

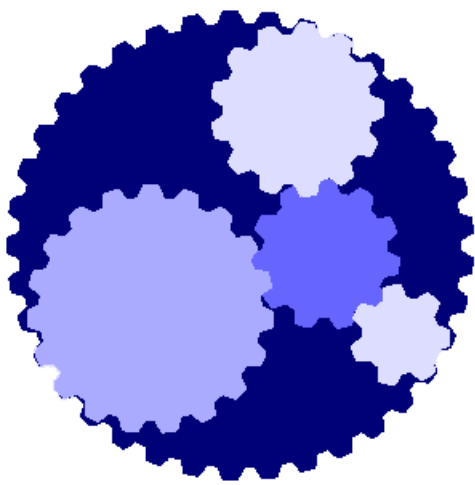
# Course 104

**Technician Role:**

***Installing Active GPRS  
Modems on Plug and  
Play Scada***



# **The NEXT Generation AMR**



## ***Plug and Play Scada***

- **Gives you the power to  
configure your own  
AMR, via an easy to use  
Web interface**
- **Multi-vendor modem  
support**

# **Previous Course Requirements**

- 102 Technician - Installation of Meters

**Once you are done with this Course, you should be able to:**

- Configure a meter to read on Plug and Play Scada through an Active GPRS Modem
- Configure the SmarTee, Kocos A1140, Maestro and Enfora Active GPRS Modems to connect to Plug and Play Scada
- Do basic troubleshooting on Active GPRS Modems.

# **MODULE 1: Active GPRS**

## **Modems in general**



**TruTeeq SmarToo/SmarTee**



**Siemens/Cinterion TC65**



**Enfora**

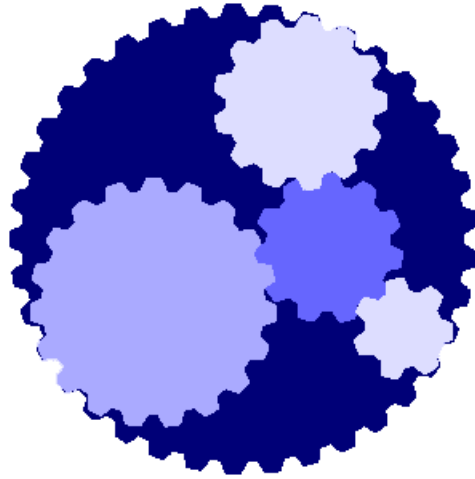


**Kocos**



**Maestro**

- Active GPRS Modems are cell phone modems that connect out to the Server over TCP/IP, typically over the normal Internet.
- The alternative is GPRS Modems working over an APN (Private Network), where the Server connects to the modems over TCP/IP.
- Advantages of using Active GPRS Modems rather than Passive (APN) GPRS Modems include:
  - Don't have to pay premium for APN
  - Better support (everybody uses Internet)
  - Not limited to one network or country
  - For Intelligent Active GPRS Modems, better use of unreliable links
  - Don't have to use Router at server: half of the data sent over wireless, faster ping times and no wireless bottleneck at server.
- Intelligent Active GPRS Modems can identify themselves over the TCP connection to the server, whereas Generic Active GPRS Modems cannot.
- While Plug and Play Scada only currently supports 3 Intelligent Active GPRS Modems (TruTeq, Kocos A1140 and TC65), more GPRS modems can be configured as Generic Active GPRS Modems (2 examples being the Enfora and the Maestro).
- The TruTeq SmarTee modem slots into the Elster A1700, and the Kocos A1140 modem slots into the Elster A1140, and can get power from the serial port on the Elster A1140 and Elster AS230 Serial comms module. Both can fit under their meter's cover, giving additional protection against theft and SIM card theft in particular. Both are supplied by Elster.
- The Siemens/Cinterion TC65 modem runs a program supplied by SDG Technologies, which protects the SIM card by putting on a secret PIN. Any modem with a TC45 or TC65 cell phone engine is compatible.
- The Maestro modem is supplied by Trinity Telecoms in South Africa, and runs a program called SmartPack – written on the OpenAT platform – which makes it possible to connect and reconnect to a remote IP address. This is the second cheapest option of the 5 above modem types.
- The Enfora modem is currently the cheapest option that has been tested successfully with Plug and Play Scada.



