



The Layered Service Approach for Digital Outdoor Displays

Time and Money

Rapid response to display downtime is nowhere more crucial than in the digital outdoor advertising industry. Prismview has established a methodology that offers its customers multiple layers of assurance and documentation that the digital advertising medium is serviced promptly.

Because the digital display is a sophisticated compilation of sensitive digital components, the need for service is a reality. While the need is infrequent, it is nevertheless an unfortunate reality for all manufacturers. Prismview has developed a service philosophy which it refers to as its 'Layered Approach'. The term layer refers to additional layers of backup in terms of communication, documentation, and on-site repair.

Prismview recognizes that extended downtime is a cause of advertiser dissatisfaction and, ultimately, down-time credits. The layered service methodology provides for back-up at every step of the process.

Prismview provides the availability of entire-system monitoring and problem resolution on a 24/7 basis, 365 days a year.

When a Problem Occurs

The first critical aspect of the Prismview layered response is the immediate recognition of a malfunction. Most Prismview digital outdoor displays are outfitted with two problem-identification systems:

1. Visual problem recognition through the on-site webcam
2. Electronic notification from the remote diagnostics program

This two-pronged approach provides dual notification at the time of malfunction. The two are used in tandem throughout the repair process to inspect difficulties and to confirm the resolution. Each system provides a back-up for the other in the unlikely event of a malfunction in one of the communication media.

Webcam Monitoring

The trained human eye continues to be a critical element in any electronic display repair. The webcam, placed onto the lower side of each display, facing back into the display face, gives first-hand, real-time visual image of the display in the field.

At the Prismview Service Center in Logan, Utah, Prismview technicians visually inspect over 1800 displays at least once every hour. Concurrent with each inspection, an electronic photograph is taken by the webcam. This photograph is stored for later reference to provide a visual documentation of display function for both the Prismview technical team and Prismview customers, should such a photo be of value.



When a Problem Occurs - continued

At the heart of the Field Service Center is the visual inspection auditorium where technical specialists are placed facing large electronic screens, each with a grouping of remote digital outdoor displays, shown in real time on the screen. At the bottom of each display image is a printed notification with the display number and location.

Each technician in the group is assigned a particular segment of the Prismview installed displays. The display groupings are each visually inspected on the screen. The technicians look for abnormalities in image quality. If no abnormalities are identified, they toggle the next grouping onto their screens for inspection.

If an abnormality is identified, the technician immediately isolates the affected display onto a separate screen. This isolation triggers the Prismview proprietary "Dashboard" software to automatically place pull-down menus on the isolated screen with that display's history, on-site service staff, and on-site parts inventory.

Remote Diagnostics

Each Prismview digital outdoor display is outfitted with a remote diagnostics system that identifies failures within the display. In addition, the current iteration of the program further identifies potential failures by measuring critical data which may indicate a pending failure.

Items monitored electronically are as follows:

- LED modules
- Power supplies (pending problems as well as failure mode)
- Transformers
- Ventilation system
- Cabinet pressure
- Cabinet temperature

In the event of a failure, the diagnostics program sends a message via e-mail to the technical support group in the Field Service Center, noting the nature of the failure. This second layer of notification is redundant with the monitoring system. However, in addition to the back-up nature of the redundancy, there is value in the different information relayed as compared to the visual abnormality as it is observed.

Problem Resolution

The Prismview "Dashboard" webcam monitoring system provides the perfect tandem component with the remote diagnostics system. Together, an abundance of information is available to the technical specialists in Logan, Utah, regardless of the actual display location.



When a Problem Occurs - continued

Once a problem is identified, the particular display may be isolated, and the following information is made available:

- Ambient conditions at the display location
- Temperature inside of the display cabinet
- The level of air pressure inside the cabinet
- The visual impact of the failure
- The technical nature of the failure
- The inventory of parts, on-site
- The service groups available, complete with contact information

The initial course of action always involves deciding whether the correction may be made remotely through the computer system, or if an on-site repair is necessary. If an on-site repair is necessary, it is determined whether such a repair requires immediate response or may be handled during the next preventive maintenance trip.

Many items may be addressed remotely, through computer access. The Prismview technical staff is trained to address every remote repair option prior to dispatching on-site service.

If on-site service is required, a list of local, certified technical groups is accessed through the pull-down menus of the Prismview Service Data Base. In most markets, layers of technical groups have been identified and trained to ensure that multiple service resources are available for each display. These groups are rated on the basis of past performance and relative experience regarding availability.

From the menu, a technician is identified and dispatched to the display location. The technician is sent a repair order electronically, complete with the information diagnosed by the Prismview Service Center. This usually makes it possible for the technician to go to the site with the problem's resolution already specified and the parts available on-site to make the necessary repair. The work of the on-site technician is limited to parts swap. The system is designed to ensure that almost all failures can be isolated to swappable components which may be replaced from a parts inventory. The affected part is then sent back to Prismview Service for repair or replacement.

Once on-site, the technician notifies the Service Center of his or her arrival and confirms the work to be performed.

Display Repair

The Prismview digital display may be accessed through the front or rear, depending on the customer's preference. Because the catwalk is generally removed from the front of a digital display for aesthetic purposes, front access requires a bucket truck or some other ground-access component.

Since many displays are at significant elevation, front access is not feasible without significant expense. Likewise, a crane of an appropriate height may not be readily available. For these situations, Prismview offers a user-friendly rear-service solution.



