RACOM
RADIO DATA NETWORKS

PPP-GPRS protocol for MG100

version 11.0.4.0
12/16/2010

1. Introduction

PPP-GPRS protocol is identical with the PPP protocol for MORSE, in addition uses the menu `SXe`.

MG100 is a variation on the MR400 radiomodem, equipped with GPRS in place of the radio part. It allows for connecting points of the data network via the GPRS network or inserting a GPRS section into the MORSE network transmission path.

2. Data Format

The data format is similar to the PPP protocol. A more detailed description is contained in article Format of the UDP datagram IPGW for MORSE. The PPP protocol is used in the `M-IP-M` mode.

3. Implementation in the MORSE System

Regarding HW the modem board is connected to the GPRS module through the SCC1 channel, which is why it is unavailable to the user. SCC2, SCC3, and ETH0 channels and the ADIO analog and digital I/O module are available. The SCC0 channel can be used subject to SCC0 being out of operation for the time the service cable is connected.

Modem communication with the GPRS module is indicated by three LEDs located by the antenna connector:

GS – GPRS status

Tx – transmitting packets from the modem to the GPRS module

Rx – receiving packets from the GPRS module to the modem

SW control is carried out using the PPP protocol by selecting parameter "`(g)prs mode:ON`". Functions controlling the radio part, which are contained in the SETR Main menu, are not functional. For example, instead of monitoring the radio channel we use "`iMSIe1r`" for monitoring communication with the network.

The GPRS module can have an assigned static IP address. It is then always available to all network subscribers and is listed in their Art tables:

- as "default gw" in case it is the only owner of a fixed IP address

- or in a pair with a MORSE address

```
dest:    gw:
69000001 C0A80005
69000002 C0A80016
```

  in the case of more known subscribers.

There must be at least one module with a static address in the network.

If the GPRS module has an assigned dynamic IP address which changes on each new login it must report at regular "`(p)roxy timeout`" intervals to the address of the module with the fixed address, which then maintains a list of other subscribers in the `Art` table.

The module can be put into idle mode by entering the specific password "`(s)ms passwd`". It can be reactivated by sending an SMS with the password to its telephone number.

4. Configuration

When configuring the MG100 connect the network output of the node to SCC1:

```
 Ne1NS1

Nodes:                          retab
Nid|address |M | u   s | L   N |l w n g|sTO Err  Cent vTO hTO
(0) 00461B02     -  S00| -  R00|0 0 0 0| 15 SERV  OFF 304  30
(1) 6981AA01    S02 S00| -  S01|0 0 0 0| 15 SERV  OFF 304  30
(2) 00000000    S01 S00| -  R02|0 0 0 0| 15 SERV  OFF 304  30
(3) 00000000    S02 S00| -  R03|0 0 0 0| 15 SERV  OFF 304  30
(4) 00000000    S03 S00| -  R04|0 0 0 0| 15 SERV  OFF 304  30

 SIe 1rN1

Channel to Node Interface:
    retranslation     |   user+service             lim
 id N  A t          m | N  A t Base     m  sec brc S   e
(0) 0   NO AR         | 1   NO AR          usr OFF NONE
(1) 1   NO AR         | 2 MASK 00000000/08 usr OFF NONE
(2) 0   NO AR         | 1 MASK 00000000/08 usr OFF NONE
(3) 0   NO AR         | 0 MASK 00000000/08 usr OFF NONE
```

Select the communication speed on SCC1 according to the GPRS module, idle to 200 and the PPP protocol:

```
SPe 1b1152
    1i200
    1o2P
```

Since 07/2010 are GPRS routers MG100M2 and MG100M3 configured to higher speed on the SCC1 port:

```
SPe 1b2304
    1i200
    1o2P
```

```
SCCs:
    n     m     g    b   p8   i   s  XRC D G  o
(0)RS232 ASYNC  SW  19200N81  5 1600 --- D 0 MARS-A
(1)RS232 ASYNC  SW 115200N81 200 1600 --- D 0 PPP
(2)RS232 ASYNC  SW  19200N81  5 1600 --- D 0 MARS-A
(3)RS232 ASYNC  SW  19200N81  5 1600 --- D 0 MARS-A
```

