbackAlreadyInstalled_c • 0x03F4: gL2caLePsmInvalid_c • 0x03F5: gL2caLePsmAlreadyRegistered_c • 0x03F6: gL2caLePsmNotRegistered_c • 0x03F7: gL2caLePsmInsufficientResources_c • 0x03F8: gL2caChannelInvalid_c • 0x03F9: gL2caChannelClosed_c • 0x03FA: gL2caChannelAlreadyConnected_c • 0x03FB: gL2caConnectionParametersRejected_c • 0x03FC: gL2caChannelBusy_c • 0x03FE: gL2caInvalidParameter_c • 0x03FF: gL2caError_c • 0x0401: gSmNullCBFunction_c • 0x0402: gSmCommandNotSupported_c • 0x0403: gSmUnexpectedCommand_c • 0x0404: gSmInvalidCommandCode_c • 0x0405: gSmInvalidCommandLength_c • 0x0406: gSmInvalidCommandParameter_c • 0x0407: gSmInvalidDeviceId_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0408: gSmInvalidInternalOperation_c • 0x0409: gSmInvalidConnectionHandle_c • 0x040A: gSmImproperKeyDistributionField_c • 0x040B: gSmUnexpectedKeyType_c • 0x040C: gSmUnexpectedPairingTerminationReason_c • 0x040D: gSmUnexpectedKeyset_c • 0x040E: gSmSmpTimeoutOccurred_c • 0x040F: gSmUnknownSmpPacketType_c • 0x0410: gSmInvalidSmpPacketLength_c • 0x0411: gSmInvalidSmpPacketParameter_c • 0x0412: gSmReceivedUnexpectedSmpPacket_c • 0x0413: gSmReceivedSmpPacketFromUnknownDevice_c • 0x0414: gSmReceivedUnexpectedHciEvent_c • 0x0415: gSmReceivedHciEventFromUnknownDevice_c • 0x0416: gSmInvalidHciEventParameter_c • 0x0417: gSmLlConnectionEncryptionInProgress_c • 0x0418: gSmLlConnectionEncryptionFailure_c • 0x0419: gSmInsufficientResources_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x041A: gSmOobDataAddressMismatch_c • 0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c • 0x041C: gSmReceivedTimerEventForUnknownDevice_c • 0x041D: gSmUnattainableLocalDeviceSecRequirements_c • 0x041E: gSmUnattainableLocalDeviceMinKeySize_c • 0x041F: gSmUnattainableSlaveSecReqRequirements_c • 0x0431: gSmPairingErrorPasskeyEntryFailed_c • 0x0432: gSmPairingErrorConfirmValueFailed_c • 0x0433: gSmPairingErrorCommandNotSupported_c • 0x0434: gSmPairingErrorInvalidParameters_c • 0x0435: gSmPairingErrorUnknownReason_c • 0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c • 0x0461: gSmTbInvalidDataSignature_c • 0x0501: gAttInvalidHandle_c • 0x0502: gAttReadNotPermitted_c • 0x0503: gAttWriteNotPermitted_c • 0x0504: gAttInvalidPdu_c • 0x0505: gAttInsufficientAuthentication_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0506: gAttRequestNotSupported_c • 0x0507: gAttInvalidOffset_c • 0x0508: gAttInsufficientAuthorization_c • 0x0509: gAttPrepareQueueFull_c • 0x050A: gAttAttributeNotFound_c • 0x050B: gAttAttributeNotLong_c • 0x050C: gAttInsufficientEncryptionKeySize_c • 0x050D: gAttInvalidAttributeValueLength_c • 0x050E: gAttUnlikelyor_c • 0x050F: gAttInsufficientEncryption_c • 0x0510: gAttUnsupportedGroupType_c • 0x0511: gAttInsufficientResources_c • 0x0601: gGattAnotherProcedureInProgress_c • 0x0602: gGattLongAttributePacketsCorrupted_c • 0x0603: gGattMultipleAttributesOverflow_c • 0x0604: gGattUnexpectedReadMultipleResponseLength_c • 0x0605: gGattInvalidValueLength_c • 0x0606: gGattServerTimeout_c • 0x0607: gGattIndicationAlreadyInProgress_c • 0x0608: gGattClientConfirmationTimeout_c • 0x0701: gGapAdvDataTooLong_c • 0x0702: gGapScanRspDataTooLong_c |

| Table continued from the previous page... | | |
|---|--------------|--|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0703: gGapDeviceNotBonded_c • 0x0704: gGapAnotherProcedureInProgress_c • 0x0801: gDevDbCccdLimitReached_c • 0x0802: gDevDbCccdNotFound_c • 0x0901: gGattDbInvalidHandle_c • 0x0902: gGattDbCharacteristicNotFound_c • 0x0903: gGattDbCccdNotFound_c • 0x0904: gGattDbServiceNotFound_c • 0x0905: gGattDbDescriptorNotFound_c |

3.3.2 GATTDBDynamic-AddCccd.Request

Description

Adds a CCCD in the database.

Parameters

Table 184. GATTDBDynamic-AddCccd.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x46 |
| OpCode | 1 | 0x0F |
| Length | 1 | 0x00 - This message does not have any parameters |

3.3.3 GATTDBDynamic-AddCccd.Indication

Description

Adds a CCCD in the database.

Parameters

Table 185. GATTDBDynamic-AddCccd.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|----------|
| OpGroup | 1 | 0x46 |
| OpCode | 1 | 0x8B |

Table continues on the next page...

Table 185. GATTDBDynamic-AddCccd.Indication Parameters (continued)

| | | |
|------------|---|---|
| Length | 1 | Length in bytes of the following parameters |
| CCCDHandle | 2 | Handle of the CCCD declaration |

3.3.4 GATTDBDynamic-AddCharacteristicDeclarationAndValue.Request

Description

Adds a Characteristic declaration and its Value into the database.

Parameters

Table 186. GATTDBDynamic-AddCharacteristicDeclarationAndValue.Request Parameters

| Parameter | Size (bytes) | Comments |
|--------------------------|--------------|--|
| OpGroup | 1 | 0x46 |
| OpCode | 1 | 0x0D |
| Length | 1 | Length in bytes of the following parameters |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| CharacteristicProperties | 1 | Characteristic properties Possible values: 0x00: gNone_c (No Properties selected) 0x01: gBroadcast_c (Characteristic can be broadcast) 0x02: gRead_c (Characteristic can be read) 0x04: gWriteWithoutRsp_c (Characteristic can be written without response) 0x08: gWrite_c (Characteristic can be written with response) |

Table continues on the next page...

Table 186. GATTDBDynamic-AddCharacteristicDeclarationAndValue.Request Parameters (continued)

| | | |
|------------------------|--------------------|---|
| | | <p>0x10: gNotify_c (Characteristic can be notified)</p> <p>0x20: gIndicate_c (Characteristic can be indicated)</p> <p>0x40: gAuthSignedWrites_c (Characteristic can be written with signed data)</p> <p>0x80: gExtendedProperties_c (Extended Characteristic properties)</p> |
| MaxValueLength | 2 | If the Characteristic Value length is variable, this is the maximum length; for fixed lengths this must be set to 0 |
| InitialValueLength | 2 | Value length at initialization; remains fixed if maxValueLength is set to 0, otherwise cannot be greater than maxValueLength |
| InitialValue | InitialValueLength | Contains the initial value of the Characteristic |
| ValueAccessPermissions | 1 | <p>Access permissions for the value attribute</p> <p>Possible values:</p> <p>0x00: gPermissionNone_c (No permissions selected)</p> <p>0x01: gPermissionFlagReadable_c (Attribute can be read)</p> <p>0x02: gPermissionFlagReadWithEncryption_c (Attribute may be read only if link is encrypted)</p> <p>0x04: gPermissionFlagReadWithAuthentication_c (Attribute may be read only by authenticated peers)</p> <p>0x08: gPermissionFlagReadWithAuthorization_c (Attribute may be read only by authorized peers)</p> <p>0x10: gPermissionFlagWritable_c (Attribute can be written)</p> <p>0x20: gPermissionFlagWriteWithEncryption_c (Attribute may be written only if link is encrypted)</p> |

Table 186. GATTDBDynamic-AddCharacteristicDeclarationAndValue.Request Parameters (continued)

| | | |
|--|--|--|
| | | 0x40: gPermissionFlagWriteWithAuthentication_c (Attribute may be written only by authenticated peers) 0x80: gPermissionFlagWriteWithAuthorization_c (Attribute may be written only by authorized peers) |
|--|--|--|

Table 187. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

3.3.5 GATTDBDynamic-AddCharacteristicDeclarationAndValue.Indication

Description

Adds a Characteristic declaration and its Value into the database.

Parameters

Table 188. GATTDBDynamic-AddCharacteristicDeclarationAndValue.Indication Parameters

| Parameter | Size (bytes) | Comments |
|----------------------|--------------|---|
| OpGroup | 1 | 0x46 |
| OpCode | 1 | 0x89 |
| Length | 1 | Length in bytes of the following parameters |
| CharacteristicHandle | 2 | Handle of the Characteristic declaration |

3.3.6 GATTDBDynamic-AddCharacteristicDeclarationWithUniqueValue.Request

Description

Adds a Characteristic declaration with a Value contained in a universal value buffer.

Parameters

Table 189. GATTDBDynamic-AddCharacteristicDeclarationWithUniqueValue.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|----------|
| OpGroup | 1 | 0x46 |

Table continues on the next page...

Table 189. GATTDBDynamic-AddCharacteristicDeclarationWithUniqueValue.Request Parameters (continued)

| | | |
|--------------------------|----------|--|
| OpCode | 1 | 0x10 |
| Length | 1 | Length in bytes of the following parameters |
| UuidType | 1 | <p>UUID type</p> <p>Possible values:</p> <p>0x01: Uuid16Bits</p> <p>0x02: Uuid128Bits</p> <p>0x03: Uuid32Bits</p> |
| Uuid | Variable | <p>UUID value</p> <p>"Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure.</p> |
| CharacteristicProperties | 1 | <p>Characteristic properties</p> <p>Possible values:</p> <p>0x00: gNone_c (No Properties selected)</p> <p>0x01: gBroadcast_c (Characteristic can be broadcast)</p> <p>0x02: gRead_c (Characteristic can be read)</p> <p>0x04: gWriteWithoutRsp_c (Characteristic can be written without response)</p> <p>0x08: gWrite_c (Characteristic can be written with response)</p> <p>0x10: gNotify_c (Characteristic can be notified)</p> <p>0x20: gIndicate_c (Characteristic can be indicated)</p> <p>0x40: gAuthSignedWrites_c (Characteristic can be written with signed data)</p> <p>0x80: gExtendedProperties_c (Extended Characteristic properties)</p> |
| ValueAccessPermissions | 1 | <p>Access permissions for the value attribute</p> <p>Possible values:</p> |

Table 189. GATTDBDynamic-AddCharacteristicDeclarationWithUniqueValue.Request Parameters (continued)

| | | |
|--|--|--|
| | | 0x00: gPermissionNone_c (No permissions selected) 0x01: gPermissionFlagReadable_c (Attribute can be read) 0x02: gPermissionFlagReadWithEncryption_c (Attribute may be read only if link is encrypted) 0x04: gPermissionFlagReadWithAuthentication_c (Attribute may be read only by authenticated peers) 0x08: gPermissionFlagReadWithAuthorization_c (Attribute may be read only by authorized peers) 0x10: gPermissionFlagWritable_c (Attribute can be written) 0x20: gPermissionFlagWriteWithEncryption_c (Attribute may be written only if link is encrypted) 0x40: gPermissionFlagWriteWithAuthentication_c (Attribute may be written only by authenticated peers) 0x80: gPermissionFlagWriteWithAuthorization_c (Attribute may be written only by authorized peers) |
|--|--|--|

Table 190. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

3.3.7 GATTDBDynamic-AddCharacteristicDeclarationWithUniqueValue.Indication

Description

Adds a Characteristic declaration with a Value contained in a universal value buffer.

Parameters

Table 191. GATTDBDynamic-AddCharacteristicDeclarationWithUniqueValue.Indication Parameters

| Parameter | Size (bytes) | Comments |
|----------------------|--------------|---|
| OpGroup | 1 | 0x46 |
| OpCode | 1 | 0x8C |
| Length | 1 | Length in bytes of the following parameters |
| CharacteristicHandle | 2 | Handle of the Characteristic declaration |

3.3.8 GATTDBDynamic-AddCharacteristicDescriptor.Request

Description

Adds a Characteristic descriptor into the database.

Parameters

Table 192. GATTDBDynamic-AddCharacteristicDescriptor.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------------------------|-----------------------|--|
| OpGroup | 1 | 0x46 |
| OpCode | 1 | 0x0E |
| Length | 1 | Length in bytes of the following parameters |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
| DescriptorValueLength | 2 | Fixed length of the descriptor attribute value |
| Value | DescriptorValueLength | Initial value of the descriptor attribute |
| DescriptorAccessPermissions | 1 | Access permissions for the descriptor attribute Possible values: 0x00: gPermissionNone_c (No permissions selected) |

Table 192. GATTDBDynamic-AddCharacteristicDescriptor.Request Parameters (continued)

| | | |
|--|--|---|
| | | 0x01: gPermissionFlagReadable_c (Attribute can be read) 0x02: gPermissionFlagReadWithEncryption_c (Attribute may be read only if link is encrypted) 0x04: gPermissionFlagReadWithAuthenticatio n_c (Attribute may be read only by authenticated peers) 0x08: gPermissionFlagReadWithAuthorization_c (Attribute may be read only by authorized peers) 0x10: gPermissionFlagWritable_c (Attribute can be written) 0x20: gPermissionFlagWriteWithEncryption_c (Attribute may be written only if link is encrypted) 0x40: gPermissionFlagWriteWithAuthenticatio n_c (Attribute may be written only by authenticated peers) 0x80: gPermissionFlagWriteWithAuthorization_c (Attribute may be written only by authorized peers) |
|--|--|---|

Table 193. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

3.3.9 GATTDBDynamic-AddCharacteristicDescriptor.Indication

Description

Adds a Characteristic descriptor into the database.

Parameters

Table 194. GATTDBDynamic-AddCharacteristicDescriptor.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|----------|
|-----------|--------------|----------|

Table continues on the next page...

Table 194. GATTDDBDynamic-AddCharacteristicDescriptor.Indication Parameters (continued)

| | | |
|------------------|---|---|
| OpGroup | 1 | 0x46 |
| OpCode | 1 | 0x8A |
| Length | 1 | Length in bytes of the following parameters |
| DescriptorHandle | 2 | Handle of the Descriptor declaration |

3.3.10 GATTDDBDynamic-AddIncludeDeclaration.Request

Description

Adds an Include declaration into the database.

Parameters

Table 195. GATTDDBDynamic-AddIncludeDeclaration.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------------------|--------------|--|
| OpGroup | 1 | 0x46 |
| OpCode | 1 | 0x0C |
| Length | 1 | Length in bytes of the following parameters |
| IncludedServiceHandle | 2 | Handle of the included Service declaration |
| EndGroupHandle | 2 | Last handle of the included Service |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |

Table 196. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

3.3.11 GATTDBDynamic-AddIncludeDeclaration.Indication

Description

Adds an Include declaration into the database.

Parameters

Table 197. GATTDBDynamic-AddIncludeDeclaration.Indication Parameters

| Parameter | Size (bytes) | Comments |
|---------------|--------------|---|
| OpGroup | 1 | 0x46 |
| OpCode | 1 | 0x88 |
| Length | 1 | Length in bytes of the following parameters |
| IncludeHandle | 2 | Handle of the Include declaration |

3.3.12 GATTDBDynamic-AddPrimaryServiceDeclaration.Request

Description

Adds a Primary Service declaration into the database.

Parameters

Table 198. GATTDBDynamic-AddPrimaryServiceDeclaration.Request Parameters

| Parameter | Size (bytes) | Comments |
|---------------|--------------|--|
| OpGroup | 1 | 0x46 |
| OpCode | 1 | 0x0A |
| Length | 1 | Length in bytes of the following parameters |
| DesiredHandle | 2 | The desired handle for the Primary Service declaration |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |

Table 199. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

3.3.13 GATTDBDynamic-AddPrimaryServiceDeclaration.Indication

Description

Adds a Primary Service declaration into the database.

Parameters

Table 200. GATTDBDynamic-AddPrimaryServiceDeclaration.Indication Parameters

| Parameter | Size (bytes) | Comments |
|---------------|--------------|---|
| OpGroup | 1 | 0x46 |
| OpCode | 1 | 0x86 |
| Length | 1 | Length in bytes of the following parameters |
| ServiceHandle | 2 | Handle of the Service declaration |

3.3.14 GATTDBDynamic-AddSecondaryServiceDeclaration.Request

Description

Adds a Secondary Service declaration into the database.

Parameters

Table 201. GATTDBDynamic-AddSecondaryServiceDeclaration.Request Parameters

| Parameter | Size (bytes) | Comments |
|---------------|--------------|--|
| OpGroup | 1 | 0x46 |
| OpCode | 1 | 0x0B |
| Length | 1 | Length in bytes of the following parameters |
| DesiredHandle | 2 | The desired handle for the Secondary Service declaration |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |

Table continues on the next page...

Table 201. GATTDBDynamic-AddSecondaryServiceDeclaration.Request Parameters (continued)

| | | |
|------|----------|--|
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |
|------|----------|--|

Table 202. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

3.3.15 GATTDBDynamic-AddSecondaryServiceDeclaration.Indication

Description

Adds an Primary Service declaration into the database.

Parameters

Table 203. GATTDBDynamic-AddSecondaryServiceDeclaration.Indication Parameters

| Parameter | Size (bytes) | Comments |
|---------------|--------------|---|
| OpGroup | 1 | 0x46 |
| OpCode | 1 | 0x87 |
| Length | 1 | Length in bytes of the following parameters |
| ServiceHandle | 2 | Handle of the Service declaration |

3.3.16 GATTDBDynamic-Init.Request

Description

Allocates smallest possible buffers and initializes an empty database.

Parameters

Table 204. GATTDBDynamic-Init.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x46 |
| OpCode | 1 | 0x08 |
| Length | 1 | 0x00 - This message does not have any parameters |

3.3.17 GATTDBDynamic-ReleaseDatabase.Request

Description

Releases the allocated buffers.

Parameters

Table 205. GATTDDBDynamic-ReleaseDatabase.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x46 |
| OpCode | 1 | 0x09 |
| Length | 1 | 0x00 - This message does not have any parameters |

3.3.18 GATTDDBDynamic-RemoveCharacteristic.Request

Description

Removes a Characteristic from the database.

Parameters

Table 206. GATTDDBDynamic-RemoveCharacteristic.Request Parameters

| Parameter | Size (bytes) | Comments |
|----------------------|--------------|--|
| OpGroup | 1 | 0x46 |
| OpCode | 1 | 0x12 |
| Length | 1 | Length in bytes of the following parameters |
| CharacteristicHandle | 2 | Attribute handle of the Characteristic declaration |

3.3.19 GATTDDBDynamic-RemoveService.Request

Description

Removes a Service from the database.

Parameters

Table 207. GATTDDBDynamic-RemoveService.Request Parameters

| Parameter | Size (bytes) | Comments |
|---------------|--------------|---|
| OpGroup | 1 | 0x46 |
| OpCode | 1 | 0x11 |
| Length | 1 | Length in bytes of the following parameters |
| ServiceHandle | 2 | Attribute handle of the Service declaration |

3.3.20 GATTDDB-FindCccdHandleForCharValueHandle.Request

Description

Finds the handle of a Characteristic's CCCD given the Characteristic's Value handle.

Parameters**Table 208. GATTDB-FindCccdHandleForCharValueHandle.Request Parameters**

| Parameter | Size (bytes) | Comments |
|-----------------|--------------|---|
| OpGroup | 1 | 0x46 |
| OpCode | 1 | 0x06 |
| Length | 1 | Length in bytes of the following parameters |
| CharValueHandle | 2 | The handle of the characteristic value |

3.3.21 GATTDB-FindCccdHandleForCharValueHandle.Indication**Description**

Finds the handle of a Characteristic's CCCD (giving the Characteristic's Value handle).

Parameters**Table 209. GATTDB-FindCccdHandleForCharValueHandle.Indication Parameters**

| Parameter | Size (bytes) | Comments |
|------------|--------------|---|
| OpGroup | 1 | 0x46 |
| OpCode | 1 | 0x84 |
| Length | 1 | Length in bytes of the following parameters |
| CccdHandle | 2 | CCCD handle |

3.3.22 GATTDB-FindCharValueHandleInService.Request**Description**

Finds the handle of a Characteristic Value with a given UUID inside a service.

Parameters**Table 210. GATTDB-FindCharValueHandleInService.Request Parameters**

| Parameter | Size (bytes) | Comments |
|---------------|--------------|--|
| OpGroup | 1 | 0x46 |
| OpCode | 1 | 0x05 |
| Length | 1 | Length in bytes of the following parameters |
| ServiceHandle | 2 | The handle of the Service declaration |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits |

Table continues on the next page...

Table 210. GATTDDB-FindCharValueHandleInService.Request Parameters (continued)

| | | |
|------|----------|--|
| | | 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |

Table 211. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

3.3.23 GATTDDB-FindCharValueHandleInService.Indication

Description

Finds the handle of a characteristic value (with a given UUID) inside a service.

Parameters

Table 212. GATTDDB-FindCharValueHandleInService.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------------|--------------|---|
| OpGroup | 1 | 0x46 |
| OpCode | 1 | 0x83 |
| Length | 1 | Length in bytes of the following parameters |
| CharValueHandle | 2 | Characteristic value handle |

3.3.24 GATTDDB-FindDescriptorHandleForCharValueHandle.Request

Description

Finds the handle of a Characteristic Descriptor given the Characteristic's Value handle and Descriptor's UUID.

Parameters

Table 213. GATTDDB-FindDescriptorHandleForCharValueHandle.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x46 |
| OpCode | 1 | 0x07 |
| Length | 1 | Length in bytes of the following parameters |

Table continues on the next page...

Table 213. GATTDB-FindDescriptorHandleForCharValueHandle.Request Parameters (continued)

| | | |
|-----------------|----------|--|
| CharValueHandle | 2 | The handle of the characteristic value |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |

Table 214. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

3.3.25 GATTDB-FindDescriptorHandleForCharValueHandle.Indication

Description

Finds the handle of a characteristic descriptor (giving the characteristic's value handle and descriptor's UUID).

Parameters

Table 215. GATTDB-FindDescriptorHandleForCharValueHandle.Indication Parameters

| Parameter | Size (bytes) | Comments |
|------------------|--------------|---|
| OpGroup | 1 | 0x46 |
| OpCode | 1 | 0x85 |
| Length | 1 | Length in bytes of the following parameters |
| DescriptorHandle | 2 | Descriptor handle |

3.3.26 GATTDB-FindServiceHandle.Request

Description

Finds the handle of a Service Declaration with a given UUID inside the database.

Parameters

Table 216. GATTDB-FindServiceHandle.Request Parameters

| Parameter | Size (bytes) | Comments |
|-------------|--------------|--|
| OpGroup | 1 | 0x46 |
| OpCode | 1 | 0x04 |
| Length | 1 | Length in bytes of the following parameters |
| StartHandle | 2 | The handle to start the search. Should be 0x0001 on the first call |
| UuidType | 1 | UUID type Possible values: 0x01: Uuid16Bits 0x02: Uuid128Bits 0x03: Uuid32Bits |
| Uuid | Variable | UUID value "Union" type parameter. Its structure is based on the value of parameter UuidType. See the detailed table below for parameter structure. |

Table 217. Uuid Parameter Structure

| UuidType | Structure Parameter | Size (bytes) | Comments |
|----------|---------------------|--------------|---------------|
| 0x01 | Uuid16Bits | 2 | UUID 16 bits |
| 0x02 | Uuid128Bits | 16 | UUID 128 bits |
| 0x03 | Uuid32Bits | 4 | UUID 32 bits |

3.3.27 GATTDB-FindServiceHandle.Indication

Description

Finds the handle of a Service Declaration with a given UUID inside the database.

Parameters

Table 218. GATTDB-FindServiceHandle.Indication Parameters

| Parameter | Size (bytes) | Comments |
|---------------|--------------|---|
| OpGroup | 1 | 0x46 |
| OpCode | 1 | 0x82 |
| Length | 1 | Length in bytes of the following parameters |
| ServiceHandle | 2 | Service handle |

3.3.28 GATTDB-Init.Request

Description

Initializes the GATT database at runtime.

Parameters

Table 219. GATTDB-Init.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x46 |
| OpCode | 1 | 0x01 |
| Length | 1 | 0x00 - This message does not have any parameters |

3.3.29 GATTDB-ReadAttribute.Request

Description

Reads an attribute from application level.

Parameters

Table 220. GATTDB-ReadAttribute.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x46 |
| OpCode | 1 | 0x03 |
| Length | 1 | Length in bytes of the following parameters |
| Handle | 2 | The handle of the attribute to be read |
| MaxBytes | 2 | The maximum number of bytes to be read |

3.3.30 GATTDB-ReadAttribute.Indication

Description

Reads an attribute value (from application level).

Parameters

Table 221. GATTDB-ReadAttribute.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-------------|--------------|---|
| OpGroup | 1 | 0x46 |
| OpCode | 1 | 0x81 |
| Length | 1 | Length in bytes of the following parameters |
| ValueLength | 2 | Attribute value length |
| Value | ValueLength | Attribute value |

3.3.31 GATTDB-WriteAttribute.Request

Description

Writes an attribute from the application level.

Parameters

Table 222. GATTDB-WriteAttribute.Request Parameters

| Parameter | Size (bytes) | Comments |
|-------------|--------------|---|
| OpGroup | 1 | 0x46 |
| OpCode | 1 | 0x02 |
| Length | 1 | Length in bytes of the following parameters |
| Handle | 2 | The handle of the attribute to be written |
| ValueLength | 2 | The number of bytes to be written |
| Value | ValueLength | The value to be written |

3.4 GAP Messages

3.4.1 BLE-HostInitialize.Request

Description

Performs master initialization of the BLE Host stack.

