Digital Pagers for Telemetry

New York State
Department of Transportation
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NATMEC

A Little Background

- A permanent traffic monitoring site needs to collect volume, speed and class data.
- Once the data is collected, you need to be able to access it.
- You can download the traffic counter directly to a PC or by use of telemetry.

A Little Background

- Telemetry is used to contact the station remotely. There are several ways to do this.
- A standard telephone line.
- A cellular telephone connection.
- And now digital pagers.

The Idea

- During the final months of 1999, NYSDOT was approached by an upstart internet company with a novel approach to data downloading.
- We could use a communication product based on digital pager technology.
- The question then, was this feasible?

The Idea

- The idea was intriguing and warranted further investigation.
- After receiving approval of management, it was time to move forward.
- Over the course of the next several months, Sudhir Murthy (Trafinfo.Com) and I discussed different scenarios and the needs of NYSDOT.

Feed the Need

- One of my basic requirements was that any product produced would have to be as good as our current practices.
- I also had to consider what the effect would be on communication costs associated with our telemetry program.
- The product would need to be reliable. Deployment location would be an issue.

The Design

- The device would be based on ReFLEX™ (two-way) Narrowband PCS Technology.
- FLEX™ paging protocols, from Motorola, have become the de-facto standard for high speed paging.
- Low power consumption would be a *must have item*.

