# GE310-GNSS, GL865 V4 CMUX Implementation
# User Guide

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## APPLICABILITY TABLE

| PRODUCTS | Sw Version | Modules |
|---|---|---|
| ■ ■ GE310-GNSS | 35.00.xx0 | 2G |
| ■ ■ GL865-QUAD | 34.00.xx0 | 2G |

**Note**: the features described in the present document are provided by the products equipped with the software versions equal or higher than the versions shown in the table. See also the Document History chapter.

# CONTENTS

# 1. INTRODUCTION

## 1.1. Scope

This document covers the more significant standard and proprietary AT commands provided by Telit's modules. Several module features are described and for each one of them the related AT commands are explained through examples. This document is not an exhaustive description of the AT commands implemented on the Telit's modules series, its target is only to give you an entry point to the AT commands world.

## 1.2. Audience

The present User Guide is addressed to users that need to learn and use quickly standard and proprietary AT commands. The reader can learn the use of the AT commands through simple examples shown in the document, and then deepen the interested AT commands reading the documents [1]/[17] in accordance with the used module.

## 1.3. Contact Info and Support

For general contact, technical support services, technical questions and report documentation errors contact Telit Technical Support at:

- TS-EMEA@telit.com
- TS-AMERICAS@telit.com
- TS-APAC@telit.com
- TS-SRD@telit.com    (for Short Range Devices)


Alternatively, use:

http://www.telit.com/support


For detailed information about where you can buy the Telit modules or for recommendations on accessories and components visit:

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Our aim is to make this guide as helpful as possible. Keep us informed of your comments and suggestions for improvements.

Telit appreciates feedback from the users of our information.

## 1.4. Text Conventions

| | |
|---|---|
| **STOP** | Danger – This information MUST be followed or catastrophic equipment failure or bodily injury may occur. |

| | |
|---|---|
| ⚠️ | Caution or Warning – Alerts the user to important points about integrating the module, if these points are not followed, the module and end user equipment may fail or malfunction. |

| | |
|---|---|
| ℹ️ | Tip or Information – Provides advice and suggestions that may be useful when integrating the module. |

All dates are in ISO 8601 format, i.e. YYYY-MM-DD.

## 1.5. Related Documents

[1] 3GPP TS 07.10 Version 7.1.0
[2] GE310 AT Commands Reference Guide, code: 80598ST10945A
[3] GE310 Software User Guide, code: 1VV0301566

## 1.6. Abbreviation and Acronyms

DCE    Data Communication Equipment

DTE    Data Terminal Equipment

MUX    Multiplexer

NVM    Non Volatile Memory

OS     Operating System

TT     Trace Tool (Generic Trace Tool)

VSD    Virtual Service Device

## 2. OVERVIEW

Before dealing with the technical characteristics of the CMUX Standard Protocol [1] provided by the GE310-GNSS Module and the setting up and use of the Telit Serial Port MUX tool running on DTE (PC-Windows), it is useful to show how the two software components can be used together and which advantages they give. The GE310 shows three virtual connections (VC1, VC2, VC3) which are running on a unique physical serial line (COM1/ASC0); the Module has entered the Multiplexed Mode.

The three different Applications running on DTE are tied, via the virtual connections, to three Access Points in order to communicate with three different Services provided by the Telit Module.

The main steps to enter the Multiplexed mode are:

- Telit Module and DTE are physical connected via ASC0/COM1 serial ports, and both are powered on;

- Run the Telit Serial Port MUX tool on DTE, refer to chapter 6;

- On DTE start, for example, three  Hyper Terminals connected to three virtual ports provided by the Telit tool, e.g. COM3, COM4, COM5.

- Now the Hyper Terminals can send and receive data from the Module on three independent Virtual Channels by means of the Multiplexer Protocol implemented by the Telit Tool.

Tab 1 summarizes the VSD Configuration of GE310

Legend:

"ASC0/VCx": Virtual Connection (channels) that must be used to reach the Access Point indicated on the top of the column. The user can use one or more Access Points.

| VSD Access Points | | |
|---|---|---|
| AT0<br><br>Instance #1 | AT1<br><br>Instance #2 | AT2<br><br>Instance #3 |
| ASC0/VC1 | ASC0/VC2 | ASC0/VC3 |