Parameters

Table 223. BLE-HostInitialize.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x47 |
| OpCode | 1 | 0x01 |
| Length | 1 | 0x00 - This message does not have any parameters |

3.4.2 GAP.Confirm

Description

Status of the GAP request.

Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|----------|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x80 |

Table continues on the next page...

| | | |
|--------|---|--|
| Length | 1 | Length in bytes of the following parameters |
| Status | 2 | <p>The status of the GAP request</p> <p>Possible values:</p> <ul style="list-style-type: none"> • 0x0000: gBleSuccess_c • 0x0001: gBleInvalidParameter_c • 0x0002: gBleOverflow_c • 0x0003: gBleUnavailable_c • 0x0004: gBleFeatureNotSupported_c • 0x0005: gBleOutOfMemory_c • 0x0006: gBleAlreadyInitialized_c • 0x0007: gBleOsError_c • 0x0008: gBleUnexpectedError_c • 0x0009: gBleInvalidState_c • 0x0101: gHciUnknownHciCommand_c • 0x0102: gHciUnknownConnectionIdentifier_c • 0x0103: gHciHardwareFailure_c • 0x0104: gHciPageTimeout_c • 0x0105: gHciAuthenticationFailure_c • 0x0106: gHciPinOrKeyMissing_c • 0x0107: gHciMemoryCapacityExceeded_c • 0x0108: gHciConnectionTimeout_c • 0x0109: gHciConnectionLimitExceeded_c • 0x010A: gHciSynchronousConnectionLimitToADeviceExceeded_c • 0x010B: gHciAclConnectionAlreadyExists_c • 0x010C: gHciCommandDisallowed_c • 0x010D: gHciConnectionRejectedDueToLimitedResources_c |

| | | |
|--|--|--|
| | | <ul style="list-style-type: none"> • 0x010E: gHciConnectionRejectedDueToSecurityReasons_c • 0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c • 0x0110: gHciConnectionAcceptTimeoutExceeded_c • 0x0111: gHciUnsupportedFeatureOrParameterValue_c • 0x0112: gHciInvalidHciCommandParameters_c • 0x0113: gHciRemoteUserTerminatedConnection_c • 0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c • 0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c • 0x0116: gHciConnectionTerminatedByLocalHost_c • 0x0117: gHciRepeatedAttempts_c • 0x0118: gHciPairingNotAllowed_c • 0x0119: gHciUnknownLpmPdu_c • 0x011A: gHciUnsupportedRemoteFeature_c • 0x011B: gHciScoOffsetRejected_c • 0x011C: gHciScoIntervalRejected_c • 0x011D: gHciScoAirModeRejected_c • 0x011E: gHciInvalidLpmParameters_c • 0x011F: gHciUnspecifiedError_c • 0x0120: gHciUnsupportedLpmParameterValue_c • 0x0121: gHciRoleChangeNotAllowed_c |
|--|--|--|

| | | |
|--|--|---|
| | | <ul style="list-style-type: none"> • 0x0122: gHciLLResponseTimeout_c • 0x0123: gHciLmpErrorTransactionCollision_c • 0x0124: gHciLmpPduNotAllowed_c • 0x0125: gHciEncryptionModeNotAcceptable_c • 0x0126: gHciLinkKeyCannotBeChanged_c • 0x0127: gHciRequestedQosNotSupported_c • 0x0128: gHciInstantPassed_c • 0x0129: gHciPairingWithUnitKeyNotSupported_c • 0x012A: gHciDifferentTransactionCollision_c • 0x012B: gHciReserved_0x2B_c • 0x012C: gHciQosNotAcceptableParameter_c • 0x012D: gHciQosRejected_c • 0x012E: gHciChannelClassificationNotSupported_c • 0x012F: gHciInsufficientSecurity_c • 0x0130: gHciParameterOutOfMandatoryRange_c • 0x0131: gHciReserved_0x31_c • 0x0132: gHciRoleSwitchPending_c • 0x0133: gHciReserved_0x33_c • 0x0134: gHciReservedSlotViolation_c • 0x0135: gHciRoleSwitchFailed_c • 0x0136: gHciExtendedInquiryResponseTooLarge_c • 0x0137: gHciSecureSimplePairingNotSupportedByHost_c • 0x0138: gHciHostBusyPairing_c |
|--|--|---|

| | | |
|--|--|---|
| | | <ul style="list-style-type: none"> • 0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c • 0x013A: gHciControllerBusy_c • 0x013B: gHciUnacceptableConnectionParameters_c • 0x013C: gHciDirectedAdvertisingTimeout_c • 0x013D: gHciConnectionTerminatedDueToMicFailure_c • 0x013E: gHciConnectionFailedToBeEstablished_c • 0x013F: gHciMacConnectionFailed_c • 0x0140: gHciCoarseClockAdjustmentRejected_c • 0x01A0: gHciAlreadyInit_c • 0x01A1: gHciInvalidParameter_c • 0x01A2: gHciCallbackNotInstalled_c • 0x01A3: gHciCallbackAlreadyInstalled_c • 0x01A4: gHciCommandNotSupported_c • 0x01A5: gHciEventNotSupported_c • 0x01A6: gHciTransportError_c • 0x03F0: gL2caAlreadyInit_c • 0x03F1: gL2caInsufficientResources_c • 0x03F2: gL2caCallbackNotInstalled_c • 0x03F3: gL2caCallbackAlreadyInstalled_c • 0x03F4: gL2caLePsmInvalid_c • 0x03F5: gL2caLePsmAlreadyRegistered_c • 0x03F6: gL2caLePsmNotRegistered_c |
|--|--|---|

| | | |
|--|--|--|
| | | <ul style="list-style-type: none"> • 0x03F7: gL2caLePsmInsufficientResources_c • 0x03F8: gL2caChannelInvalid_c • 0x03F9: gL2caChannelClosed_c • 0x03FA: gL2caChannelAlreadyConnected_c • 0x03FB: gL2caConnectionParametersRejected_c • 0x03FC: gL2caChannelBusy_c • 0x03FE: gL2caInvalidParameter_c • 0x03FF: gL2caError_c • 0x0401: gSmNullCBFunction_c • 0x0402: gSmCommandNotSupported_c • 0x0403: gSmUnexpectedCommand_c • 0x0404: gSmInvalidCommandCode_c • 0x0405: gSmInvalidCommandLength_c • 0x0406: gSmInvalidCommandParameter_c • 0x0407: gSmInvalidDeviceId_c • 0x0408: gSmInvalidInternalOperation_c • 0x0409: gSmInvalidConnectionHandle_c • 0x040A: gSmImproperKeyDistributionField_c • 0x040B: gSmUnexpectedKeyType_c • 0x040C: gSmUnexpectedPairingTerminationReason_c • 0x040D: gSmUnexpectedKeyset_c • 0x040E: gSmSmpTimeoutOccurred_c • 0x040F: gSmUnknownSmpPacketType_c • 0x0410: gSmInvalidSmpPacketLength_c |
|--|--|--|

- 0x0411:
gSmInvalidSmpPacketParameter_c
- 0x0412:
gSmReceivedUnexpectedSmpPacket_c
- 0x0413:
gSmReceivedSmpPacketFromUnknownDevice_c
- 0x0414:
gSmReceivedUnexpectedHciEvent_c
- 0x0415:
gSmReceivedHciEventFromUnknownDevice_c
- 0x0416:
gSmInvalidHciEventParameter_c
- 0x0417:
gSmLlConnectionEncryptionInProgress_c
- 0x0418:
gSmLlConnectionEncryptionFailure_c
- 0x0419:
gSmInsufficientResources_c
- 0x041A:
gSmOobDataAddressMismatch_c
- 0x041B:
gSmSmpPacketReceivedAfterTimeoutOccurred_c
- 0x041C:
gSmReceivedTimerEventForUnknownDevice_c
- 0x041D:
gSmUnattainableLocalDeviceSecRequirements_c
- 0x041E:
gSmUnattainableLocalDeviceMinKeySize_c
- 0x041F:
gSmUnattainableSlaveSecReqRequirements_c
- 0x0431:
gSmPairingErrorPasskeyEntryFailed_c

| | | |
|--|--|--|
| | | <ul style="list-style-type: none"> • 0x0432: gSmPairingErrorConfirmValueFailed_c • 0x0433: gSmPairingErrorCommandNotSupported_c • 0x0434: gSmPairingErrorInvalidParameters_c • 0x0435: gSmPairingErrorUnknownReason_c • 0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c • 0x0461: gSmTbInvalidDataSignature_c • 0x0501: gAttInvalidHandle_c • 0x0502: gAttReadNotPermitted_c • 0x0503: gAttWriteNotPermitted_c • 0x0504: gAttInvalidPdu_c • 0x0505: gAttInsufficientAuthentication_c • 0x0506: gAttRequestNotSupported_c • 0x0507: gAttInvalidOffset_c • 0x0508: gAttInsufficientAuthorization_c • 0x0509: gAttPrepareQueueFull_c • 0x050A: gAttAttributeNotFound_c • 0x050B: gAttAttributeNotLong_c • 0x050C: gAttInsufficientEncryptionKeySize_c • 0x050D: gAttInvalidAttributeValueLength_c • 0x050E: gAttUnlikelyor_c • 0x050F: gAttInsufficientEncryption_c • 0x0510: gAttUnsupportedGroupType_c • 0x0511: gAttInsufficientResources_c |
|--|--|--|

| | | |
|--|--|--|
| | | <ul style="list-style-type: none"> • 0x0601: gGattAnotherProcedureInProgress_c • 0x0602: gGattLongAttributePacketsCorrupted_c • 0x0603: gGattMultipleAttributesOverflow_c • 0x0604: gGattUnexpectedReadMultipleResponseLength_c • 0x0605: gGattInvalidValueLength_c • 0x0606: gGattServerTimeout_c • 0x0607: gGattIndicationAlreadyInProgress_c • 0x0608: gGattClientConfirmationTimeout_c • 0x0701: gGapAdvDataTooLong_c • 0x0702: gGapScanRspDataTooLong_c • 0x0703: gGapDeviceNotBonded_c • 0x0801: gDevDbCccdLimitReached_c • 0x0802: gDevDbCccdNotFound_c • 0x0901: gGattDbInvalidHandle_c • 0x0902: gGattDbCharacteristicNotFound_c • 0x0903: gGattDbCccdNotFound_c • 0x0904: gGattDbServiceNotFound_c • 0x0905: gGattDbDescriptorNotFound_c |
|--|--|--|

3.4.3 GAP-AcceptPairingRequest.Request

Description

Accepts the pairing request from a peer.

Parameters

Table 224. GAP-AcceptPairingRequest.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|----------|
| OpGroup | 1 | 0x48 |

Table continues on the next page...

Table 224. GAP-AcceptPairingRequest.Request Parameters (continued)

| | | |
|-------------------|----------|--|
| OpCode | 1 | 0x0F |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | The peer requesting authentication |
| PairingParameters | Variable | Pairing parameters as required by the SMP Structure type parameter. See the detailed table below for parameter structure. |

Table 225. PairingParameters Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|----------------------|--------------|---|
| WithBonding | 1 | TRUE if this device is able to and wants to bond after pairing, FALSE otherwise |
| SecurityModeAndLevel | 1 | The desired security mode-level Possible values: 0x10: gMode1Level1_c (Mode 1 Level 1 - No Security) 0x11: gMode1Level2_c (Mode 1 Level 2 - Encryption without authentication) 0x12: gMode1Level3_c (Mode 1 Level 3 - Encryption with authentication) 0x13: gMode1Level4_c (Mode 1 Level 4 - Encryption with LE Secure Connections pairing) 0x21: gMode2Level1_c (Mode 2 Level 1 - Data Signing without authentication) 0x22: gMode2Level2_c (Mode 2 Level 2 - Data Signing with authentication) |
| MaxEncryptionKeySize | 1 | Maximum LTK size supported by the device |
| LocalIoCapabilities | 1 | I/O capabilities used to determine the pairing method Possible values: 0x00: gIoDisplayOnly_c (May display a PIN, no input) 0x01: gIoDisplayYesNo_c (May display a PIN and has a binary input (for example, YES and NO buttons)) |

Table continues on the next page...

Table 225. PairingParameters Parameter Structure (continued)

| | | |
|-----------------------------|---|--|
| | | 0x02: gloKeyboardOnly_c (Has keyboard input, no display) 0x03: gloNone_c (No input and no display) 0x04: gloKeyboardDisplay_c (Has keyboard input and display) |
| OobAvailable | 1 | TRUE if this device has Out-of-Band data that can be used for authenticated pairing, FALSE otherwise |
| CentralKeys | 1 | SMP keys to be distributed by the Central Possible values: 0x00: gNoKeys_c (No key can be distributed) 0x01: gLtk_c (Long Term Key) 0x02: glrk_c (Identity Resolving Key) 0x04: gCsrk_c (Connection Signature Resolving Key) |
| PeripheralKeys | 1 | SMP keys to be distributed by the Peripheral Possible values: 0x00: gNoKeys_c (No key can be distributed) 0x01: gLtk_c (Long Term Key) 0x02: glrk_c (Identity Resolving Key) 0x04: gCsrk_c (Connection Signature Resolving Key) |
| LeSecureConnectionSupported | 1 | indicates if device supports LE Secure Connections pairing |
| UseKeypressNotifications | 1 | Indicates if device supports Keypress Notification PDUs during Passkey Entry pairing |

3.4.4 GAP-AddDeviceToWhiteList.Request

Description

Adds a device address to the White List.

Parameters

Table 226. GAP-AddDeviceToWhiteList.Request Parameters

| Parameter | Size (bytes) | Comments |
|-------------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x23 |
| Length | 1 | Length in bytes of the following parameters |
| AddressType | 1 | The address type (public or random) Possible values: 0x00: gPublic_c 0x01: gRandom_c |
| Address | 6 | The address of the white-listed device |

3.4.5 GAP-AdvertisingEventCommandFailed.Indication

Description

Event received when advertising could not be enabled or disabled.

Parameters

| Parameter | Size (bytes) | Comments |
|------------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x99 |
| Length | 1 | Length in bytes of the following parameters |
| FailReason | 2 | The reason of failure Possible values: <ul style="list-style-type: none"> • 0x0000: gBleSuccess_c • 0x0001: gBleInvalidParameter_c • 0x0002: gBleOverflow_c • 0x0003: gBleUnavailable_c • 0x0004: gBleFeatureNotSupported_c • 0x0005: gBleOutOfMemory_c • 0x0006: gBleAlreadyInitialized_c • 0x0007: gBleOsError_c • 0x0008: gBleUnexpectedError_c • 0x0009: gBleInvalidState_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0101: gHciUnknownHciCommand_c • 0x0102: gHciUnknownConnectionIdentifier_c • 0x0103: gHciHardwareFailure_c • 0x0104: gHciPageTimeout_c • 0x0105: gHciAuthenticationFailure_c • 0x0106: gHciPinOrKeyMissing_c • 0x0107: gHciMemoryCapacityExceeded_c • 0x0108: gHciConnectionTimeout_c • 0x0109: gHciConnectionLimitExceeded_c • 0x010A: gHciSynchronousConnectionLimitToADeviceExceeded_c • 0x010B: gHciAclConnectionAlreadyExists_c • 0x010C: gHciCommandDisallowed_c • 0x010D: gHciConnectionRejectedDueToLimitedResources_c • 0x010E: gHciConnectionRejectedDueToSecurityReasons_c • 0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c • 0x0110: gHciConnectionAcceptTimeoutExceeded_c • 0x0111: gHciUnsupportedFeatureOrParameterValue_c • 0x0112: gHciInvalidHciCommandParameters_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0113: gHciRemoteUserTerminatedConnection_c • 0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c • 0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c • 0x0116: gHciConnectionTerminatedByLocalHost_c • 0x0117: gHciRepeatedAttempts_c • 0x0118: gHciPairingNotAllowed_c • 0x0119: gHciUnknownLpmPdu_c • 0x011A: gHciUnsupportedRemoteFeature_c • 0x011B: gHciScoOffsetRejected_c • 0x011C: gHciScoIntervalRejected_c • 0x011D: gHciScoAirModeRejected_c • 0x011E: gHciInvalidLpmParameters_c • 0x011F: gHciUnspecifiedError_c • 0x0120: gHciUnsupportedLpmParameterValue_c • 0x0121: gHciRoleChangeNotAllowed_c • 0x0122: gHciLLResponseTimeout_c • 0x0123: gHciLmpErrorTransactionCollision_c • 0x0124: gHciLmpPduNotAllowed_c • 0x0125: gHciEncryptionModeNotAcceptable_c • 0x0126: gHciLinkKeyCannotBeChanged_c • 0x0127: gHciRequestedQosNotSupported_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0128: gHciInstantPassed_c • 0x0129: gHciPairingWithUnitKeyNotSupported_c • 0x012A: gHciDifferentTransactionCollision_c • 0x012B: gHciReserved_0x2B_c • 0x012C: gHciQosNotAcceptableParameter_c • 0x012D: gHciQosRejected_c • 0x012E: gHciChannelClassificationNotSupported_c • 0x012F: gHciInsufficientSecurity_c • 0x0130: gHciParameterOutOfMandatoryRange_c • 0x0131: gHciReserved_0x31_c • 0x0132: gHciRoleSwitchPending_c • 0x0133: gHciReserved_0x33_c • 0x0134: gHciReservedSlotViolation_c • 0x0135: gHciRoleSwitchFailed_c • 0x0136: gHciExtendedInquiryResponseTooLarge_c • 0x0137: gHciSecureSimplePairingNotSupportedByHost_c • 0x0138: gHciHostBusyPairing_c • 0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c • 0x013A: gHciControllerBusy_c • 0x013B: gHciUnacceptableConnectionParameters_c • 0x013C: gHciDirectedAdvertisingTimeout_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x013D: gHciConnectionTerminatedDueToMicFailure_c • 0x013E: gHciConnectionFailedToBeEstablished_c • 0x013F: gHciMacConnectionFailed_c • 0x0140: gHciCoarseClockAdjustmentRejected_c • 0x01A0: gHciAlreadyInit_c • 0x01A1: gHciInvalidParameter_c • 0x01A2: gHciCallbackNotInstalled_c • 0x01A3: gHciCallbackAlreadyInstalled_c • 0x01A4: gHciCommandNotSupported_c • 0x01A5: gHciEventNotSupported_c • 0x01A6: gHciTransportError_c • 0x03F0: gL2caAlreadyInit_c • 0x03F1: gL2caInsufficientResources_c • 0x03F2: gL2caCallbackNotInstalled_c • 0x03F3: gL2caCallbackAlreadyInstalled_c • 0x03F4: gL2caLePsmInvalid_c • 0x03F5: gL2caLePsmAlreadyRegistered_c • 0x03F6: gL2caLePsmNotRegistered_c • 0x03F7: gL2caLePsmInsufficientResources_c • 0x03F8: gL2caChannelInvalid_c • 0x03F9: gL2caChannelClosed_c • 0x03FA: gL2caChannelAlreadyConnected_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x03FB: gL2caConnectionParametersRejected_c • 0x03FC: gL2caChannelBusy_c • 0x03FE: gL2caInvalidParameter_c • 0x03FF: gL2caError_c • 0x0401: gSmNullCBFunction_c • 0x0402: gSmCommandNotSupported_c • 0x0403: gSmUnexpectedCommand_c • 0x0404: gSmInvalidCommandCode_c • 0x0405: gSmInvalidCommandLength_c • 0x0406: gSmInvalidCommandParameter_c • 0x0407: gSmInvalidDeviceId_c • 0x0408: gSmInvalidInternalOperation_c • 0x0409: gSmInvalidConnectionHandle_c • 0x040A: gSmImproperKeyDistributionField_c • 0x040B: gSmUnexpectedKeyType_c • 0x040C: gSmUnexpectedPairingTerminationReason_c • 0x040D: gSmUnexpectedKeyset_c • 0x040E: gSmSmpTimeoutOccurred_c • 0x040F: gSmUnknownSmpPacketType_c • 0x0410: gSmInvalidSmpPacketLength_c • 0x0411: gSmInvalidSmpPacketParameter_c |

| Table continued from the previous page... | | |
|---|--------------|--|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0412: gSmReceivedUnexpectedSmpPacket_c • 0x0413: gSmReceivedSmpPacketFromUnknownDevice_c • 0x0414: gSmReceivedUnexpectedHciEvent_c • 0x0415: gSmReceivedHciEventFromUnknownDevice_c • 0x0416: gSmInvalidHciEventParameter_c • 0x0417: gSmLlConnectionEncryptionInProgress_c • 0x0418: gSmLlConnectionEncryptionFailure_c • 0x0419: gSmInsufficientResources_c • 0x041A: gSmOobDataAddressMismatch_c • 0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c • 0x041C: gSmReceivedTimerEventForUnknownDevice_c • 0x041D: gSmUnattainableLocalDeviceSecRequirements_c • 0x041E: gSmUnattainableLocalDeviceMinKeySize_c • 0x041F: gSmUnattainableSlaveSecReqRequirements_c • 0x0431: gSmPairingErrorPasskeyEntryFailed_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0432: gSmPairingErrorConfirmValueFailed_c • 0x0433: gSmPairingErrorCommandNotSupported_c • 0x0434: gSmPairingErrorInvalidParameters_c • 0x0435: gSmPairingErrorUnknownReason_c • 0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c • 0x0461: gSmTbInvalidDataSignature_c • 0x0501: gAttInvalidHandle_c • 0x0502: gAttReadNotPermitted_c • 0x0503: gAttWriteNotPermitted_c • 0x0504: gAttInvalidPdu_c • 0x0505: gAttInsufficientAuthentication_c • 0x0506: gAttRequestNotSupported_c • 0x0507: gAttInvalidOffset_c • 0x0508: gAttInsufficientAuthorization_c • 0x0509: gAttPrepareQueueFull_c • 0x050A: gAttAttributeNotFound_c • 0x050B: gAttAttributeNotLong_c • 0x050C: gAttInsufficientEncryptionKeySize_c • 0x050D: gAttInvalidAttributeValueLength_c • 0x050E: gAttUnlikelyor_c • 0x050F: gAttInsufficientEncryption_c • 0x0510: gAttUnsupportedGroupType_c |

| Table continued from the previous page... | | |
|---|--------------|---|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0511: gAttInsufficientResources_c • 0x0601: gGattAnotherProcedureInProgress_c • 0x0602: gGattLongAttributePacketsCorrupted_c • 0x0603: gGattMultipleAttributesOverflow_c • 0x0604: gGattUnexpectedReadMultipleResponseLength_c • 0x0605: gGattInvalidValueLength_c • 0x0606: gGattServerTimeout_c • 0x0607: gGattIndicationAlreadyInProgress_c • 0x0608: gGattClientConfirmationTimeout_c • 0x0701: gGapAdvDataTooLong_c • 0x0702: gGapScanRspDataTooLong_c • 0x0703: gGapDeviceNotBonded_c • 0x0801: gDevDbCccdLimitReached_c • 0x0802: gDevDbCccdNotFound_c • 0x0901: gGattDbInvalidHandle_c • 0x0902: gGattDbCharacteristicNotFound_c • 0x0903: gGattDbCccdNotFound_c • 0x0904: gGattDbServiceNotFound_c • 0x0905: gGattDbDescriptorNotFound_c |

3.4.6 GAP-AdvertisingEventStateChanged.Indication

Description

Event received when advertising was successfully enabled or disabled.

Parameters

Table 227. GAP-AdvertisingEventStateChanged.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x98 |
| Length | 1 | 0x00 - This message does not have any parameters |

3.4.7 GAP-Authorize.Request

Description

Authorizes a peer for a certain attribute in the database.

Parameters

Table 228. GAP-Authorize.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x07 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | The peer being authorized |
| Handle | 2 | The attribute handle |
| Access | 1 | GATT Database access type (the type of access granted - read or write) Possible values: 0x00: gRead_c (Attempting to read the attribute) 0x01: gWrite_c (Attempting to write the attribute) |

3.4.8 GAP-CheckIfBonded.Request

Description

Verifies if a connected peer device is bonded.

Parameters

Table 229. GAP-CheckIfBonded.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|----------|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x20 |

Table continues on the next page...

Table 229. GAP-CheckIfBonded.Request Parameters (continued)

| | | |
|----------|---|---|
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID of the GAP peer |

3.4.9 GAP-CheckIfBonded.Indication

Description

Returns whether a connected peer device is bonded or not.

Parameters

Table 230. GAP-CheckIfBonded.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x86 |
| Length | 1 | Length in bytes of the following parameters |
| IsBonded | 1 | Bonded flag |

3.4.10 GAP-CheckIndicationStatus.Request

Description

Retrieves the indication status for a given client and a given CCCD handle.

Parameters

Table 231. Parameters GAP-CheckIndicationStatus.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x0A |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | The peer GATT client |
| Handle | 2 | The handle of the CCCD |

3.4.11 GAP-CheckIndicationStatus.Indication

Description

Returns the indication status for a given Client and a given CCCD handle.

Parameters

Table 232. GAP-CheckIndicationStatus.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|----------|
|-----------|--------------|----------|

Table continues on the next page...

Table 232. GAP-CheckIndicationStatus.Indication Parameters (continued)

| | | |
|----------|---|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x82 |
| Length | 1 | Length in bytes of the following parameters |
| IsActive | 1 | Indication status |

3.4.12 GAP-CheckNotificationStatus.Request

Description

Retrieves the notification status for a given client and a given CCCD handle.

Parameters

Table 233. GAP-CheckNotificationStatus.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x09 |
| Length | 1 | Length in bytes of the following parameters |
| Deviceld | 1 | The peer GATT client |
| Handle | 2 | The handle of the CCCD |

3.4.13 GAP-CheckNotificationStatus.Indication

Description

Returns the notification status for a given Client and a given CCCD handle.