Display Repair - continued

Front access is made through the face of the display by removing individual LED modules. Each module has recessed, quarter-turn hex-head screws at the corners. With a simple hex-head T-handle driver (provided), the technician turns each head and then manually removes the LED module with his fingers by pulling on the protruding louvers. The module will easily unseat, exposing the power and data connection wires, connected in daisy-chain fashion on the rear. These have self-locking connections and can be easily removed.

If the LED module is, itself, the problem, then the removal and replacement of that particular module is a five-minute task. If a power supply or other internal component is at fault, then those components may be easily removed and replaced once one or more LED modules are removed.

Rear access to the display is made through one of a series of panels. Each panel is annotated on its exterior with the LED module numbers on the face of the display. This allows the technician to easily identify the location of the display components to be replaced.

Removal of the panel requires the removal of four screws. The panel is then lifted upward to unseat it and then allowed to hang below from the tether which connects it to the display cabinet.

The inside of the display is a the mirror image of the display when viewed from the front. The power supplies, transformers, and other internal components are in the front with the LED modules at the rear. For each location where a component blocks access to an LED module, that component is on a hinged assembly in order to provide ready access to the back of the LED modules. Should the LED module need to be removed, the quarter-turn, hex-head screws may be accessed using the same T-handle driver from the rear. The affected module is then pushed forward, holding onto the handle on its back, and then pulled through the opening where it was placed. The replacement module is pushed through the face, seated and then secured using the quarter-turn screws on the replacement module.

On-Site Parts Swap and Remote Supervision

Utilizing the technologies of the webcam and the technician's cellular phone, the on-site parts swap is completed under the supervision of the Prismview Service Technician in Logan, Utah. In most scenarios, the part swap satisfies the problem identified by the webcam and diagnostics program. However, if additional issues present themselves, the remote supervision of the Prismview technical staff makes it possible for testing and additional remedies to be taken, utilizing the technical on-site labor.

Component Repair

In the parts inventory within the Knack box, padded return-addressed envelopes can be found for that particular display. Once the affected component has been removed, the on-site technician is responsible for placing it into the provided envelope and sending it, immediately, to the Prismview Service Center for repair or replacement.

When the component arrives at the Prismview Service Center, it is dispatched to the bench repair area where it is evaluated to determine if it is suitable for repair. In most cases, it is possible to repair the part and return it to the local support staff, which will be charged with returning the part to the on-site inventory upon its next trip to the display location.



Display Repair - continued

Repair vs. Replace

A unique, cost-saving element of the Prismview service philosophy relates to the production of swappable components which can be repaired. This is a critical, overall cost-control factor in the maintenance of a digital display.

Many manufacturers encase the face of their LED components in black epoxy in order to provide contrast and seal the face of the display. Other manufacturers seal the entire LED module, and/or other components, in order to prevent water incursion problems. Both scenarios limit the ability to repair minor subcomponents, resulting in the unnecessary expense of component replacement when a simple repair would otherwise be possible.

Prismview conformal coats all internal components to deflect water, in the unlikely event that water penetrates the cabinet. The Prismview cabinetry is water-sealed with internal pressure, which forces air out through the face of the display. This system prevents water from entering the display cabinet.

The Prismview LED modules are produced in a patented formula that does not result in encasing the LEDs in epoxy. (For further information regarding Prismview contrast philosophy, see Prismview white paper 'High Contrast Display Face.')

At the rear of the LED pixels – at the point where the LED leads approach the printed circuit board – the leads are exposed in a ventilated area, thus providing cooling to the face, without encapsulating the diodes in a permanent coating.

Prismview Service Plans

Prismview provides the finest in digital display service for all applications, anywhere in the world. Prismview has built a reputation as the go-to company for the highest caliber of sign service by the sign industry.

As the digital billboard came of age, the outdoor advertising industry came to Prismview to find solutions for the demands of its emerging needs. Prismview's history of superior service to the equally demanding casino industry provided a platform from which the layered service methodology was born.

Prismview LLC, a wholly owned subsidiary of Samsung Electronics, offers two service options for its digital billboard customers. Both service options include webcam monitoring and remote diagnostics. Both operate as per the methodology previously described. The difference between the two options relates to response time requirements.

Prismview 24-Hour Service Response

This program offers monitoring, service dispatch, and repair on a 24-hour basis. Any time, 365 days-per-year, Prismview monitors each display and dispatches and coordinates all repair activity, regardless of the time of day.



Prismview Service Plans - continued

Prismview Business-Hours Service Response

This program is identical to that just described, but without the after-hours requirement. In this scenario, Prismview monitors each display between the hours of 8 a.m. and 6 p.m. Eastern time. On-site maintenance is dispatched during this time period. When a problem is identified before 2 p.m. at the display location, same-day service is usually possible. For problems identified after 2 p.m., service is typically completed no later than the following day by noon, local time.

Documentation

Prismview offers multiple layers of documentation for its digital outdoor customers. At a customer's request, Prismview can provide a printed history of each display's service history, noting the date of each service requirement, the response time, the completion time, the nature of the difficulty, and the technical team dispatched.

Prismview can also, at any time, provide a photographic documentation of a particular time of day in order to demonstrate the display's level of function.

Reviews

Lamar Advertising tracks its digital billboards in terms of number of "incidents," response time, and total time to repair. Prismview is one of Lamar's two digital outdoor suppliers and has received very favorable reviews from Lamar for its excellent service. Astral Media, a sophisticated multimedia outdoor advertising firm in Canada, subjected Prismview to a rigorous competition with three other international vendors before awarding Prismview its first digital deployment. After the first 12 displays were operating for the first quarter, Astral noted, "At no point have we regretted our decision to select Prismview. Performance at all levels has exceeded our expectations."

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