*Tab 1:* CMUX vs. Access Points

NOTE

with the term "instance" is intended an AT Commands Parser. TELIT modules provide three logically independent AT Commands Parsers. Any instance is connected to an Access Point. In general, the Access Point is the connection between the communication path and the Service offered by the module.
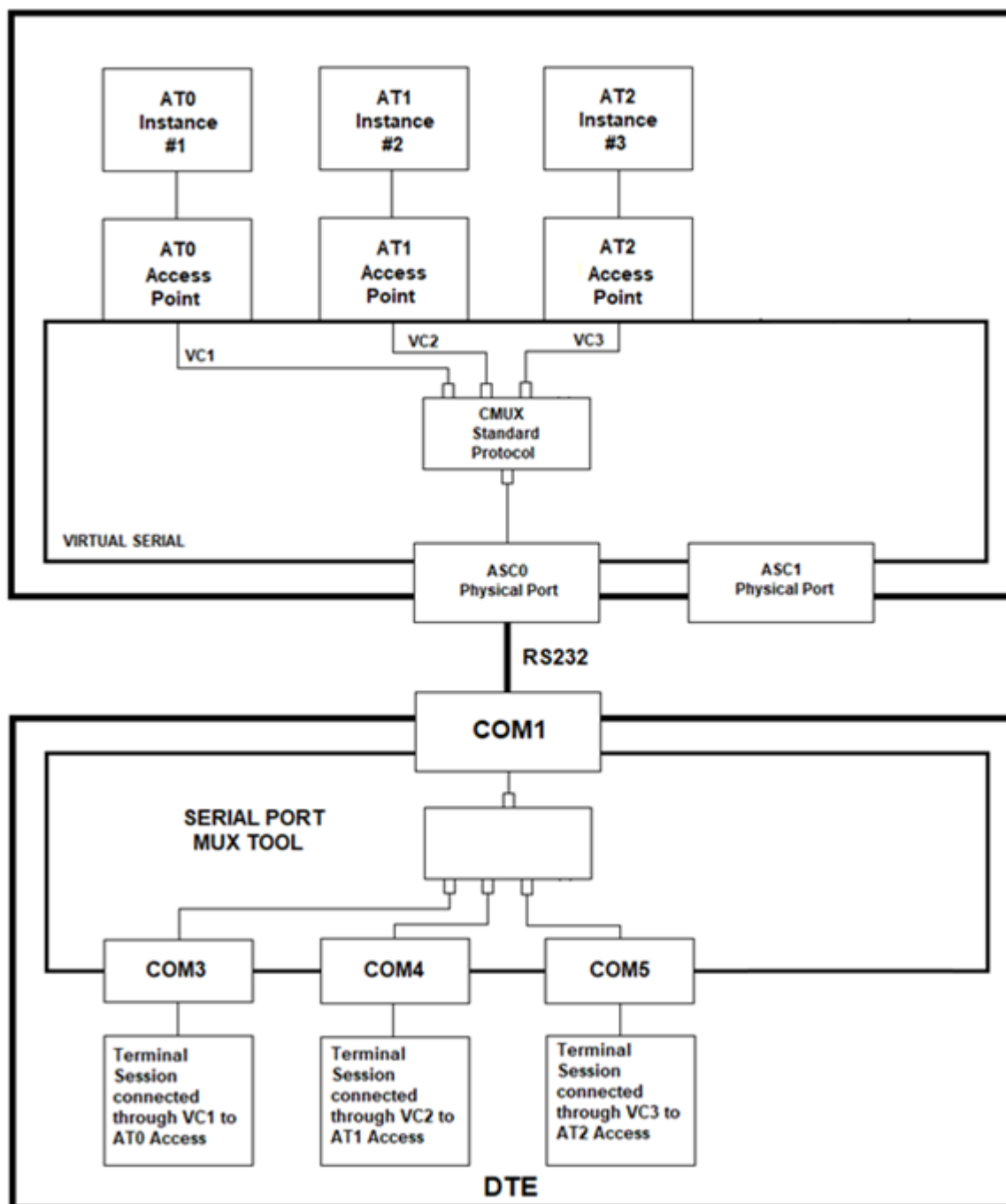
Due to the multiplexing feature, operations such as controlling the module or using the SMS service can be performed via vacant virtual channels without disturbing the existing data flow and no access to a second Serial Port is needed.

Telit CMUX implementation has the following characteristics:

- Operating Option: Basic, refer to [1];
- DLC parameter negotiation (PN) is supported; ref to [1]
- Only UIH frames are supported, refer to [1];
- Three full DLCI (three Virtual Ports);
- Flow control supported only using MSC, FCon and FCoff frames are not supported

# 3. SERIAL MULTIPLEXER PROTOCOL

The next chapter introduces the CMUX Protocol and its Frames Structures with a particular attention to the GE310 CMUX implementation. Refer to [1] to have the complete description.

## 3.1. CMUX Frames Structures

All information transmitted between the module and the application is based on frames that have the following structure:

| Flag | Address | Control | Length Indicator | Information Field | FCS | Flag |
|---|---|---|---|---|---|---|
| 1 octet | 1 octet | 1 octet | 1or2 octets | Unspecified length but integral number of octets | 1 octet | 1 octet |

**Flag Octet**

Each frame begins and ends with a flag octet defined as 11111001 in Binary format (0xF9 in Hexadecimal format).

**Address Octet**

The form of address octet is the following:

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| EA | C/R | DLCI | | | | | |

**EA:    Extension Bit**

It is set to 1.

