The Eastlake Community Church Story

Long Version Photo Essay

Entry: #RESI34E128

Category: House of Worship

Contractor: Sound Image

By Michael Fay

Eastlake Community Church is a large, non-denominational, Christian church located in Chula Vista, California. They have a casual atmosphere, but a serious faith; their services reflect that. You're going to hear loud, energetic music and you're going to see regular people worshiping God outwardly. You're going to experience a quick service and you're going to laugh. You might even think, "I can't believe they did that in church." They get that a lot.

The statement above is paraphrased from the Eastlake Community Church website, www.eastlakechurch.com. This is the atmosphere and worship style that they convey at every opportunity. The following is the story behind the technology that was recently built to support Eastlake's vision of "amped up" worship.

The Eastlake project was unlike others for many reasons, not the least of which was their desire to have an AV System that is uncompromised by the usual architectural, aesthetic or financial restrictions that face most churches. In other words, the quality and effectiveness of the AV Systems became the priority in almost all critical decision-making phases of planning, development, construction and implementation. The AV budget was not unlimited, but it was sufficiently large enough to accomplish all that is described below.

This project was a design/build collaboration between a core group of Eastlake's project development team including their Lead Pastor, Worship Pastor, and Creative Director, and a design, engineering and installation team from Sound Image's Contracting Division.

Marcus Jones (MJ), Eastlake's Worship Pastor, and this author, Sound Image's Senior Engineer and in-house design consultant, were the driving forces behind the vision and solutions that were implemented at Eastlake Community Church.

Performance goals

The Acoustical performance goals were:

A. RT60 that is at, or slightly below, 1.0 seconds at 1kHz, with the extremes of 60Hz and 8kHz not exceeding +/- 0.2 seconds from the mid-band RT.

B. Room geometry and acoustic treatments should complement the audio goals listed below.

C. Work closely with the project's architect to optimize the geometry of the interior space and recommend finish materials that will complement the acoustical goals whenever and wherever possible.

D. Use standard construction materials and techniques whenever possible to help manage costs.

    1. Use rectilinear rather than curved shapes throughout.

The key Audio System operational and performance goals were:

A. A high-powered, stereo loudspeaker package that would provide excellent coverage, clarity, and frequency response.

    1. MJ wanted the system to be concert capable, with a "cruising altitude" of 105 dB, and a minimum of 6dB of peak headroom.

    2. A usable frequency range between 35Hz and 16kHz.

B. The front few rows of seating should not be the worst seats in the room. Much more on this below under the "Subwoofers" heading.

C. A digital mixing console with a minimum of 56 inputs and a minimum of 12 aux send busses.

D. Multiple monitoring options to include:

    1. Six wedge monitor mix busses

2. Wired in-ear monitors with personal mix stations

3. Wireless in-ear monitors with personal mix stations

E. Multi-channel, Pro-Tools recording. 32 tracks minimum.

F. A secondary, digital mix position to handle audio for video and distributed audio mixes. 16 input channels minimum.

The key Video System operational and performance goals were:

A. Large video screens. No, I mean really large video screens.

B. Incorporate multiple screens with independent content and control.

C. Multiple high-definition (HD) cameras for image magnification (IMag) presentation.

D. Standard-definition (SD) video recording.

E. No live nor delayed video broadcasting required.

F. Modest video distribution of IMag signals in specific ancillary areas.

G. Infrastructure for future video distribution of IMag signals outside the perimeter of the facility.

Facility Overview

The Eastlake facility is a fan-shaped, main sanctuary with theater-style seating for 1,550. The project began with new construction of a pre-engineered, steel framework structure.

Within the physical limits of the structure's framework, and some practical guidelines related to budgetary management, we were allowed to direct the architect to design the building's interior geometry and finishes to best accommodate the project's AV System performance goals. This included the stage layout, the FOH tech booth design, the tech room layout, the geometry and finish on all walls, the flooring, and ceiling treatments.