# Exercise

# Module 1

## **Assignment:**

Taking into account your site or a specific site that you may have in mind (take a real example if possible), which Active GPRS Modem would you use?

Place: \_\_\_\_\_

Which Active GPRS Modem?: \_\_\_\_\_

Motivate why:

---

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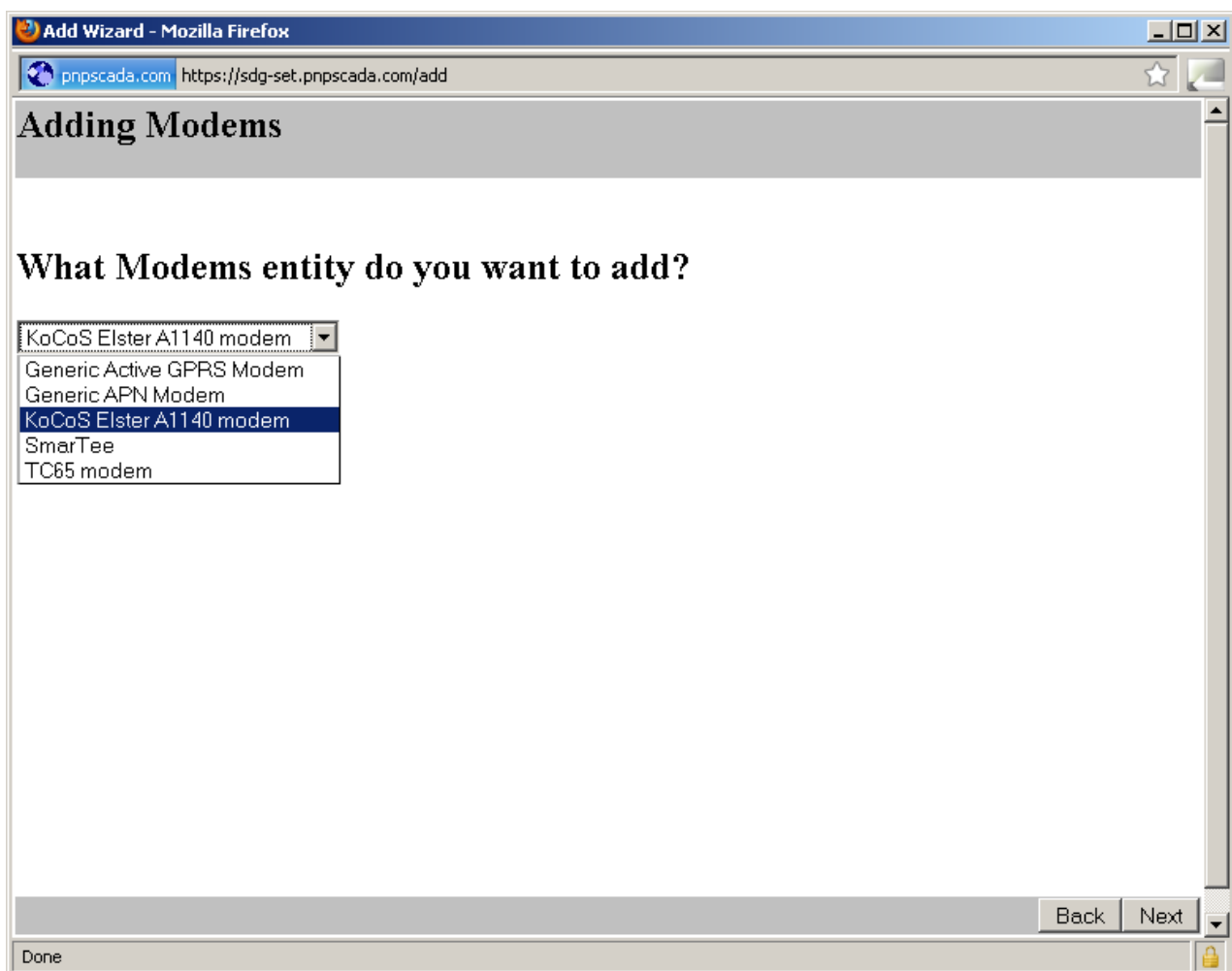
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Call the Lecturer if you have any questions, and when you're done.