Parameters

Table 234. GAP-CheckNotificationStatus.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x81 |
| Length | 1 | Length in bytes of the following parameters |
| IsActive | 1 | Notification status |

3.4.14 GAP-ClearWhiteList.Request

Description

Removes all addresses from the White List.

Parameters

Table 235. GAP-ClearWhiteList.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x22 |
| Length | 1 | 0x00 - This message does not have any parameters |

3.4.15 GAP-Connect.Request

Description

Connects to a scanned device.

Parameters

Table 236. GAP-Connect.Request Parameters

| Parameter | Size (bytes) | Comments |
|----------------------------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x1C |
| Length | 1 | Length in bytes of the following parameters |
| CreateConnectionParameters | Variable | Create connection command parameters Structure type parameter. See the detailed table below for parameter structure. |

Table 237. CreateConnectionParameters Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|---|
| ScanInterval | 2 | Scanning interval - default 10ms |
| ScanWindow | 2 | Scanning window - default 10ms |
| FilterPolicy | 1 | Indicates whether the connection request is issued for a specific device or for all the devices in the White List - default specific device Possible values: 0x00: gUseDeviceAddress_c (Initiates a connection with a specific device identified by its address) 0x01: gUseWhiteList_c (Initiates connections with all the devices in the White List at the same time) |

Table continues on the next page...

Table 237. CreateConnectionParameters Parameter Structure (continued)

| | | |
|------------------------|---|---|
| OwnAddressType | 1 | Indicates whether the address used in connection requests will be the public address or the random address - default public address Possible values: 0x00: gPublic_c 0x01: gRandom_c |
| PeerAddressType | 1 | When connecting to a specific device, this indicates that device's address type - default public address Possible values: 0x00: gPublic_c 0x01: gRandom_c |
| PeerAddress | 6 | When connecting to a specific device, this indicates that device's address |
| ConnIntervalMin | 2 | The minimum desired connection interval - default 100ms |
| ConnIntervalMax | 2 | The maximum desired connection interval - default 200ms |
| ConnLatency | 2 | The desired connection latency (the maximum number of consecutive connection events the Slave is allowed to ignore) - default 0 |
| SupervisionTimeout | 2 | The maximum time interval between consecutive over-the-air packets; if this timer expires, the connection is dropped - default 10s |
| ConnEventLengthMin | 2 | The minimum desired connection event length - default 0ms |
| ConnEventLengthMax | 2 | The maximum desired connection event length - default maximum possible, ~41 s |
| usePeerIdentityAddress | 1 | TRUE if the address defined in the peerAddressType and peerAddress is an identity address |
| Initiating_PHYs | 1 | Phy Flags |

3.4.16 GAP-ConnectionEventAuthenticationRejected.Indication

Description

A link encryption or pairing request was rejected by the peer Slave.

Parameters

Table 238. GAP-ConnectionEventAuthenticationRejected.Indication Parameters

| Parameter | Size (bytes) | Comments |
|--------------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0xA1 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the connection |
| RejectReason | 1 | <p>The reason of the rejection</p> <p>Possible values:</p> <p>0x02: gOobNotAvailable_c (This device does not have the required OOB for authenticated pairing)</p> <p>0x03: gIncompatibleIoCapabilities_c (The combination of I/O capabilities does not allow pairing with the desired level of security)</p> <p>0x05: gPairingNotSupported_c (This device does not support pairing)</p> <p>0x06: gLowEncryptionKeySize_c (The peer's encryption key size is too low for this device's required security level)</p> <p>0x08: gUnspecifiedReason_c (The host has rejected the pairing for an unknown reason)</p> <p>0x09: gRepeatedAttempts_c (This device is the target of repeated unsuccessful pairing attempts and does not allow further pairing attempts at the moment)</p> <p>0xF0: gLinkEncryptionFailed_c (Link could not be encrypted)</p> |

3.4.17 GAP-ConnectionEventConnected.Indication

Description

A connection was established.

Parameters

Table 239. GAP-ConnectionEventConnected.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|----------|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x9D |

Table continues on the next page...

Table 239. GAP-ConnectionEventConnected.Indication Parameters (continued)

| | | |
|----------------------|----------|--|
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the connection |
| ConnectionParameters | Variable | Connection parameters established by the Controller Structure type parameter. See the detailed table below for parameter structure. |
| PeerAddressType | 1 | Connected device's address type Possible values: 0x00: gPublic_c 0x01: gRandom_c |
| PeerAddress | 6 | Connected device's address |
| peerRpaResolved | 1 | TRUE if the address defined by peerAddressType and peerAddress is the identity address of the peer, and the peer used an RPA that was resolved by the Controller and is contained in the peerRpa field |
| peerRpa | 6 | Peer Resolvable Private Address if Controller Privacy is active and peerRpaResolved is TRUE |
| localRpaUsed | 1 | TRUE if the Controller has used an RPA contained in the localRpa field |
| localRpa | 6 | Local Resolvable Private Address if Controller Privacy is active and localRpaUsed is TRUE |

Table 240. Connection Parameters Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|---|
| ConnInterval | 2 | Interval between connection events |
| ConnLatency | 2 | Number of consecutive connection events the Slave may ignore |
| SupervisionTimeout | 2 | The maximum time interval between consecutive over-the-air packets; if this timer expires, the connection is dropped |
| MasterClockAccuracy | 1 | Accuracy of master's clock, allowing for frame detection optimizations Possible values: 0x00: gMasterClkAcc500ppm_c |

Table 240. Connection Parameters Parameter Structure (continued)

| | | |
|--|--|---|
| | | 0x01: gMasterClkAcc250ppm_c 0x02: gMasterClkAcc150ppm_c 0x03: gMasterClkAcc100ppm_c 0x04: gMasterClkAcc75ppm_c 0x05: gMasterClkAcc50ppm_c 0x06: gMasterClkAcc30ppm_c 0x07: gMasterClkAcc20ppm_c |
|--|--|---|

3.4.18 GAP-ConnectionEventDisconnected.Indication

Description

A connection is terminated.

Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0xAA |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the connection |
| Reason | 2 | Reason for disconnection Possible values: <ul style="list-style-type: none"> • 0x0000: gBleSuccess_c • 0x0001: gBleInvalidParameter_c • 0x0002: gBleOverflow_c • 0x0003: gBleUnavailable_c • 0x0004: gBleFeatureNotSupported_c • 0x0005: gBleOutOfMemory_c • 0x0006: gBleAlreadyInitialized_c • 0x0007: gBleOsError_c • 0x0008: gBleUnexpectedError_c • 0x0009: gBleInvalidState_c • 0x0101: gHciUnknownHciCommand_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0102: gHciUnknownConnectionIdentifier_c • 0x0103: gHciHardwareFailure_c • 0x0104: gHciPageTimeout_c • 0x0105: gHciAuthenticationFailure_c • 0x0106: gHciPinOrKeyMissing_c • 0x0107: gHciMemoryCapacityExceeded_c • 0x0108: gHciConnectionTimeout_c • 0x0109: gHciConnectionLimitExceeded_c • 0x010A: gHciSynchronousConnectionLimitToADeviceExceeded_c • 0x010B: gHciAclConnectionAlreadyExists_c • 0x010C: gHciCommandDisallowed_c • 0x010D: gHciConnectionRejectedDueToLimitedResources_c • 0x010E: gHciConnectionRejectedDueToSecurityReasons_c • 0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c • 0x0110: gHciConnectionAcceptTimeoutExceeded_c • 0x0111: gHciUnsupportedFeatureOrParameterValue_c • 0x0112: gHciInvalidHciCommandParameters_c • 0x0113: gHciRemoteUserTerminatedConnection_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c • 0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c • 0x0116: gHciConnectionTerminatedByLocalHost_c • 0x0117: gHciRepeatedAttempts_c • 0x0118: gHciPairingNotAllowed_c • 0x0119: gHciUnknownLpmPdu_c • 0x011A: gHciUnsupportedRemoteFeature_c • 0x011B: gHciScoOffsetRejected_c • 0x011C: gHciScoIntervalRejected_c • 0x011D: gHciScoAirModeRejected_c • 0x011E: gHciInvalidLpmParameters_c • 0x011F: gHciUnspecifiedError_c • 0x0120: gHciUnsupportedLpmParameterValue_c • 0x0121: gHciRoleChangeNotAllowed_c • 0x0122: gHciLLResponseTimeout_c • 0x0123: gHciLmpErrorTransactionCollision_c • 0x0124: gHciLmpPduNotAllowed_c • 0x0125: gHciEncryptionModeNotAcceptable_c • 0x0126: gHciLinkKeyCannotBeChanged_c • 0x0127: gHciRequestedQosNotSupported_c • 0x0128: gHciInstantPassed_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0129: gHciPairingWithUnitKeyNotSupported_c • 0x012A: gHciDifferentTransactionCollision_c • 0x012B: gHciReserved_0x2B_c • 0x012C: gHciQosNotAcceptableParameter_c • 0x012D: gHciQosRejected_c • 0x012E: gHciChannelClassificationNotSupported_c • 0x012F: gHciInsufficientSecurity_c • 0x0130: gHciParameterOutOfMandatoryRange_c • 0x0131: gHciReserved_0x31_c • 0x0132: gHciRoleSwitchPending_c • 0x0133: gHciReserved_0x33_c • 0x0134: gHciReservedSlotViolation_c • 0x0135: gHciRoleSwitchFailed_c • 0x0136: gHciExtendedInquiryResponseTooLarge_c • 0x0137: gHciSecureSimplePairingNotSupportedByHost_c • 0x0138: gHciHostBusyPairing_c • 0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c • 0x013A: gHciControllerBusy_c • 0x013B: gHciUnacceptableConnectionParameters_c • 0x013C: gHciDirectedAdvertisingTimeout_c • 0x013D: gHciConnectionTerminatedDueToMicFailure_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x013E: gHciConnectionFailedToBeEstablished_c • 0x013F: gHciMacConnectionFailed_c • 0x0140: gHciCoarseClockAdjustmentRejected_c • 0x01A0: gHciAlreadyInit_c • 0x01A1: gHciInvalidParameter_c • 0x01A2: gHciCallbackNotInstalled_c • 0x01A3: gHciCallbackAlreadyInstalled_c • 0x01A4: gHciCommandNotSupported_c • 0x01A5: gHciEventNotSupported_c • 0x01A6: gHciTransportError_c • 0x03F0: gL2caAlreadyInit_c • 0x03F1: gL2caInsufficientResources_c • 0x03F2: gL2caCallbackNotInstalled_c • 0x03F3: gL2caCallbackAlreadyInstalled_c • 0x03F4: gL2caLePsmInvalid_c • 0x03F5: gL2caLePsmAlreadyRegistered_c • 0x03F6: gL2caLePsmNotRegistered_c • 0x03F7: gL2caLePsmInsufficientResources_c • 0x03F8: gL2caChannelInvalid_c • 0x03F9: gL2caChannelClosed_c • 0x03FA: gL2caChannelAlreadyConnected_c • 0x03FB: gL2caConnectionParametersRejected_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x03FC: gL2caChannelBusy_c • 0x03FE: gL2caInvalidParameter_c • 0x03FF: gL2caError_c • 0x0401: gSmNullCBFunction_c • 0x0402: gSmCommandNotSupported_c • 0x0403: gSmUnexpectedCommand_c • 0x0404: gSmInvalidCommandCode_c • 0x0405: gSmInvalidCommandLength_c • 0x0406: gSmInvalidCommandParameter_c • 0x0407: gSmInvalidDeviceId_c • 0x0408: gSmInvalidInternalOperation_c • 0x0409: gSmInvalidConnectionHandle_c • 0x040A: gSmImproperKeyDistributionField_c • 0x040B: gSmUnexpectedKeyType_c • 0x040C: gSmUnexpectedPairingTerminationReason_c • 0x040D: gSmUnexpectedKeyset_c • 0x040E: gSmSmpTimeoutOccurred_c • 0x040F: gSmUnknownSmpPacketType_c • 0x0410: gSmInvalidSmpPacketLength_c • 0x0411: gSmInvalidSmpPacketParameter_c • 0x0412: gSmReceivedUnexpectedSmpPacket_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0413: gSmReceivedSmpPacketFromUnknownDevice_c • 0x0414: gSmReceivedUnexpectedHciEvent_c • 0x0415: gSmReceivedHciEventFromUnknownDevice_c • 0x0416: gSmInvalidHciEventParameter_c • 0x0417: gSmLlConnectionEncryptionInProgress_c • 0x0418: gSmLlConnectionEncryptionFailure_c • 0x0419: gSmInsufficientResources_c • 0x041A: gSmOobDataAddressMismatch_c • 0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c • 0x041C: gSmReceivedTimerEventForUnknownDevice_c • 0x041D: gSmUnattainableLocalDeviceSecRequirements_c • 0x041E: gSmUnattainableLocalDeviceMinKeySize_c • 0x041F: gSmUnattainableSlaveSecReqRequirements_c • 0x0431: gSmPairingErrorPasskeyEntryFailed_c • 0x0432: gSmPairingErrorConfirmValueFailed_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0433: gSmPairingErrorCommandNotSupported_c • 0x0434: gSmPairingErrorInvalidParameters_c • 0x0435: gSmPairingErrorUnknownReason_c • 0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c • 0x0461: gSmTbInvalidDataSignature_c • 0x0501: gAttInvalidHandle_c • 0x0502: gAttReadNotPermitted_c • 0x0503: gAttWriteNotPermitted_c • 0x0504: gAttInvalidPdu_c • 0x0505: gAttInsufficientAuthentication_c • 0x0506: gAttRequestNotSupported_c • 0x0507: gAttInvalidOffset_c • 0x0508: gAttInsufficientAuthorization_c • 0x0509: gAttPrepareQueueFull_c • 0x050A: gAttAttributeNotFound_c • 0x050B: gAttAttributeNotLong_c • 0x050C: gAttInsufficientEncryptionKeySize_c • 0x050D: gAttInvalidAttributeValueLength_c • 0x050E: gAttUnlikelyor_c • 0x050F: gAttInsufficientEncryption_c • 0x0510: gAttUnsupportedGroupType_c • 0x0511: gAttInsufficientResources_c |

| Table continued from the previous page... | | |
|---|--------------|--|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0601: gGattAnotherProcedureInProgress_c • 0x0602: gGattLongAttributePacketsCorrupted_c • 0x0603: gGattMultipleAttributesOverflow_c • 0x0604: gGattUnexpectedReadMultipleResponseLength_c • 0x0605: gGattInvalidValueLength_c • 0x0606: gGattServerTimeout_c • 0x0607: gGattIndicationAlreadyInProgress_c • 0x0608: gGattClientConfirmationTimeout_c • 0x0701: gGapAdvDataTooLong_c • 0x0702: gGapScanRspDataTooLong_c • 0x0703: gGapDeviceNotBonded_c • 0x0801: gDevDbCccdLimitReached_c • 0x0802: gDevDbCccdNotFound_c • 0x0901: gGattDbInvalidHandle_c • 0x0902: gGattDbCharacteristicNotFound_c • 0x0903: gGattDbCccdNotFound_c • 0x0904: gGattDbServiceNotFound_c • 0x0905: gGattDbDescriptorNotFound_c |

3.4.19 GAP-ConnectionEventEncryptionChanged.Indication

Description

Link's encryption state has changed, for example, during pairing or after a reconnection with a bonded peer.

Parameters

Table 241. GAP-ConnectionEventEncryptionChanged.Indication Parameters

| Parameter | Size (bytes) | Comments |
|--------------------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0xA8 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the connection |
| NewEncryptionState | 1 | TRUE if link has been encrypted, FALSE if encryption was paused or removed |

3.4.20 GAP-ConnectionEventKeyExchangeRequest.Indication

Description

The pairing procedure requires the SMP keys to be distributed to the peer.

Parameters

Table 242. GAP-ConnectionEventKeyExchangeRequest.Indication Parameters

| Parameter | Size (bytes) | Comments |
|------------------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0xA5 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the connection |
| RequestedKeys | 1 | Mask identifying the keys being requested Possible values: 0x00: gNoKeys_c (No key can be distributed) 0x01: gLtk_c (Long Term Key) 0x02: glrk_c (Identity Resolving Key) 0x04: gCsrk_c (Connection Signature Resolving Key) |
| RequestedLtkSize | 1 | Requested size of the encryption key |

3.4.21 GAP-ConnectionEventKeysReceived.Indication

Description

SMP keys distributed by the peer during pairing were received.

Parameters

Table 243. ConnectionEventKeysReceived.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0xA6 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the connection |
| Keys | Variable | The SMP keys of the local device Structure type parameter. See the detailed table below for parameter structure. |

Table 244. Keys Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|-------------------|---|
| LtkIncluded | 1 | Boolean value which indicates if LTK size and LTK are included or not |
| LtkInfo | Variable | LTK information (size and value) Structure type parameter. See the detailed table below for parameter structure. |
| IrkIncluded | 1 | Boolean value which indicates if IRK is included or not |
| Irk | 16 x IrkIncluded | Identity Resolving Key |
| CsrkIncluded | 1 | Boolean value which indicates if CSRK is included or not |
| Csrk | 16 x CsrkIncluded | Connection Signature Resolving Key |
| RandEdivInfo | Variable | Rand information (size and value) and Ediv Structure type parameter. See the detailed table below for parameter structure. |
| AddressIncluded | IrkIncluded | Boolean value which indicates if Address is included or not |
| AddressInfo | Variable | Address information (type and value) Structure type parameter. See the detailed table below for parameter structure. |

Table 245. LtkInfo Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|----------------------------|
| LtkSize | 1 | Encryption Key Size |
| Ltk | LtkSize | Long Term (Encryption) Key |

Table 246. RandEdivInfo Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|---------------------------------------|
| RandSize | 1 | Random value size |
| Rand | RandSize | Random value used to identify the LTK |
| Ediv | 2 | EDIV value used to identify the LTK |

Table 247. AddressInfo Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| DeviceAddressType | 1 | Public or Random address Possible values: 0x00: gPublic_c 0x01: gRandom_c |
| DeviceAddress | 6 | Device Address |

3.4.22 GAP-ConnectionEventLeDataLengthChanged.Indication

Description

The new TX/RX Data Length parameters.

Parameters

Table 248. GAP-ConnectionEventLeDataLengthChanged.Indication Parameters

| Parameter | Size (bytes) | Comments |
|---------------------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0xB0 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the connection |
| LeDataLengthChanged | Variable | Connection Le Data Length Changed Event data Structure type parameter. See the detailed table below for parameter structure. |

Table 249. LeDataLengthChanged Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| MaxTxOctets | 2 | The maximum number of payload octets in a Link Layer Data Channel PDU to transmit on this connection |
| MaxTxTime | 2 | The maximum time that the local Controller will take to send a Link Layer Data Channel PDU on this connection |
| MaxRxOctets | 2 | The maximum number of payload octets in a Link Layer Data Channel PDU to receive on this connection |
| MaxRxTime | 2 | The maximum time that the local Controller will take to receive a Link Layer Data Channel PDU on this connection |

3.4.23 GAP-ConnectionEventLeScDisplayNumericValue.Indication

Description

Event sent to display and confirm a Numeric Comparison Value when using the LE SC Numeric Comparison pairing method.

Parameters

Table 250. GAP-ConnectionEventLeScDisplayNumericValue Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0xB2 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the connection |
| ncValue | 4 | A number between 0 and 999999 decimal which must be confirmed by the user on both pairing devices |

3.4.24 GAP-ConnectionEventLeScKeypressNotification.Indication

Description

Remote Keypress Notification received during Passkey Entry Pairing Method.

Parameters

Table 251. GAP-ConnectionEventLeScKeyPressNotification.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|----------|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0xB3 |

Table continues on the next page...

Table 251. GAP-ConnectionEventLeScKeyPressNotification.Indication Parameters (continued)

| | | |
|-----------------------------------|----------|---|
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the connection |
| GapLeScKeyPressNotificationParams | Variable | Keypress notification type which denotes a passkey entry keypress action Structure type parameter. See the detailed table below for parameter structure. |

Table 252. GapLeScKeyPressNotificationParams Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| keypressNotifType | 1 | Possible values: 0x00: gKnPasskeyEntryStarted_c 0x01: gKnPasskeyDigitStarted_c 0x02: gKnPasskeyDigitErased_c (gKnPasskeyDigitErased_c) 0x03: gKnPasskeyCleared_c 0x04: gKnPasskeyEntryCompleted_c |

3.4.25 GAP-ConnectionEventLeScOobDataRequest.Indication

Description

Event sent to request LE SC OOB Data (r, Cr and Addr) received from a peer.

Parameters

Table 253. GAP-ConnectionEventLeScOobDataRequest.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0xB1 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the connection |

3.4.26 GAP-ConnectionEventLongTermKeyRequest.Indication

Description

The bonded peer Master has requested link encryption and the LTK must be provided.

Parameters

Table 254. GAP-ConnectionEventLongTermKeyRequest.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0xA7 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the connection |
| Ediv | 2 | The Encryption Diversifier, as defined by the SMP |
| RandSize | 1 | Random number size |
| Rand | RandSize | The Random number, as defined by the SMP |

3.4.27 GAP-ConnectionEventOobRequest.Indication

Description

Out-of-Band data must be provided for the pairing procedure.

Parameters

Table 255. GAP-ConnectionEventOobRequest.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0xA3 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the connection |

3.4.28 GAP-ConnectionEventPairingComplete.Indication

Description

Pairing procedure is complete, either successfully or with failure.

Parameters

Table 256. GAP-ConnectionEventPairingComplete.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0xA9 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the connection |

Table continues on the next page...

Table 256. GAP-ConnectionEventPairingComplete.Indication Parameters (continued)

| | | |
|---------------|----------|--|
| PairingStatus | 1 | Pairing status Possible values: 0x01: PairingSuccessful (Pairing succeeded) 0x00: PairingFailed (Pairing failed) |
| PairingData | Variable | Information of pairing completion "Union" type parameter. Its structure is based on the value of parameter PairingStatus. See the detailed table below for parameter structure. |

Table 257. PairingData Parameter Structure

| PairingStatus | Structure Parameter | Size (bytes) | Comments |
|---------------|---------------------|--------------|--|
| 0x01 | PairingSuccessful | Variable | Pairing successful data Structure type parameter. See the detailed table below for parameter structure. |
| 0x00 | PairingFailed | Variable | Pairing failed data Structure type parameter. See the detailed table below for parameter structure. |

