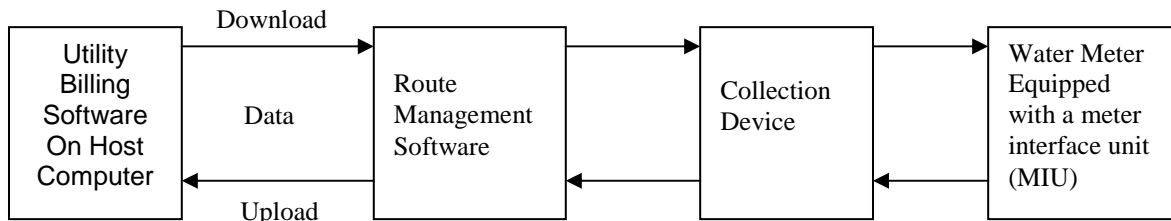


### AMR Systems Definition

Definition: AMR (Automatic Meter Reading) is a widely used term. It describes the automation of just about any part of the Meter Reading process. Reading automation can be entering keyed readings into a handheld computer up to and including receiving the readings via a fixed network with a wide variety of options in between.

#### System Components:



There are four main components to an Automated Meter Reading system:

1. **Utility Billing Software:** This software is what the utility uses to generate the water bills. Before the advent of Automated Meter Reading (AMR), meter readings (data) were entered manually into the computer. Bills were then generated through the billing software in the computer and sent out to customers. Hersey **does not** sell this component of the system.
2. **Route Management Software:** This is a software program that is usually installed on the billing software computer. If not, it must be installed on a computer that has access to the billing software database of water accounts, usually through a network connection. This software performs two basic functions. First and foremost, it allows data to transfer to and from the host computer (billing system) and the collection device. Secondly, it performs some data management functions that allow the utility to efficiently manage the routes. The format of this data flow between the billing database and the route management software is called a file interface. ***This file interface is developed by the billing software vendor and is required before the route management system can be installed.*** Prior to AMR, route management software was the equivalent of meter reading books printed in route order.
3. **Collection Device:** Prior to AMR, the collection device was a route book. A route book was a ledger of accounts. The accounts were arranged in the order that the meter reader walked the route. As the meter reader obtained readings, he or she would write the readings on the appropriate account page in the route book. After reading the route, the meter reader would pass the book to a billing clerk who would manually enter the data into the billing software. Today the collection device is a piece of hardware (most commonly a handheld or laptop computer coupled with a receiver) that the meter reader takes out into the field to collect meter readings. These readings are then automatically transferred into the billing software.

4. **Water Meter with MIU**-The Meter Interface Unit (MIU) is a radio frequency device that attaches to a water meter. The type of MIU needed depends on the type of AMR being used. In the most basic forms of AMR, an MIU is not needed. A meter reader visually reads each meter and manually enters the data into the collection device (handheld). In all other forms of AMR (Touch Pad, Mobile Radio, Telephone, Radio Fixed Network) an MIU is needed. The MIU communicates the meter's identification number and reading to the collection device.

### **Types of AMR Systems**

#### **Visual Read Handheld System:**

This system consists of a utility billing package, route management software, a collection device (handheld computer), and a standard water meter. The utility downloads a route from the billing package, via the route management software, into a handheld computer. The meter reader takes the handheld computer into the field, visually reads each water meter and manually enters the reading into the handheld computer. At the end of the day, the meter reader takes the handheld back to the office, up-loads the readings (via the route management software) into the billing package, and bills are generated.

#### **Advantages:**

The main advantages of this system are time saved and the elimination of transcription errors. Meter readings are entered into a handheld computer in the field. The data can be uploaded into the billing system eliminating the need for the billing department to manually enter readings into the host computer. It also eliminates data entry errors as well as the issue of illegible handwriting by meter readers. Since route management software is used, the utility can take advantage of special reports. (Exceptions, Hi/Low, Tampers, Notes, etc.)

#### **Disadvantages:**

The Meter reader still has to read the meter visually and could transpose read numbers. For large meters, pits have to be pump out and confined space issues present problems. The Meter reader has to be on the right "page" in the handheld and is still required to visit each meter and enter the reading correctly.

#### **Touch Pad System**

This system consists of a utility billing package, route management software, a collection device (handheld computer with reading probe), and a water meter with an encoder register attached to a inductive pad (wall mount or pit lid mount). The utility downloads a route from the billing package, via the route management software, into a handheld computer. The meter reader takes the handheld computer into the field and touches the reading device (which is attached to the handheld via a cable or Bluetooth wireless) to a Touch Pad. The meter reading and a register ID are automatically transferred from the meter into the handheld computer. The register ID is a unique number that the handheld uses to put the meter reading into the proper account. Because of the unique ID number, the meter reader no longer has to be on the "right page" in the handheld. They can read the route in any order and the handheld will deposit the reading in the proper account. At the end of the day, the meter reader takes the handheld back to the office, uploads the readings (via the route management software) into the billing package, and bills are generated.

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**Advantages**

Reading time is drastically reduced since there is no need to visually read the meter, no need to pump out pits, no chance of being locked out of houses to read indoor set meters, no confined space issues, no fogged registers, no transposition errors or wrong reads, no need to read the route in order, and the proper read goes into the proper account.

**Disadvantages**

Additional cost of Encoder register and touch pad. The meter reader still has to physically visit each meter site and is exposed to the elements and locale.