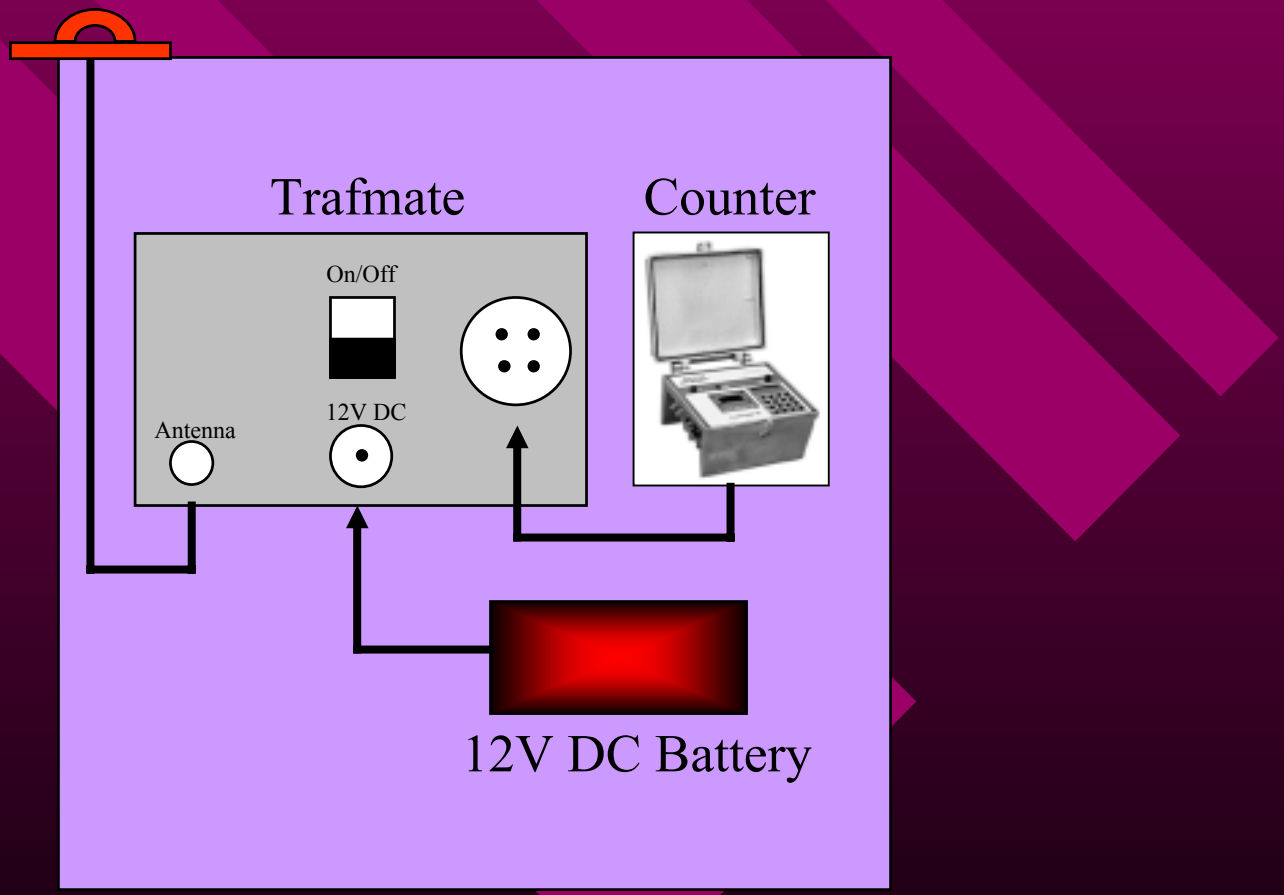
The Look

- The device would have a small footprint. Cabinet real estate can be at a premium.
- It should have a display of some sort.
- It needs to have external connectors instead of hard wired harnesses. This would improve portability.
- Should have a typical o-n-o-f-f switch.

The Feel

- Designing with our field personnel in mind, I wanted it to be simple to use.
- A field crew needs to spend a minimal amount of time as possible at roadside due to safety concerns.
- Plug in all the cables, turn on the power, then relax. System goes through a POST routine and if all is well, your finished.