# **MODULE 2:**

## **Adding an Intelligent Active GPRS Modem to Plug and Play Scada**

### ***Step 1: Plug and Play Scada setup***





- Log in to Plug and Play Scada.
- Add a Modem entity:
- Choose either the KoCoS Elster A1140 modem, the SmarTee modem or the TC65 modem, and press Next.
- Select the SIM card to use, or Push the Add New button to add a new SIM card if it has not been added yet, and press Next.
- **Be very sure that the SIM card number is entered correctly in full (at least 19 digits), since Plug and Play Scada uses the SIM card number to identify the Intelligent Active GPRS modems. You cannot simply pad a shorter number with zeroes. If your SIM card number starts with 0 or ends with 5 or more zeroes, it is the wrong number.**
- The cell phone number is used for CSD backup if the meter doesn't come in over GPRS, and if one or more CSD modems has been physically connected to the server. The public Plug and Play Scada server does not support CSD.
- Enter a Human Readable Name in order to be able to identify the modem later on.
- Click Finish.
- Please note, instructions to program the modem itself to connect to Plug and Play Scada is contained on the last page, except for the TC65, which must be programmed by SDG (phone support and supply your cell phone number and request for a re-program)

# ***Step 2: Active GPRS Modem setup A. The TC65***

**Add Wizard - Mozilla Firefox**

pnpscada.com https://sdg.pnpscada.com/addTC65?memh=1297655425&adv: ☆

## Add a TC65 modem

User defined modem name:

Back Finish

Done

- For any Modem with the TC45 or TC65 based Cell phone engine from Siemens or Cinterion to connect to Plug and Play Scada, it needs to be programmed with a Java program from SDG Technologies.
- Email SDG Technologies support at: [support@sdgtech.co.za](mailto:support@sdgtech.co.za) if you need to program your TC65 or TC45 modem. State the modem's telephone number, and leave it powered up.

# Step 2: Active GPRS Modem setup B. The TruTeq SmarTee/SmarToo/Cruiser modem

Add Wizard - Mozilla Firefox

pnpscada.com https://sdg-set.pnpscada.com/addSmarTee?memh=1297657965&advar\_diddep=done&replaceId=null&advar\_class=123&p2t

## Add a TruTeq SmarTee/SmarToo/Cruiser modem

User defined modem name:

**You need at least version V117x of the Firmware for this to work. Check the firmware version with command ?03**  
**WARNING!** Trying to configure these settings on an older Firmware version could cause the modem to become inaccessible.

To set up a TruTeq SmarTee, SmarToo or Cruiser modem to work with pnpscada.com, you need to set up the following commands on the modem in the [TruTalk command language](#):

```
!150 0
!18 1 !17 1 00:02:00 !42 0 150 ""
!154 41.134.117.162
!157 7627
!158 internet
!159
!160
!161 1440 2 1
!150 1
!15 !16 1 1 !17 1 00:01:00
!256
```

This tells the modem to automatically connect to the pnpscada.com server (41.134.117.162) on port 7627. If you use a different APN for Internet on your network, specify that with !158. If you need a username and password, specify those with !159 and !160.

(To go into command mode while in a CSD call with the modem, enter --- )  
(To get the SIM card number while in command mode, enter !64 "AT+CCID")