Set PPP protocol parameters `(L)oc IP` and `(R)mt IP` to zero, `mr(u):1500, (h)ayes simulator:OFF a (g)prs mode:ON.`

Important

It is necessary set a non-zero value in (R)mt IP for the router MG100M2...

```
PPP parameters:
Wanted options:
(L)oc IP:00000000h 0.0.0.0
(R)mt IP:00000000h 0.0.0.0
Got options:
         00000000h 0.0.0.0
         00000000h 0.0.0.0
mr(u):1500
(h)ayes simulator:OFF
LCP m(a)gic:ON    obsolete LCP ma(G)ic (sv465..sv479):OFF
(F)lags:0
(g)prs mode:ON  (i)nfo
IPG(W)
(q)uit
>>
```

The items "`Got options:`" are filled in automaticaly after connecting to the BTS.

The current overview of accessible BTS, the information about the module used and PPP protocol state provides the "`(i)nfo`" menu, e.g.:

Example for MG100M1... router, which is attached to GSM/GPRS network. Timeout `SXe r 1go = 120 sec`, row S denotes the active BTS:

```
>>GPRS info: RSSI -61 dBm; registered home; GPRS attached.

#MONI: EUROTEL - CZ BSIC:17 RxQual:0 LAC:0725 Id:20A7 ARFCN:48 PWR:-60dbm TA:0
#MONI: Cell  BSIC  LAC  CellId  ARFCN    Power  C1  C2  TA  RxQual  PLMN
#MONI:  S    17  0725   20A7      48   -60dbm  45  45   0     0    EUROTEL - CZ
#MONI: N1    11  0725   95D7     520   -73dbm  17  33
#MONI: N2    16  0725   20A5      93   -88dbm  17  11
#MONI: N3    15  0725   0000     112   -95dbm  10   4
#MONI: N4    11  0725   95D5     524   -96dbm  -6  -12
#MONI: N5    16  0725   209A      41   -98dbm   7   1
#MONI: N6    15  0725   20C0      87   -99dbm   6   0

next info in 87 sec (of 120)
DEBUG: gprs_state 9, grps_attached 1, t0_state 0, last_itime 3s
```

```
DEBUG: next dehryz in 1163 sec (of 1200)
>>
```

Example for MG100M2... router,, which is attached to UMTS network. Timeout SXe r 1go = 0 sec, only the active BTS is displayed:

```
>>GPRS info: RSSI -65 dBm; registered home; GPRS attached.

#MONI: EUROTEL - CZ PSC:53 RSCP:-73 LAC:0EE3 Id:ED99CFF EcIo:-9.5
   UARFCN:10564 PWR:-64dbm DRX:32 SCR:848

DEBUG: gprs_state 9, grps_attached 1, t0_state 0, last_itime 7s
DEBUG: next dehryz in 294 sec (of 300)
>>
```

In menu `IPG(W)` select the `M-IP-M` mode and long `(t)imeout:8000`:

```
INTERNET PROTOCOL GATEWAY:
M-IP-M:
  (A)rt:1; write (E)nable:ON
  (r)epeats:0002  (t)imeout:8000  (p)roxy timeout:300s
  (f)rag size:1500bytes  (g)lue (append) up to:0packets
IP-M-IP:
  (I)PArt:0
...
```

`(p)roxy timeout:300s` is used for the GPRS module with a dynamic IP address and `(p)roxy timeout:0s` is sufficient for static addresses

There are three basic ways of filling in the Art table which menu `M-IP-M` refers to:

1. the GPRS module is the only one assigned with a static IP address:
   - table Art is empty, and is filled in automatically after logging in other modules
2. the GPRS module has an assigned dynamic IP address:
   - the IP address of the module, which has a static IP address, is written to "`default gw`" in the Art table; see example. This module with the static IP address then becomes the router.
3. more modules have static IP addresses:
   - fill "`dest`" and "`gw`" in the Art table so that we get a translation table where the column "dest" contains MORSE address and "`gw`" the respective IP addresses of other known CUs having the static addresses.

```
ART No 1:
items: 0
default gw: C0A81234 (192.168.18.52  )
dest:    gw:
>>
```

