GSM/GPRS Remote AMR Solution
Content

- Introduction
- Our AMR System -- GR System
- Details
  - Terminal
  - Master Station
  - Typical Application
- Advantages of GR System
Introduction

GSM /GPRS FOR REMOTE READING OF ELECTRICITY METERS

For new AMR projects entirely based on Wireless, GPRS/GSM is an innovative solution that offers many advantages.
Advantage of GPRS

High Speed
Low cost
Scalability
Constantly connected
Easy of Installation

... with GPRS
## Figure – Wireless Communications

<table>
<thead>
<tr>
<th>COST</th>
<th>SMS</th>
<th>Data Call</th>
<th>GPRS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection</td>
<td>Excellent</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td>Maintenance</td>
<td>Excellent</td>
<td>Good</td>
<td>Excellent</td>
</tr>
<tr>
<td>Transmission</td>
<td>Fair</td>
<td>Fair</td>
<td>Excellent</td>
</tr>
<tr>
<td>TECHNICAL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ease of Installation</td>
<td>Excellent</td>
<td>Excellent</td>
<td>Excellent</td>
</tr>
<tr>
<td>Scalability</td>
<td>Excellent</td>
<td>Fair</td>
<td>Excellent</td>
</tr>
<tr>
<td>Reliability</td>
<td>Excellent</td>
<td>Good</td>
<td>Excellent</td>
</tr>
</tbody>
</table>
Typical Scenario – GR System
Infrastructure – GR System

Staff

End User

Master Station

Interface Bus

GPRS/CDMA

Other Systems

Terminal

Terminal
Infrastructure – Master Station of GR.

GPPS Server
Adapter
Route
Firewall
Switch
LAN
WEB Server
Application Server
DataBase
Communication Server
Client
Terminal – Feature

- 32-bit RISC CPU
- Precision Metering
- Well-known wireless module. e.g. Siemens, Sony-Ericsson...
- Multi protocol supported, compatibility with IEC series Proto.
- Auto Field Event Detect
## Terminal – Characteristics

<table>
<thead>
<tr>
<th>Item</th>
<th>Technical Specification</th>
<th>Item</th>
<th>Technical Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Precision</strong></td>
<td>Active: Class0.5/1.0</td>
<td>Impulse Constant</td>
<td>200imp/kW·h</td>
</tr>
<tr>
<td></td>
<td>Reactive: Class2.0</td>
<td></td>
<td>200imp/kVar·h</td>
</tr>
<tr>
<td></td>
<td>Voltage, Current, Power: Class 1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Frequency: 0.01HZ</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Rating Frequency</strong></td>
<td>50Hz</td>
<td>Design Longevity</td>
<td>15Years</td>
</tr>
<tr>
<td><strong>Normal Operating Voltage</strong></td>
<td>0.8Un~1.15Un</td>
<td>Normal Operating Temperature</td>
<td>-20℃~+65℃</td>
</tr>
<tr>
<td><strong>Limit Operating Voltage</strong></td>
<td>0.6 Un~1.25Un</td>
<td>Limit Operating Temperature</td>
<td>-25℃~+70℃</td>
</tr>
<tr>
<td><strong>Power Consumption</strong></td>
<td>≤2W, 5VA</td>
<td>Temperature of storage and transportation</td>
<td>-25℃~+70℃</td>
</tr>
<tr>
<td><strong>Veracity of clock</strong></td>
<td>≤0.5s/d</td>
<td>Environmental humidity</td>
<td>&lt;85%</td>
</tr>
<tr>
<td><strong>Keeping data time after power cut</strong></td>
<td>≥10Yrs</td>
<td>Dimension size</td>
<td>262×175×93(mm)</td>
</tr>
<tr>
<td><strong>Battery operating time</strong></td>
<td>≥5Years</td>
<td>Net weight</td>
<td>2.5kg</td>
</tr>
</tbody>
</table>
Deployment – Master Station Component

Client: Win Form/Browser

Application Server:
- Data Analysis
- Messaging
- Management
- Interfacing
- Security
- Caching
- Web Server

Database:
- Storing of e.g.
  - Business data
  - User data
  - Machine data (counter, settings)

Distributed Framework
Component of the Application server ...

**Security**
- Access control
- User and rights management
- Encryption
- Provisioning
- Synchronization
- Billing

**Metering**
- Communication
- Raw Data Collect
- Data complement
- Data Storage

**Application-server**
- Processing engine
- Application provider J2EE
- Web Front end
- Database access

**Data Analysis**
- Key Customer
- Monthly Report
- Annual Report
- Daily Load Chart
- Field Fault Report
- Messaging API

**Integration**
- standard interfaces
- Database
- Customized Interfaces
- e.g. SAP, LDAP, ...
- e.g. Oracle, ...
- With Other App.
Typical Application

- **Metering**
  - Periodic measurement reporting (daily, monthly)
  - Collect measurement values from terminal at server and store them in a data base
  - Graphical analysis of data
  - Interfaces to existing customer systems

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Counter</th>
<th>Time Stamp</th>
</tr>
</thead>
<tbody>
<tr>
<td>T0003211</td>
<td>233 KWh</td>
<td>26.08.2004 8:00</td>
</tr>
<tr>
<td>T0002321</td>
<td>111 KWh</td>
<td>26.08.2004 8:00</td>
</tr>
<tr>
<td>T0009324</td>
<td>101 KWh</td>
<td>26.08.2004 8:00</td>
</tr>
<tr>
<td>T0040235</td>
<td>9 KWh</td>
<td>26.08.2004 7:00</td>
</tr>
<tr>
<td>T0040568</td>
<td>991 KWh</td>
<td>26.08.2004 8:00</td>
</tr>
<tr>
<td>T0040687</td>
<td>881 KWh</td>
<td>26.08.2004 8:02</td>
</tr>
<tr>
<td>T0041989</td>
<td>12 KWh</td>
<td>26.08.2004 8:01</td>
</tr>
</tbody>
</table>
Typical Application

- **Metering—supporting data item**
- Positive active electricity energy (multi-tariff)
- Negative active electricity energy (multi-tariff)
- Three-phase voltage
- Three-phase current
- Active power (total, three phase)
- Reactive power (total, three phase)
- Demand and time
Typical Application

- Field Fault/Exception Detect
  - Voltage lost, over voltage, short of voltage
  - Current lost, overload, over current
  - Phase lost
  - Power reversal, phase reversal
  - Parameter changing of meter
  - Hardware malfunction
  - etc
Typical Application

Data Analysis
Advantages of GR System

- Aesthetically applicable design, advanced technology, leading in the field
- Overall plan of resolution, meeting the very requirement of the customers
- Systems stable running on site, abundant operating experiences
- Timely, comprehensive training and maintenance