Back Finish

Done

- You need at least version V117x of the Firmware for this modem to work. You can check the firmware version with command **?03**
- To get into command mode when connected to the Serial Port, enter **AT\$TT**
- To upgrade the firmware, use the latest Yatpro software from TruTeq and upload the correct firmware with the appropriate option in the software (select !serial). You need your computer to be connected to the modem via a serial cable to do this.
- To get into command mode when in a CSD call with the mode, enter **---**
- To connect directly to the SmarTee modem via a serial cable, you'll need a special serial cable, or a cable with a 25 pin male serial cable connector on one side (to plug it in where the meter normally goes)
- The SmarTee can also be set to receive AT commands via SMS, but the instructions for that is beyond the scope of this document.
- You need to make sure what your server IP is (!154), and what the proper APN (!158) and username (!159) & password (!160) is for your cell phone network to log in to Internet. Substitute those values below if they don't match your particular configuration.
- The commands you need are:  
**!150 0**  
**!18 1 !17 1 00:02:00 !42 0 150 ""**  
**!154 196.22.139.148**  
**!157 7627**  
**!158 internet**  
**!159**  
**!160**  
**!161 1440 2 1**  
**!150 1**  
**!15 !16 1 1 !17 1 00:01:00**  
**!256**
- To get the SIM card number while in command mode, enter:  
**!64 "AT+CCID"**
- All modems of this type connect on TCP port 7627. Plug and Play Scada will identify the particular modem by the SIM card number, which it will retrieve from the modem over the TCP/IP connection.
- If the modem connects to the wrong server, it should automatically set the IP to the right server.

# Step 2: Active GPRS

## Modem setup

### C. The KoCoS Elster A1140 modem

Add Wizard - Mozilla Firefox

pnpscada.com https://sdg-set.pnpscada.com/addKoCoS?memh=1297657968&advar\_diddep=done&replaceId=null&advar\_class=132&p31\_r

### Add a KoCoS Elster A1140 modem

User defined modem name:

**You need at least version 2.1 of the Firmware for this to work. (2.1 and 2.10 is equivalent)**

To confirm the firmware version, SMS **ver** to the modem. It should reply with the firmware version.  
If you get no response, the modem firmware might be very old: SMS **ver?** to the modem.

To program via SMS to connect to Plug and Play Scada, there are 4 SMS necessary at this stage:

```
GPRS /e:1 /apn:internet
NET /i:1 /m:1 /h:41.134.117.162 /p:56267 /sid:2 /ito:300 /rto:60 /e:0
NET /i:1 /e:1
SAVE
RST
```

The first one sets up GPRS and the APN.  
The second one sets up TCP application 1 to connect somewhere on TCP, reporting SIM card number on connect.  
The third one starts TCP application 1.  
The fourth one saves the settings.  
The fifth one resets the modem.

If it doesn't work, send GPRS or NET to the modem. It will reply with the current settings for these commands. Make sure the settings are as you set it above, especially that NET1 returns /e:1 and not /e:0

