

InTek eTM (extended Tele-Metering & Monitoring/Control) is a micro-gateway developed in Java to embed on Java capable Cellular Modem, where in our application is using Centurion TC65T (GSM GPRS Modem with Java programming capability).

A custom supervisory application/program (Master protocol) is developed in that GSM modem/terminal to connect to the respective Meter (or IED/Controller) on real-time (continuous) connection in accordance to the Slave protocol available on such Meter (or IED/Controller).

The implemented master protocol on GSM Modem is a simple and straight forward application based-on respective Meter/IED. This is to reduce the size of program for suitable loading into that GSM Modem micro Java machine.

It is recommended to use semi-private secured GSM data connection system with special arrangement with any GSM provider. On this arrangement, the operator will provide specific APN login system with a bulk bytes quota system per month (per whole system and not per remote device). The connection from GSM Provider Gateway Control Center to Master SCADA/AMR Control Center is recommended to be leased-line, and this could be arranged directly with the respective GSM provider or 3rd party leased-line data provider. This approach will only allow the data to be interchanged locally, and protected to be passed-through to the public internet.

The data that collected by GSM Modem/Terminal will be transported on GSM TCP/IP network with InTek Cellular protocol that based-on true exception scheme. In the SCADA/AMR Master Control Centre side, the real-time data is converted back to standard protocol and interface, and be presented to the Master SCADA software as either :

- . OPC DA Server, or
- . IEC 60870-5-104, or
- . DNP 3.0 TCP

Meter Load Profile or other Log (such as Fault Disturbance, Power Quality, etc.) data that collected by InTek eTM Master will be stored on SQL/ODBC Database for further processing by customer existing billing software. The format of database/table will follow the standard of existing software.

On normal condition (no alarm and no request from Master), the system will only need to transmit periodic healthy-byte (configurable, as required by customer operation) with default 5 minutes. If there is no healthy byte received by eTM Master, then on 1.5x periodic time, a Com Fail alarm will be generated for respective device. This scheme will provide low cost per day per station, which is in average will be less than 1 cent.

As the initial connection to the InTek eTM Master is performed by the remote InTek eTM GSM modem/terminal, then the system could work on DHCP system presented by GSM provider. Of course, the Static IP is still recommended, and some GSM provider is able to provide this static IP feature under special arrangement/agreement.

Reporting of change of state or any critical alarm is also be backup with SMS report on InTek eTM modem/terminal, where if the CoS/alarm is could not be sent via GPRS after the pre-defined period then it will be sent as SMS report. InTek eTM Master is having feature to convert the received SMS back to real-time value to the Master SCADA system.

Component of InTek eTM system are :

- . InTek eTM Master [located in the same place with SCADA/AMR Control Centre]
- . InTek eTM Remote [a Smart GSM Modem/Terminal w/ InTek eTM Java software]
- . InTek eTM Extended Remote [which is InTekUC for downstream multiple connections]

InTek eTM Master

InTek eTM Master is fully utilized InTek UC application platform, so all of the InTek UC features are available for InTek eTM Master. In addition, the InTek eTM Master will be equipped with specific application for ODBC/SQL database storage as well as connection to GSM Modem for SMS data interchange.

InTek eTM Remote [Standard]

InTek eTM Java software application will be embedded in Centurion TC65T GSM Modem/Terminal, and it will be connected on continuous real-time via serial RS-232 link to the respective Meter, IED, or Controller.

InTek application resided on TC65T Modem will be connected as point-to-point serial link to single end device (for either Meter, IED, or Controller). The application will have it's internal I/O database with addressing capability for :

- . 128 Digital Inputs (Status)
- . 64 Digital Outputs (Control / Command)
- . 128 Analog Inputs / Counters (16-bits and 32-bits value)
- . 32 Analog Outputs

The collected points/value from the end device as well as from the Modem's internal (built-in) I/O will be mapped and stored on the above I/O database as well.

Load Profile, Historical Data, and other Logs are processed separately from the above I/O.

Centurion TC65T has a built-in physical I/O as follow :

- . 10 x DI/DO (configurable as DI or DO) – TTL Level
- . 2 AI (Analog Inputs) – 0 to 5VDC

With the addition of InTek I/O Adaptation Board, it will be available to be used as Mini RTU for monitoring/controlling Switchgear Panel and/or Environment condition. The InTek adaptation board is available for custom configuration :

- . 10 DI only, 2 DO & 8 DI, and 4 DO & 6 DI
- . 2 x AI w/ 4 to 20 mA input]
- . DI adaptation level w/ opto-coupler : 12VDC, 24VDC, 48VDC, and 110VDC
- . DO rating : 12VDC @ 2Amp, 24VDC @ 1Amp, and 48VDC @ 500 mAmp.

InTek-eTM
 extended Tele-Metering
 and Monitoring/Control
 Front End SCADA Gateway



SCADA Master *Protocols for Interface to CC:*
 [running concurrently]
 IEC 60870-5-104 (Ethernet)
 DNP 3.0 TCP (Ethernet)
 OPC DA Server (Ethernet)

Protocols to Downstream :
 [running concurrently]
InTek Cellular (TCP/IP)
 IEC 60870-5-101 (Serial)
 IEC 60870-5-104 (Ethernet)
 IEC 61107 / 62056 (Serial)
 DNP 3.0 (Serial)
 DNP 3.0 TCP (Ethernet)
 Modbus RTU (Serial)
 Modbus TCP (Ethernet)
 EDF HNZ RTU (Serial)
 ABB Indactic33 (Serial bit-sync)

PC Server w/
 SQL Server for
 AMR Load Profiles
 Storage

Router

Leased-Line

**Private Secured
 GSM Network**
 w/ Specific APN
 and Dedicated Routing
GSM Network
 w/ specific APN
 GPRS/EDGE/3G

**GSM
 Network
 Control
 Centre**

Public Network
 (not used, but if utilized - will need
 more security enhancement)

**Public
 Internet**

InTek Cellular (TCP/IP) Protocol