A typical cabinet layout



But how does it work?

- The basic premise of operation is simple. It wakes up, asks the counter if it has a daily file, then transmits the file.
- Once the file is transmitted (or if there is no file present) the unit goes back to sleep.
- The cycle is repeated every day.

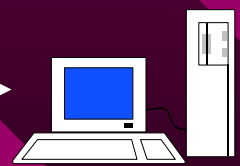
Where does the file go to and how does it get to me?

Data and

Diagnostics

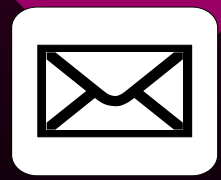
Internet Server

Data Download



PC with Trafinfo software

Error Reporting



E-mail

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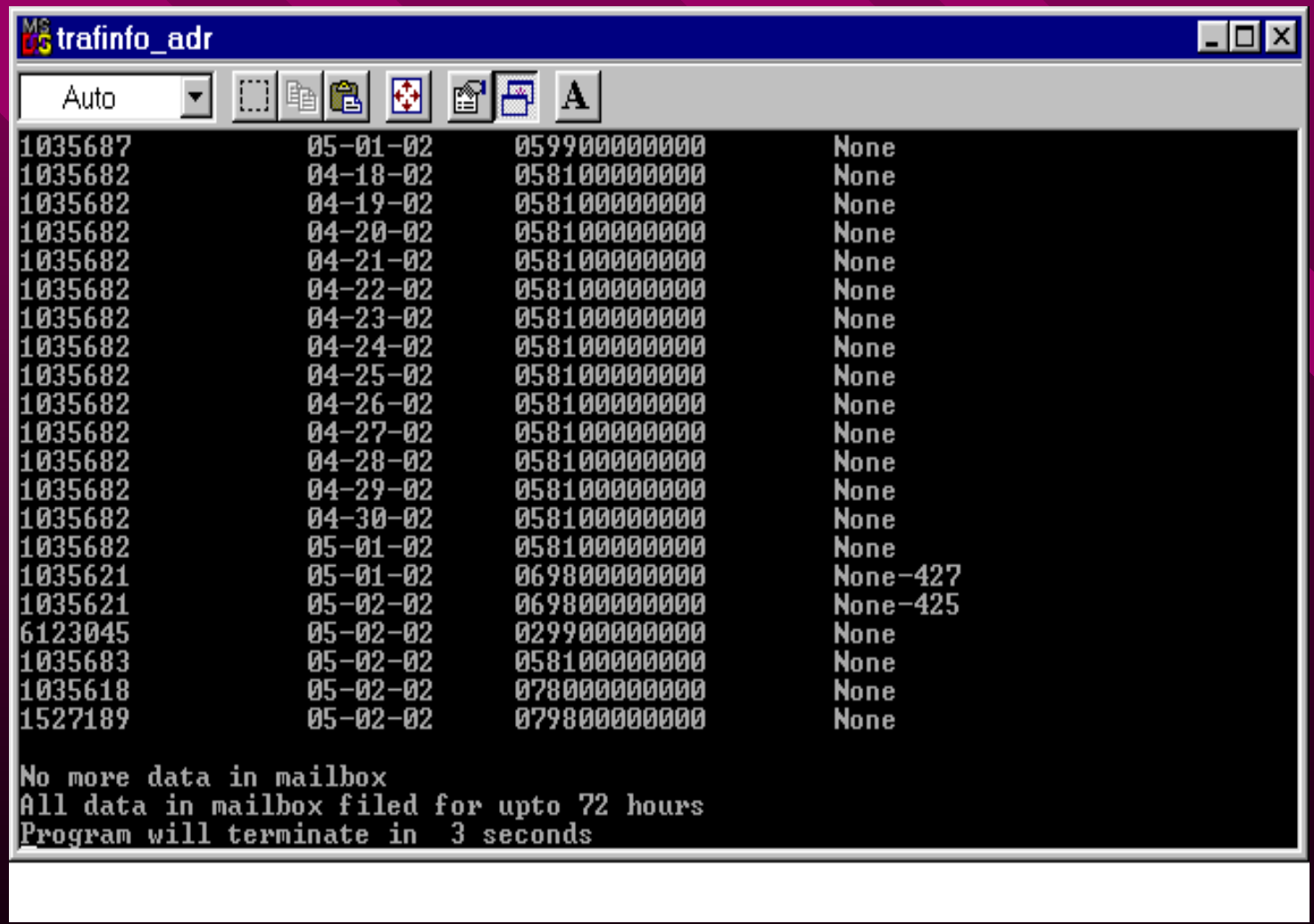
The System