Special parameters for the GPRS mode are found in menu: `SXe 1g`

Important

Do not use the Init and Sync command in this menu. After choosing "SXe" read the current state using "r" = (r)ead, continue "1g". The new parameters save by "w". Next, do (I)nit the menu SPe or total reboot.

```
GSM/GPRS DIALER:
(i)nit string (&K0\Q0&D0&C1):
(p)in:0
(A)PN string:
(n)umber:*99***1#
(s)ms passwd:
inf(o) timeout:1800
(d)ehryz timeout:1200
d(e)hryz mode:MODULE RESET+WARM RESTART (MG100i only)
(q)uit
>>

GSM/GPRS/... DIALER:
(i)nit string (&K0\Q0&D0&C1):
(p)in:0
(A)PN string:
(n)umber:*99***1#
(w)ireless service select:AUTO
ope(r)ator select:AUTO
oper(a)tor code:0
(s)ms passwd:
inf(o) timeout:1800
(d)ehryz timeout:1200
d(e)hryz mode:WARM RESTART
(q)uit
>>
```

(i)nit string (&K0\Q0&D0&C1): – AT commands which are executed on initialising the connection can be prepared here. We recommend for routers MG100i since version fw 10.0.98.0:

- MG100x0: " "
- MG100x1,2,3: "&K0\Q0&D0&C1"
- MG100x4: "&C1"

p)in:0 – f the SIM card uses a PIN, enter it here. On entering an incorrect PIN there is a risk of blocking the SIM card!

(A)PN string: – name used by the APN network, e.g.: profi.internet, telemetry...

(n)umber: –login number to the network, e.g.: *99***1#

(w)ireless service select:AUTO

- (0) AUTO - volí přednostně UMTS, pak GPRS-EDGE
- (1) GPRS/EDGE (2.5G)
- (2) UMTS (3G)

- volba módu, pro MG100x2, MG100x3

ope(r)ator select:AUTO

- `(0) AUTO` – automaticaly
- `(1) MANUAL/AUTO` – preferably to `oper(a)tor code`
- `(2) MANUAL` – according to `oper(a)tor code`

- volba operátora, pro MG100x1,2,3,4

oper(a)tor code:0 – code for the ope(r)ator select, e.g. 23002

(s)ms passwd: – content of SMS message (min. 6 characters) to activate CU from idle state. After entering parameter "`(s)ms passwd:`" and initialising the protocol the CU is put into idle state.

inf(o) timeout: – for testing. With period "`inf(o) timeout:`" short jumps to "`command mode`" are made with the new record about the connected BTS station. However, there is approximately a 5 second communication delay, which is overcome by means of timeouts on PPP. Records can be read using the "`SPe1ti`" command and takes effect on RSS LEDs also. For tuning purposes use `inf(o) timeout:30 sec`, for standard operating around 1000 sec. RSS state can be refreshed using the init of PPP protocol.

`MG100x4: inf(o) timeout:0` – the used module does not support this function

(d)ehryz timeout: – the CU monitors the incoming IP packets. If no packet arrives over the "`(d)ehryz timeout`" period then the restart according to next parameter is executed

d(e)hryz mode:

- `(0) WARM RESTART` – `Init` is executed and an entry is made to the `Event log`
- `(1) POWER CYCLE+WARM RESTART` – both voltage restart of GPRS module and modem restart (protocol `Init` is executed and an entry is made to the `Event log`)
- `(2) MODULE RESET+WARM RESTART (MG100i only)` – hardware RESET of module is executed and warm restart of modem (`Init` is executed and an entry is made to the `Event log`)

  - this is the recomended choice for new routers MG100i

5. History

- 11/2005 - release 740 - new description
- 08/2007 - BTS info example
- 05/2009 - release 10.0.85.0 - MG100i routers - menus SPe 1tL, SXe r 1ge
- 03/2010 - release 10.0.98.0 - router MG100M4 - (i)nit string, inf(o) timeout

- 07/2010 - speed 230.4 kbps on SCC1 for MG100M2 and MG100M3
- 12/2010 - (w)ireless service select, ope(r)ator select - added