Table 258. PairingSuccessful Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|---|
| WithBonding | 1 | Indicates whether the devices is bonded |

| Structure Parameter (PairingFailed) | Size (bytes) | Comments |
|-------------------------------------|--------------|---|
| FailReason | 2 | The reason of failure Possible values: <ul style="list-style-type: none"> • 0x0000: gBleSuccess_c • 0x0001: gBleInvalidParameter_c • 0x0002: gBleOverflow_c • 0x0003: gBleUnavailable_c • 0x0004: gBleFeatureNotSupported_c • 0x0005: gBleOutOfMemory_c • 0x0006: gBleAlreadyInitialized_c |

| Structure Parameter (PairingFailed) | Size (bytes) | Comments |
|-------------------------------------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0007: gBleOsError_c • 0x0008: gBleUnexpectedError_c • 0x0009: gBleInvalidState_c • 0x0101: gHciUnknownHciCommand_c • 0x0102: gHciUnknownConnectionIdentifier_c • 0x0103: gHciHardwareFailure_c • 0x0104: gHciPageTimeout_c • 0x0105: gHciAuthenticationFailure_c • 0x0106: gHciPinOrKeyMissing_c • 0x0107: gHciMemoryCapacityExceeded_c • 0x0108: gHciConnectionTimeout_c • 0x0109: gHciConnectionLimitExceeded_c • 0x010A: gHciSynchronousConnectionLimitToADeviceExceeded_c • 0x010B: gHciAclConnectionAlreadyExists_c • 0x010C: gHciCommandDisallowed_c • 0x010D: gHciConnectionRejectedDueToLimitedResources_c • 0x010E: gHciConnectionRejectedDueToSecurityReasons_c • 0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c • 0x0110: gHciConnectionAcceptTimeoutExceeded_c • 0x0111: gHciUnsupportedFeatureOrParameterValue_c |

| Structure Parameter (PairingFailed) | Size (bytes) | Comments |
|-------------------------------------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0112: gHciInvalidHciCommandParameters_c • 0x0113: gHciRemoteUserTerminatedConnection_c • 0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c • 0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c • 0x0116: gHciConnectionTerminatedByLocalHost_c • 0x0117: gHciRepeatedAttempts_c • 0x0118: gHciPairingNotAllowed_c • 0x0119: gHciUnknownLpmPdu_c • 0x011A: gHciUnsupportedRemoteFeature_c • 0x011B: gHciScoOffsetRejected_c • 0x011C: gHciScoIntervalRejected_c • 0x011D: gHciScoAirModeRejected_c • 0x011E: gHciInvalidLpmParameters_c • 0x011F: gHciUnspecifiedError_c • 0x0120: gHciUnsupportedLpmParameterValue_c • 0x0121: gHciRoleChangeNotAllowed_c • 0x0122: gHciLLResponseTimeout_c • 0x0123: gHciLmpErrorTransactionCollision_c • 0x0124: gHciLmpPduNotAllowed_c • 0x0125: gHciEncryptionModeNotAcceptable_c • 0x0126: gHciLinkKeyCannotBeChanged_c |

| Structure Parameter (PairingFailed) | Size (bytes) | Comments |
|-------------------------------------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0127: gHciRequestedQosNotSupported_c • 0x0128: gHciInstantPassed_c • 0x0129: gHciPairingWithUnitKeyNotSupported_c • 0x012A: gHciDifferentTransactionCollision_c • 0x012B: gHciReserved_0x2B_c • 0x012C: gHciQosNotAcceptableParameter_c • 0x012D: gHciQosRejected_c • 0x012E: gHciChannelClassificationNotSupported_c • 0x012F: gHciInsufficientSecurity_c • 0x0130: gHciParameterOutOfMandatoryRange_c • 0x0131: gHciReserved_0x31_c • 0x0132: gHciRoleSwitchPending_c • 0x0133: gHciReserved_0x33_c • 0x0134: gHciReservedSlotViolation_c • 0x0135: gHciRoleSwitchFailed_c • 0x0136: gHciExtendedInquiryResponseTooLarge_c • 0x0137: gHciSecureSimplePairingNotSupportedByHost_c • 0x0138: gHciHostBusyPairing_c • 0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c • 0x013A: gHciControllerBusy_c • 0x013B: gHciUnacceptableConnectionParameters_c • 0x013C: gHciDirectedAdvertisingTimeout_c |

| Structure Parameter (PairingFailed) | Size (bytes) | Comments |
|-------------------------------------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x013D: gHciConnectionTerminatedDueToMicFailure_c • 0x013E: gHciConnectionFailedToBeEstablished_c • 0x013F: gHciMacConnectionFailed_c • 0x0140: gHciCoarseClockAdjustmentRejected_c • 0x01A0: gHciAlreadyInit_c • 0x01A1: gHciInvalidParameter_c • 0x01A2: gHciCallbackNotInstalled_c • 0x01A3: gHciCallbackAlreadyInstalled_c • 0x01A4: gHciCommandNotSupported_c • 0x01A5: gHciEventNotSupported_c • 0x01A6: gHciTransportError_c • 0x03F0: gL2caAlreadyInit_c • 0x03F1: gL2caInsufficientResources_c • 0x03F2: gL2caCallbackNotInstalled_c • 0x03F3: gL2caCallbackAlreadyInstalled_c • 0x03F4: gL2caLePsmInvalid_c • 0x03F5: gL2caLePsmAlreadyRegistered_c • 0x03F6: gL2caLePsmNotRegistered_c • 0x03F7: gL2caLePsmInsufficientResources_c • 0x03F8: gL2caChannelInvalid_c • 0x03F9: gL2caChannelClosed_c • 0x03FA: gL2caChannelAlreadyConnected_c |

| Structure Parameter (PairingFailed) | Size (bytes) | Comments |
|-------------------------------------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x03FB: gL2caConnectionParametersRejected_c • 0x03FC: gL2caChannelBusy_c • 0x03FE: gL2caInvalidParameter_c • 0x03FF: gL2caError_c • 0x0401: gSmNullCBFunction_c • 0x0402: gSmCommandNotSupported_c • 0x0403: gSmUnexpectedCommand_c • 0x0404: gSmInvalidCommandCode_c • 0x0405: gSmInvalidCommandLength_c • 0x0406: gSmInvalidCommandParameter_c • 0x0407: gSmInvalidDeviceId_c • 0x0408: gSmInvalidInternalOperation_c • 0x0409: gSmInvalidConnectionHandle_c • 0x040A: gSmImproperKeyDistributionField_c • 0x040B: gSmUnexpectedKeyType_c • 0x040C: gSmUnexpectedPairingTerminationReason_c • 0x040D: gSmUnexpectedKeypset_c • 0x040E: gSmSmpTimeoutOccurred_c • 0x040F: gSmUnknownSmpPacketType_c • 0x0410: gSmInvalidSmpPacketLength_c • 0x0411: gSmInvalidSmpPacketParameter_c • 0x0412: gSmReceivedUnexpectedSmpPacket_c |

| Structure Parameter (PairingFailed) | Size (bytes) | Comments |
|-------------------------------------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0413: gSmReceivedSmpPacketFromUnknownDevice_c • 0x0414: gSmReceivedUnexpectedHciEvent_c • 0x0415: gSmReceivedHciEventFromUnknownDevice_c • 0x0416: gSmInvalidHciEventParameter_c • 0x0417: gSmLlConnectionEncryptionInProgress_c • 0x0418: gSmLlConnectionEncryptionFailure_c • 0x0419: gSmInsufficientResources_c • 0x041A: gSmOobDataAddressMismatch_c • 0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c • 0x041C: gSmReceivedTimerEventForUnknownDevice_c • 0x041D: gSmUnattainableLocalDeviceSecRequirements_c • 0x041E: gSmUnattainableLocalDeviceMinKeySize_c • 0x041F: gSmUnattainableSlaveSecReqRequirements_c • 0x0431: gSmPairingErrorPasskeyEntryFailed_c • 0x0432: gSmPairingErrorConfirmValueFailed_c |

| Structure Parameter (PairingFailed) | Size (bytes) | Comments |
|-------------------------------------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0433: gSmPairingErrorCommandNotSupported_c • 0x0434: gSmPairingErrorInvalidParameters_c • 0x0435: gSmPairingErrorUnknownReason_c • 0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c • 0x0461: gSmTbInvalidDataSignature_c • 0x0501: gAttInvalidHandle_c • 0x0502: gAttReadNotPermitted_c • 0x0503: gAttWriteNotPermitted_c • 0x0504: gAttInvalidPdu_c • 0x0505: gAttInsufficientAuthentication_c • 0x0506: gAttRequestNotSupported_c • 0x0507: gAttInvalidOffset_c • 0x0508: gAttInsufficientAuthorization_c • 0x0509: gAttPrepareQueueFull_c • 0x050A: gAttAttributeNotFound_c • 0x050B: gAttAttributeNotLong_c • 0x050C: gAttInsufficientEncryptionKeySize_c • 0x050D: gAttInvalidAttributeValueLength_c • 0x050E: gAttUnlikelyor_c • 0x050F: gAttInsufficientEncryption_c • 0x0510: gAttUnsupportedGroupType_c • 0x0511: gAttInsufficientResources_c • 0x0601: gGattAnotherProcedureInProgress_c |

| Structure Parameter (PairingFailed) | Size (bytes) | Comments |
|-------------------------------------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0602: gGattLongAttributePacketsCorrupted_c • 0x0603: gGattMultipleAttributesOverflow_c • 0x0604: gGattUnexpectedReadMultipleResponseLength_c • 0x0605: gGattInvalidValueLength_c • 0x0606: gGattServerTimeout_c • 0x0607: gGattIndicationAlreadyInProgress_c • 0x0608: gGattClientConfirmationTimeout_c • 0x0701: gGapAdvDataTooLong_c • 0x0702: gGapScanRspDataTooLong_c • 0x0703: gGapDeviceNotBonded_c • 0x0801: gDevDbCccdLimitReached_c • 0x0802: gDevDbCccdNotFound_c • 0x0901: gGattDbInvalidHandle_c • 0x0902: gGattDbCharacteristicNotFound_c • 0x0903: gGattDbCccdNotFound_c • 0x0904: gGattDbServiceNotFound_c • 0x0905: gGattDbDescriptorNotFound_c |

3.4.29 GAP-ConnectionEventPairingRequest.Indication

Description

A pairing request was received from the peer Master.

Parameters

Table 259. GAP-ConnectionEventPairingRequest.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|----------|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x9E |

Table continues on the next page...

Table 259. GAP-ConnectionEventPairingRequest.Indication Parameters (continued)

| | | |
|-------------------|----------|---|
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the connection |
| PairingParameters | Variable | Pairing parameters Structure type parameter. See the detailed table below for parameter structure. |

Table 260. PairingParameters Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|----------------------|--------------|---|
| WithBonding | 1 | TRUE if this device is able to and wants to bond after pairing, FALSE otherwise |
| SecurityModeAndLevel | 1 | The desired security mode-level Possible values: 0x10: gMode1Level1_c (Mode 1 Level 1 - No Security) 0x11: gMode1Level2_c (Mode 1 Level 2 - Encryption without authentication) 0x12: gMode1Level3_c (Mode 1 Level 3 - Encryption with authentication) 0x13: gMode1Level4_c (Mode 1 Level 4 - Encryption with LE Secure Connections pairing) 0x21: gMode2Level1_c (Mode 2 Level 1 - Data Signing without authentication) 0x22: gMode2Level2_c (Mode 2 Level 2 - Data Signing with authentication) |
| MaxEncryptionKeySize | 1 | Maximum LTK size supported by the device |
| LocalCapabilities | 1 | I/O capabilities used to determine the pairing method Possible values: 0x00: gIoDisplayOnly_c (May display a PIN, no input) 0x01: gIoDisplayYesNo_c (May display a PIN and has a binary input (for example, YES and NO buttons)) 0x02: gIoKeyboardOnly_c (Has keyboard input, no display) |

Table continues on the next page...

Table 260. PairingParameters Parameter Structure (continued)

| | | |
|-----------------------------|---|--|
| | | 0x03: gNoNone_c (No input and no display) 0x04: gNoKeyboardDisplay_c (Has keyboard input and display) |
| OobAvailable | 1 | TRUE if this device has Out-of-Band data that can be used for authenticated pairing, FALSE otherwise |
| CentralKeys | 1 | SMP keys to be distributed by the Central Possible values: 0x00: gNoKeys_c (No key can be distributed) 0x01: gLtk_c (Long Term Key) 0x02: glrk_c (Identity Resolving Key) 0x04: gCsrk_c (Connection Signature Resolving Key) |
| PeripheralKeys | 1 | SMP keys to be distributed by the Peripheral Possible values: 0x00: gNoKeys_c (No key can be distributed) 0x01: gLtk_c (Long Term Key) 0x02: glrk_c (Identity Resolving Key) 0x04: gCsrk_c (Connection Signature Resolving Key) |
| LeSecureConnectionSupported | 1 | indicates if device supports LE Secure Connections pairing |
| UseKeypressNotifications | 1 | Indicates if device supports Keypress Notification PDUs during Passkey Entry pairing |

3.4.30 GAP-ConnectionEventPairingResponse.Indication

Description

A pairing response was received from the peer Slave.

Parameters

Table 261. GAP-ConnectionEventPairingResponse.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|----------|
| OpGroup | 1 | 0x48 |

Table continues on the next page...

Table 261. GAP-ConnectionEventPairingResponse.Indication Parameters (continued)

| | | |
|-------------------|----------|---|
| OpCode | 1 | 0xA0 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the connection |
| PairingParameters | Variable | Pairing parameters Structure type parameter. See the detailed table below for parameter structure. |

Table 262. PairingParameters Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|----------------------|--------------|---|
| WithBonding | 1 | TRUE if this device is able to and wants to bond after pairing, FALSE otherwise |
| SecurityModeAndLevel | 1 | The desired security mode-level Possible values: 0x10: gMode1Level1_c (Mode 1 Level 1 - No Security) 0x11: gMode1Level2_c (Mode 1 Level 2 - Encryption without authentication) 0x12: gMode1Level3_c (Mode 1 Level 3 - Encryption with authentication) 0x13: gMode1Level4_c (Mode 1 Level 4 - Encryption with LE Secure Connections pairing) 0x21: gMode2Level1_c (Mode 2 Level 1 - Data Signing without authentication) 0x22: gMode2Level2_c (Mode 2 Level 2 - Data Signing with authentication) |
| MaxEncryptionKeySize | 1 | Maximum LTK size supported by the device |
| LocalIoCapabilities | 1 | I/O capabilities used to determine the pairing method Possible values: 0x00: gIoDisplayOnly_c (May display a PIN, no input) 0x01: gIoDisplayYesNo_c (May display a PIN and has a binary input (for example, YES and NO buttons)) 0x02: gIoKeyboardOnly_c (Has keyboard input, no display) |

Table continues on the next page...

Table 262. PairingParameters Parameter Structure (continued)

| | | |
|-----------------------------|---|--|
| | | 0x03: gloNone_c (No input and no display) 0x04: gloKeyboardDisplay_c (Has keyboard input and display) |
| OobAvailable | 1 | TRUE if this device has Out-of-Band data that can be used for authenticated pairing, FALSE otherwise |
| CentralKeys | 1 | SMP keys to be distributed by the Central Possible values: 0x00: gNoKeys_c (No key can be distributed) 0x01: gLtk_c (Long Term Key) 0x02: glrk_c (Identity Resolving Key) 0x04: gCsrk_c (Connection Signature Resolving Key) |
| PeripheralKeys | 1 | SMP keys to be distributed by the Peripheral Possible values: 0x00: gNoKeys_c (No key can be distributed) 0x01: gLtk_c (Long Term Key) 0x02: glrk_c (Identity Resolving Key) 0x04: gCsrk_c (Connection Signature Resolving Key) |
| LeSecureConnectionSupported | 1 | indicates if device supports LE Secure Connections pairing |
| UseKeypressNotifications | 1 | Indicates if device supports Keypress Notification PDUs during Passkey Entry pairing |

3.4.31 GAP-ConnectionEventParameterUpdateComplete.Indication

Description

The connection has new parameters.

Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|----------|
| OpGroup | 1 | 0x48 |

Table continues on the next page...

| <i>Table continued from the previous page...</i> | | |
|--|--------------|--|
| Parameter | Size (bytes) | Comments |
| OpCode | 1 | 0xAF |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the connection |
| ConnectionParameterUpdateComplete | Variable | Connection parameter update complete event data Structure type parameter. See the detailed table below for parameter structure. |

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|---|
| Status | 2 | <p>The status of the request</p> <p>Possible values:</p> <ul style="list-style-type: none"> • 0x0000: gBleSuccess_c • 0x0001: gBleInvalidParameter_c • 0x0002: gBleOverflow_c • 0x0003: gBleUnavailable_c • 0x0004: gBleFeatureNotSupported_c • 0x0005: gBleOutOfMemory_c • 0x0006: gBleAlreadyInitialized_c • 0x0007: gBleOsError_c • 0x0008: gBleUnexpectedError_c • 0x0009: gBleInvalidState_c • 0x0101: gHciUnknownHciCommand_c • 0x0102: gHciUnknownConnectionIdentifier_c • 0x0103: gHciHardwareFailure_c • 0x0104: gHciPageTimeout_c • 0x0105: gHciAuthenticationFailure_c • 0x0106: gHciPinOrKeyMissing_c • 0x0107: gHciMemoryCapacityExceeded_c |

Table continues on the next page...

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0108: gHciConnectionTimeout_c • 0x0109: gHciConnectionLimitExceeded_c • 0x010A: gHciSynchronousConnectionLimitToADeviceExceeded_c • 0x010B: gHciAclConnectionAlreadyExists_c • 0x010C: gHciCommandDisallowed_c • 0x010D: gHciConnectionRejectedDueToLimitedResources_c • 0x010E: gHciConnectionRejectedDueToSecurityReasons_c • 0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c • 0x0110: gHciConnectionAcceptTimeoutExceeded_c • 0x0111: gHciUnsupportedFeatureOrParameterValue_c • 0x0112: gHciInvalidHciCommandParameters_c • 0x0113: gHciRemoteUserTerminatedConnection_c • 0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c • 0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c • 0x0116: gHciConnectionTerminatedByLocalHost_c • 0x0117: gHciRepeatedAttempts_c • 0x0118: gHciPairingNotAllowed_c |

Table continues on the next page...

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0119: gHciUnknownLpmPdu_c • 0x011A: gHciUnsupportedRemoteFeature_c • 0x011B: gHciScoOffsetRejected_c • 0x011C: gHciScoIntervalRejected_c • 0x011D: gHciScoAirModeRejected_c • 0x011E: gHciInvalidLpmParameters_c • 0x011F: gHciUnspecifiedError_c • 0x0120: gHciUnsupportedLpmParameterValue_c • 0x0121: gHciRoleChangeNotAllowed_c • 0x0122: gHciLLResponseTimeout_c • 0x0123: gHciLmpErrorTransactionCollision_c • 0x0124: gHciLmpPduNotAllowed_c • 0x0125: gHciEncryptionModeNotAcceptable_c • 0x0126: gHciLinkKeyCannotBeChanged_c • 0x0127: gHciRequestedQosNotSupported_c • 0x0128: gHciInstantPassed_c • 0x0129: gHciPairingWithUnitKeyNotSupported_c • 0x012A: gHciDifferentTransactionCollision_c • 0x012B: gHciReserved_0x2B_c • 0x012C: gHciQosNotAcceptableParameter_c • 0x012D: gHciQosRejected_c • 0x012E: gHciChannelClassificationNotSupported_c |

Table continues on the next page...

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x012F: gHciInsufficientSecurity_c • 0x0130: gHciParameterOutOfMandatoryRange_c • 0x0131: gHciReserved_0x31_c • 0x0132: gHciRoleSwitchPending_c • 0x0133: gHciReserved_0x33_c • 0x0134: gHciReservedSlotViolation_c • 0x0135: gHciRoleSwitchFailed_c • 0x0136: gHciExtendedInquiryResponseTooLarge_c • 0x0137: gHciSecureSimplePairingNotSupportedByHost_c • 0x0138: gHciHostBusyPairing_c • 0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c • 0x013A: gHciControllerBusy_c • 0x013B: gHciUnacceptableConnectionParameters_c • 0x013C: gHciDirectedAdvertisingTimeout_c • 0x013D: gHciConnectionTerminatedDueToMicFailure_c • 0x013E: gHciConnectionFailedToBeEstablished_c • 0x013F: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c • 0x0140: gHciMacConnectionFailed_c • 0x0141: gHciCoarseClockAdjustmentRejected_c |

Table continues on the next page...

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0141: gHciType0SubmapNotDefined_c • 0x0142: gHciUnknownAdvertisingIdentifier_c • 0x0143: gHciLimitReached_c • 0x0144: gHciOperationCancelledByHost_c • 0x01A0: gHciAlreadyInit_c • 0x01A1: gHciInvalidParameter_c • 0x01A2: gHciCallbackNotInstalled_c • 0x01A3: gHciCallbackAlreadyInstalled_c • 0x01A4: gHciCommandNotSupported_c • 0x01A5: gHciEventNotSupported_c • 0x01A6: gHciTransportError_c • 0x03F0: gL2caAlreadyInit_c • 0x03F1: gL2caInsufficientResources_c • 0x03F2: gL2caCallbackNotInstalled_c • 0x03F3: gL2caCallbackAlreadyInstalled_c • 0x03F4: gL2caLePsmInvalid_c • 0x03F5: gL2caLePsmAlreadyRegistered_c • 0x03F6: gL2caLePsmNotRegistered_c • 0x03F7: gL2caLePsmInsufficientResources_c • 0x03F8: gL2caChannelInvalid_c • 0x03F9: gL2caChannelClosed_c • 0x03FA: gL2caChannelAlreadyConnected_c • 0x03FB: gL2caConnectionParametersRejected_c • 0x03FC: gL2caChannelBusy_c |

Table continues on the next page...

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x03FE: gL2caInvalidParameter_c • 0x03FF: gL2caError_c • 0x0401: gSmNullCBFunction_c • 0x0402: gSmCommandNotSupported_c • 0x0403: gSmUnexpectedCommand_c • 0x0404: gSmInvalidCommandCode_c • 0x0405: gSmInvalidCommandLength_c • 0x0406: gSmInvalidCommandParameter_c • 0x0407: gSmInvalidDeviceId_c • 0x0408: gSmInvalidInternalOperation_c • 0x0409: gSmInvalidConnectionHandle_c • 0x040A: gSmImproperKeyDistributionField_c • 0x040B: gSmUnexpectedKeyType_c • 0x040C: gSmUnexpectedPairingTerminationReason_c • 0x040D: gSmUnexpectedKeyset_c • 0x040E: gSmSmpTimeoutOccurred_c • 0x040F: gSmUnknownSmpPacketType_c • 0x0410: gSmInvalidSmpPacketLength_c • 0x0411: gSmInvalidSmpPacketParameter_c • 0x0412: gSmReceivedUnexpectedSmpPacket_c • 0x0413: gSmReceivedSmpPacketFromUnknownDevice_c |

Table continues on the next page...

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0414: gSmReceivedUnexpectedHciEvent_c • 0x0415: gSmReceivedHciEventFromUnknownDevice_c • 0x0416: gSmInvalidHciEventParameter_c • 0x0417: gSmLlConnectionEncryptionInProgress_c • 0x0418: gSmLlConnectionEncryptionFailure_c • 0x0419: gSmInsufficientResources_c • 0x041A: gSmOobDataAddressMismatch_c • 0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c • 0x0431: gSmPairingErrorPasskeyEntryFailed_c • 0x0432: gSmPairingErrorConfirmValueFailed_c • 0x0433: gSmPairingErrorCommandNotSupported_c • 0x0434: gSmPairingErrorInvalidParameters_c • 0x0435: gSmPairingErrorUnknownReason_c • 0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c • 0x0461: gSmTbInvalidDataSignature_c • 0x0501: gAttInvalidHandle_c • 0x0502: gAttReadNotPermitted_c |

Table continues on the next page...

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0503: gAttWriteNotPermitted_c • 0x0504: gAttInvalidPdu_c • 0x0505: gAttInsufficientAuthentication_c • 0x0506: gAttRequestNotSupported_c • 0x0507: gAttInvalidOffset_c • 0x0508: gAttInsufficientAuthorization_c • 0x0509: gAttPrepareQueueFull_c • 0x050A: gAttAttributeNotFound_c • 0x050B: gAttAttributeNotLong_c • 0x050C: gAttInsufficientEncryptionKeySize_c • 0x050D: gAttInvalidAttributeValueLength_c • 0x050E: gAttUnlikelyor_c • 0x050F: gAttInsufficientEncryption_c • 0x0510: gAttUnsupportedGroupType_c • 0x0511: gAttInsufficientResources_c • 0x0601: gGattAnotherProcedureInProgress_c • 0x0602: gGattLongAttributePacketsCorrupted_c • 0x0603: gGattMultipleAttributesOverflow_c • 0x0604: gGattUnexpectedReadMultipleResponseLength_c • 0x0605: gGattInvalidValueLength_c • 0x0606: gGattServerTimeout_c • 0x0607: gGattIndicationAlreadyInProgress_c • 0x0608: gGattClientConfirmationTimeout_c |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|--|
| Structure Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0701: gGapAdvDataTooLong_c • 0x0702: gGapScanRspDataTooLong_c • 0x0703: gGapDeviceNotBonded_c • 0x0704: gGapAnotherProcedureInProgress_c • 0x0801: gDevDbCccdLimitReached_c • 0x0802: gDevDbCccdNotFound_c • 0x0901: gGattDbInvalidHandle_c • 0x0902: gGattDbCharacteristicNotFound_c • 0x0903: gGattDbCccdNotFound_c • 0x0904: gGattDbServiceNotFound_c • 0x0905: gGattDbDescriptorNotFound_c |
| ConnInterval | 2 | Connection interval |
| ConnLatency | 2 | Connection latency |
| SupervisionTimeout | 2 | Supervision timeout |

3.4.32 GAP-ConnectionEventParameterUpdateRequest.Indication

Description

A connection parameter update request has been received.

Parameters

Table 263. GAP-ConnectionEventParameterUpdateRequest.Indication Parameters

| Parameter | Size (bytes) | Comments |
|----------------------------------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0xAE |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the connection |
| ConnectionParameterUpdateRequest | Variable | Connection parameter update request event data |

Table 263. GAP-ConnectionEventParameterUpdateRequest.Indication Parameters (continued)

| | | |
|--|--|---|
| | | Structure type parameter. See the detailed table below for parameter structure. |
|--|--|---|

Table 264. ConnectionParameterUpdateRequest Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--------------------|
| IntervalMin | 2 | Minimum interval |
| IntervalMax | 2 | Maximum interval |
| SlaveLatency | 2 | Slave latency |
| TimeoutMultiplier | 2 | Timeout multiplier |

3.4.33 GAP-ConnectionEventPasskeyDisplay.Indication

Description

The pairing procedure requires this Slave to display the passkey for the Master's user.

Parameters

Table 265. GAP-ConnectionEventPassKeyDisplay.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-------------------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0xA4 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the connection |
| PasskeyForDisplay | 4 | Passkey to be displayed by this Slave |

3.4.34 GAP-ConnectionEventPasskeyRequest.Indication

Description

Peer Slave has requested a passkey (maximum 6 digit PIN) for the pairing procedure.

Parameters

Table 266. GAP-ConnectionEventPassKeyRequest.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0xA2 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the connection |

3.4.35 GAP-ConnectionEventPowerReadFailure.Indication

Description

Power reading could not be performed.