- The TRAFMATE device uses the SkyTEL paging network.
- SkyTEL Network Operations Center (NOC) located in Jackson, Mississippi with a secondary server location in San Antonio, Texas.
- TRAFMATE sends the files to the NOC. Data is stored in a mailbox until retrieved.

The PC side of it

- It is very easy to get your files when you are ready, as a manual or scheduled task.
- A standalone executable program is run on your computer and the process starts.
- The program sends a request for data to the NOC over the internet.
- The files are then downloaded directly to your PC in a predetermined directory.

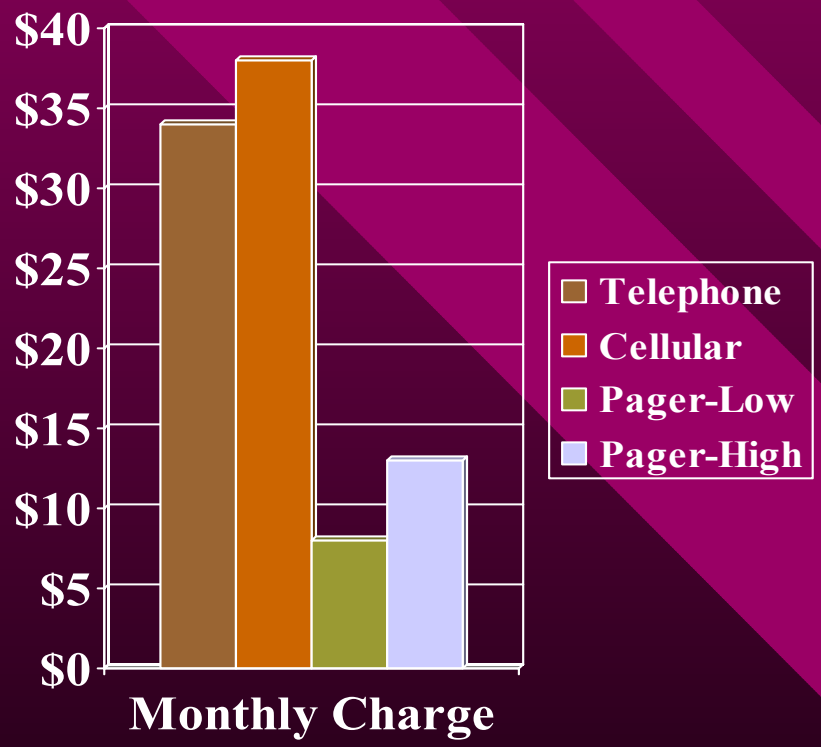
The look of a download

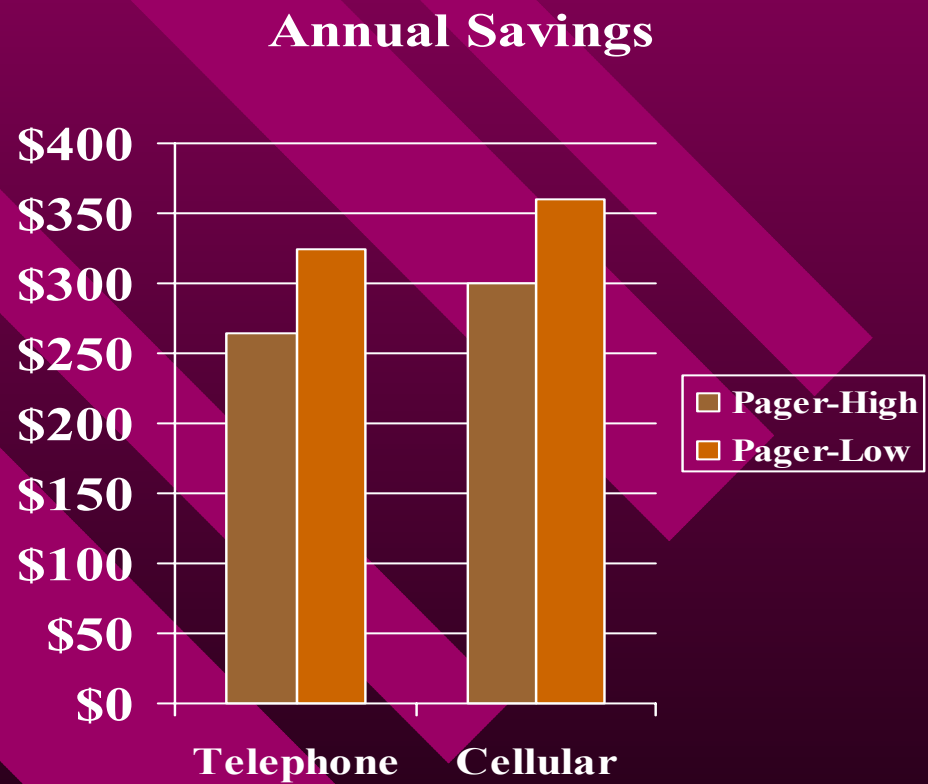


The Financial Aspect

- One of the reasons for using this system is because you pay for what you use.
- A typical telephone line can cost $30.00 per month.
- The charge for using a digital pager to download traffic volume data can be $10.00 per month.
- A savings of 66% per site.