**C/R: Command/Response**

The Initiator is the entity that sends the first SABM command using DLCI 0. In the Telit CMUX implementation, the Initiator is always the Application, consequently it sends a command to the Module with C/R = 1; when the Module (Responder) answers C/R is still 1. If on the same Data Link session the Module sends a command towards the Application C/R is 0; when the Application answers C/R is still 0. The table below summarizes the concept.

| Session Initiator | Direction | Responder | C/R Value | Command/Response |
|---|---|---|---|---|
| Application | → | Module | 1 | Command |
| Application | ← | Module | 1 | Response |
| Application | ← | Module | 0 | Command |
| Application | → | Module | 0 | Response |

**DLCI: Data Link Connection Identifier**

DLCI value identifies the Virtual Port inside the Module with the following assignment:

| DLCI | Virtual Port type |
|------|-------------------|
| 0 | Reserved to Control Channel |
| 1 | Virtual Port #1 |
| 2 | Virtual Port #2 |
| 3 | Virtual Port #3 |

**Control Octet**

The content of the control octet defines the type of frame as in the following table:

| Frame Type | Control Octet | | | | | | | |
|------------|---|---|---|---|-----|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| SABM (Set Asynchronous Balanced Mode) | 1 | 1 | 1 | 1 | P/F | 1 | 0 | 0 |
| UA (Unnumbered Acknowledgement) | 1 | 1 | 0 | 0 | P/F | 1 | 1 | 0 |
| DM (Disconnected Mode) | 1 | 1 | 1 | 1 | P/F | 0 | 0 | 0 |
| DISC (Disconnect) | 1 | 1 | 0 | 0 | P/F | 0 | 1 | 0 |
| UIH (Unnumbered Information with Header check) | 1 | 1 | 1 | 1 | P/F | 1 | 1 | 1 |

**P/F stands for Poll/Final bit:**

Refer to [1] to have a detailed description.

**SABM (Set Asynchronous Balanced Mode)**

The SABM command is used by the application to start the HDLC Connection and module will answer to this command with an UA Frame.

**UA (Unnumbered Acknowledgement)**

The UA response is sent by the module as an acknowledgement that a SABM or DISC command was accepted.

**DM (Disconnected Mode)**

In case module rejects SABM or DISC command it will send DM response, this happens if for example a SABM is sent for a DLCI not supported. Or if a DISC is sent to a DLCI Address already closed.

**DISC (Disconnect)**

The DISC is used to close a previously established connection. If the application sends a disc for the DLCI 0 (the control channel), all the established channels will be closed. The module will answer to this command with an UA Frame.

**UIH (Unnumbered Information)**

Please refer to the following chapters for the detailed information about UIH

**Length Indicator**

This Octet specifies the length of the Information Field

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| E/A | L1 | L2 | L3 | L4 | L5 | L6 | L7 |

**E/A Bit** should be 1 in case 7 bits are enough for the length (length <= 127) otherwise length should be coded with two octets as described below:

Octet 1:

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 0 | L1 | L2 | L3 | L4 | L5 | L6 | L7 |

Octet 2:

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| L8 | L9 | L10 | L11 | L12 | L13 | L14 | L15 |

**Information Field**

The information field is the payload of the frame and carries the user data. The field exists only for frame type that contains UIH Control Field. The P/F bit should be set to value 0 when this field is sent.

**FCS (Frame Checking Sequence)**

Refer to [1] to have a detailed description.

**DLC parameter negotiation (PN)**

Before a data DLC is set up, the TE and MS must agree on the parameters to be used for that DLC. These parameters are determined by parameter negotiation.

Be aware that the control channel DLCI 0 doesn't need the PN frame.

The parameter negotiation uses the following type field octet:

| Bit | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** |
|---|---|---|---|---|---|---|---|---|
| | EA | C/R | 0 | 0 | 0 | 0 | 0 | 1 |

The length field octet contains the value 8 and there follow eight value octets.

The value octets contain are describe in the following table:

| Value Octet | Bit 1 | Bit 2 | Bit 3 | Bit 4 | Bit 5 | Bit 6 | Bit 7 | Bit 8 |
|---|---|---|---|---|---|---|---|---|
| **1** | D1 | D2 | D3 | D4 | D5 | D6 | 0 | 0 |
| **2** | I1 | I2 | I3 | I4 | CL1 | CL2 | CL3 | CL4 |
| **3** | P1 | P2 | P3 | P4 | P5 | P6 | 0 | 0 |
| **4** | T1 | T2 | T3 | T4 | T5 | T6 | T7 | T8 |
| **5** | N1 | N2 | N3 | N4 | N5 | N6 | N7 | N8 |
| **6** | N9 | N10 | N11 | N12 | N13 | N14 | N15 | N16 |
| **7** | NA1 | NA2 | NA3 | NA4 | NA5 | NA6 | NA7 | NA8 |
| **8** | K1 | K2 | K3 | 0 | 0 | 0 | 0 | 0 |

The various fields are coded as follows:

- The D-bits define the DLCI that the other information refers to; Bit D1 is the least significant.

- The I-bits define the type of frames used for carrying information in the particular DLC as in below table:

| Meaning | I1 | I2 | I3 | I4 |
|---|---|---|---|---|
| Use UIH frames | 0 | 0 | 0 | 0 |
| Use UI frames | 1 | 0 | 0 | 0 |
| Use I frames | 0 | 1 | 0 | 0 |

NOTE: Other values are reserved. The only supported value in GE310 is 0000.

In the absence of negotiation the frame type used (for DLCI>0) is the same as used by the multiplexer control channel.