Back Finish

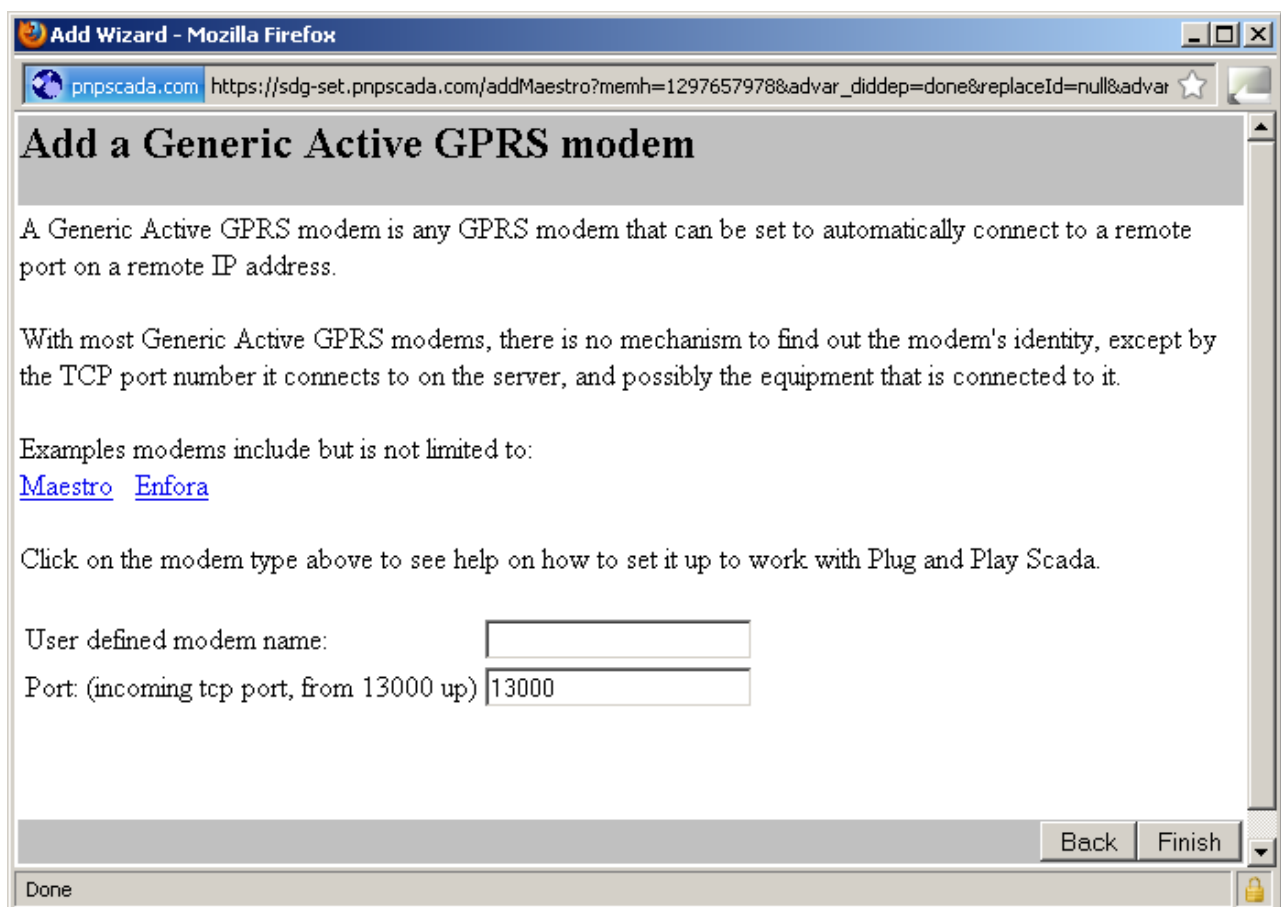
Done

- The special KoCoS modem that fits into the Elster A1140 meter plugs straight into the Meter for power and serial communication, so it is not easy to connect to your computer via a serial cable.
- The best way to program this modem is via SMS commands:
- Command for checking the firmware version:
  - ver
  - Some older versions respond to:
    - ver?
- The commands for setting up the modem are:
  - GPRS /e:1 /apn:internet
  - NET /i:1 /m:1 /h:41.134.117.162 /p:56267 /sid:2 /ito:300 /rto:60 /e:0
  - NET /i:1 /e:1
  - SAVE
  - RST
- Make sure you pass the correct APN and your Server IP in the appropriate places.
- To check your setup, SMS the following commands to the modem and check that your settings was correctly set:
  - GPRS
  - NET
- Check especially that NET1 returns /e:1 and not /e:0
- The KoCoS modem **MUST** be set up to connect to the correct IP. Plug and Play Scada **CANNOT** adjust this setting remotely.

# MODULE 3:

## Adding an Generic Active GPRS Modem to Plug and Play Scada

### *Step 1: Plug and Play Scada setup*



**Add a Generic Active GPRS modem**

A Generic Active GPRS modem is any GPRS modem that can be set to automatically connect to a remote port on a remote IP address.

With most Generic Active GPRS modems, there is no mechanism to find out the modem's identity, except by the TCP port number it connects to on the server, and possibly the equipment that is connected to it.

Examples modems include but is not limited to:  
[Maestro](#) [Enfora](#)

Click on the modem type above to see help on how to set it up to work with Plug and Play Scada.

User defined modem name:

Port: (incoming tcp port, from 13000 up)