Typical Cost Comparisons





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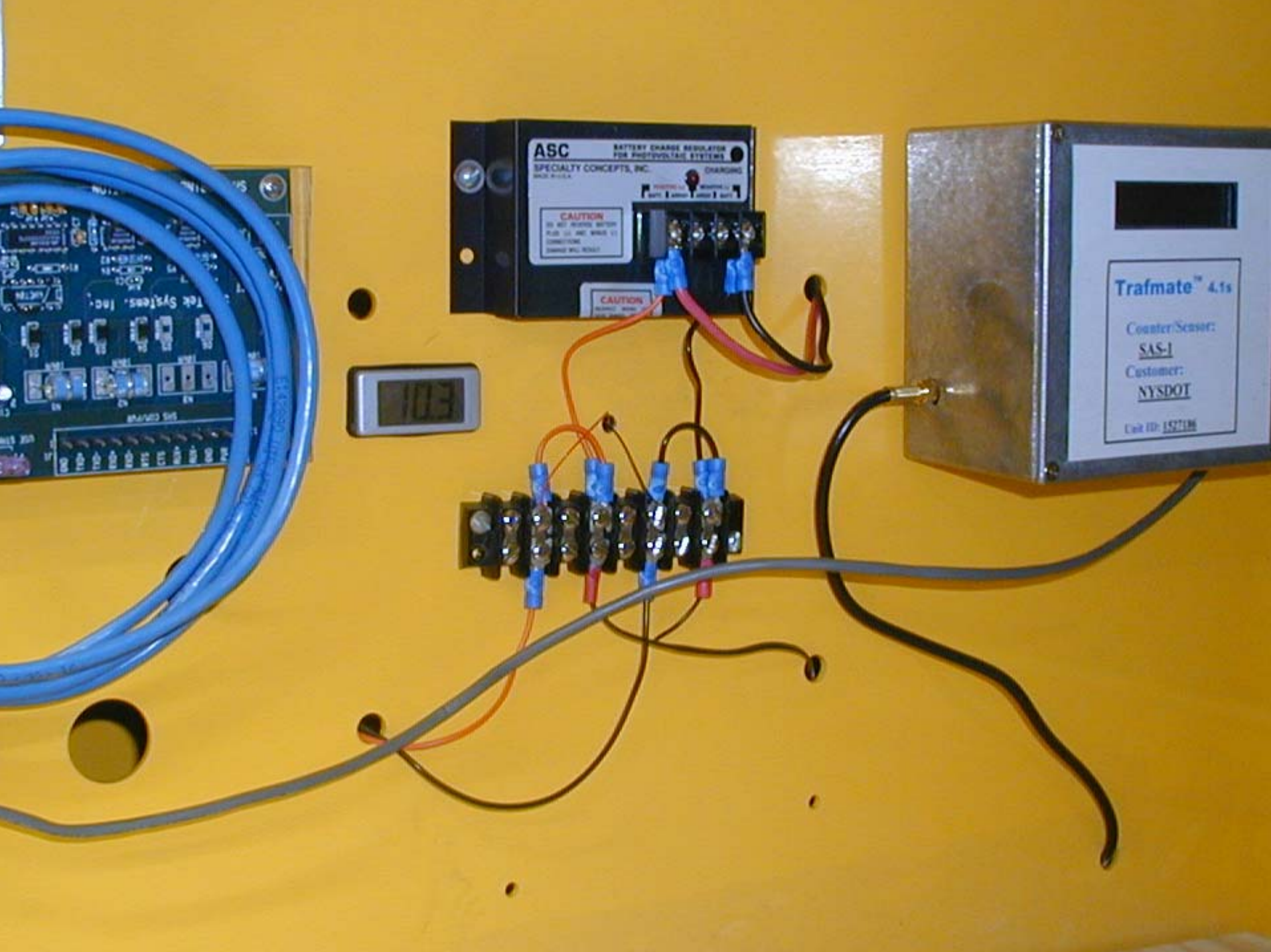
Pager-Low: Less than 2k bytes/day
Pager-High: Greater than 2k bytes/day

Portability

- The TRAFMATE unit is versatile enough to be used for portable communication needs.
- NYSDOT is deploying several trailers for short count purposes.
- The trailers will be equipped with a TRAFMATE interfaced to a SmarTEK acoustic sensor.


SAFETY


ASC
SPECIALTY CONCEPTS, INC.
CAUTION
CAUTION
Trafmate™ 4.1s
Counter/Sensor:
SAS-1
Customer:
NYSDOT

Some Limitations

- TRAFMATE cannot communicate between traffic counter and PC in a real time mode.
- The unit must be used within the coverage area of the paging service. Paging service will provide a map.

Some Enhancements

- Upgrades from the original design include the following:
- The ability of the unit to monitor the main battery voltage and e-mail the user if the voltage drops below a threshold.
- You can e-mail the unit and request a status check of the counter. TRAFMATE then e-mails a response.

Conclusions

- This is a very easy system to install. Simple hand tools are all that is needed.
- The software is easy to install on a PC. You do need access to the internet.
- Communication costs are manageable. You pay for what you use.

Acknowledgements

- Thank you to Sudhir Murthy, President of Trafinfo Communications, Inc. for your perseverance.
- Thanks also to Michael Fay and Todd Westhuis, NYSDOT managers who approved of this idea from the beginning.
- NYSDOT Traffic Monitoring Unit. They continue to support and expand this project.

Questions/Comments

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