



Monday, November 15th, 2010

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The Portable People Meter

NEXT GENERATION ELECTRONIC RATINGSSM

THE PORTABLE PEOPLE METER™ SYSTEM

Advanced Technology and Sophisticated Consumer Research

The Portable People Meter (PPM™) system has been hailed as being as important to digital media in opening new opportunities for the marketplace as TiVo®, MPEG and high-definition DVD.

The innovative PPM technology and the people behind it have been honored by the *Research Business Report*, the leading marketing research publication, and by *EE Times*, the leading electronics industry publication.

The PPM is a unique, versatile audience measurement system that can track consumer exposure to any encoded broadcast signal. The PPM can determine what consumers listen to on the radio; what they watch on broadcast, cable and satellite TV; what media they stream on the Internet; and what they hear in stores and entertainment venues.

The Portable People Meter is a mobile-phone-sized device that consumers wear throughout the day that works by detecting identification codes that can be embedded in the audio portion of any transmission.

The Portable People Meter system consists of several components:

- **Encoder**, which is installed at the programming or distribution source to insert an inaudible **identification code** into the audio stream;
- **Station monitor**, which is installed at the programming source to ensure audio content is encoded properly;
- **Portable People Meter**, which is worn by a consumer to detect and record the inaudible codes in the programming that the consumer is exposed to;
- **Base station**, where each survey participant places the meter at the end of the day to recharge the battery and to send collected codes to a household collection device known as a "hub;"
- **Portable recharger**, which allows the PPM to store multiple days of media exposure data;
- **Household hub**, which collects the codes from all the base stations in the survey household and transmits them to Arbitron via the telephone during the overnight hours.



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Do you know
a broadcaster
who desperately
needs help?

Broadcasters Foundation of America

Closely tied to the system's encoding/decoding technology is a **patented respondent monitoring and feedback system** designed to enhance survey participants' involvement with the study, lessening their burden and increasing their compliance with the Portable People Meter procedures.

In addition to encoding, Arbitron is also exploring audio matching as an additional means to assure measurement of all broadcasts in a local market, even those that are not encoded.

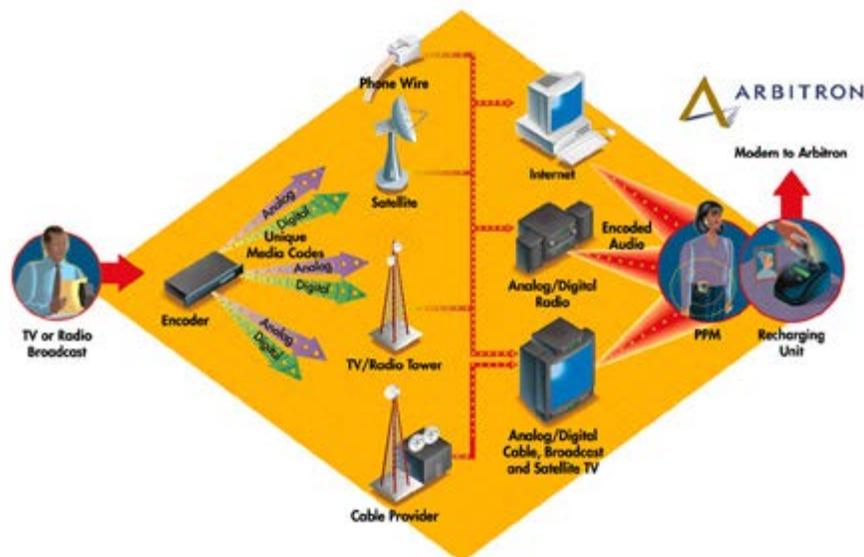
Arbitron is conducting field tests of a "dual-function" PPM using current hardware. The dual-function meter can:

- Detect inaudible codes in the audio of stations that are equipped with the Arbitron PPM encoder.
- Collect audio signatures for any broadcast, which are later matched to signatures collected by an in-market monitoring system.

To conduct these field tests, Arbitron successfully downloaded updated versions of audio-matching software into the current generation PPMs that were in the field. Delivered through household phone lines, the software upgrade demonstrated that Arbitron could remotely convert “encoding-only” portable meters to “dual-function” audience meters.

Arbitron holds a number of [patents](#) for audio matching technologies.

The Portable People Meter System in Action



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Analog Encoder
Digital Encoder
SDI Encoder

The Encoder

The encoder is installed at the distribution source. It fits into a standard studio equipment rack (1U or 1.75") and provides continuous, real-time stereo encoding of program material as it is broadcast. This equipment is self-monitoring to ensure continuous operation and noninterference with the broadcast. (Arbitron is designing a multichannel unit for cable or satellite broadcast

systems to avoid the need to install large numbers of encoders to handle all available channels.)

The Station Monitor

The station monitor is used to detect encoded audio program material. It is

a device designed to check whether over-the-air broadcast content is being encoded properly. The monitor will alert station engineers if it receives an incorrectly encoded signal, or a signal that is not encoded at all.