Parameters

| Parameter | Size (bytes) | Comments |
|------------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0xAD |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the connection |
| FailReason | 2 | Reason for power reading failure Possible values: <ul style="list-style-type: none"> • 0x0000: gBleSuccess_c • 0x0001: gBleInvalidParameter_c • 0x0002: gBleOverflow_c • 0x0003: gBleUnavailable_c • 0x0004: gBleFeatureNotSupported_c • 0x0005: gBleOutOfMemory_c • 0x0006: gBleAlreadyInitialized_c • 0x0007: gBleOsError_c • 0x0008: gBleUnexpectedError_c • 0x0009: gBleInvalidState_c • 0x0101: gHciUnknownHciCommand_c • 0x0102: gHciUnknownConnectionIdentifier_c • 0x0103: gHciHardwareFailure_c • 0x0104: gHciPageTimeout_c • 0x0105: gHciAuthenticationFailure_c • 0x0106: gHciPinOrKeyMissing_c • 0x0107: gHciMemoryCapacityExceeded_c • 0x0108: gHciConnectionTimeout_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0109: gHciConnectionLimitExceeded_c • 0x010A: gHciSynchronousConnectionLimitToADeviceExceeded_c • 0x010B: gHciAclConnectionAlreadyExists_c • 0x010C: gHciCommandDisallowed_c • 0x010D: gHciConnectionRejectedDueToLimitedResources_c • 0x010E: gHciConnectionRejectedDueToSecurityReasons_c • 0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c • 0x0110: gHciConnectionAcceptTimeoutExceeded_c • 0x0111: gHciUnsupportedFeatureOrParameterValue_c • 0x0112: gHciInvalidHciCommandParameters_c • 0x0113: gHciRemoteUserTerminatedConnection_c • 0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c • 0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c • 0x0116: gHciConnectionTerminatedByLocalHost_c • 0x0117: gHciRepeatedAttempts_c • 0x0118: gHciPairingNotAllowed_c • 0x0119: gHciUnknownLpmPdu_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x011A: gHciUnsupportedRemoteFeature_c • 0x011B: gHciScoOffsetRejected_c • 0x011C: gHciScoIntervalRejected_c • 0x011D: gHciScoAirModeRejected_c • 0x011E: gHciInvalidLpmParameters_c • 0x011F: gHciUnspecifiedError_c • 0x0120: gHciUnsupportedLpmParameterValue_c • 0x0121: gHciRoleChangeNotAllowed_c • 0x0122: gHciLLResponseTimeout_c • 0x0123: gHciLmpErrorTransactionCollision_c • 0x0124: gHciLmpPduNotAllowed_c • 0x0125: gHciEncryptionModeNotAcceptable_c • 0x0126: gHciLinkKeyCannotBeChanged_c • 0x0127: gHciRequestedQosNotSupported_c • 0x0128: gHciInstantPassed_c • 0x0129: gHciPairingWithUnitKeyNotSupported_c • 0x012A: gHciDifferentTransactionCollision_c • 0x012B: gHciReserved_0x2B_c • 0x012C: gHciQosNotAcceptableParameter_c • 0x012D: gHciQosRejected_c • 0x012E: gHciChannelClassificationNotSupported_c • 0x012F: gHciInsufficientSecurity_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0130: gHciParameterOutOfMandatoryRange_c • 0x0131: gHciReserved_0x31_c • 0x0132: gHciRoleSwitchPending_c • 0x0133: gHciReserved_0x33_c • 0x0134: gHciReservedSlotViolation_c • 0x0135: gHciRoleSwitchFailed_c • 0x0136: gHciExtendedInquiryResponseTooLarge_c • 0x0137: gHciSecureSimplePairingNotSupportedByHost_c • 0x0138: gHciHostBusyPairing_c • 0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c • 0x013A: gHciControllerBusy_c • 0x013B: gHciUnacceptableConnectionParameters_c • 0x013C: gHciDirectedAdvertisingTimeout_c • 0x013D: gHciConnectionTerminatedDueToMicFailure_c • 0x013E: gHciConnectionFailedToBeEstablished_c • 0x013F: gHciMacConnectionFailed_c • 0x0140: gHciCoarseClockAdjustmentRejected_c • 0x01A0: gHciAlreadyInit_c • 0x01A1: gHciInvalidParameter_c • 0x01A2: gHciCallbackNotInstalled_c • 0x01A3: gHciCallbackAlreadyInstalled_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x01A4: gHciCommandNotSupported_c • 0x01A5: gHciEventNotSupported_c • 0x01A6: gHciTransportError_c • 0x03F0: gL2caAlreadyInit_c • 0x03F1: gL2caInsufficientResources_c • 0x03F2: gL2caCallbackNotInstalled_c • 0x03F3: gL2caCallbackAlreadyInstalled_c • 0x03F4: gL2caLePsmInvalid_c • 0x03F5: gL2caLePsmAlreadyRegistered_c • 0x03F6: gL2caLePsmNotRegistered_c • 0x03F7: gL2caLePsmInsufficientResources_c • 0x03F8: gL2caChannelInvalid_c • 0x03F9: gL2caChannelClosed_c • 0x03FA: gL2caChannelAlreadyConnected_c • 0x03FB: gL2caConnectionParametersRejected_c • 0x03FC: gL2caChannelBusy_c • 0x03FE: gL2caInvalidParameter_c • 0x03FF: gL2caError_c • 0x0401: gSmNullCBFunction_c • 0x0402: gSmCommandNotSupported_c • 0x0403: gSmUnexpectedCommand_c • 0x0404: gSmInvalidCommandCode_c • 0x0405: gSmInvalidCommandLength_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0406: gSmInvalidCommandParameter_c • 0x0407: gSmInvalidDeviceId_c • 0x0408: gSmInvalidInternalOperation_c • 0x0409: gSmInvalidConnectionHandle_c • 0x040A: gSmImproperKeyDistributionField_c • 0x040B: gSmUnexpectedKeyType_c • 0x040C: gSmUnexpectedPairingTerminationReason_c • 0x040D: gSmUnexpectedKeyset_c • 0x040E: gSmSmpTimeoutOccurred_c • 0x040F: gSmUnknownSmpPacketType_c • 0x0410: gSmInvalidSmpPacketLength_c • 0x0411: gSmInvalidSmpPacketParameter_c • 0x0412: gSmReceivedUnexpectedSmpPacket_c • 0x0413: gSmReceivedSmpPacketFromUnknownDevice_c • 0x0414: gSmReceivedUnexpectedHciEvent_c • 0x0415: gSmReceivedHciEventFromUnknownDevice_c • 0x0416: gSmInvalidHciEventParameter_c • 0x0417: gSmLlConnectionEncryptionInProgress_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0418: gSmLlConnectionEncryptionFailure_c • 0x0419: gSmInsufficientResources_c • 0x041A: gSmOobDataAddressMismatch_c • 0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c • 0x041C: gSmReceivedTimerEventForUnknownDevice_c • 0x041D: gSmUnattainableLocalDeviceSecRequirements_c • 0x041E: gSmUnattainableLocalDeviceMinKeySize_c • 0x041F: gSmUnattainableSlaveSecReqRequirements_c • 0x0431: gSmPairingErrorPasskeyEntryFailed_c • 0x0432: gSmPairingErrorConfirmValueFailed_c • 0x0433: gSmPairingErrorCommandNotSupported_c • 0x0434: gSmPairingErrorInvalidParameters_c • 0x0435: gSmPairingErrorUnknownReason_c • 0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c • 0x0461: gSmTbInvalidDataSignature_c • 0x0501: gAttInvalidHandle_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0502: gAttReadNotPermitted_c • 0x0503: gAttWriteNotPermitted_c • 0x0504: gAttInvalidPdu_c • 0x0505: gAttInsufficientAuthentication_c • 0x0506: gAttRequestNotSupported_c • 0x0507: gAttInvalidOffset_c • 0x0508: gAttInsufficientAuthorization_c • 0x0509: gAttPrepareQueueFull_c • 0x050A: gAttAttributeNotFound_c • 0x050B: gAttAttributeNotLong_c • 0x050C: gAttInsufficientEncryptionKeySize_c • 0x050D: gAttInvalidAttributeValueLength_c • 0x050E: gAttUnlikelyor_c • 0x050F: gAttInsufficientEncryption_c • 0x0510: gAttUnsupportedGroupType_c • 0x0511: gAttInsufficientResources_c • 0x0601: gGattAnotherProcedureInProgress_c • 0x0602: gGattLongAttributePacketsCorrupted_c • 0x0603: gGattMultipleAttributesOverflow_c • 0x0604: gGattUnexpectedReadMultipleResponseLength_c • 0x0605: gGattInvalidValueLength_c • 0x0606: gGattServerTimeout_c • 0x0607: gGattIndicationAlreadyInProgress_c |

| Table continued from the previous page... | | |
|---|--------------|--|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0608: gGattClientConfirmationTimeout_c • 0x0701: gGapAdvDataTooLong_c • 0x0702: gGapScanRspDataTooLong_c • 0x0703: gGapDeviceNotBonded_c • 0x0801: gDevDbCccdLimitReached_c • 0x0802: gDevDbCccdNotFound_c • 0x0901: gGattDbInvalidHandle_c • 0x0902: gGattDbCharacteristicNotFound_c • 0x0903: gGattDbCccdNotFound_c • 0x0904: gGattDbServiceNotFound_c • 0x0905: gGattDbDescriptorNotFound_c |

3.4.36 GAP-ConnectionEventRssiRead.Indication

Description

RSSI for an active connection has been read.

Parameters

Table 267. GAP-ConnectionEventRssiRead.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0xAB |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the connection |
| Rssi | 1 | Value of the RSSI |

3.4.37 GAP-ConnectionEventSlaveSecurityRequest.Indication

Description

A Slave Security Request has been received from the peer Slave.

Parameters

Table 268. Parameters GAP-ConnectionEventSlaveSecurityRequest.Indication Parameters

| Parameter | Size (bytes) | Comments |
|--------------------------------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x9F |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the connection |
| SlaveSecurityRequestParameters | Variable | Slave security request parameters Structure type parameter. See the detailed table below for parameter structure. |

Table 269. SlaveSecurityRequestParameters Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|-------------------------|--------------|--|
| BondAfterPairing | 1 | TRUE if the Slave supports bonding, FALSE otherwise |
| bAuthenticationRequired | 1 | TRUE if the slave requires authentication for MITM protection, FALSE otherwise |

3.4.38 GAP-ConnectionEventTxPowerLevelRead.Indication

Description

TX power level for an active connection has been read.

Parameters

Table 270. GAP-ConnectionEventTxPowerLevelRead.Indication Parameters

| Parameter | Size (bytes) | Comments |
|--------------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0xAC |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID identifying the connection |
| TxPowerLevel | 1 | Value of the TX power |

3.4.39 GAP-ControllerReset.Request

Description

Resets the controller.

Parameters

Table 271. GAP-ConnectionReset.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x34 |
| Length | 1 | 0x00 - This message does not have any parameters |

3.4.40 GAP-CreateRandomDeviceAddress.Request

Description

Requests the controller to create a random address.

Parameters

Table 272. GAP-CreateRandomDeviceAddress.Request Parameters

| Parameter | Size (bytes) | Comments |
|--------------------|------------------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x26 |
| Length | 1 | Length in bytes of the following parameters |
| IrkIncluded | 1 | Boolean value which indicates if IRK is included or not |
| Irk | 16 x IrkIncluded | The Identity Resolving Key to be used for a private resolvable address |
| RandomPartIncluded | IrkIncluded | Boolean value which indicates if random part is included or not |
| RandomPart | 3 x RandomPartIncluded | Array containing the random part of a Private Resolvable Address |

3.4.41 GAP-DenyLongTermKey.Request

Description

Rejects a long term key request from the controller.

Parameters

Table 273. GAP-DenyLongTermKey.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x17 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | The GAP peer who requested encryption |

3.4.42 GAP-Disconnect.Request

Description

Initiates disconnection from a connected peer device.

Parameters

Table 274. GAP-Disconnect.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x1D |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | The connected peer to disconnect from |

3.4.43 GAP-EnableControllerPrivacy.Request

Description

Enables or disables Controller Privacy (Enhanced Privacy feature).

Parameters

Table 275. GAP-EnableControllerPrivacy.Request Parameters

| Parameter | Size (bytes) | Comments |
|----------------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x36 |
| Length | 1 | Length in bytes of the following parameters |
| Enable | 1 | Enables or disables Controller Privacy |
| OwnIrk | 16 x Enable | Local IRK |
| PeerIdCount | Enable | Size of PeerIdentities array |
| PeerIdentities | Variable | Array of peer identity addresses and IRKs Structure type parameter. See the detailed table below for parameter structure. |

Table 276. PeerIdentities Parameters Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|----------|
| | 1 | |

3.4.44 GAP-EnableHostPrivacy.Request

Description

Enables or disables Host Privacy (automatic regeneration of a Private Address).

Parameters**Table 277. GAP-EnableHostPrivacy.Request Parameters**

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x35 |
| Length | 1 | Length in bytes of the following parameters |
| Enable | 1 | Enables or disables Host Privacy |
| Irk | 16 x Enable | Local IRK to be used for Resolvable Private Address generation |

3.4.45 GAP-EnableUpdateConnectionParameters.Request**Description**

Updates the connection parameters.

Parameters**Table 278. GAP-EnableUpdateConnectionParameters.Indication Parameters**

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x32 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | The DeviceID for which the command is intended |
| Enable | 1 | Allow/dissalow the parameters update |

3.4.46 GAP-EncryptLink.Request**Description**

Encrypts the link with a bonded peer.

Parameters**Table 279. GAP-EncryptLink.Request Parameters**

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x0E |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID of the peer |

3.4.47 GAP-EnterPasskey.Request

Description

Enters the passkey requested by a peer during the pairing process.

Parameters

Table 280. GAP-EnterPassKey.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x11 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | The GAP peer that requested a passkey entry |
| Passkey | 4 | The peer's secret passkey |

3.4.48 GAP-GenericEventAdvertisingDataSetupComplete.Indication

Description

Controller event - advertising data setup completed.

Parameters

Table 281. GAP-GenericEventAdvertisingDataSetupComplete.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x8D |
| Length | 1 | 0x00 - This message does not have any parameters |

3.4.49 GAP-GenericEventAdvertisingParametersSetupComplete.Indication

Description

Controller event - advertising parameters setup completed.

Parameters

Table 282. GAP-GenericEventAdvertisingParametersSetupComplete.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x8C |
| Length | 1 | 0x00 - This message does not have any parameters |

3.4.50 GAP-GenericEventAdvertisingSetupFailed.Indication

Description

Controller event - advertising setup failed.

Parameters

| Parameter | Size (bytes) | Comments |
|-----------------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x8B |
| Length | 1 | Length in bytes of the following parameters |
| SetupFailReason | 2 | Setup fail reason Possible values: <ul style="list-style-type: none"> • 0x0000: gBleSuccess_c • 0x0001: gBleInvalidParameter_c • 0x0002: gBleOverflow_c • 0x0003: gBleUnavailable_c • 0x0004: gBleFeatureNotSupported_c • 0x0005: gBleOutOfMemory_c • 0x0006: gBleAlreadyInitialized_c • 0x0007: gBleOsError_c • 0x0008: gBleUnexpectedError_c • 0x0009: gBleInvalidState_c • 0x0101: gHciUnknownHciCommand_c • 0x0102: gHciUnknownConnectionIdentifier_c • 0x0103: gHciHardwareFailure_c • 0x0104: gHciPageTimeout_c • 0x0105: gHciAuthenticationFailure_c • 0x0106: gHciPinOrKeyMissing_c • 0x0107: gHciMemoryCapacityExceeded_c • 0x0108: gHciConnectionTimeout_c • 0x0109: gHciConnectionLimitExceeded_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x010A: gHciSynchronousConnectionLimitToADeviceExceeded_c • 0x010B: gHciAclConnectionAlreadyExists_c • 0x010C: gHciCommandDisallowed_c • 0x010D: gHciConnectionRejectedDueToLimitedResources_c • 0x010E: gHciConnectionRejectedDueToSecurityReasons_c • 0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c • 0x0110: gHciConnectionAcceptTimeoutExceeded_c • 0x0111: gHciUnsupportedFeatureOrParameterValue_c • 0x0112: gHciInvalidHciCommandParameters_c • 0x0113: gHciRemoteUserTerminatedConnection_c • 0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c • 0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c • 0x0116: gHciConnectionTerminatedByLocalHost_c • 0x0117: gHciRepeatedAttempts_c • 0x0118: gHciPairingNotAllowed_c • 0x0119: gHciUnknownLpmPdu_c • 0x011A: gHciUnsupportedRemoteFeature_c |

| Table continued from the previous page... | | |
|---|--------------|--|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x011B: gHciScoOffsetRejected_c • 0x011C: gHciScoIntervalRejected_c • 0x011D: gHciScoAirModeRejected_c • 0x011E: gHciInvalidLpmParameters_c • 0x011F: gHciUnspecifiedError_c • 0x0120: gHciUnsupportedLpmParameterValue_c • 0x0121: gHciRoleChangeNotAllowed_c • 0x0122: gHciLLResponseTimeout_c • 0x0123: gHciLmpErrorTransactionCollision_c • 0x0124: gHciLmpPduNotAllowed_c • 0x0125: gHciEncryptionModeNotAcceptable_c • 0x0126: gHciLinkKeyCannotBeChanged_c • 0x0127: gHciRequestedQosNotSupported_c • 0x0128: gHciInstantPassed_c • 0x0129: gHciPairingWithUnitKeyNotSupported_c • 0x012A: gHciDifferentTransactionCollision_c • 0x012B: gHciReserved_0x2B_c • 0x012C: gHciQosNotAcceptableParameter_c • 0x012D: gHciQosRejected_c • 0x012E: gHciChannelClassificationNotSupported_c • 0x012F: gHciInsufficientSecurity_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0130: gHciParameterOutOfMandatoryRange_c • 0x0131: gHciReserved_0x31_c • 0x0132: gHciRoleSwitchPending_c • 0x0133: gHciReserved_0x33_c • 0x0134: gHciReservedSlotViolation_c • 0x0135: gHciRoleSwitchFailed_c • 0x0136: gHciExtendedInquiryResponseTooLarge_c • 0x0137: gHciSecureSimplePairingNotSupportedByHost_c • 0x0138: gHciHostBusyPairing_c • 0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c • 0x013A: gHciControllerBusy_c • 0x013B: gHciUnacceptableConnectionParameters_c • 0x013C: gHciDirectedAdvertisingTimeout_c • 0x013D: gHciConnectionTerminatedDueToMicFailure_c • 0x013E: gHciConnectionFailedToBeEstablished_c • 0x013F: gHciMacConnectionFailed_c • 0x0140: gHciCoarseClockAdjustmentRejected_c • 0x01A0: gHciAlreadyInit_c • 0x01A1: gHciInvalidParameter_c • 0x01A2: gHciCallbackNotInstalled_c • 0x01A3: gHciCallbackAlreadyInstalled_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x01A4: gHciCommandNotSupported_c • 0x01A5: gHciEventNotSupported_c • 0x01A6: gHciTransportError_c • 0x03F0: gL2caAlreadyInit_c • 0x03F1: gL2caInsufficientResources_c • 0x03F2: gL2caCallbackNotInstalled_c • 0x03F3: gL2caCallbackAlreadyInstalled_c • 0x03F4: gL2caLePsmInvalid_c • 0x03F5: gL2caLePsmAlreadyRegistered_c • 0x03F6: gL2caLePsmNotRegistered_c • 0x03F7: gL2caLePsmInsufficientResources_c • 0x03F8: gL2caChannelInvalid_c • 0x03F9: gL2caChannelClosed_c • 0x03FA: gL2caChannelAlreadyConnected_c • 0x03FB: gL2caConnectionParametersRejected_c • 0x03FC: gL2caChannelBusy_c • 0x03FE: gL2caInvalidParameter_c • 0x03FF: gL2caError_c • 0x0401: gSmNullCBFunction_c • 0x0402: gSmCommandNotSupported_c • 0x0403: gSmUnexpectedCommand_c • 0x0404: gSmInvalidCommandCode_c • 0x0405: gSmInvalidCommandLength_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0406: gSmInvalidCommandParameter_c • 0x0407: gSmInvalidDeviceId_c • 0x0408: gSmInvalidInternalOperation_c • 0x0409: gSmInvalidConnectionHandle_c • 0x040A: gSmImproperKeyDistributionField_c • 0x040B: gSmUnexpectedKeyType_c • 0x040C: gSmUnexpectedPairingTerminationReason_c • 0x040D: gSmUnexpectedKeyset_c • 0x040E: gSmSmpTimeoutOccurred_c • 0x040F: gSmUnknownSmpPacketType_c • 0x0410: gSmInvalidSmpPacketLength_c • 0x0411: gSmInvalidSmpPacketParameter_c • 0x0412: gSmReceivedUnexpectedSmpPacket_c • 0x0413: gSmReceivedSmpPacketFromUnknownDevice_c • 0x0414: gSmReceivedUnexpectedHciEvent_c • 0x0415: gSmReceivedHciEventFromUnknownDevice_c • 0x0416: gSmInvalidHciEventParameter_c • 0x0417: gSmLlConnectionEncryptionInProgress_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0418: gSmLlConnectionEncryptionFailure_c • 0x0419: gSmInsufficientResources_c • 0x041A: gSmOobDataAddressMismatch_c • 0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c • 0x041C: gSmReceivedTimerEventForUnknownDevice_c • 0x041D: gSmUnattainableLocalDeviceSecRequirements_c • 0x041E: gSmUnattainableLocalDeviceMinKeySize_c • 0x041F: gSmUnattainableSlaveSecReqRequirements_c • 0x0431: gSmPairingErrorPasskeyEntryFailed_c • 0x0432: gSmPairingErrorConfirmValueFailed_c • 0x0433: gSmPairingErrorCommandNotSupported_c • 0x0434: gSmPairingErrorInvalidParameters_c • 0x0435: gSmPairingErrorUnknownReason_c • 0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c • 0x0461: gSmTbInvalidDataSignature_c • 0x0501: gAttInvalidHandle_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0502: gAttReadNotPermitted_c • 0x0503: gAttWriteNotPermitted_c • 0x0504: gAttInvalidPdu_c • 0x0505: gAttInsufficientAuthentication_c • 0x0506: gAttRequestNotSupported_c • 0x0507: gAttInvalidOffset_c • 0x0508: gAttInsufficientAuthorization_c • 0x0509: gAttPrepareQueueFull_c • 0x050A: gAttAttributeNotFound_c • 0x050B: gAttAttributeNotLong_c • 0x050C: gAttInsufficientEncryptionKeySize_c • 0x050D: gAttInvalidAttributeValueLength_c • 0x050E: gAttUnlikelyor_c • 0x050F: gAttInsufficientEncryption_c • 0x0510: gAttUnsupportedGroupType_c • 0x0511: gAttInsufficientResources_c • 0x0601: gGattAnotherProcedureInProgress_c • 0x0602: gGattLongAttributePacketsCorrupted_c • 0x0603: gGattMultipleAttributesOverflow_c • 0x0604: gGattUnexpectedReadMultipleResponseLength_c • 0x0605: gGattInvalidValueLength_c • 0x0606: gGattServerTimeout_c • 0x0607: gGattIndicationAlreadyInProgress_c |

| Table continued from the previous page... | | |
|---|--------------|--|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0608: gGattClientConfirmationTimeout_c • 0x0701: gGapAdvDataTooLong_c • 0x0702: gGapScanRspDataTooLong_c • 0x0703: gGapDeviceNotBonded_c • 0x0801: gDevDbCccdLimitReached_c • 0x0802: gDevDbCccdNotFound_c • 0x0901: gGattDbInvalidHandle_c • 0x0902: gGattDbCharacteristicNotFound_c • 0x0903: gGattDbCccdNotFound_c • 0x0904: gGattDbServiceNotFound_c • 0x0905: gGattDbDescriptorNotFound_c |

3.4.51 GAP-GenericEventAdvTxPowerLevelRead.Indication

Description

Controller event - advertising transmission power level.

Parameters

Table 283. GAP-GenericEventAdvTxPowerLevelRead.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x95 |
| Length | 1 | Length in bytes of the following parameters |
| AdvTxPowerLevel | 1 | Advertising transmission power level (in dBm) |

3.4.52 GAP-GenericEventControllerPrivacyStateChanged.Indication

Description

The Controller Privacy was enabled or disabled.

Parameters

Table 284. GAP-GenericEventControllerPrivacyStateChanged.Indication Parameters

| Parameter | Size (bytes) | Comments |
|---------------------------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0xB7 |
| Length | 1 | Length in bytes of the following parameters |
| NewControllerPrivacyState | 1 | Indicates the new state of the controller privacy: TRUE if enabled, FALSE if disabled |

3.4.53 GAP-GenericEventControllerResetComplete.Indication

Description

The controller has been reset.

Parameters

Table 285. GAP-GenericEventControllerResetComplete.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0xB4 |
| Length | 1 | 0x00 - This message does not have any parameters |

3.4.54 GAP-GenericEventCreateConnectionCanceled.Indication

Description

Controller event - create connection procedure canceled.

Parameters

Table 286. GAP-GenericEventCreateConnectionCanceled.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x93 |
| Length | 1 | 0x00 - This message does not have any parameters |

3.4.55 GAP-GenericEventDeviceAddedToWhiteList.Indication

Description

Controller event - device added to White List.

Parameters

Table 287. GAP-GenericEventDeviceAddedToWhiteList.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x8F |
| Length | 1 | 0x00 - This message does not have any parameters |

3.4.56 GAP-GenericEventDeviceRemovedFromWhiteList.Indication

Description

Controller event - device removed from White List.

Parameters

Table 288. GAP-GenericEventDeviceRemovedFromWhiteList.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x90 |
| Length | 1 | 0x00 - This message does not have any parameters |

3.4.57 GAP-GenericEventInitializationComplete.Indication

Description

Controller event - initialization complete.

Parameters

Table 289. GAP-GenericEventInitializationComplete.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x89 |
| Length | 1 | 0x00 - This message does not have any parameters |

Table 289. GAP-GenericEventInitializationComplete.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x89 |
| Length | 1 | 0x00 - This message does not have anyLength in bytes of the following parameters |

Table continues on the next page...

Table 289. GAP-GenericEventInitializationComplete.Indication Parameters (continued)

| | | |
|------------------|----------|---|
| initCompleteData | Variable | data for the gInitializationComplete_c event Structure type parameter. See detailed table below for parameter structure. |
|------------------|----------|---|

Table 290. initCompleteData Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|-----------------------|--------------|--------------------------------------|
| SupportedFeatures | 4 | local supported features |
| NumOfSupportedAdvSets | 1 | number of supported advertising sets |
| PeriodicAdvListSize | 1 | periodic advertiser list size |

3.4.58 GAP-GenericEventInternalError.Indication

Description

Controller event - controller error.

Parameters

Table 291. GAP-GenericEventInternalError.Indication Parameters

| Parameter | Size (bytes) | Comments |
|---------------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x8A |
| Length | 1 | Length in bytes of the following parameters |
| InternalError | Variable | Internal Error event data Structure type parameter. See the detailed table below for parameter structure. |

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| ErrorCode | 2 | Error code Possible values: <ul style="list-style-type: none"> • 0x0000: gBleSuccess_c • 0x0001: gBleInvalidParameter_c • 0x0002: gBleOverflow_c • 0x0003: gBleUnavailable_c • 0x0004: gBleFeatureNotSupported_c |

Table continues on the next page...