**Radio System**

This system consists of a utility billing package, route management software, a collection device (handheld computer with a radio receiver), and a water meter with an MIU (Radio Transmitter) for walk-by radio reading. For Mobile Radio Reading a Laptop computer, Mobile radio receiver and software are added. The utility downloads a route from the billing package, via the route management software, into a handheld computer or to the mobile laptop computer. The meter reader takes the radio receiver (attached to a handheld computer) into the field or the meter reader drives by the meters and obtains the readings of the mobile radio route. Two pieces of information are transferred from the meter into the handheld/laptop, a meter reading and a register ID. The register ID is a unique number that the handheld uses to put the meter reading into the proper account. Because of this ID number, the meter reader no longer has to be on the right "page" in the handheld. That is, they can read the route in any order and the handheld will put the reading in the proper account. At the end of the day, the meter reader takes the handheld and or laptop readings back to the office, uploads the readings (via the route management software) into the billing package, and bills are generated.

**Advantages**

Readings are transferred into the handheld / laptop at a very fast rate. There is no need to visually read the meter, no need to pump out pits, no chance of being locked out of houses to read inside set meters, no confined space issues, no fogged registers, no need to go onto customers' property, no transposition errors or wrong reads, no need to read the route in order, and the proper read goes into the proper account. More meters can be read at a much faster rate since each site does not have to be visited.

**Disadvantages**

Additional cost of Encoder register and MIU.

**Fixed Network Radio System**

This system consists of a utility billing package, meter management software, collection devices (collectors mounted a minimum of 25' above grade level), and a water meter with a higher power MIU (Radio Transmitter) for fixed network radio reading. The utility receives data from a link to a website either in the form of emailed reports or real time readings retrieved from the site. Information is transferred from the meter to the collector including meter reading, MIU ID, tamper information, and leak detection. The MIU ID is a unique number that the system uses to put the meter information into the proper account.

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**Advantages**

Meter data are available at any time for use in billing conflicts or conservation effort programs. There is no need to visually read the meter, no need to pump out pits, no chance of being locked out of houses to read inside set meters, no confined space issues, no fogged registers, no need to go onto customers' property and no transposition errors or wrong reads. This is the latest offering for the utility that requires cutting edge technology in an effort to improve customer service and manage all aspects of its workforce and distribution system. Software and data warehousing are maintained at a hosted site reducing the initial outlay to implement such a system. Personnel can be reassigned to other jobs as required by the utility.

**Disadvantages**

Additional cost of Encoder register and MIU, collectors, hosting fees.

**Hersey Meters AMR System Components****Visual Reading Handheld System**

## Option 1

Utility Billing Software	Use existing utilities billing software. Hersey does not sell billing software.
Route Management Software	EZ Reader Route Management Software, Installation and Training
Collection Device	Psion, G5R or FC200R Handheld & Cradle or Download Cable
Meter	Any Hersey water meter (Will also work with competitor's meters)

## Option 2

Utility Billing Software	Use existing utilities billing software. Hersey does not sell billing software.
Route Management Software	Itron MVRs Software, Installation and Training
Collection Device	Itron G5 or FC200 Handheld, Cradle, Cable
Meter	Any Hersey water meter (Will also work with competitor's meters)

**Touch Pad System**

## Option 1

Utility Billing Software	Use existing utilities billing software. Hersey does not sell billing software.
Route Management Software	EZ Reader Route Management Software, Installation and Training
Collection Device	Psion, G5, FC200 Handheld, Download Cable, VersaProbe universal probe
Meter	Any Hersey water meter with wall mount or pit mount touch pad (Will

	also work with competitor's meters)
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### Option 2

Utility Billing Software	Use existing utilities billing software. Hersey does not sell billing software.
Route Management Software	Itron MVRS Software, Installation and Training
Collection Device	Itron G5 or FC200 Handheld, Cradle, Cable, VersaProbe universal probe
Meter	Any Hersey water meter with wall mount or pit mount touch pad (Will also work with competitor's meters)

### Radio System – Walk-by

#### Option 1

Utility Billing Software	Use existing utilities billing software. Hersey does not sell billing software.
Route Management Software	EZ Reader Route Management Software, Installation and Training
Collection Device	G5 or FC200R Handheld, Download Cable, Cradle
Meter	Any Hersey water meter with Itron ERT radio MIU (Will also work with competitor's meters)

#### Option 2

Utility Billing Software	Use existing utilities billing software. Hersey does not sell billing software.
Route Management Software	Itron MVRS Software, Installation and Training
Collection Device	G5 or FC200R Handheld, Download Cable, Cradle
Meter	Any Hersey water meter with Itron ERT radio MIU (Will also work with competitor's meters)

### Radio System – Mobile

#### Option 1

Utility Billing Software	Use existing utilities billing software. Hersey does not sell billing software.
Route Management Software	EZ Reader Route Management Software, Installation and Training
Collection Device	G5R or FC200R Handheld, cradle and cable
Collection Device	Itron Mobile Collection System with EZ-Reader software
Meter	Any Hersey water meter with Itron ERT radio MIU (Will also work with competitor's meters)

**Option 2**

Utility Billing Software	Use existing utilities billing software. Hersey does not sell billing software.
Route Management Software	Itron MVRS Software, Installation and Training
Collection Device	G5R or FC200R Handheld, cradle and cable
Collection Device	Itron Mobile Collection System with MVRS software
Meter	Any Hersey water meter with Itron ERT radio MIU (Will also work with competitor's meters)

**Radio System – Fixed Network****Option**

Utility Billing Software	Use existing utilities billing software. Hersey does not sell billing software.
Route Management Software	Itron MVRS Software, Installation and Training and Hosted
Collection Device	CCU 5
Collection Device	Handheld Programmer/Receiver not released yet
Meter	Any Hersey water meter with Itron Endpoint radio MIU (Will also work with competitor's meters)

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