The Portable People Meter

Following several stages of miniaturization, the Portable People Meter is now a “mobile phone-sized” 65 cubic centimeters and 75 grams (four cubic inches, 2.6 ounces). It consists of a specially sensitive audio transducer, digital signal processing (DSP) circuitry to analyze input for code detection, extensive memory accommodating at least one day of event codes, and a rechargeable battery. The battery operates for at least one day without recharging.

The Portable People Meter is also equipped with a motion detector, which is linked to a small green light that is visible to the survey participant. The motion detector is a key component in our ability to track whether the survey participant is carrying the meter throughout the day. As long as the meter is being carried, the motion detector senses the smallest movement and keeps the green light illuminated. The green light is a visible cue to survey participants that they are fulfilling our request to carry the meter with them throughout the day.



The Base Station

The base station extracts data—both the collected identification codes and the motion data from the motion detector—from the Portable People Meter. It also recharges the battery, passes data to the household hub and offers immediate feedback to the survey participant. Respondents are awarded “points” based on the time that the meter was actively in motion throughout the day.

The point total for the day and the total points awarded are displayed on a liquid-crystal-display (LCD) messaging screen in the base station.



The Portable Recharger

The recharger allows the PPM to be carried by respondents for extended periods. This means the PPM can be deployed in more flexible sample designs independent of the PPM household components that we designed for panel-based



The Household Hub

Data from each base unit are transmitted to the household data collector (or "hub") through the household wiring. No extra wiring is required. The hub receives data from all of the base units in the household and passes these data to the central computer system over the household telephone line. Both the base unit and the hub have been designed for ease of installation and ease of use by participants. The hub has an LCD screen for simple instructions and problem diagnosis.

How Audio Encoding Works

Arbitron's patented audio encoding system has been under development since 1992. The system has been continuously improved, tested and refined since then and is now being deployed in audience measurement research. It provides an extremely reliable means of identifying signal source, and works equally well with all existing electronic media delivery systems: analog, digital, live and recorded broadcasts. The embedded codes can even be picked up in transmissions delivered via the Internet.

It is based on the science of "psychoacoustic masking," which, simply explained, makes it possible to "hide" tiny bits of sound energy in the normal audio output of electronic media signals. This added sound energy creates a "fingerprint" which corresponds to a specific series of digits—this is the "code" in audio encoding—which in turn identify the specific source of the encoded signal. While present in the audio stream, the embedded code cannot be heard.

The encoding technology is paired with decoding technology that searches out and recognizes the inaudible code in the audio output. This decoding system was developed by Arbitron with the assistance of Lockheed Martin, a major U.S. defense contractor having extensive experience in antisubmarine warfare systems. The decoder uses a computerized DSP (digital signal processor) to search out and identify the specific numeric code—and thus the signal source—of audio programs encoded using the Arbitron encoder.

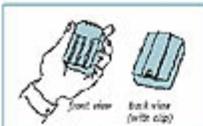
Each encoder puts out a specific series of audio codes so that (by installing an encoder in the transmission path of a television station, cable service, radio station, etc.) the signal can be effectively tagged with the assigned code.

Patented Respondent Cooperation System

Acting from the conviction that short, straightforward instructions usually lead to better and more complete cooperation in panel research of any kind, we have established three simple rules for the PPM panelists to follow:

- Take your meter with you.
- Keep the green light on.
- Recharge your meter at bedtime.

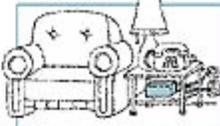
There are three simple parts:



1 A Personal Meter is given to each member of your household six years old or older. You simply wear or keep your Personal Meter with you wherever you go. It picks up a special silent signal broadcast with the radio and TV transmissions. The Personal Meter can be clipped to your belt, another piece of clothing or a purse, or worn in a variety of other convenient ways.



2 A Personal Meter Recharging Unit is placed in the bedroom of each household member. This unit recharges the Personal Meter and collects your listening and viewing information. When you go to bed, you'll place the Personal Meter into its recharging unit so all your radio listening and TV viewing will be counted every day. This unit also lets us know how many hours you wore your Personal Meter that day. This lets you earn points which equal cash gifts!



3 The Collection Unit sends your household's information to Arbitron's main collection computer through a special toll-free telephone line once each day. The whole process takes only a few seconds late at night, so you won't even know it's happening. Your household's information is combined with data from many other households for a total picture of what's being listened to and watched in your area.

That's all you need to do!

Keep the Personal Meter with you:






We instruct all the panelists to “undock” their meters when they wake up in the morning, to wear or carry the meter all day, and then to make sure to return it to the “dock” or base station just before bedtime. Once in the base station, the battery is recharged and the data are uploaded to the data collection hub. (While the Portable People Meter is in the base station, it still collects codes from television viewing or radio listening that takes place in the room.)



A green light on the meter is tied to the motion detector. While the meter detects motion, the green light remains on. But when no motion is detected for a period of time, the light flashes. After more time with no motion, it goes out. The total “green-light time” recorded by the meter is then converted to a number of “points” earned for the day. These points are used to determine the incentive paid to respondents. These incentives, together with the sheer “fun factor” of earning points every day, have proven to be effective in getting respondent compliance with the PPM process.

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