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0005: gBleOutOfMemory_c • 0x0006: gBleAlreadyInitialized_c • 0x0007: gBleOsError_c • 0x0008: gBleUnexpectedError_c • 0x0009: gBleInvalidState_c • 0x0101: gHciUnknownHciCommand_c • 0x0102: gHciUnknownConnectionIdentifier_c • 0x0103: gHciHardwareFailure_c • 0x0104: gHciPageTimeout_c • 0x0105: gHciAuthenticationFailure_c • 0x0106: gHciPinOrKeyMissing_c • 0x0107: gHciMemoryCapacityExceeded_c • 0x0108: gHciConnectionTimeout_c • 0x0109: gHciConnectionLimitExceeded_c • 0x010A: gHciSynchronousConnectionLimitToADeviceExceeded_c • 0x010B: gHciAclConnectionAlreadyExists_c • 0x010C: gHciCommandDisallowed_c • 0x010D: gHciConnectionRejectedDueToLimitedResources_c • 0x010E: gHciConnectionRejectedDueToSecurityReasons_c • 0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c • 0x0110: gHciConnectionAcceptTimeoutExceeded_c |

Table continues on the next page...

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0111: gHciUnsupportedFeatureOrParameterValue_c • 0x0112: gHciInvalidHciCommandParameters_c • 0x0113: gHciRemoteUserTerminatedConnection_c • 0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c • 0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c • 0x0116: gHciConnectionTerminatedByLocalHost_c • 0x0117: gHciRepeatedAttempts_c • 0x0118: gHciPairingNotAllowed_c • 0x0119: gHciUnknownLmpPdu_c • 0x011A: gHciUnsupportedRemoteFeature_c • 0x011B: gHciScoOffsetRejected_c • 0x011C: gHciScoIntervalRejected_c • 0x011D: gHciScoAirModeRejected_c • 0x011E: gHciInvalidLmpParameters_c • 0x011F: gHciUnspecifiedError_c • 0x0120: gHciUnsupportedLmpParameterValue_c • 0x0121: gHciRoleChangeNotAllowed_c • 0x0122: gHciLLResponseTimeout_c • 0x0123: gHciLmpErrorTransactionCollision_c • 0x0124: gHciLmpPduNotAllowed_c |

Table continues on the next page...

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0125: gHciEncryptionModeNotAcceptable_c • 0x0126: gHciLinkKeyCannotBeChanged_c • 0x0127: gHciRequestedQosNotSupported_c • 0x0128: gHciInstantPassed_c • 0x0129: gHciPairingWithUnitKeyNotSupported_c • 0x012A: gHciDifferentTransactionCollision_c • 0x012B: gHciReserved_0x2B_c • 0x012C: gHciQosNotAcceptableParameter_c • 0x012D: gHciQosRejected_c • 0x012E: gHciChannelClassificationNotSupported_c • 0x012F: gHciInsufficientSecurity_c • 0x0130: gHciParameterOutOfMandatoryRange_c • 0x0131: gHciReserved_0x31_c • 0x0132: gHciRoleSwitchPending_c • 0x0133: gHciReserved_0x33_c • 0x0134: gHciReservedSlotViolation_c • 0x0135: gHciRoleSwitchFailed_c • 0x0136: gHciExtendedInquiryResponseTooLarge_c • 0x0137: gHciSecureSimplePairingNotSupportedByHost_c • 0x0138: gHciHostBusyPairing_c • 0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c |

Table continues on the next page...

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x013A: gHciControllerBusy_c • 0x013B: gHciUnacceptableConnectionParameters_c • 0x013C: gHciDirectedAdvertisingTimeout_c • 0x013D: gHciConnectionTerminatedDueToMicFailure_c • 0x013E: gHciConnectionFailedToBeEstablished_c • 0x013F: gHciConnectionFailedToBeEstablishedOrSyncTimeout_c • 0x0140: gHciMacConnectionFailed_c • 0x0141: gHciCoarseClockAdjustmentRejected_c • 0x0142: gHciType0SubmapNotDefined_c • 0x0143: gHciUnknownAdvertisingIdentifier_c • 0x0144: gHciLimitReached_c • 0x0145: gHciOperationCancelledByHost_c • 0x01A0: gHciAlreadyInit_c • 0x01A1: gHciInvalidParameter_c • 0x01A2: gHciCallbackNotInstalled_c • 0x01A3: gHciCallbackAlreadyInstalled_c • 0x01A4: gHciCommandNotSupported_c • 0x01A5: gHciEventNotSupported_c • 0x01A6: gHciTransportError_c • 0x03F0: gL2caAlreadyInit_c • 0x03F1: gL2caInsufficientResources_c |

Table continues on the next page...

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x03F2: gL2caCallbackNotInstalled_c • 0x03F3: gL2caCallbackAlreadyInstalled_c • 0x03F4: gL2caLePsmInvalid_c • 0x03F5: gL2caLePsmAlreadyRegistered_c • 0x03F6: gL2caLePsmNotRegistered_c • 0x03F7: gL2caLePsmInsufficientResources_c • 0x03F8: gL2caChannelInvalid_c • 0x03F9: gL2caChannelClosed_c • 0x03FA: gL2caChannelAlreadyConnected_c • 0x03FB: gL2caConnectionParametersRejected_c • 0x03FC: gL2caChannelBusy_c • 0x03FE: gL2caInvalidParameter_c • 0x03FF: gL2caError_c • 0x0401: gSmNullCBFunction_c • 0x0402: gSmCommandNotSupported_c • 0x0403: gSmUnexpectedCommand_c • 0x0404: gSmInvalidCommandCode_c • 0x0405: gSmInvalidCommandLength_c • 0x0406: gSmInvalidCommandParameter_c • 0x0407: gSmInvalidDeviceId_c • 0x0408: gSmInvalidInternalOperation_c • 0x0409: gSmInvalidConnectionHandle_c • 0x040A: gSmImproperKeyDistributionField_c |

Table continues on the next page...

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x040B: gSmUnexpectedKeyType_c • 0x040C: gSmUnexpectedPairingTerminationReason_c • 0x040D: gSmUnexpectedKeyset_c • 0x040E: gSmSmpTimeoutOccurred_c • 0x040F: gSmUnknownSmpPacketType_c • 0x0410: gSmInvalidSmpPacketLength_c • 0x0411: gSmInvalidSmpPacketParameter_c • 0x0412: gSmReceivedUnexpectedSmpPacket_c • 0x0413: gSmReceivedSmpPacketFromUnknownDevice_c • 0x0414: gSmReceivedUnexpectedHciEvent_c • 0x0415: gSmReceivedHciEventFromUnknownDevice_c • 0x0416: gSmInvalidHciEventParameter_c • 0x0417: gSmLlConnectionEncryptionInProgress_c • 0x0418: gSmLlConnectionEncryptionFailure_c • 0x0419: gSmInsufficientResources_c • 0x041A: gSmOobDataAddressMismatch_c • 0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c |

Table continues on the next page...

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x041C: gSmReceivedTimerEventForUnknownDevice_c • 0x041D: gSmUnattainableLocalDeviceSecRequirements_c • 0x041E: gSmUnattainableLocalDeviceMinKeySize_c • 0x041F: gSmUnattainableSlaveSecReqRequirements_c • 0x0431: gSmPairingErrorPasskeyEntryFailed_c • 0x0432: gSmPairingErrorConfirmValueFailed_c • 0x0433: gSmPairingErrorCommandNotSupported_c • 0x0434: gSmPairingErrorInvalidParameters_c • 0x0435: gSmPairingErrorUnknownReason_c • 0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c • 0x0461: gSmTbInvalidDataSignature_c • 0x0501: gAttInvalidHandle_c • 0x0502: gAttReadNotPermitted_c • 0x0503: gAttWriteNotPermitted_c • 0x0504: gAttInvalidPdu_c • 0x0505: gAttInsufficientAuthentication_c • 0x0506: gAttRequestNotSupported_c • 0x0507: gAttInvalidOffset_c • 0x0508: gAttInsufficientAuthorization_c |

Table continues on the next page...

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x0509: gAttPrepareQueueFull_c • 0x050A: gAttAttributeNotFound_c • 0x050B: gAttAttributeNotLong_c • 0x050C: gAttInsufficientEncryptionKeySize_c • 0x050D: gAttInvalidAttributeValueLength_c • 0x050E: gAttUnlikelyor_c • 0x050F: gAttInsufficientEncryption_c • 0x0510: gAttUnsupportedGroupType_c • 0x0511: gAttInsufficientResources_c • 0x0601: gGattAnotherProcedureInProgress_c • 0x0602: gGattLongAttributePacketsCorrupted_c • 0x0603: gGattMultipleAttributesOverflow_c • 0x0604: gGattUnexpectedReadMultipleResponseLength_c • 0x0605: gGattInvalidValueLength_c • 0x0606: gGattServerTimeout_c • 0x0607: gGattIndicationAlreadyInProgress_c • 0x0608: gGattClientConfirmationTimeout_c • 0x0701: gGapAdvDataTooLong_c • 0x0702: gGapScanRspDataTooLong_c • 0x0703: gGapDeviceNotBonded_c • 0x0704: gGapAnotherProcedureInProgress_c • 0x0801: gDevDbCccdLimitReached_c |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|--|
| Structure Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x0802: gDevDbCccdNotFound_c • 0x0901: gGattDbInvalidHandle_c • 0x0902: gGattDbCharacteristicNotFound_c • 0x0903: gGattDbCccdNotFound_c • 0x0904: gGattDbServiceNotFound_c • 0x0905: gGattDbDescriptorNotFound_c |
| ErrorSource | 1 | <p>Error source</p> <p>Possible values:</p> <ul style="list-style-type: none"> • 0x00: gHciCommandStatus_c • 0x01: gCheckPrivateResolvableAddress_c • 0x02: gVerifySignature_c • 0x03: gAddNewConnection_c • 0x04: gResetController_c • 0x05: gSetEventMask_c • 0x06: gReadLeBufferSize_c • 0x07: gSetLeEventMask_c • 0x08: gReadDeviceAddress_c • 0x09: gReadLocalSupportedFeatures_c • 0x0A: gReadWhiteListSize_c • 0x0B: gClearWhiteList_c • 0x0C: gAddDeviceToWhiteList_c • 0x0D: gRemoveDeviceFromWhiteList_c • 0x0E: gCancelCreateConnection_c • 0x0F: gReadRadioPower_c • 0x10: gSetRandomAddress_c • 0x11: gCreateRandomAddress_c • 0x12: gEncryptLink_c • 0x13: gProvideLongTermKey_c |
| Table continues on the next page... | | |

Table continued from the previous page...

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x14: gDenyLongTermKey_c • 0x15: gConnect_c • 0x16: gDisconnect_c • 0x17: gTerminatePairing_c • 0x18: gSendSlaveSecurityRequest_c • 0x19: gEnterPasskey_c • 0x1A: gProvideOob_c • 0x1B: gSendSmpKeys_c • 0x1C: gWriteSuggestedDefaultDataLength_c • 0x1D: gReadSuggestedDefaultDataLength_c • 0x1E: gUpdateLeDataLength_c • 0x1F: gEnableHostPrivacy_c • 0x20: gEnableControllerPrivacy_c • 0x21: gLeScSendKeypressNotification_c • 0x22: gLeScSetPeerOobData_c • 0x23: gLeScGetLocalOobData_c • 0x24: gLeScValidateNumericValue_c • 0x25: gLeScRegeneratePublicKey_c • 0x26: gLeSetResolvablePrivateAddressTimeout_c • 0x27: gDefaultPairingProcedure_c • 0x28: gLeControllerTest_c • 0x29: gLeReadPhy_c • 0x2A: gLeSetPhy_c • 0x2B: gSaveKeys_c • 0x2C: gSetChannelMap_c |
| HciCommandOpcode | 2 | HCI command operation code |

3.4.59 GAP-GenericEventLeScLocalOobData.Indication

Description

Local OOB data used for LE Secure Connections pairing.

Parameters

Table 292. GAP-GenericEventLeScLocalOobData.Indication Parameters

| Parameter | Size (bytes) | Comments |
|--------------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0xB6 |
| Length | 1 | Length in bytes of the following parameters |
| RandomValue | 16 | LE SC OOB r (Random value) |
| ConfirmValue | 16 | LE SC OOB Cr (Random Confirm value) |

3.4.60 GAP-GenericEventPrivateResolvableAddressVerified.Indication

Description

Controller event - Private Resolvable Address verified.

Parameters

Table 293. GAP-GenericEventPrivateResolvableAddressVerified.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x96 |
| Length | 1 | Length in bytes of the following parameters |
| Verified | 1 | Private Resolvable Address verified |

3.4.61 GAP-GenericEventPublicAddressRead.Indication

Description

Controller event - public address read.

Parameters

Table 294. GAP-GenericEventPublicAddressRead.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x94 |
| Length | 1 | Length in bytes of the following parameters |
| Address | 6 | Public address |

3.4.62 GAP-GenericEventRandomAddressReady.Indication

Description

Controller event - random address ready.

Parameters

Table 295. GAP-GenericEventRandomAddressReady.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x92 |
| Length | 1 | Length in bytes of the following parameters |
| Address | 6 | Random address |

3.4.63 GAP-GenericEventRandomAddressSet.Indication

Description

Controller event - Private Resolvable Address verified.

Parameters

Table 296. GAP-GenericEventRandomAddressSet.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x97 |
| Length | 1 | 0x00 - This message does not have any parameters |

3.4.64 GAP-GenericEventTxPowerLevelSetComplete.Indication

Description

Tx Power Level set completed.

Parameters

Table 297. GAP-GenericEventTxPowerLevelSetComplete.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0xB9 |
| Length | 1 | Length in bytes of the following parameters |
| status | 1 | Indicates the status of the Set Tx Power Level request |

3.4.65 GAP-GenericEventWhiteListCleared.Indication

Description

Controller event - White List cleared.

Parameters

Table 298. GAP-GenericEventWhiteListCleared.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x91 |
| Length | 1 | 0x00 - This message does not have any parameters |

3.4.66 GAP-GenericEventWhiteListSizeRead.Indication

Description

Controller event - White List size.

Parameters

Table 299. GAP-GenericEventWhiteListSizeRead.Indication Parameters

| Parameter | Size (bytes) | Comments |
|---------------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x8E |
| Length | 1 | Length in bytes of the following parameters |
| WhiteListSize | 1 | White list size |

3.4.67 GAP-GetBondedDeviceName.Request

Description

Retrieves the name of a bonded device.

Parameters

Table 300. GAP-GetBondedDeviceName.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x29 |
| Length | 1 | Length in bytes of the following parameters |
| NvmIndex | 1 | Index of the device in NVM bonding area |

Table continues on the next page...

Table 300. GAP-GetBondedDeviceName.Request Parameters (continued)

| | | |
|-------------|---|---|
| MaxNameSize | 1 | Maximum number of characters to be copied, including the terminating NULL character |
|-------------|---|---|

3.4.68 GAP-GetBondedDeviceName.Indication

Description

Returns the name of a bonded device.

Parameters

Table 301. GAP-GetBondedDeviceName.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x88 |
| Length | 1 | Length in bytes of the following parameters |
| NameSize | 1 | The name size |
| Name | NameSize | The name value |

3.4.69 GAP-GetBondedDevicesCount.Request

Description

Retrieves the number of bonded devices.

Parameters

Table 302. GAP-GetBondedDevicesCount.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x28 |
| Length | 1 | 0x00 - This message does not have any parameters |

3.4.70 GAP-GetBondedDevicesCount.Indication

Description

Returns the number of bonded devices.

Parameters

Table 303. GAP-GetBondedDevicesCount.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|----------|
| OpGroup | 1 | 0x48 |

Table continues on the next page...

Table 303. GAP-GetBondedDevicesCount.Indication Parameters (continued)

| | | |
|-------------------|---|---|
| OpCode | 1 | 0x87 |
| Length | 1 | Length in bytes of the following parameters |
| NbOfBondedDevices | 1 | Number of bonded devices |

3.4.71 GAP-GetBondedDevicesIdentityInformation.Request

Description

Retrieves a list of the identity information of bonded devices, if any.

Parameters

Table 304. GAP-GetBondedDevicesIdentityInformation.Request Parameters

| Parameter | Size (bytes) | Comments |
|------------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x3C |
| Length | 1 | Length in bytes of the following parameters |
| maxDevices | 1 | Maximum number of addresses to be obtained |

3.4.72 GAP-GetBondedDevicesIdentityInformation.Indication

Description

Returns a list of the identity information of bonded devices.

Parameters

Table 305. GAP-GetBondedDevicesIdentityInformation.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------------------------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0xBB |
| Length | 1 | Length in bytes of the following parameters |
| NbOfDeviceIdentityAddresses | 1 | The number of device identity addresses |
| IdentityAddresses | Variable | Identity addresses list Structure type parameter. See detailed table below for parameter structure. |

Table 306. IdentityAddresses Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|---|
| IdentityAddressType | 1 | Identity Address Type Possible values: 0x00: gPublic_c 0x01: gRandom_c |
| IdentityAddress | 6 | Identity Address |
| Irk | 16 | Identity Resolving Key |

3.4.73 GAP-LeReadPhy.Request

Description

Read the Tx and Rx Phy on the connection with a device.

Parameters

Table 307. GAP-LeReadPhy.Request

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x3E |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID of the peer |

3.4.74 GAP-LeScSetPeerOobData.Request

Description

Sets peer OOB data used for LE Secure Connections pairing.

Parameters

Table 308. GAP-LeScSetPeerOobData.Request Parameters

| Parameter | Size (bytes) | Comments |
|--------------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x3A |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | The DeviceID for which the command is intended |
| RandomValue | 16 | LE SC OOB r (Random value) |
| ConfirmValue | 16 | LE SC OOB Cr (Random Confirm value) |

3.4.75 GAP-LeScPublicKeyRegenerated.Indication

Description

The private/public key pair used for LE Secure Connections pairing has been regenerated.

Parameters

Table 309. GAP-LeScPublicKeyRegenerated.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0xB5 |
| Length | 1 | 0x00 - This message does not have any parameters |

3.4.76 GAP-LeScRegeneratePublicKey.Request

Description

Regenerates the private/public key pair used for LE Secure Connections pairing.

Parameters

Table 310. GAP-LeScRegeneratePublicKey.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x37 |
| Length | 1 | 0x00 - This message does not have any parameters |

3.4.77 GAP-LeScSendKeypressNotificationPrivacy.Request

Description

Sends a Keypress Notification to the peer.

Parameters

Table 311. GAP-LeScSendKeypressNotification.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------------------------------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x3B |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | The DeviceID for which the command is intended |
| GapLeScKeypressNotificationParams | Variable | Keypress notification type which denotes a passkey entry keypress action |

Table 311. GAP-LeScSendKeypressNotification.Request Parameters (continued)

| | | |
|--|--|---|
| | | Structure type parameter. See the detailed table below for parameter structure. |
|--|--|---|

Table 312. GapLeScKeypressNotificationParams Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| keypressNotifType | 1 | Possible values: 0x00: gKnPasskeyEntryStarted_c 0x01: gKnPasskeyDigitStarted_c 0x02: gKnPasskeyDigitErased_c (gKnPasskeyDigitErased_c) 0x03: gKnPasskeyCleared_c 0x04: gKnPasskeyEntryCompleted_c |

3.4.78 GAP-LeScGetLocalOobData.Request

Description

Retrieves local OOB data used for LE Secure Connections pairing.

Parameters

Table 313. GAP-LeScGetLocalOobData.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x39 |
| Length | 1 | 0x00 - This message does not have any parameters |

3.4.79 GAP-LeScValidateNumericValue.Request

Description

Validates the numeric value during the Numeric Comparison LE Secure Connections pairing.

Parameters

Table 314. GAP-LeScValidateNumericValue.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x38 |
| Length | 1 | Length in bytes of the following parameters |

Table continues on the next page...

Table 314. GAP-LeScValidateNumericValue.Request Parameters (continued)

| | | |
|----------|---|---|
| DeviceId | 1 | The DeviceID for which the command is intended |
| Valid | 1 | TRUE if user has indicated that numeric values are matched, FALSE otherwise |

3.4.80 GAP-LeSetPhy.Request

Description

Set the Tx and Rx Phy on the connection with a device or all subsequent connections.

Parameters

Table 315. GAP-LeSetPhy.Request

| Parameter | Size (bytes) | Comments |
|------------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x3F |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID of the peer. |
| allPhys | 1 | Bit mask indicating Host preferences on Tx and Rx Phy |
| txPhys | 1 | Bit mask indicating Host preferences on Tx Phy |
| rxPhys | 1 | Bit mask indicating Host preferences on Rx Phy |
| phyOptions | 2 | Host preferences on Coded Phy Possible values: 0x00: gLeCodingNoPreference_c (Host has no preference on the LE Coded Phy) 0x01: gLeCodingS2_c (Host prefers to use S=2 on the LE Coded Phy) 0x02: gLeCodingS8_c (Host prefers to use S=8 on the LE Coded Phy) |

3.4.81 GAP-LoadCustomPeerInformation.Request

Description

Loads the custom peer information in raw data format.

Parameters

Table 316. GAP-LoadCustomPeerInformation.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x1F |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID of the GAP peer |
| Offset | 2 | Data offset (offset from the beginning) |
| InfoSize | 2 | Data size |

3.4.82 GAP-LoadCustomPeerInformation.Indication

Description

Returns the custom peer information in raw data format.

Parameters

Table 317. GAP-LoadCustomPeerInformation.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x85 |
| Length | 1 | Length in bytes of the following parameters |
| InfoSize | 2 | Data size |
| Info | InfoSize | Data value |

3.4.83 GAP-LoadEncryptionInformation.Request

Description

Loads encryption key for a bonded device.

Parameters

Table 318. GAP-LoadEncryptionInformation.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x18 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID of the peer |

3.4.84 GAP-LoadEncryptionInformation.Indication

Description

Returns the encryption key for a bonded device.

Parameters

Table 319. GAP-LoadEncryptionInformation.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x84 |
| Length | 1 | Length in bytes of the following parameters |
| LtkSize | 1 | LTK size |
| Ltk | LtkSize | LTK value |

3.4.85 GAP-Pair.Request

Description

Initiate pairing with a peer device.

Parameters

Table 320. GAP-Pair.Request Parameters

| Parameter | Size (bytes) | Comments |
|-------------------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x0C |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | The peer to pair with |
| PairingParameters | Variable | Pairing parameters as required by the SMP Structure type parameter. See the detailed table below for parameter structure. |

Table 321. Pairing Parameters Structure

| Structure Parameter | Size (bytes) | Comments |
|----------------------|--------------|---|
| WithBonding | 1 | TRUE if this device is able to and wants to bond after pairing, FALSE otherwise |
| SecurityModeAndLevel | 1 | The desired security mode-level Possible values: 0x10: gMode1Level1_c (Mode 1 Level 1 - No Security) 0x11: gMode1Level2_c (Mode 1 Level 2 - Encryption without authentication) |

Table continues on the next page...

Table 321. Pairing Parameters Structure (continued)

| | | |
|----------------------|---|--|
| | | <p>0x12: gMode1Level3_c (Mode 1 Level 3 - Encryption with authentication)</p> <p>0x13: gMode1Level4_c (Mode 1 Level 4 - Encryption with LE Secure Connections pairing)</p> <p>0x21: gMode2Level1_c (Mode 2 Level 1 - Data Signing without authentication)</p> <p>0x22: gMode2Level2_c (Mode 2 Level 2 - Data Signing with authentication)</p> |
| MaxEncryptionKeySize | 1 | Maximum LTK size supported by the device |
| LocalloCapabilities | 1 | <p>I/O capabilities used to determine the pairing method</p> <p>Possible values:</p> <p>0x00: gIoDisplayOnly_c (May display a PIN, no input)</p> <p>0x01: gIoDisplayYesNo_c (May display a PIN and has a binary input (for example, YES and NO buttons))</p> <p>0x02: gIoKeyboardOnly_c (Has keyboard input, no display)</p> <p>0x03: gIoNone_c (No input and no display)</p> <p>0x04: gIoKeyboardDisplay_c (Has keyboard input and display)</p> |
| OobAvailable | 1 | TRUE if this device has Out-of-Band data that can be used for authenticated pairing, FALSE otherwise |
| CentralKeys | 1 | <p>SMP keys to be distributed by the Central</p> <p>Possible values:</p> <p>0x00: gNoKeys_c (No key can be distributed)</p> <p>0x01: gLtk_c (Long Term Key)</p> <p>0x02: gLrk_c (Identity Resolving Key)</p> <p>0x04: gCsrk_c (Connection Signature Resolving Key)</p> |
| PeripheralKeys | 1 | <p>SMP keys to be distributed by the Peripheral</p> <p>Possible values:</p> |

Table continues on the next page...

Table 321. Pairing Parameters Structure (continued)

| | | |
|-----------------------------|---|--|
| | | 0x00: gNoKeys_c (No key can be distributed) 0x01: gLtk_c (Long Term Key) 0x02: glrk_c (Identity Resolving Key) 0x04: gCsrk_c (Connection Signature Resolving Key) |
| LeSecureConnectionSupported | 1 | indicates if device supports LE Secure Connections pairing |
| UseKeypressNotifications | 1 | Indicates if device supports Keypress Notification PDUs during Passkey Entry pairing |

3.4.86 GAP-ProvideLongTermKey.Request

Description

Provides the Long Term Key to the controller for encryption setup.

Parameters

Table 322. GAP-ProvideLongTermKey.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x16 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | The GAP peer who requested encryption |
| LtkSize | 1 | The Long Term Key size |
| Ltk | LtkSize | The Long Term Key |

3.4.87 GAP-ProvideOob.Request

Description

Provides the Out Of Band data for SMP pairing process.

Parameters

Table 323. GAP-ProvideOob.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|----------|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x12 |

Table continues on the next page...

Table 323. GAP-ProvideOob.Request Parameters (continued)

| | | |
|----------|----|---|
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | The pairing device |
| Oob | 16 | OOB data |

3.4.88 GAP-ReadPublicDeviceAddress.Request

Description

Reads the device's public address from the controller.