- The CL-bits define the type of convergence layer to be used on the particular DLCI - see next Table:

| Meaning | CL1 | CL2 | CL3 | CL4 |
|---------|-----|-----|-----|-----|
| Type 1  | 0   | 0   | 0   | 0   |
| Type 2  | 1   | 0   | 0   | 0   |
| Type 3  | 0   | 1   | 0   | 0   |
| Type 4  | 1   | 1   | 0   | 0   |

Other values are reserved.


- The P-bits define the priority to be assigned to the particular DLC. The range of values is 0 to 63 with 0 being the lowest priority. P1 is the least significant bit. Default value for P-bits are given by the DLCI values.
- The T-bits define the value of the acknowledgement timer (T1). The units are hundredths of a second and T1 is the least significant bit.
- The N-bits define the maximum frame size (N1). The parameter is a sixteen-bit number with N1 as the least significant bit.
- The NA-bits define the maximum number of retransmissions (N2). The parameter is an eight-bit number with NA1 as the least significant bit.
- The K-bits define the window size for error recovery mode (k). The parameter is a four -bit number with K1 as the least significant bit.


The TE transmits a parameter negotiation command to the MS with the fields set to the values that the TE intends to use for the particular DLCI. The MS replies with a parameter negotiation response with its proposed set of values. The following rules must be observed by the MS in constructing its response:

- The DLCI value may not be changed.

- The use of I frames or UI frames is optional so an MS may respond with a UIH choice if it does not implement UI frames or I frames.

- The MS may not change the convergence layer proposed by the TE.

- The MS may not change the priority proposed by the TE.

- The T1 value is the one that the TE will use and is not negotiable; the MS will insert its own T1 value. It is advisable that different T1s are used in each direction.

- The MS may propose a smaller value for maximum frame size (N1) if it has insufficient memory to handle the size proposed.

- The N2 value is the one that the TE will use and is not negotiable; the MS will insert its own N2 value.

- The MS may propose a smaller value for window size (k) if it has insufficient memory to handle the size proposed.
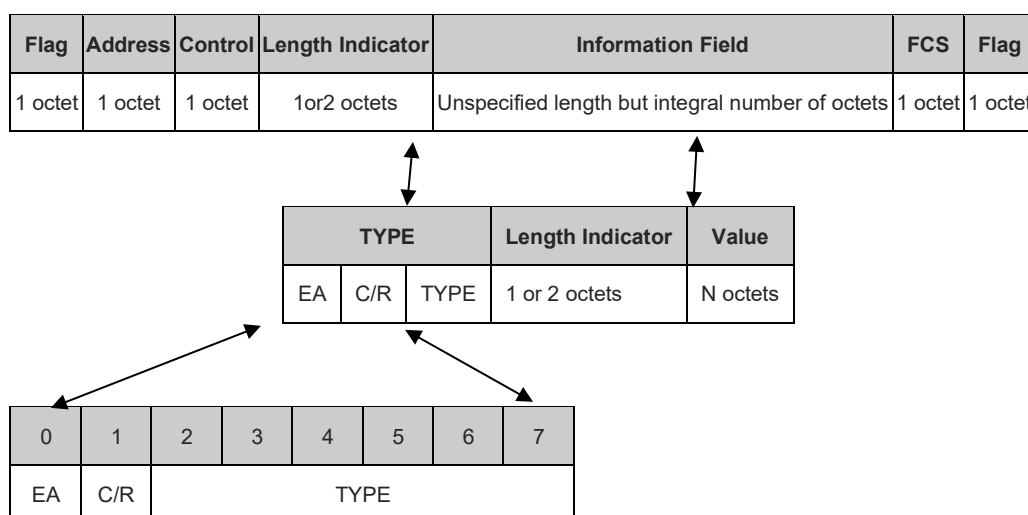
If the TE considers the response from the MS to be acceptable the TE will start to establish the DLC in accordance with the procedures 3GPP. If the response is not acceptable the TE may

initiate another parameter negotiation command with revised parameters or pass the failure information to a higher layer.

If an incoming call arrives at the MS from the network for which no DLC has been set up, the MS may initiate the parameter negotiation procedure and set up a DLC. This situation should not occur in practice since a TE will generally set up DLCs for all the functions it shares with the MS after the capabilities exchange. The indication of an incoming call will be through an 07.07 or 07.05 result code.

### 3.1.1. UIH Control Channel Frame Coding

Refer to [1] and the figure below: the Information field can carry UIH Commands or User Data. The Information field exists only for UIH frame type. The P/F bit should be set to value 0 when this field is sent. This chapter focuses on the UIH Commands; in this case DLCI shall always have the value 0. It means that the UIH Command is transferred on the logical Control Channel

| Flag | Address | Control | Length Indicator | Information Field | FCS | Flag |
|---|---|---|---|---|---|---|
| 1 octet | 1 octet | 1 octet | 1or2 octets | Unspecified length but integral number of octets | 1 octet | 1 octet |

| TYPE | | | Length Indicator | Value |
|---|---|---|---|---|
| EA | C/R | TYPE | 1 or 2 octets | N octets |

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| EA | C/R | TYPE | | | | | |

**Type Octet:**

**EA: Extension Bit**
It is always set to 1.

**C/R:** Identifies if it is a Command or Response

**TYPE:** Hereafter are listed the UIH Commands TYPES followed by their Length Indicators (for its coding see chapter 3.1).
If Length Indicators is not zero, it is followed the Values octets.