Back Finish

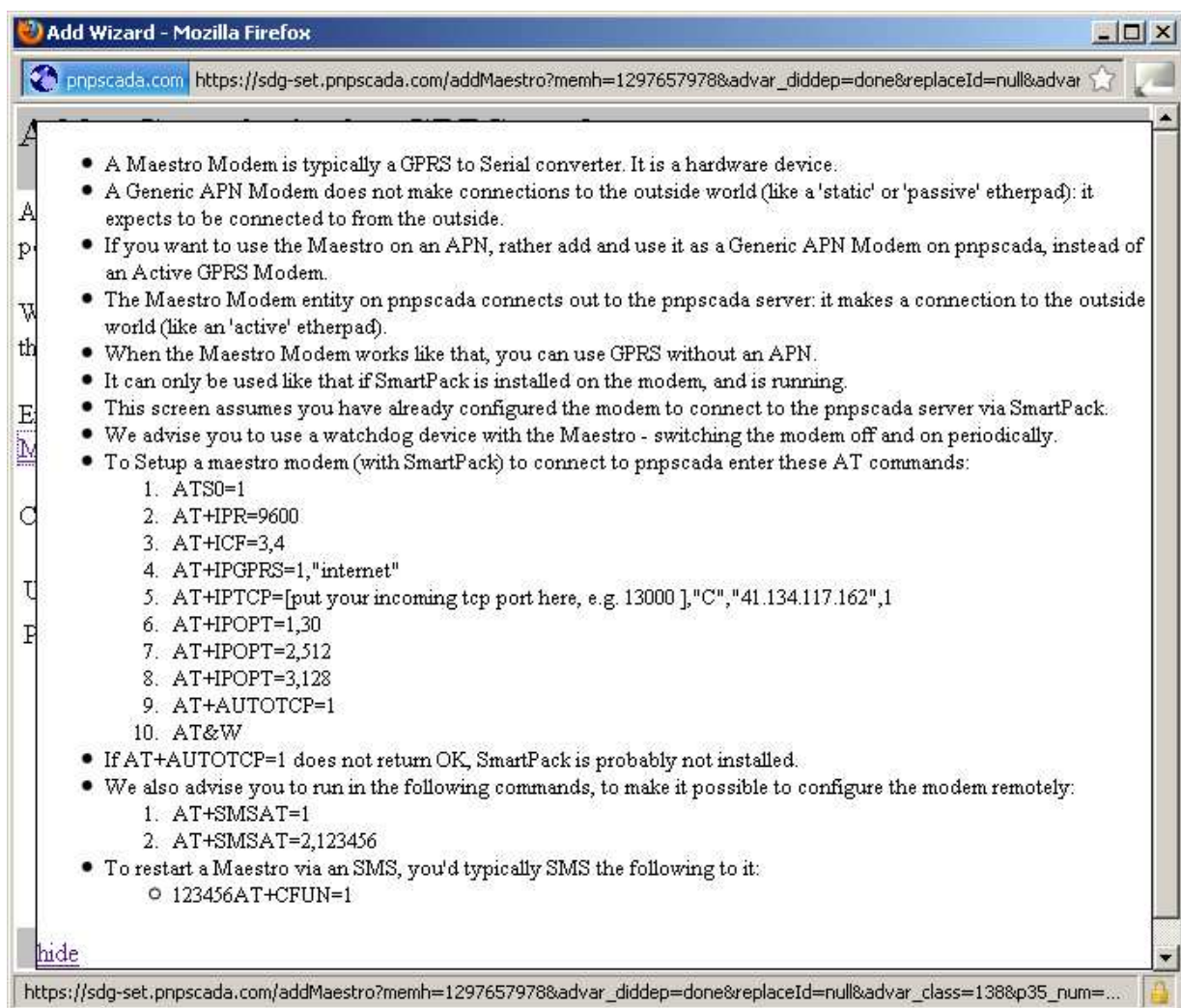
Done



- Log in to Plug and Play Scada.
  - Add a Modem entity:
  - Choose Generic Active GPRS Modem.
  - Select the SIM card to use, or Push the Add New button to add a new SIM card if it has not been added yet, and press Next.
  - The Generic Active GPRS Modems are identified by the port number they connect to on the server.
  - Enter a unique Port number for this Modem (the same port you'll set up on the modem itself).
  - Enter a human readable Name that you can use later to identify the modem.
  - Push the Finish Button to add the modem.
- 
- As long as a GPRS modem can be set up to provide the following, it can be added on Plug and Play Scada as a Generic Active GPRS Modem:
    - an automatically connected TCP connection to a configured remote IP - at a configured remote TCP/IP Port.
    - TCP Link maintenance: re-establishing the TCP connection automatically in case the link goes down.
    - an exact pass through connection from its Serial Port to the TCP connection. This means that all it sends and receives on the TCP connection must be directly received and sent through the Serial Port.