Parameters

Table 324. GAP-ReadPublicDeviceAddress.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x25 |
| Length | 1 | 0x00 - This message does not have any parameters |

3.4.89 GAP-ReadRadioPowerLevel.Request

Description

Reads the power level of the controller's radio.

Parameters

Table 325. GAP-ReadRadioPowerLevel.Request Parameters

| Parameter | Size (bytes) | Comments |
|------------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x2C |
| Length | 1 | Length in bytes of the following parameters |
| TxReadType | 1 | Transmission read type Possible values: 0x00: gTxPowerCurrentLevelInConnection_c (Reading the instantaneous TX power level in a connection) 0x01: gTxPowerMaximumLevelInConnection_c (Reading the maximum TX power level achieved during a connection) |

Table continues on the next page...

Table 325. GAP-ReadRadioPowerLevel.Request Parameters (continued)

| | | |
|----------|---|---|
| | | 0x02: gTxPowerLevelForAdvertising_c (Reading the TX power on the advertising channels) 0x03: gRssi_c (Reading the Received Signal Strength Indication in a connection) |
| DeviceId | 1 | The DeviceId for which the command is intended |

3.4.90 GAP-ReadWhiteListSize.Request

Description

Retrieves the size of the White List.

Parameters

Table 326. GAP-ReadWhiteListSize.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x21 |
| Length | 1 | 0x00 - This message does not have any parameters |

3.4.91 GAP-RegisterDeviceSecurityRequirements.Request

Description

Registers the device security requirements.

Parameters

Table 327. GAP-RegisterDeviceSecurityRequirements.Request Parameters

| Parameter | Size (bytes) | Comments |
|------------------------------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x02 |
| Length | 1 | Length in bytes of the following parameters |
| SecurityRequirementsIncluded | 1 | Boolean value which indicates if security requirements are included or not |
| SecurityRequirements | Variable | Device security requirements Structure type parameter. See the detailed table below for parameter structure. |

Table 328. SecurityRequirements Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|--------------------------------|--------------|--|
| MasterSecurityRequirements | Variable | Security requirements added to all services Structure type parameter. See the detailed table below for parameter structure. |
| NbOfServices | 1 | Number of service-specific requirements |
| GapServiceSecurityRequirements | Variable | Array of service-specific requirements Structure type parameter. See the detailed table below for parameter structure. |

Table 329. MasterSecurityRequirements Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|--------------------------|--------------|---|
| SecurityModeLevel | 1 | Security mode and level Possible values: 0x10: gMode1Level1_c (Mode 1 Level 1 - No Security) 0x11: gMode1Level2_c (Mode 1 Level 2 - Encryption without authentication) 0x12: gMode1Level3_c (Mode 1 Level 3 - Encryption with authentication) 0x13: gMode1Level4_c (Mode 1 Level 4 - Encryption with LE Secure Connections pairing) 0x21: gMode2Level1_c (Mode 2 Level 1 - Data Signing without authentication) 0x22: gMode2Level2_c (Mode 2 Level 2 - Data Signing with authentication) |
| Authorization | 1 | Authorization required |
| MinimumEncryptionKeySize | 2 | Minimum encryption key (LTK) size |

Table 330. GapServiceSecurityRequirements Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| ServiceHandle | 2 | Handle of the Service declaration in the GATT Database |
| Requirements | Variable | Requirements for all attributes in this service |

Table 330. GapServiceSecurityRequirements Parameter Structure (continued)

| | | |
|--|--|---|
| | | Structure type parameter. See the detailed table below for parameter structure. |
|--|--|---|

Table 331. Requirements Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|--------------------------|--------------|---|
| SecurityModeLevel | 1 | Security mode and level Possible values: 0x10: gMode1Level1_c (Mode 1 Level 1 - No Security) 0x11: gMode1Level2_c (Mode 1 Level 2 - Encryption without authentication) 0x12: gMode1Level3_c (Mode 1 Level 3 - Encryption with authentication) 0x13: gMode1Level4_c (Mode 1 Level 4 - Encryption with LE Secure Connections pairing) 0x21: gMode2Level1_c (Mode 2 Level 1 - Data Signing without authentication) 0x22: gMode2Level2_c (Mode 2 Level 2 - Data Signing with authentication) |
| Authorization | 1 | Authorization required |
| MinimumEncryptionKeySize | 2 | Minimum encryption key (LTK) size |

3.4.92 GAP-RejectKeyExchangeRequest.Request

Description

Rejects the Key Exchange procedure with a paired peer.

Parameters

Table 332. GAP-RejectKeyExchangeRequest.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x15 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | The GAP peer who requested the Key Exchange procedure |

3.4.93 GAP-RejectPairing.Request

Description

Rejects the peer's authentication request.

Parameters

Table 333. GAP-RejectPairing.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x10 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | The GAP peer who requested authentication |
| Reason | 1 | Pairing reject reason Possible values: 0x02: gOobNotAvailable_c (This device does not have the required OOB for authenticated pairing) 0x03: gIncompatibleIoCapabilities_c (The combination of I/O capabilities does not allow pairing with the desired level of security) 0x05: gPairingNotSupported_c (This device does not support pairing) 0x06: gLowEncryptionKeySize_c (The peer's encryption key size is too low for this device's required security level) 0x08: gUnspecifiedReason_c (The host has rejected the pairing for an unknown reason) 0x09: gRepeatedAttempts_c (This device is the target of repeated unsuccessful pairing attempts and does not allow further pairing attempts at the moment) 0xF0: gLinkEncryptionFailed_c (Link could not be encrypted) |

3.4.94 GAP-RejectPasskeyRequest.Request

Description

Rejects the passkey request from a peer.

Parameters

Table 334. GAP-RejectPasskeyRequest.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x13 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | The GAP peer that requested a passkey entry |

3.4.95 GAP-RemoveAllBonds.Request

Description

Removes all bonds with other devices.

Parameters

Table 335. GAP-RemoveAllBonds.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x2B |
| Length | 1 | 0x00 - This message does not have any parameters |

3.4.96 GAP-RemoveBond.Request

Description

Removes the bond with a device.

Parameters

Table 336. GAP-RemoveBond.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x2A |
| Length | 1 | Length in bytes of the following parameters |
| NvmIndex | 1 | Index of the device in NVM bonding area |

3.4.97 GAP-RemoveDeviceFromWhiteList.Request

Description

Removes a device address from the White List.

Parameters

Table 337. GAP-RemoveDeviceFromWhiteList.Request Parameters

| Parameter | Size (bytes) | Comments |
|-------------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x24 |
| Length | 1 | Length in bytes of the following parameters |
| AddressType | 1 | The address type (public or random) Possible values: 0x00: gPublic_c 0x01: gRandom_c |
| Address | 6 | The address of the white-listed device |

3.4.98 GAP-SaveCccd.Request

Description

Save the CCCD value for a specific client and CCCD handle.

Parameters

Table 338. GAP-SaveCccd.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x08 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | The peer GATT client |
| Handle | 2 | The handle of the CCCD as defined in the GATT Database |
| Cccd | 1 | The bit mask representing the CCCD value to be saved Possible values: 0x00: gEmpty_c (Nothing is enabled) 0x01: gNotification_c (Enables notifications) 0x02: gIndication_c (Enabled indications) |

3.4.99 GAP-SaveCustomPeerInformation.Request

Description

Saves custom peer information in raw data format.

Parameters

Table 339. GAP-SaveCustomPeerInformation.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x1E |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID of the GAP peer |
| Offset | 2 | Data offset (offset from the beginning) |
| InfoSize | 2 | Data size |
| Info | InfoSize | Data |

3.4.100 GAP-SaveDeviceName.Request

Description

Saves the name of a bonded device.

Parameters

Table 340. GAP-SaveDeviceName.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x27 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | Device ID for the active peer which name is saved |
| NameSize | 1 | Number of characters to be saved |
| Name | NameSize | Array of characters holding the name |

3.4.101 GAP-ScanningEventCommandFailed.Indication

Description

Event received when scanning could not be enabled or disabled.

Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x9B |
| Length | 1 | Length in bytes of the following parameters |

Table continues on the next page...

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|------------|--------------|--|
| FailReason | 2 | <p>The reason of failure</p> <p>Possible values:</p> <ul style="list-style-type: none"> • 0x0000: gBleSuccess_c • 0x0001: gBleInvalidParameter_c • 0x0002: gBleOverflow_c • 0x0003: gBleUnavailable_c • 0x0004: gBleFeatureNotSupported_c • 0x0005: gBleOutOfMemory_c • 0x0006: gBleAlreadyInitialized_c • 0x0007: gBleOsError_c • 0x0008: gBleUnexpectedError_c • 0x0009: gBleInvalidState_c • 0x0101: gHciUnknownHciCommand_c • 0x0102: gHciUnknownConnectionIdentifier_c • 0x0103: gHciHardwareFailure_c • 0x0104: gHciPageTimeout_c • 0x0105: gHciAuthenticationFailure_c • 0x0106: gHciPinOrKeyMissing_c • 0x0107: gHciMemoryCapacityExceeded_c • 0x0108: gHciConnectionTimeout_c • 0x0109: gHciConnectionLimitExceeded_c • 0x010A: gHciSynchronousConnectionLimitToADeviceExceeded_c • 0x010B: gHciAclConnectionAlreadyExists_c • 0x010C: gHciCommandDisallowed_c • 0x010D: gHciConnectionRejectedDueToLimitedResources_c |

| Table continued from the previous page... | | |
|---|--------------|--|
| Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x010E: gHciConnectionRejectedDueToSecurityReasons_c • 0x010F: gHciConnectionRejectedDueToUnacceptableBdAddr_c • 0x0110: gHciConnectionAcceptTimeoutExceeded_c • 0x0111: gHciUnsupportedFeatureOrParameterValue_c • 0x0112: gHciInvalidHciCommandParameters_c • 0x0113: gHciRemoteUserTerminatedConnection_c • 0x0114: gHciRemoteDeviceTerminatedConnectionLowResources_c • 0x0115: gHciRemoteDeviceTerminatedConnectionPowerOff_c • 0x0116: gHciConnectionTerminatedByLocalHost_c • 0x0117: gHciRepeatedAttempts_c • 0x0118: gHciPairingNotAllowed_c • 0x0119: gHciUnknownLpmPdu_c • 0x011A: gHciUnsupportedRemoteFeature_c • 0x011B: gHciScoOffsetRejected_c • 0x011C: gHciScoIntervalRejected_c • 0x011D: gHciScoAirModeRejected_c • 0x011E: gHciInvalidLpmParameters_c • 0x011F: gHciUnspecifiedError_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0120: gHciUnsupportedLpmParameterValue_c • 0x0121: gHciRoleChangeNotAllowed_c • 0x0122: gHciLLResponseTimeout_c • 0x0123: gHciLmpErrorTransactionCollision_c • 0x0124: gHciLmpPduNotAllowed_c • 0x0125: gHciEncryptionModeNotAcceptable_c • 0x0126: gHciLinkKeyCannotBeChanged_c • 0x0127: gHciRequestedQosNotSupported_c • 0x0128: gHciInstantPassed_c • 0x0129: gHciPairingWithUnitKeyNotSupported_c • 0x012A: gHciDifferentTransactionCollision_c • 0x012B: gHciReserved_0x2B_c • 0x012C: gHciQosNotAcceptableParameter_c • 0x012D: gHciQosRejected_c • 0x012E: gHciChannelClassificationNotSupported_c • 0x012F: gHciInsufficientSecurity_c • 0x0130: gHciParameterOutOfMandatoryRange_c • 0x0131: gHciReserved_0x31_c • 0x0132: gHciRoleSwitchPending_c • 0x0133: gHciReserved_0x33_c • 0x0134: gHciReservedSlotViolation_c • 0x0135: gHciRoleSwitchFailed_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0136: gHciExtendedInquiryResponseTooLarge_c • 0x0137: gHciSecureSimplePairingNotSupportedByHost_c • 0x0138: gHciHostBusyPairing_c • 0x0139: gHciConnectionRejectedDueToNoSuitableChannelFound_c • 0x013A: gHciControllerBusy_c • 0x013B: gHciUnacceptableConnectionParameters_c • 0x013C: gHciDirectedAdvertisingTimeout_c • 0x013D: gHciConnectionTerminatedDueToMicFailure_c • 0x013E: gHciConnectionFailedToBeEstablished_c • 0x013F: gHciMacConnectionFailed_c • 0x0140: gHciCoarseClockAdjustmentRejected_c • 0x01A0: gHciAlreadyInit_c • 0x01A1: gHciInvalidParameter_c • 0x01A2: gHciCallbackNotInstalled_c • 0x01A3: gHciCallbackAlreadyInstalled_c • 0x01A4: gHciCommandNotSupported_c • 0x01A5: gHciEventNotSupported_c • 0x01A6: gHciTransportError_c • 0x03F0: gL2caAlreadyInit_c • 0x03F1: gL2caInsufficientResources_c • 0x03F2: gL2caCallbackNotInstalled_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x03F3: gL2caCallbackAlreadyInstalled_c • 0x03F4: gL2caLePsmInvalid_c • 0x03F5: gL2caLePsmAlreadyRegistered_c • 0x03F6: gL2caLePsmNotRegistered_c • 0x03F7: gL2caLePsmInsufficientResources_c • 0x03F8: gL2caChannelInvalid_c • 0x03F9: gL2caChannelClosed_c • 0x03FA: gL2caChannelAlreadyConnected_c • 0x03FB: gL2caConnectionParametersRejected_c • 0x03FC: gL2caChannelBusy_c • 0x03FE: gL2caInvalidParameter_c • 0x03FF: gL2caError_c • 0x0401: gSmNullCBFunction_c • 0x0402: gSmCommandNotSupported_c • 0x0403: gSmUnexpectedCommand_c • 0x0404: gSmInvalidCommandCode_c • 0x0405: gSmInvalidCommandLength_c • 0x0406: gSmInvalidCommandParameter_c • 0x0407: gSmInvalidDeviceId_c • 0x0408: gSmInvalidInternalOperation_c • 0x0409: gSmInvalidConnectionHandle_c • 0x040A: gSmImproperKeyDistributionField_c • 0x040B: gSmUnexpectedKeyType_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x040C: gSmUnexpectedPairingTerminationReason_c • 0x040D: gSmUnexpectedKeyset_c • 0x040E: gSmSmpTimeoutOccurred_c • 0x040F: gSmUnknownSmpPacketType_c • 0x0410: gSmInvalidSmpPacketLength_c • 0x0411: gSmInvalidSmpPacketParameter_c • 0x0412: gSmReceivedUnexpectedSmpPacket_c • 0x0413: gSmReceivedSmpPacketFromUnknownDevice_c • 0x0414: gSmReceivedUnexpectedHciEvent_c • 0x0415: gSmReceivedHciEventFromUnknownDevice_c • 0x0416: gSmInvalidHciEventParameter_c • 0x0417: gSmLlConnectionEncryptionInProgress_c • 0x0418: gSmLlConnectionEncryptionFailure_c • 0x0419: gSmInsufficientResources_c • 0x041A: gSmOobDataAddressMismatch_c • 0x041B: gSmSmpPacketReceivedAfterTimeoutOccurred_c • 0x041C: gSmReceivedTimerEventForUnknownDevice_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x041D: gSmUnattainableLocalDeviceSecRequirements_c • 0x041E: gSmUnattainableLocalDeviceMinKeySize_c • 0x041F: gSmUnattainableSlaveSecReqRequirements_c • 0x0431: gSmPairingErrorPasskeyEntryFailed_c • 0x0432: gSmPairingErrorConfirmValueFailed_c • 0x0433: gSmPairingErrorCommandNotSupported_c • 0x0434: gSmPairingErrorInvalidParameters_c • 0x0435: gSmPairingErrorUnknownReason_c • 0x0460: gSmTbResolvableAddressDoesNotMatchIrk_c • 0x0461: gSmTbInvalidDataSignature_c • 0x0501: gAttInvalidHandle_c • 0x0502: gAttReadNotPermitted_c • 0x0503: gAttWriteNotPermitted_c • 0x0504: gAttInvalidPdu_c • 0x0505: gAttInsufficientAuthentication_c • 0x0506: gAttRequestNotSupported_c • 0x0507: gAttInvalidOffset_c • 0x0508: gAttInsufficientAuthorization_c • 0x0509: gAttPrepareQueueFull_c • 0x050A: gAttAttributeNotFound_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| | | <ul style="list-style-type: none"> • 0x050B: gAttAttributeNotLong_c • 0x050C: gAttInsufficientEncryptionKeySize_c • 0x050D: gAttInvalidAttributeValueLength_c • 0x050E: gAttUnlikelyor_c • 0x050F: gAttInsufficientEncryption_c • 0x0510: gAttUnsupportedGroupType_c • 0x0511: gAttInsufficientResources_c • 0x0601: gGattAnotherProcedureInProgress_c • 0x0602: gGattLongAttributePacketsCorrupted_c • 0x0603: gGattMultipleAttributesOverflow_c • 0x0604: gGattUnexpectedReadMultipleResponseLength_c • 0x0605: gGattInvalidValueLength_c • 0x0606: gGattServerTimeout_c • 0x0607: gGattIndicationAlreadyInProgress_c • 0x0608: gGattClientConfirmationTimeout_c • 0x0701: gGapAdvDataTooLong_c • 0x0702: gGapScanRspDataTooLong_c • 0x0703: gGapDeviceNotBonded_c • 0x0801: gDevDbCccdLimitReached_c • 0x0802: gDevDbCccdNotFound_c • 0x0901: gGattDbInvalidHandle_c • 0x0902: gGattDbCharacteristicNotFound_c |

Table continued from the previous page...

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0903: gGattDbCccdNotFound_c • 0x0904: gGattDbServiceNotFound_c • 0x0905: gGattDbDescriptorNotFound_c |

3.4.102 GAP-ScanningEventDeviceScanned.Indication

Description

Event received when an advertising device has been scanned.

Parameters

Table 341. GAP-ScanningEventDeviceScanned.Indication Parameters

| Parameter | Size (bytes) | Comments |
|---------------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x9C |
| Length | 1 | Length in bytes of the following parameters |
| ScannedDevice | Variable | Scanned device information Structure type parameter. See the detailed table below for parameter structure. |

Table 342. ScannedDevice Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|---|
| AddressType | 1 | Device's advertising address type Possible values: 0x00: gPublic_c 0x01: gRandom_c |
| Address | 6 | Device's advertising address |
| Rssi | 1 | RSSI on the advertising channel; may be compared to the TX power contained in the AD Structure of type gAdTxPowerLevel_c to estimate distance from the advertiser |
| DataLength | 1 | Length of the advertising or scan response data |

Table continues on the next page...

Table 342. ScannedDevice Parameter Structure (continued)

| Data | DataLength | Advertising or scan response data |
|----------------------------|------------|--|
| AdvEventType | 1 | Advertising report type, indicating what type of event generated this data (advertising, scan response) Possible values: 0x00: gBleAdvRepAdvInd_c (Connectable undirected advertising (ADV_IND)) 0x01: gBleAdvRepAdvDirectInd_c (Connectable directed advertising (ADV_DIRECT_IND)) 0x02: gBleAdvRepAdvScanInd_c (Scannable undirected advertising (ADV_SCAN_IND)) 0x03: gBleAdvRepAdvNonconnInd_c (Non Connectable undirected advertising (ADV_NONCONN_IND)) 0x04: gBleAdvRepScanRsp_c (Scan Response (SCAN_RSP)) |
| DirectRpaUsed | 1 | TRUE if directed advertising with Resolvable Private Address as Direct Address was detected while Enhanced Privacy is enabled |
| DirectRpa | 6 | Resolvable Private Address set as Direct Address for directed advertising |
| advertisingAddressResolved | 1 | TRUE if the address contained in the addressType and aAddress fields is the identity address of a resolved RPA from the Advertising Address field |

3.4.103 GAP-ScanningEventStateChanged.Indication

Description

Event received when scanning had been successfully enabled or disabled.

Parameters

Table 343. GAP-ScanningEventStateChanged.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x9A |
| Length | 1 | 0x00 - This message does not have any parameters |

3.4.104 GAP-SendSlaveSecurityRequest.Request

Description

Informs the peer Master about local security requirements.

Parameters

Table 344. GAP-SendSlaveSecurityRequest.Request Parameters

| Parameter | Size (bytes) | Comments |
|-------------------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x0D |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | The GAP peer to pair with |
| BondAfterPairing | 1 | Specifies if bonding is supported |
| SecurityModeLevel | 1 | <p>The level of security requested</p> <p>Possible values:</p> <p>0x10: gMode1Level1_c (Mode 1 Level 1 - No Security)</p> <p>0x11: gMode1Level2_c (Mode 1 Level 2 - Encryption without authentication)</p> <p>0x12: gMode1Level3_c (Mode 1 Level 3 - Encryption with authentication)</p> <p>0x13: gMode1Level4_c (Mode 1 Level 4 - Encryption with LE Secure Connections pairing)</p> <p>0x21: gMode2Level1_c (Mode 2 Level 1 - Data Signing without authentication)</p> <p>0x22: gMode2Level2_c (Mode 2 Level 2 - Data Signing with authentication)</p> |

3.4.105 GAP-SendSmpKeys.Request

Description

Sends the SMP keys during SMP Key Exchange procedure.

Parameters

Table 345. GAP-SendSmpKeys.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|----------|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x14 |

Table continues on the next page...

Table 345. GAP-SendSmpKeys.Request Parameters (continued)

| | | |
|----------|----------|---|
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | The GAP peer who initiated the procedure |
| Keys | Variable | The SMP keys of the local device Structure type parameter. See the detailed table below for parameter structure. |

Table 346. Keys Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|-------------------|---|
| LtkIncluded | 1 | Boolean value which indicates if LTK size and LTK are included or not |
| LtkInfo | Variable | LTK information (size and value) Structure type parameter. See the detailed table below for parameter structure. |
| IrkIncluded | 1 | Boolean value which indicates if IRK is included or not |
| Irk | 16 x IrkIncluded | Identity Resolving Key |
| CsrkIncluded | 1 | Boolean value which indicates if CSRK is included or not |
| Csrk | 16 x CsrkIncluded | Connection Signature Resolving Key |
| RandEdivInfo | Variable | Rand information (size and value) and Ediv Structure type parameter. See the detailed table below for parameter structure. |
| AddressIncluded | IrkIncluded | Boolean value which indicates if Address is included or not |
| AddressInfo | Variable | Address information (type and value) Structure type parameter. See the detailed table below for parameter structure. |

Table 347. LtkInfo Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|----------------------------|
| LtkSize | 1 | Encryption Key Size |
| Ltk | LtkSize | Long Term (Encryption) Key |

Table 348. RandEdivInfo Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|---------------------------------------|
| RandSize | 1 | Random value size |
| Rand | RandSize | Random value used to identify the LTK |
| Ediv | 2 | EDIV value used to identify the LTK |

Table 349. AddressInfo Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| DeviceAddressType | 1 | Public or Random address Possible values: 0x00: gPublic_c 0x01: gRandom_c |
| DeviceAddress | 6 | Device Address |

3.4.106 GAP-SetAdvertisingData.Request

Description

Sets the advertising and scan response data.

Parameters

Table 350. GAP-SetAdvertisingData.Request Parameters

| Parameter | Size (bytes) | Comments |
|--------------------------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x04 |
| Length | 1 | Length in bytes of the following parameters |
| AdvertisingDataIncluded | 1 | Boolean value which indicates if advertising data is included or not |
| AdvertisingData | Variable | Advertising data Structure type parameter. See the detailed table below for parameter structure. |
| ScanResponseDataIncluded | 1 | Boolean value which indicates if scan response data is included or not |
| ScanResponseData | Variable | Scan response data Structure type parameter. See the detailed table below for parameter structure. |

Table 351. AdvertisingData Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| NbOfAdStructures | 1 | Number of advertising data structures |
| AdStructures | Variable | Advertising data structures Structure type parameter. See the detailed table below for parameter structure. |

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Length | 1 | Advertising data length |
| Type | 1 | Advertising data type Possible values: <ul style="list-style-type: none"> • 0x01: gAdFlags_c (Defined by the Bluetooth SIG) • 0x02: gAdIncomplete16bitServiceList_c (Defined by the Bluetooth SIG) • 0x03: gAdComplete16bitServiceList_c (Defined by the Bluetooth SIG) • 0x04: gAdIncomplete32bitServiceList_c (Defined by the Bluetooth SIG) • 0x05: gAdComplete32bitServiceList_c (Defined by the Bluetooth SIG) • 0x06: gAdIncomplete128bitServiceList_c (Defined by the Bluetooth SIG) • 0x07: gAdComplete128bitServiceList_c (Defined by the Bluetooth SIG) • 0x08: gAdShortenedLocalName_c (Defined by the Bluetooth SIG) • 0x09: gAdCompleteLocalName_c (Defined by the Bluetooth SIG) • 0x0A: gAdTxPowerLevel_c (Defined by the Bluetooth SIG) • 0x0D: gAdClassOfDevice_c (Defined by the Bluetooth SIG) |

Table continues on the next page...

Table continued from the previous page...