**Multiplexer close down (CLD)**
The CLD command is used to reset the link, exit Multiplexed Mode and enter AT Command Mode.

| LSb | | | | | | MSb | LSb | | | | | | | MSb |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Type** | | | | | | | **Length Indicator** | | | | | | | |
| E/A | C/R | 0 | 0 | 0 | 0 | 1 | 1 | E/A | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**Test Command (Test)**
Feature NOT Supported

**Modem Status Command (MSC)**

MSC command is used to send Virtual V.24 Signals status. Each Virtual Connection has its own independent Virtual V.24 Signals status.

Format without Break Indication:

LSb                                   MSb

| Type | | | | | | | | Length Indicator | | | | | | | | DLCI | | | V24 octet | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E/A | C/R | 0 | 0 | 0 | 1 | 1 | 1 | E/A | 0 | 1 | 0 | 0 | 0 | 0 | 0 | E/A | 1 | DLCI | E/A | Lines Status |

Format with Break Indication:

LSb                                   MSb

| Type | | | | | | | | Length Indicator | | | | | | | | DLCI | | | V24 octet | | Break octet |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E/A | C/R | 0 | 0 | 0 | 1 | 1 | 1 | E/A | 1 | 1 | 0 | 0 | 0 | 0 | 0 | E/A | 1 | DLCI | E/A | Lines Status | Break Status |

**V.24 Octet** from Module to Application

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 1 | FC | DSR | CTS | 0 | 0 | RING | DCD |

*Fig. 1:* V.24 Octet DCE → DTE

**V.24 Octet** from Application to Module

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 1 | FC | DTR | RTS | 0 | 0 | 0 | 0 |

*Fig. 2:* V.24 Octet DTE → DCE

**FC:** this bit is set to 1 when module or application is not able to accept any frames.

**CTS:** this bit is set to 1 when module is able to receive data (ref. cmd &K,\Q and related)

**RTS:** this bit is set to 1 when application is able to receive data. (ref. cmd &K,\Q and related)

**DSR:** this bit is set to 1 when module is ready to communicate (ref. cmd &S, and related)

**DTR:** this bit is set to 1 when application is ready to receive data. (ref. cmd &D, and related)

**RING**: this bit is set to 1 when module receive an incoming call (ref. cmd \R, and related)

**DCD:** this bit is set to 1 when module has an active data connection. (ref. cmd &C, and related)

---

NOTICE:

when a new instance is established the default settings are FC = 1, RTS = 0, DTR = 0, this means that the module will not be able to send the data to application until user changes the default setting to FC = 0, RTS = 1, DTR = 1. The application will send an MSC command to change this value before starting sending data.

---

**Break Octet**

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

This octet will be sent each time a Break Signal is simulated.

**Not Supported Command Response (NSC)**

This response is sent in case a command type is not supported by the receiving entity.

LSb        MSb

| Type | | | | | | | | Length Indicator | | | | | | | | Command Type | | |
|------|---|---|---|---|---|---|---|-----------------|---|---|---|---|---|---|---|--------------|---|---|
| E/A | C/R | 0 | 0 | 1 | 0 | 0 | 0 | E/A | 1 | 0 | 0 | 0 | 0 | 0 | 0 | E/A | C/R | command type |

**Power Saving Control (PSC)**

Standard PSC command is used to cause the Telit Module to enter the Power Saving Mode when it is in Multiplexed Mode. It simulates the **N=0** command.
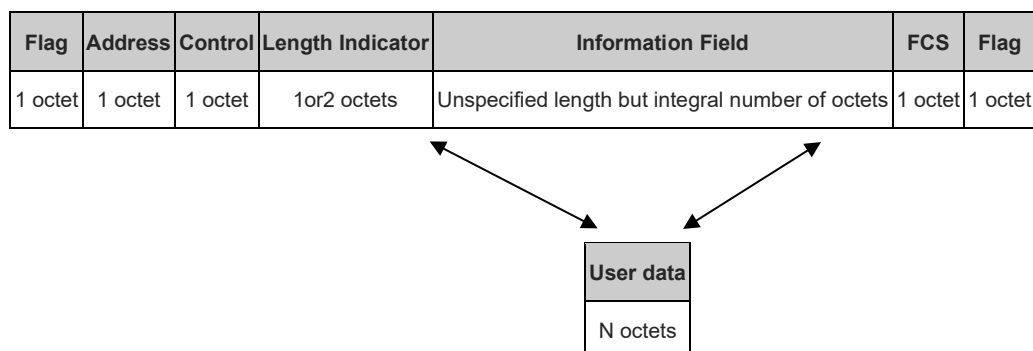
LSb                     MSb

| Type | | | | | | | Length Indicator | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E/A | C/R | 0 | 0 | 0 | 0 | 1 | 0 | E/A | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

PSC command has one more octet containing the Power Saving Mode

LSb                     MSb

| Type | | | | | | | Length Indicator | | | | | | | | Power Saving Mode |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E/A | C/R | 0 | 0 | 0 | 0 | 1 | 0 | E/A | 1 | 0 | 0 | 0 | 0 | 0 | 0 | mode |