# ***Step 2: Active GPRS Modem setup***

## **A. The Fargo Maestro modem**



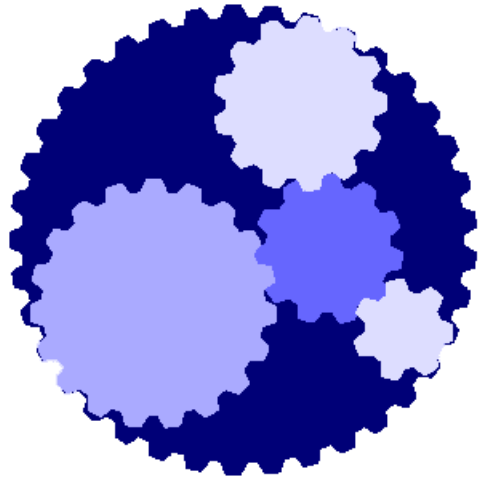
- The Maestro modem has a maximum packet size that causes disruptions when your meter protocol packet size exceeds it, as is the case with some Landis&Gyr setups for the IEC readout, as well as with the SDG RTU. We advise you use a different modem to connect these devices.
- The easiest way to set up the Maestro is via AT commands with a serial terminal program when it is connected to a computer over a serial cable.
- For the Maestro Modem to be compatible with Plug and Play Scada, it must have SmartPack installed:
  - To check whether your Maestro has SmartPack installed, run the following AT command:  
`AT+AUTOTCP=1`  
 if it does not return OK, SmartPack is not installed.  
 Contact your supplier and insist on SmartPack.
- If you want to program the Maestro via SMS, you need to set that up with:
  - `AT+SMSAT=1`
  - `AT+SMSAT=2,123456`
  - (where 123456 is the password that must precede every AT command in every SMS that you send the modem)
- To set up the Maestro to connect to Plug and Play Scada, enter the following commands, taking care to substitute your Incoming Port (from Step 1), Server IP and APN name in the appropriate places:
  - `ATS0=1`
  - `AT+IPR=9600`
  - `AT+ICF=3,4`
  - `AT+IPGPRS=1,"internet"`
  - `AT+IPTCP=[put your incoming tcp port here, e.g. 13000], "C", "41.134.117.162", 1`
  - `AT+IPOPT=1,30`
  - `AT+IPOPT=2,512`
  - `AT+IPOPT=3,128`
  - `AT+AUTOTCP=1`
  - `AT&W`

# Step 2: Active GPRS Modem setup

## B. The Enfora modem



- The way to set up the Enfora is via AT commands with a serial terminal program when it is connected to a computer over a serial cable.
- To set up the Enfora to connect to Plug and Play Scada, enter the following commands, taking care to substitute your Incoming Port (from Step 1) & Server IP (at\$paddst), and your APN name (at+cgdcont) in the appropriate places:
  - at&f
  - ats0=1
  - at+ifc=0,0
  - at+icf=3,0 (for 8N1 or at+icf=5,1 for 7E1)
  - at+ipr=9600
  - at&w
  - at\$reset
  - at+cgdcont=1,"IP","internet"
  - at%cgpc=1,"asd,asd"
  - at\$areg=2
  - AT\$EVENT=99,1,12,1,1
  - AT\$EVENT=99,3,44,1,0
  - AT\$STOATEV=1,AT\$RESET
  - AT\$EVTIM1=28800
  - at&w
  - at\$reset
  - at\$cggeer
  - at\$hostif=2
  - at\$paddst="gprs.pnpasca.com",1358
  - at\$active=1
  - at\$padblk=1472
  - at\$padfwd=ff
  - at\$padto=2
  - at\$connto=10
  - at\$idleto=60
  - at\$wakeup=1,1
  - at&w
  - AT\$PADCMD=0
  - AT&W



# Exercise

# Module 2 & 3

## **Assignment:**

Set up the Active GPRS Modem on your desk to connect to Plug and Play Scada, and connect your meter to it.

Setup both Entities in Plug and Play Scada, and read in the Phasor Graph successfully.

Call the Lecturer if you have any questions, and when you're done, tell him your phasor's timestamp and the value of the red voltage, if any.