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x0E: gAdSimplePairingHashC192_c (Defined by the Bluetooth SIG) • 0x0F: gAdSimplePairingRandomizerR192_c (Defined by the Bluetooth SIG) • 0x10: gAdSecurityManagerTkValue_c (Defined by the Bluetooth SIG) • 0x11: gAdSecurityManagerOobFlags_c (Defined by the Bluetooth SIG) • 0x12: gAdSlaveConnectionIntervalRange_c (Defined by the Bluetooth SIG) • 0x14: gAdServiceSolicitationList16bit_c (Defined by the Bluetooth SIG) • 0x15: gAdServiceSolicitationList128bit_c (Defined by the Bluetooth SIG) • 0x16: gAdServiceData16bit_c (Defined by the Bluetooth SIG) • 0x17: gAdPublicTargetAddress_c (Defined by the Bluetooth SIG) • 0x18: gAdRandomTargetAddress_c (Defined by the Bluetooth SIG) • 0x19: gAdAppearance_c (Defined by the Bluetooth SIG) • 0x1A: gAdAdvertisingInterval_c (Defined by the Bluetooth SIG) • 0x1B: gAdLeDeviceAddress_c (Defined by the Bluetooth SIG) • 0x1C: gAdLeRole_c (Defined by the Bluetooth SIG) • 0x1D: gAdSimplePairingHashC256_c (Defined by the Bluetooth SIG) • 0x1E: gAdSimplePairingRandomizerR256_c (Defined by the Bluetooth SIG) |

Table continues on the next page...

| <i>Table continued from the previous page...</i> | | |
|--|--------------|--|
| Structure Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x1F: gAdServiceSolicitationList32bit_c (Defined by the Bluetooth SIG) • 0x20: gAdServiceData32bit_c (Defined by the Bluetooth SIG) • 0x21: gAdServiceData128bit_c (Defined by the Bluetooth SIG) • 0x3D: gAd3dInformationData_c (Defined by the Bluetooth SIG) • 0xFF: gAdManufacturerSpecificData_c (Defined by the Bluetooth SIG) |
| Data | Length | Advertising data |

Table 352. ScanResponseData Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| NbOfAdStructures | 1 | Number of advertising data structures |
| AdStructures | Variable | Advertising data structures Structure type parameter. See the detailed table below for parameter structure. |

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|---|
| Length | 1 | Advertising data length |
| Type | 1 | Advertising data type Possible values: <ul style="list-style-type: none"> • 0x01: gAdFlags_c (Defined by the Bluetooth SIG) • 0x02: gAdIncomplete16bitServiceList_c (Defined by the Bluetooth SIG) • 0x03: gAdComplete16bitServiceList_c (Defined by the Bluetooth SIG) • 0x04: gAdIncomplete32bitServiceList_c (Defined by the Bluetooth SIG) |

Table continues on the next page...

Table continued from the previous page...

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| | | <ul style="list-style-type: none"> • 0x05: gAdComplete32bitServiceList_c (Defined by the Bluetooth SIG) • 0x06: gAdIncomplete128bitServiceList_c (Defined by the Bluetooth SIG) • 0x07: gAdComplete128bitServiceList_c (Defined by the Bluetooth SIG) • 0x08: gAdShortenedLocalName_c (Defined by the Bluetooth SIG) • 0x09: gAdCompleteLocalName_c (Defined by the Bluetooth SIG) • 0x0A: gAdTxPowerLevel_c (Defined by the Bluetooth SIG) • 0x0D: gAdClassOfDevice_c (Defined by the Bluetooth SIG) • 0x0E: gAdSimplePairingHashC192_c (Defined by the Bluetooth SIG) • 0x0F: gAdSimplePairingRandomizerR192_c (Defined by the Bluetooth SIG) • 0x10: gAdSecurityManagerTkValue_c (Defined by the Bluetooth SIG) • 0x11: gAdSecurityManagerOobFlags_c (Defined by the Bluetooth SIG) • 0x12: gAdSlaveConnectionIntervalRange_c (Defined by the Bluetooth SIG) • 0x14: gAdServiceSolicitationList16bit_c (Defined by the Bluetooth SIG) • 0x15: gAdServiceSolicitationList128bit_c (Defined by the Bluetooth SIG) • 0x16: gAdServiceData16bit_c (Defined by the Bluetooth SIG) |

Table continues on the next page...

| Table continued from the previous page... | | |
|---|--------------|--|
| Structure Parameter | Size (bytes) | Comments |
| | | <ul style="list-style-type: none"> • 0x17: gAdPublicTargetAddress_c (Defined by the Bluetooth SIG) • 0x18: gAdRandomTargetAddress_c (Defined by the Bluetooth SIG) • 0x19: gAdAppearance_c (Defined by the Bluetooth SIG) • 0x1A: gAdAdvertisingInterval_c (Defined by the Bluetooth SIG) • 0x1B: gAdLeDeviceAddress_c (Defined by the Bluetooth SIG) • 0x1C: gAdLeRole_c (Defined by the Bluetooth SIG) • 0x1D: gAdSimplePairingHashC256_c (Defined by the Bluetooth SIG) • 0x1E: gAdSimplePairingRandomizerR256_c (Defined by the Bluetooth SIG) • 0x1F: gAdServiceSolicitationList32bit_c (Defined by the Bluetooth SIG) • 0x20: gAdServiceData32bit_c (Defined by the Bluetooth SIG) • 0x21: gAdServiceData128bit_c (Defined by the Bluetooth SIG) • 0x3D: gAd3dInformationData_c (Defined by the Bluetooth SIG) • 0xFF: gAdManufacturerSpecificData_c (Defined by the Bluetooth SIG) |
| Data | Length | Advertising data |

3.4.107 GAP-SetAdvertisingParameters.Request

Description

Sets the advertising parameters.

Parameters

Table 353. GAP-SetAdvertisingParameters.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|----------|
| OpGroup | 1 | 0x48 |

Table continues on the next page...

Table 353. GAP-SetAdvertisingParameters.Request Parameters (continued)

| | | |
|-----------------------|----------|---|
| OpCode | 1 | 0x03 |
| Length | 1 | Length in bytes of the following parameters |
| AdvertisingParameters | Variable | Advertising parameters Structure type parameter. See the detailed table below for parameter structure. |

Table 354. AdvertisingParameters Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| MinInterval | 2 | Minimum desired advertising interval - default 1.28s |
| MaxInterval | 2 | Maximum desired advertising interval - default 1.28s |
| AdvertisingType | 1 | Advertising type - default connectable undirected Possible values: 0x00: gConnectableUndirected_c (Answers to both connect and scan requests) 0x01: gDirectedHighDutyCycle_c (Answers only to connect requests; smaller advertising interval for quicker connection) 0x02: gScannable_c (Answers only to scan requests) 0x03: gNonConnectable_c (Does not answer to connect nor scan requests) 0x04: gDirectedLowDutyCycle_c (Answers only to connect requests; larger advertising interval) |
| OwnAddressType | 1 | Indicates whether the advertising address will be the public address or the random address Possible values: 0x00: gPublic_c 0x01: gRandom_c |
| PeerAddressType | 1 | Address type of the peer; only used in directed advertising and Enhanced Privacy |

Table continues on the next page...

Table 354. AdvertisingParameters Parameter Structure (continued)

| | | |
|--------------|---|---|
| | | Possible values: 0x00: gPublic_c 0x01: gRandom_c |
| PeerAddress | 6 | Address of the peer |
| ChannelMap | 1 | Bit mask indicating which of the three advertising channels will be used - default all three Possible values: 0x01: gChannel37_c (Bit for channel 37) 0x02: gChannel38_c (Bit for channel 38) 0x04: gChannel39_c (Bit for channel 39) |
| FilterPolicy | 1 | Indicates whether the connect and scan requests are filtered using the White List - default does not use White List Possible values: 0x00: gProcessAll_c (Accept all connect and scan requests) 0x01: gProcessConnAllScanWL_c (Accept all connect requests, but scan requests only from devices in White List) 0x02: gProcessScanAllConnWL_c (Accept all scan requests, but connect requests only from devices in White List) 0x03: gProcessWhiteListOnly_c (Accept connect and scan requests only from devices in White List) |

3.4.108 GAP-SetDefaultPairingParameters.Request

Description

Sets the default pairing parameters to be used by automatic pairing procedures.

Parameters

Table 355. GAP-SetDefaultPairingParameters.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x30 |
| Length | 1 | Length in bytes of the following parameters |

Table continues on the next page...

Table 355. GAP-SetDefaultPairingParameters.Request Parameters (continued)

| | | |
|---------------------------|----------|--|
| PairingParametersIncluded | 1 | Boolean value which indicates if pairing parameters are included or not |
| PairingParameters | Variable | Pairing parameters as required by the SMP Structure type parameter. See the detailed table below for parameter structure. |

Table 356. PairingParameters Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|----------------------|--------------|---|
| WithBonding | 1 | TRUE if this device is able to and wants to bond after pairing, FALSE otherwise |
| SecurityModeAndLevel | 1 | The desired security mode-level Possible values: 0x10: gMode1Level1_c (Mode 1 Level 1 - No Security) 0x11: gMode1Level2_c (Mode 1 Level 2 - Encryption without authentication) 0x12: gMode1Level3_c (Mode 1 Level 3 - Encryption with authentication) 0x13: gMode1Level4_c (Mode 1 Level 4 - Encryption with LE Secure Connections pairing) 0x21: gMode2Level1_c (Mode 2 Level 1 - Data Signing without authentication) 0x22: gMode2Level2_c (Mode 2 Level 2 - Data Signing with authentication) |
| MaxEncryptionKeySize | 1 | Maximum LTK size supported by the device |
| LocalloCapabilities | 1 | I/O capabilities used to determine the pairing method Possible values: 0x00: gIoDisplayOnly_c (May display a PIN, no input) 0x01: gIoDisplayYesNo_c (May display a PIN and has a binary input (for example, YES and NO buttons)) 0x02: gIoKeyboardOnly_c (Has keyboard input, no display) |

Table continues on the next page...

Table 356. PairingParameters Parameter Structure (continued)

| | | |
|-----------------------------|---|--|
| | | 0x03: gloNone_c (No input and no display) 0x04: gloKeyboardDisplay_c (Has keyboard input and display) |
| OobAvailable | 1 | TRUE if this device has Out-of-Band data that can be used for authenticated pairing, FALSE otherwise |
| CentralKeys | 1 | SMP keys to be distributed by the Central Possible values: 0x00: gNoKeys_c (No key can be distributed) 0x01: gLtk_c (Long Term Key) 0x02: glrk_c (Identity Resolving Key) 0x04: gCsrk_c (Connection Signature Resolving Key) |
| PeripheralKeys | 1 | SMP keys to be distributed by the Peripheral Possible values: 0x00: gNoKeys_c (No key can be distributed) 0x01: gLtk_c (Long Term Key) 0x02: glrk_c (Identity Resolving Key) 0x04: gCsrk_c (Connection Signature Resolving Key) |
| LeSecureConnectionSupported | 1 | indicates if device supports LE Secure Connections pairing |
| UseKeypressNotifications | 1 | Indicates if device supports Keypress Notification PDUs during Passkey Entry pairing |

3.4.109 GAP-SetLocalPasskey.Request

Description

Sets the SMP passkey for this device.

Parameters

Table 357. GAP-SetLocalPasskey.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|----------|
| OpGroup | 1 | 0x48 |

Table continues on the next page...

Table 357. GAP-SetLocalPasskey.Request Parameters (continued)

| | | |
|---------|---|---|
| OpCode | 1 | 0x19 |
| Length | 1 | Length in bytes of the following parameters |
| Passkey | 4 | The SMP passkey |

3.4.110 GAP-SetRandomAddress.Request

Description

Sets a random address into the controller.

Parameters

Table 358. GAP-SetRandomAddress.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x2E |
| Length | 1 | Length in bytes of the following parameters |
| Address | 6 | The Private Resolvable, Private Non-Resolvable, or Static Random Address |

3.4.111 GAP-SetScanMode.Request

Description

Sets internal scan filters and actions.

Parameters

Table 359. GAP-SetScanMode.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x2F |
| Length | 1 | Length in bytes of the following parameters |
| ScanMode | 1 | <p>The scan mode to be activated.</p> <p>Possible values:</p> <p>0x00: gDefaultScan_c (Reports all scanned devices to the application)</p> <p>0x01: gLimitedDiscovery_c (Reports only devices in Limited Discoverable Mode, in other words, containing the Flags AD with the LE Limited Discoverable Flag set)</p> |

Table continues on the next page...

Table 359. GAP-SetScanMode.Request Parameters (continued)

| | | |
|-------------------|----------|--|
| | | <p>0x02: gGeneralDiscovery_c (Reports only devices in General Discoverable Mode, in other words, containing the Flags AD with the LE General Discoverable Flag set)</p> <p>0x03: gAutoConnect_c (Automatically connects with devices with known addresses and does not report any scanned device to the application)</p> |
| AutoConnectParams | Variable | <p>Parameters for the Auto Connect Scan Mode</p> <p>Structure type parameter. See the detailed table below for parameter structure.</p> |

Table 360. AutoConnectParams Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|---|
| NbOfAddresses | 1 | Number of device addresses to automatically connect to |
| WriteInWhiteList | 1 | If set to TRUE, the device addresses will be written in the White List before scanning is enabled |
| AutoConnectData | Variable | <p>The connection request parameters</p> <p>Structure type parameter. See the detailed table below for parameter structure.</p> |

Table 361. AutoConnectData Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|---|
| ScanInterval | 2 | Scanning interval - default 10ms |
| ScanWindow | 2 | Scanning window - default 10ms |
| FilterPolicy | 1 | <p>Indicates whether the connection request is issued for a specific device or for all the devices in the White List - default specific device</p> <p>Possible values:</p> <p>0x00: gUseDeviceAddress_c (Initiates a connection with a specific device identified by its address)</p> |

Table continues on the next page...

Table 361. AutoConnectData Parameter Structure (continued)

| | | |
|------------------------|---|---|
| | | 0x01: gUseWhiteList_c (Initiates connections with all the devices in the White List at the same time) |
| OwnAddressType | 1 | Indicates whether the address used in connection requests will be the public address or the random address - default public address Possible values: 0x00: gPublic_c 0x01: gRandom_c |
| PeerAddressType | 1 | When connecting to a specific device, this indicates that device's address type - default public address Possible values: 0x00: gPublic_c 0x01: gRandom_c |
| PeerAddress | 6 | When connecting to a specific device, this indicates that device's address |
| ConnIntervalMin | 2 | The minimum desired connection interval - default 100ms |
| ConnIntervalMax | 2 | The maximum desired connection interval - default 200ms |
| ConnLatency | 2 | The desired connection latency (the maximum number of consecutive connection events the Slave is allowed to ignore) - default 0 |
| SupervisionTimeout | 2 | The maximum time interval between consecutive over-the-air packets; if this timer expires, the connection is dropped - default 10s |
| ConnEventLengthMin | 2 | The minimum desired connection event length - default 0ms |
| ConnEventLengthMax | 2 | The maximum desired connection event length - default maximum possible, ~41 s |
| usePeerIdentityAddress | 1 | TRUE if the address defined in the peerAddressType and peerAddress is an identity address |

3.4.112 GAP-SetTxPowerLevel.Request

Description

Sets a Transmission power level in the controller.

Parameters

Table 362. GAP-SetTxPowerLevel.Request Parameters

| Parameter | Size (bytes) | Comments |
|-------------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x3D |
| Length | 1 | Length in bytes of the following parameters |
| powerLevel | 1 | power level value as described by the controller interface |
| channelType | 1 | Advertising or Connection channel type for the Tx power level Possible values: 0x00: Advertising 0x01: Connection |

3.4.113 GAP-StartAdvertising.Request

Description

Commands the controller to start advertising.

Parameters

Table 363. GAP-StartAdvertising.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x05 |
| Length | 1 | 0x00 - This message does not have any parameters |

3.4.114 GAP-StartScanning.Request

Description

Sets the scanning parameters (optionally) and begins scanning.

Parameters

Table 364. GAP-StartScanning.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|----------|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x1A |

Table continues on the next page...

Table 364. GAP-StartScanning.Request Parameters (continued)

| | | |
|----------------------------|----------|--|
| Length | 1 | Length in bytes of the following parameters |
| ScanningParametersIncluded | 1 | Boolean value which indicates if scanning parameters are included or not |
| ScanningParameters | Variable | The scanning parameters Structure type parameter. See the detailed table below for parameter structure. |

Table 365. ScanningParameters Parameter Structure

| Structure Parameter | Size (bytes) | Comments |
|---------------------|--------------|--|
| Type | 1 | Scanning type - default passive Possible values: 0x00: gPassive_c (Passive Scanning - advertising packets are immediately reported to the Host) 0x01: gActive_c (Active Scanning - the scanner sends scan requests to the advertiser and reports to the Host after the scan response is received) |
| Interval | 2 | Scanning interval - default 10ms |
| Window | 2 | Scanning window - default 10ms |
| OwnAddressType | 1 | Indicates whether the address used in scan requests will be the public address or the random address - default public address Possible values: 0x00: gPublic_c 0x01: gRandom_c |
| FilterPolicy | 1 | Indicates whether the advertising packets are filtered using the White List - default does not use White List Possible values: 0x00: gScanAll_c (Scans all advertising packets) 0x01: gScanWithWhiteList_c (Scans advertising packets using the White List) |

3.4.115 GAP-StopAdvertising.Request

Description

Commands the controller to stop advertising.

Parameters

Table 366. GAP-StopAdvertising.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x06 |
| Length | 1 | 0x00 - This message does not have any parameters |

3.4.116 GAP-StopScanning.Request

Description

Commands the controller to stop scanning.

Parameters

Table 367. GAP-StopScanning.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x1B |
| Length | 1 | 0x00 - This message does not have any parameters |

3.4.117 GAP-UpdateConnectionParameters.Request

Description

Request a set of new connection parameters.

Parameters

Table 368. GAP-UpdateConnectionParameters.Request Parameters

| Parameter | Size (bytes) | Comments |
|-------------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x31 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | The DeviceID for which the command is intended |
| IntervalMin | 2 | The minimum value for the connection event interval |

Table continues on the next page...

Table 368. GAP-UpdateConnectionParameters.Request Parameters (continued)

| | | |
|-------------------|---|---|
| IntervalMax | 2 | The maximum value for the connection event interval |
| SlaveLatency | 2 | The slave latency parameter |
| TimeoutMultiplier | 2 | The connection timeout parameter |
| MinCeLength | 2 | The minimum connection event length |
| MaxCeLength | 2 | The maximum connection event length |

3.4.118 Gap-UpdateLeDataLength.Request

Description

Update the Tx Data parameters.

Parameters

Table 369. GAP-UpdateLeDataLength.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x33 |
| Length | 1 | Length in bytes of the following parameters |
| DeviceId | 1 | The DeviceID for which the command is intended |
| TxOctets | 2 | Maximum transmission number of payload octets |
| TxTime | 2 | Maximum transmission time |

3.4.119 GAP-VerifyPrivateResolvableAddress.Request

Description

Verifies a Private Resolvable Address with a bonded device's IRK.

Parameters

Table 370. GAP-VerifyPrivateResolvableAddress.Request Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|---|
| OpGroup | 1 | 0x48 |
| OpCode | 1 | 0x2D |
| Length | 1 | Length in bytes of the following parameters |
| NvmIndex | 1 | Index of the device in NVM bonding area whose IRK must be checked |
| Address | 6 | The Private Resolvable Address to be verified |

3.5 FSCI Messages

3.5.1 FSCI-AllowDeviceToSleep.Request

Description

FSCI-AllowDeviceToSleep.Request description.

Parameters

Table 371. FSCI-AllowDeviceToSleep.Request Parameters

| Parameter | Size (bytes) | Comments |
|--------------------------|--------------|--|
| OpGroup | 1 | 0xA3 |
| OpCode | 1 | 0x70 |
| Length | 1 | Length in bytes of the following parameters |
| Signal Host When Wake Up | 1 | Possible values: 0x00: FALSE 0x01: TRUE |
| Deep Sleep Duration | 4 | Deep sleep duration in units of 16 us. Default value is 5 s |
| Deep Sleep Mode | 1 | Deep sleep mode selection. |

3.5.2 FSCI-AllowDeviceToSleep.Confirm

Description

FSCI-AllowDeviceToSleep.Request description.

Parameters

Table 372. FSCI-AllowDeviceToSleep.Confirm Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0xA4 |
| OpCode | 1 | 0x70 |
| Length | 1 | Length in bytes of the following parameters |
| Status | 1 | Possible values: 0x00: gSuccess (Success) 0xFF: gError (Error) |

3.5.3 FSCI-Error.Indication

Description

FSCI is reporting an error condition.

Parameters**Table 373. FSCI-Error.Indication Parameters**

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0xA4 |
| OpCode | 1 | 0xFE |
| Length | 1 | Length in bytes of the following parameters |
| Status | 1 | Occurred error Possible values: 0x00: gFsciSuccess_c 0xF0: gFsciSAPDisabled_c 0xF3: gFsciAppMsgTooBig_c 0xF4: gFsciOutOfMessages_c 0xF7: gFsciUnknownOpcodeGroup_c 0xF8: gFsciOpcodeGroupsDisabled_c 0xFD: gFsciUnknownOpcode_c 0xFE: gFsciTooBig_c 0xFF: gFsciError_c |

3.5.4 FSCI-GetWakeupReason.Request

Description

FSCI-GetWakeupReason.Request description.

Parameters**Table 374. FSCI-GetWakeupReason.Request Parameters**

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0xA3 |
| OpCode | 1 | 0x72 |
| Length | 1 | 0x00 - This message does not have any parameters |

3.5.5 FSCI-GetWakeupReason.Response

Description

FSCI-GetWakeupReason.Response description.

Parameters

Table 375. FSCI-GetWakeupReason.Response Parameters

| Parameter | Size (bytes) | Comments |
|--------------|--------------|---|
| OpGroup | 1 | 0xA4 |
| OpCode | 1 | 0x72 |
| Length | 1 | Length in bytes of the following parameters |
| WakeUpReason | 1 | Wake Up Reason |

3.5.6 FSCI-WakeUp.Indication

Description

FSCI-WakeUp.Indication description.

Parameters

Table 376. FSCI-WakeUp.Indication Parameters

| Parameter | Size (bytes) | Comments |
|-----------|--------------|--|
| OpGroup | 1 | 0xA4 |
| OpCode | 1 | 0x71 |
| Length | 1 | 0x00 - This message does not have any parameters |

Chapter 4

Revision history

This table summarizes revisions to this document

Table 377. Revision history

| Revision number | Date | Substantive changes |
|-----------------|---------|--|
| 0 | 06/2015 | Initial release |
| 1 | 10/2015 | Added new applications |
| 2 | 04/2016 | Added new BLE 4.2 API |
| 3 | 07/2016 | Updates for Kinetis W |
| 4 | 09/2016 | Public information |
| 5 | 12/2017 | Adapted the text to match the QN908 platform which supports BLE 5.0 |
| 6 | 03/2018 | Removed obsolete GAP-GetBondedStaticAddresses Request and Indication |
| 7 | 07/2019 | Updated for K32W0 and QN90xx |
| 8 | 10/2019 | Updated for QN908x |

How To Reach Us

Home Page:

nxp.com

Web Support:

nxp.com/support

Information in this document is provided solely to enable system and software implementers to use NXP products. There are no express or implied copyright licenses granted hereunder to design or fabricate any integrated circuits based on the information in this document. NXP reserves the right to make changes without further notice to any products herein.

NXP makes no warranty, representation, or guarantee regarding the suitability of its products for any particular purpose, nor does NXP assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters that may be provided in NXP data sheets and/or specifications can and do vary in different applications, and actual performance may vary over time. All operating parameters, including "typicals," must be validated for each customer application by customer's technical experts. NXP does not convey any license under its patent rights nor the rights of others. NXP sells products pursuant to standard terms and conditions of sale, which can be found at the following address: nxp.com/SalesTermsandConditions.

While NXP has implemented advanced security features, all products may be subject to unidentified vulnerabilities. Customers are responsible for the design and operation of their applications and products to reduce the effect of these vulnerabilities on customer's applications and products, and NXP accepts no liability for any vulnerability that is discovered. Customers should implement appropriate design and operating safeguards to minimize the risks associated with their applications and products.

NXP, the NXP logo, NXP SECURE CONNECTIONS FOR A SMARTER WORLD, COOLFLUX, EMBRACE, GREENCHIP, HITAG, I2C BUS, ICODE, JCOP, LIFE VIBES, MIFARE, MIFARE CLASSIC, MIFARE DESFire, MIFARE PLUS, MIFARE FLEX, MANTIS, MIFARE ULTRALIGHT, MIFARE4MOBILE, MIGLO, NTAG, ROADLINK, SMARTLX, SMARTMX, STARPLUG, TOPFET, TRENCHMOS, UCODE, Freescale, the Freescale logo, Altivec, C-5, CodeTEST, CodeWarrior, ColdFire, ColdFire+, C-Ware, the Energy Efficient Solutions logo, Kinetis, Layerscape, MagniV, mobileGT, PEG, PowerQUICC, Processor Expert, QorIQ, QorIQ Qonverge, Ready Play, SafeAssure, the SafeAssure logo, StarCore, Symphony, VortiQa, Vybrid, Airfast, BeeKit, BeeStack, CoreNet, Flexis, MXC, Platform in a Package, QUICC Engine, SMARTMOS, Tower, TurboLink, UMEMS, EdgeScale, EdgeLock, eIQ, and Immersive3D are trademarks of NXP B.V. All other product or service names are the property of their respective owners. AMBA, Arm, Arm7, Arm7TDMI, Arm9, Arm11, Artisan, big.LITTLE, Cordio, CoreLink, CoreSight, Cortex, DesignStart, DynamIQ, Jazelle, Keil, Mali, Mbed, Mbed Enabled, NEON, POP, RealView, SecurCore, Socrates, Thumb, TrustZone, ULINK, ULINK2, ULINK-ME, ULINK-PLUS, ULINKpro, µVision, Versatile are trademarks or registered trademarks of Arm Limited (or its subsidiaries) in the US and/or elsewhere. The related technology may be protected by any or all of patents, copyrights, designs and trade secrets. All rights reserved. Oracle and Java are registered trademarks of Oracle and/or its affiliates. The Power Architecture and Power.org word marks and the Power and Power.org logos and related marks are trademarks and service marks licensed by Power.org.

© NXP B.V. 2015-2019.

All rights reserved.

For more information, please visit: <http://www.nxp.com>

For sales office addresses, please send an email to: salesaddresses@nxp.com



Date of release: 21 October 2019
Document identifier: BLEHSFSCIRM