### 3.1.2.    UIH Data Channel Frame Coding

Refer to [1] and the figure: the Information field is the payload of the frame and carries the user data. The Information field exists only for UIH frame type. The P/F bit should be set to value 0 when this field is sent.

| Flag | Address | Control | Length Indicator | Information Field | FCS | Flag |
|---|---|---|---|---|---|---|
| 1 octet | 1 octet | 1 octet | 1or2 octets | Unspecified length but integral number of octets | 1 octet | 1 octet |

| User data |
|---|
| N octets |

**Length indicator**

It specifies the length of the Information field. See its coding in chapter 3.1

**User Data**

User payload, the number of octets is defined by the Length Indicator

# 4. HOW TO DEVELOP A MUX USER APPLICATION

Objective of this chapter is to provide the reader with the guidelines to develop a User Application able to cause the connected module enters Multiplexed Mode and support the Multiplexing Protocol without the assistance of the Telit Serial Port MUX tool.
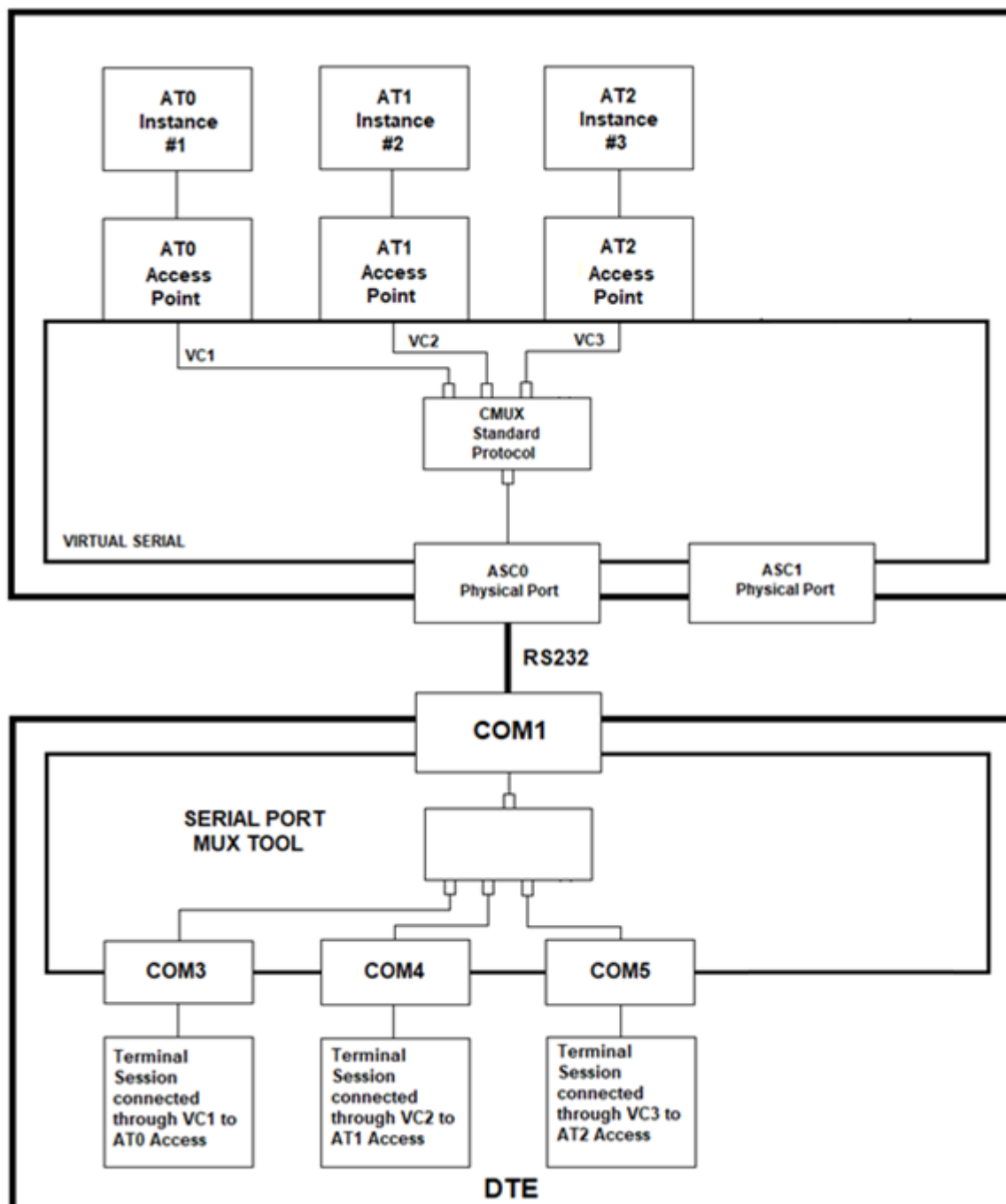
First of all, the User Application must force the connected module in Multiplexed Mode. To do that, it sends the AT commands listed below

Select the Serial Port Speed.

