SAPIP-Cell-LTE Message Explanations

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LTE Message Explanation

CPU RESET, V532 (LTE NOSLEEP)

        CPU (central processor unit) Power-on message with the firmware version number (532) and options
        (LTE NOSLEEP). Possible options are

                LTE -   4G LTE network
                GSM -   3G network
                NOSLEEP - digi module never goes to sleep
                CMNET -   China Mobile network (GSM only)

Wait for power up...

The CPU is waiting for the LTE module to acknowledge that it has powered up. A response is sent only if the module was previously powered down or reset.

No response

        No response was seen from the module after the maximum wait time (which may vary).

CTS HI OR OPEN

        The Clear-To-Send line is high (not asserted) and so the LTE module is present and working or
        the module is removed from the board.

Wake up…

        The CPU is waking up the LTE module

SLEEP_RQ LO

        The CPU is commanding the LTE module to wake up

CTS LO (OK)

        The Clear-To-Send line is asserted which means the module is present and working

Wait 2 min for LTE connect...

        The CPU is waiting up to 2 minutes for status == 2 (cell tower connect)

Got M status = 2

        The cell connection is good

Got M status = 14

        The LTE data network is good

+++

        The CPU is commanding the LTE module into AT (transparent) mode for some commands

OK

        The CPU received an OK response

ATSM1

>   The CPU is commanding sleep mode 1 (pin sleep).

ATD51

>   The CPU is commanding D5=1 (associate light controlled by I/O line 5)

ATAP1

>   The CPU is commanding API mode

ATWR

>   The CPU want the module to write the new settings

ATAC

>   The CPU wants to write all registers to non-volatile memory.

ATCN

>   The CPU wants to end command mode (AT or transparent mode).

Scanning flash…

```
DEF ATSM=0
DEF ATOS=50
ATOW=4000
```

>   Flash memory setup

ATDB

>   The CPU requests a signal strength reading in dB

Signal: -93dBm

>   A sample signal strength response

Ready

>   The CPU is finished setting up the LTE module

ATAP4

>   The CPU is requesting mini-Pascal mode for getting the date and time from the cell network

>>> import utime as time; time.localtime()

>   Pascal command to get date and time

(2019, 4, 15, 15, 24, 0, 0, 105)

>   Sample date/time repsonse

ATAP1

>   The CPU wants to go back to AT mode

updated Date Time

>   Update Date and Time is completed

NO SLEEP

>   Here the LTE module would ordinarily go to sleep but it is being kept awake for this version
>   of the firmware

4 min delay

The next call to CheckForCommands to poll the web server will happen in 4 minutes

LTE send...

The CPU has called the LTESend function to send data through the LTE network

GET /ServiceInterface.asmx/GetCommands?ID=ZZ00890015 HTTP/1.1

The HTTP (hyper text transfer protocol) request. The address of the SAPIP (serial number) is 890015 in this example.

Host: 72.52.168.29:75

The Host address and port settings (fixed in firmware)

Got: {"Commands":[{"ID":"147782","Command":"GET_RECORD:268"},...}]]}

Sample Json (java script) command data string.

Got: {"Commands":[]}

Sample empty command string (no commands in the buffer)

SENDING STATUS

The CPU is sending a status message to the web server

PUT /service/putRciResponse/rci147782.XML HTTP/1.1

HTTP command to send data

Content-Type: application/xml
Content-Length: 387

Content settings for type and length

<rci_reply version="1.1"><do_command target="async_sapip_rci"><get_records name="...

Status string sent for unit 8900015

Completed

The HTTP request is done (no error)

Meas Start

The CPU has started a measurement cycle

Last Meas

After this upcoming measurement cycle, the averages will be taken and the data will be recorded to FLASH memory and sent to the webserver

Skipping CFC

> Due to an upcoming measurement cycle (in <90 seconds), the CPU is skipping the call to CheckForCommands

CheckforCommands...

> The CPU is about to check the web server for new commands

00567,04/15/2019,15:30,12.2,+0.2206,+0.2222,+0.2225,+0.0083,+0.2229,+0.2228,+0.2229,+0.0087,00.0470,000 00,+30.3,5.07,0000,0000.0,T,F,KKKKKKKKKUK

> Sample data record (number 567) to be sent for this unit with date, time, analog and digital readings

SENDING DATA

> The CPU has initiated the SendData function

PUT /service/putData/TEST/sapDataGSM.XML HTTP/1.1

> HTTP PUT request for SAPIP data

<idigi_data><sample><name>ZZ00890015.pComplete</name><value> ... </value></sample></idigi_data>

> Sample data record ... encased within a Json string

Got M status = 15

> the LTE network is disconnected

Got M status = 3

> the cell tower is disconnected

Buffer overrun

> the CPU was expcting a short message (like SMS) but got a long one (like a delayed data request). The CPU has prevented the data from writing past the end of the buffer

RST LO

> The CPU is resetting the LTE module

RST HI

> The CPU has completed resetting the LTE module

FAST SAMPLE, NO SLEEP

> The CPU will not put the LTE module to sleep becasue of the short measurement interval

WEB DEBUG NO SLEEP, secs left = 1800

The CPU is keeping the LTE module awake because the webserver sent an SMS for a diagnostic command. After "secs left" gets to zero, the module may go back to sleep

SLEEP_RQ HI

The CPU is putting the module to sleep

LTEwakeup

The CPU is going to wake up the LTE module

GOT SMS:

The network sent an SMS wake-up and the CPU will call CheckForCommands

no modem

The CPU thinks the modem chip was removed so it's going to skip any network operations