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***Automatic Meter Reading for
Electric Meters***

The FIREFLY AMR System

Datamatic, Ltd
Energy Systems
3600 K Ave
Plano, Texas 75074
www.datamatic.com

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A stylized globe with a grid of latitude and longitude lines, positioned in the bottom left corner.

TAKE CONTROL



THE FIREFLY AMR SYSTEM FOR ELECTRIC METERS

You can't predict the future . . . but you can invent it.

Deregulation and economic uncertainties have added to an already complex business climate and made flexible technology strategies more important than ever. Will your meter reading technology be able to adapt to the shifting business conditions of tomorrow? Which strategy will solve the problems of today and provide a maximum of options for the future?

The FIREFLY Meter Interface Unit (MIU) for Electric Meters emerges from the same design paradigm as the rest of the FIREFLY family of products; being the first RF solution to combine Meter Independence, Integrated Usage Profiling and Peak Demand in a low-cost package.

Meter Independence

The form factor of the FIREFLY MIU's covers the most popular residential electric meters. We call this "Meter Independence". For most utilities, it eliminates the need for meter changeout for the purpose of AMR implementation and gives utilities the freedom to choose meters without the unforgiving constraints of proprietary AMR technologies. Meter Independence can even help utilities save money through better meter pricing. Without the compatibility limitations imposed by other meter-specific AMR technologies, utilities can solicit bids using relatively "open" specifications. This can allow responses from any and all meter manufacturers, thus increasing competition and driving down prices.

Integrated Usage Profiling

All FIREFLY MIUs track and archive ProfilePLUS Usage Profiling data that is constantly available for retrieval and analysis. The FIREFLY Electric ProfilePLUS chip holds 16,256 intervals of user-defined length. Set the interval to 15 minutes and the FIREFLY holds ¼-hourly consumption data for 169.33 days. Set the interval to 60 minutes and the FIREFLY stores data for over 677! Finer resolutions are achieved by setting the Profile Interval lower (from 1-255 minutes in one-minute increments). Stored data is purged on a FIFO basis once the MIU memory fills to capacity. Thus a "moving window" of historical data is always available (See Fig. 1).

$$\text{ProfilePLUS data capacity (in days)} = \frac{16,256}{\left(\frac{1,440}{\text{ProfilePLUS Interval (in minutes)}} \right)}$$

Fig. 1

Peak Demand

In addition to the reading and status information, FIREFLY Electric MIU's transmit peak demand data in each RF transmission. The peak kilowatt demand for both the current and previous 30-day period is included in each RF message.

Practical Considerations

Installation (typical electromechanical meter)

Installation takes only minutes in the meter shop:*

1. The glass cover and nameplate are removed from the meter.
2. The FIREFLY MIU is placed into the recess in the lower portion of the meter.
3. The nameplate is replaced on top of the MIU.
4. Both nameplate and MIU are screwed in place.
5. The power leads from the MIU are connected to the meter's power using the attached fuse clips.
6. The glass cover is replaced.
7. The meter is now ready to be taken to the field, installed and programmed.

*Certain installation details vary with meter model.

Programming

Once the meter is inserted in the socket, it is ready to be programmed. FIREFLY MIU programming is highly flexible and highly automated. Programming "templates" are defined ahead of time by the utility based on the specifics of their meter population. Templates are used to automatically enter predefined static parameters (such as the meter type, rollover and multipliers) while also allowing the installer to enter meter-specific values, such as a meter number and initial reading.

Standing by the meter with a ROADRUNNER X7 handheld computer, an RF link is established with the FIREFLY by entering "Program MIU" mode. After the MIU is awakened, the installer has the choice of using the default template (the meter model last installed) or choosing another from the list. They are then prompted to enter site-specific information. Once finished, the installer confirms the settings and sends the programming string to the MIU. The MIU responds back with a "Programmed Successfully" message and is now active.

Reading

Once programmed, FIREFLY MIU's can be read from walk-by or mobile acquisition platforms. FIREFLYs constantly transmit at their user-defined interval. The reader simply walks/drives down the street with the receiver "open". Readings and status info (tamper, outage, backup battery voltage, etc.) are automatically posted to the appropriate record. The reader may set the display to view read, unread, alert status or all meters as they read the route. In most cases, reads can be gathered while driving at posted speeds.

ProfilePLUS Extraction

Extracting ProfilePLUS involves coming within proximity of the meter with a ROADRUNNER X7 handheld or ROADRUNNER Mobile and entering the "Extract Profile Data" command. The user is prompted to enter the number of hours/days they wish to extract. The data is then transmitted from the FIREFLY MIU to the ROADRUNNER. Despite the large volume of data that ProfilePLUS captures, an 8MB ROADRUNNER X7 can hold more than 100 full extractions, while the capacity of the ROADRUNNER Mobile is virtually unlimited.

Once collected, ProfilePLUS data can be graphed (See Fig. 2) and analyzed in two different ways. If the data was extracted using a ROADRUNNER X7 handheld, the handheld will be brought back to the office where it will be placed in its cradle and unloaded to a PC during a normal communications session. Now the data can be graphed, analyzed and appropriate actions can be taken. ProfilePLUS graphs can be sent to customers in hard copy, faxed, mailed, emailed or posted to a secure section of the utility's website.

The second method involves using Datamatic's optional Profile Manager™ application. Profile Manager is designed to operate in the field on a ruggedized laptop computer/printer and allow ProfilePLUS data to be extracted, graphed, analyzed and printed in the field. Profile Manager is ideal for handling customer service issues onsite with the customer present.

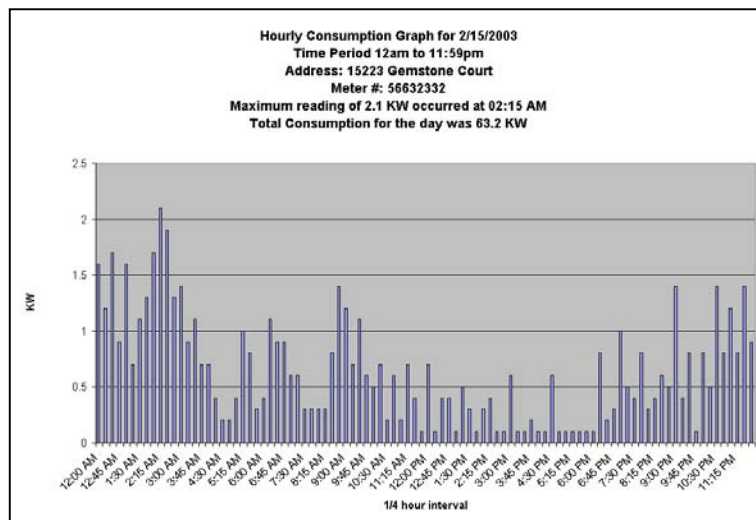


Fig. 2 ProfilePLUS graph from a residential customer showing one (1) day's usage at 15-minute intervals.

ProfilePLUS Applications

ProfilePLUS provides data to utilities that had been previously unavailable without costly "smart" meters or fixed network AMR. With ProfilePLUS, demand and time-of-use data are available from every FIREFLY-equipped meter at a fraction of the cost. Applications include settling usage disputes, load and peak studies, right-sizing distribution equipment and providing detailed billing to premium customers. ProfilePLUS data can also be used to perform "virtual" turn-on/turn-offs, reducing or eliminating the need for off-cycle reads.

The FIREFLY AMR System also encompasses solutions for water and gas meters providing complete coverage for multi-utility data collection.