**AT+IPR=115200**

**OK**


Store the setting on profile 0 and at power on use profile 0

**AT&W0&P0**

**OK**

Start MUX protocol (Module enters Multiplexed Mode):

**AT+CMUX=0**


When the User Application receives the OK response of the +CMUX command, the module entered the Multiplexed Mode and the regular serial line protocol is no more available. The User Application can continue to be connected with the module only via the Multiplexing Protocol, see the example of CMUX messages sequence in hexadecimal format listed on the next page.

---

NOTE:

the commands are sent by means of a regular serial line protocol, no Multiplexing Protocol is still activated during this phase..

---

After entering +CMUX AT Command, the CMUX protocol substitutes the regular serial line protocol. Hereafter is listed an example of CMUX protocol.

The messages are in hexadecimal format.


Legend:

**Red** - messages sent from User Application (DTE) to Module (DCE)

**Green** - messages sent from Module to User Application

**Black** - comments


**DLC establishment on Control Channel**:

**F9 03 3F 01 1C F9**          -**DLCI = 0,    SABM CMD,  POLL BIT=1**

**F9 03 73 01 D7 F9**          -**DLCI = 0,    UA RESPONSE,     FINAL BIT=1**

**DLC establishment on Virtual Channel # 1 (Open Virtual Port #1):**

**F9 03 EF 15 83 11 01 00 07 0A 7A 00 03 02 EE F9** PN CMD for DLCI 1

**F9 01 EF 15 81 11 01 00 07 0A 7A 00 03 02 8F F9** PN RESPONSE for DLCI 1

**F9 07 3F 01 DE F9** -DLCI = 1, SABM CMD, POLL BIT=1

**F9 07 73 01 15 F9** -DLCI = 1, UA RESPONSE, FINAL BIT=1

.

.

.

**DLC establishment on Virtual Channel # 2 (Open Virtual Port #2)**

.

**F9 03 EF 15 83 11 02 00 07 0A 7A 00 03 02 EE F9** PN CMD for DLCI 2

.

**F9 0B 3F 01 59 F9** -DLCI = 2, SABM CMD, POLL BIT=1

.

.

**User Application sends the AT Command: AT+CGMR<CR>**

**F9 07 EF 11 41 54 2B 43 47 4D 52 0D 2B F9**

Module answers the AT command result: <CR><LF> 35.00.000-B004<CR><LF><CR><LF><OK><CR><LF>

**F9 05 EF 25 0D 0A 33 35 2E 30 30 2E 30 30 30 2D 42 30 30 34 0D 0A 69 F9 F9 05 EF 0D 0D 0A 4F 4B 0D 0A 5F F9** User Application causes the module to enter Power Saving Mode. UIH Frame, PSC CMD

**F9 03 EF 05 41 01 F2 F9**

# 5.	SUMMARY AND RECOMMENDATIONS

The customer/integrator to design its own Multiplexer Protocol Application shall remember:

- Telit Module supports the CMUX Basic Option and UIH Frames according to [1];
- Serial Port must be so configured: 8 data bits, no parity, 1 stop bit;

If the Telit Module is operating in Multiplexer Mode, the following restrictions will be applied:

- Software Flow control XON/XOFF is not supported;
- Call control: a voice call can be initiated, answered and closed on any channel;
- Call control: Data or Fax call can be initiated and answered on any channel but closed only on the channel where the call was started/answered;
- Phonebook access: if you wish to write the same phonebook entry using two or more different Virtual Channels at the same time, please note that only the last entry will be stored;

# 6.    TELIT SERIAL PORT MUX TOOL

Telit has developed a tool called Telit Serial Port MUX;

the tool is running on a PC-Windows. From the figures it is possible infer that three Virtual Channels can exist at the same time on one physical line (COM1). Three logical COMx, provided by the Windows OS, can be used by three different PC-Applications to gain one of the three Virtual Channels.
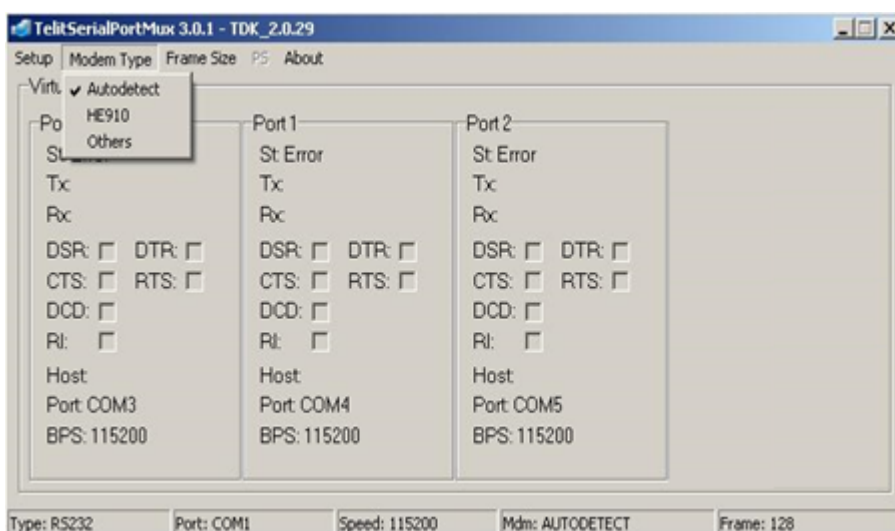
With the GE310 it is required to use at least the version 3.0.9_TDK_2.0.75

## 6.1.    Graphical Interface

After installing Telit Serial Port Mux tool on PC-Windows, it looks as in the following figure:
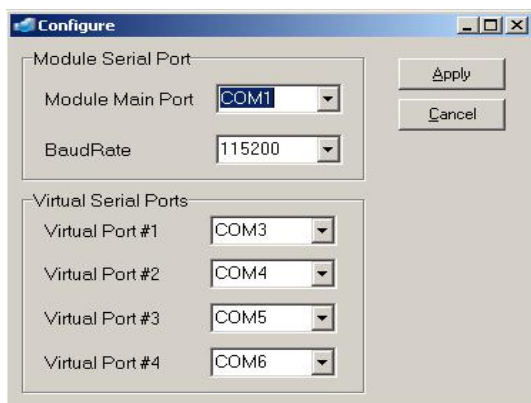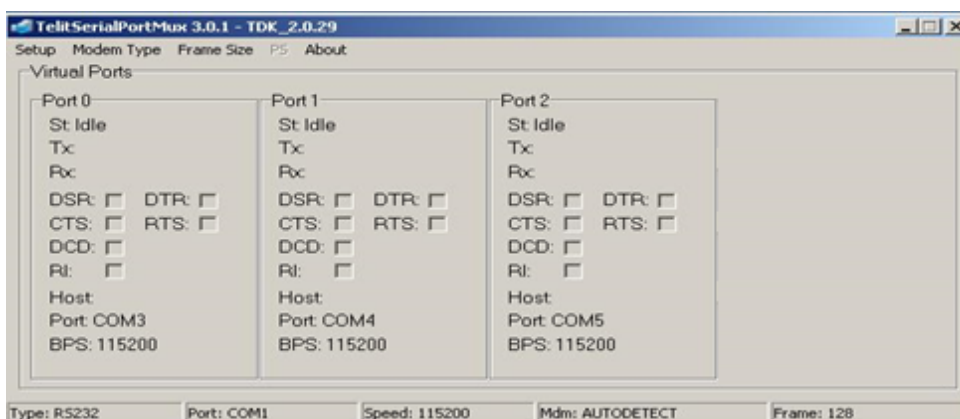




Select Setup Menu to configure the Main Port and the Virtual Ports. The Configure Panel is self- explanatory.

Click Modem Type Menu to select the Telit Modem in accordance with the actual Telit Modem connected to the DTE.
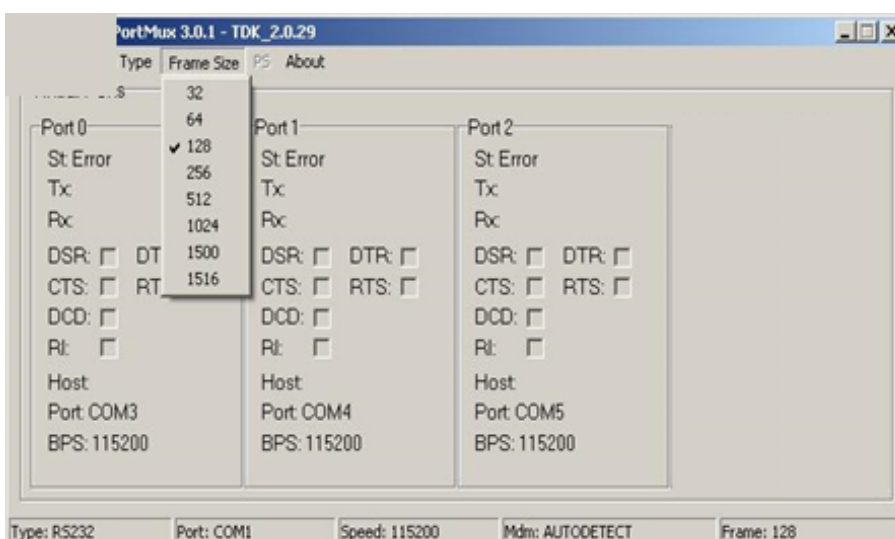


Click Frame Size Menu to define the **Maximum Frame Structure Length**

Before interfacing the module and after the first installation of this tool it is necessary to edit the TSPMux.ini file present in C:\PFiles\Telit\TelitSerialPortMux setting the below section highlighted in Yellow as in the example:

[ChannelPh]

ChnlType=RS232

ChnlPort=COM25

ChnlSpeed=115200

CmuxDsrSensitivity=0

CmuxIgnoreDtr=1

# 7. DOCUMENT HISTORY

| Revision | Date | Products/SW Versions | Changes |
|---|---|---|---|
| 0 | 2019-01-10 | 35.00.xx0 | - |
| 1 | 2019-01-16 | 35.00.xx0 | Corrected missing links in the text. |
| 2 | 2019-01-16 | 35.00.xx0/35.00.xx0 | Add GL865-QUAD V4 product |

# SUPPORT INQUIRIES

Link to **www.telit.com** and contact our technical support team for any questions related to technical issues.

# www.telit.com

**Telit**

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