One of the acoustical challenges was that the back wall, opposite the stage, consisted almost entirely of an elaborate, sliding glass door system. Though a subtle adjustment acoustically, we were able to have the door system inverted to present a slightly more convex, rather than concave view to the main loudspeakers. One of many small details that added up to a better overall final product.

In addition to the sanctuary, there were several other rooms that required integration into the overall plan. Those rooms included two parent viewing rooms, a tech room, a green room, an off-stage left staging area, an AV equipment room, and an electrical room. The Sound Image (SI) design team was influential in the functional layout of all these areas.

Careful attention was placed on getting the correct amount of clean, "tech" power into the building for the AV systems. A K-13 harmonic mitigating transformer and a LynTec, MSP-341 sequential power panel were at the heart of the tech power scheme. In addition, APC SUA1500RM2U UPS units were used in many key areas throughout the facility.

Every critical part of the audio and video signal path is connected to a UPS or a Furman, AR-15 II, voltage-regulated power conditioner. We didn't want to take any chances with the quality or quantity of the AC power. There is just too much digital AV and computer technology to handle this any other way.

Acoustics

As it should, room acoustics played a critical role in the design parameters of both the building and the main loudspeakers system. The high-powered speaker system would require a significant amount of acoustical treatment for control and containment.

A combination of practical experience, EASE and EASE Focus modeling software, and pragmatic design decisions led to the types, locations, techniques and materials used in the final acoustic design. Whenever possible, standard building materials and construction techniques were specified to help manage the labor and material costs. Examples follow.

To meet code, the underside of the building's steel roof required a thermal blanket. We were allowed to select the thermal material that offered the best acoustical properties. This was a great starting point. For no added cost, it provided a significant amount of absorption to capture reflected, mid- and high-frequency energy.

Next, we suggested that the pitch of the roof be reversed to provide more ceiling height above the stage. There is so much rigging and equipment mounted from the ceiling above the stage that we needed every possible inch we could get. Reversing the roof pitch gave us five extra feet where it was needed most.

Normally, the walls of a pre-engineered building would be hard, flat and parallel. Obviously, this is not good for a live sound venue. The solution: the side walls were constructed in two layers. The structural walls were built to meet code requirements, using standard methods and materials. The Z-shaped, inner layer of the side walls were designed to not only minimize side-to-side flutter echo, but also to act as passive, broadband sound traps.

The Z shape creates a hollow space between the structural and acoustical walls. The narrow vertical face is finished with heavy-gage perforated metal, which allows sound to collect inside the cavities. Inside the trap cavities, the wide vertical surfaces are lined with R-30 batt insulation.

The Z-walls are constructed from standard building materials and required no special construction trades nor techniques to fabricate. Other than the perf metal panels, the exposed surfaces of the side walls are painted, gypsum board over steel stud framing.

The side wall Z-traps are oriented to catch, as much as possible, the reflected energy coming off the glass back wall. Because the glass wall is one large set of sliding doors, no drapes nor other treatment was planned. The glass door system is 12' high and spans a width of 60’. No mid- nor high-frequency acoustical help here, however, the low-frequency absorption properties of the glass are helpful.

The Z-walls are an important design element that serve multiple functions not only acoustically, but aesthetically; bringing a desired element of "character" to the room.

The house-right Z-wall treatment is mirrored on the house-lift side of the room. This added geometry eliminates most of the acoustical problems that come with parallel side-walls, and creates sound absorbing traps inside the cavities that are behind the 18"-wide, perf-metal, vertical faces. The treatment also adds character to the room.

Above the glass doors we were able to put a sound absorbing panel system in place between the 14' foot mark and the roof deck, which was about +25' AFF at the rear of the building. The panel system was sloped and mounted away from the structural wall so that broadband trapping and absorption could be achieved. This area represented approximately 660 sq. ft. of passive, broadband treatment.

There are two large parent viewing rooms located in the back corners of the sanctuary. They are set at a 45 degree angle across the rear corners of the room. Each of these has a ceiling set at 10'. The large viewing windows were constructed like recording studio windows, with two panes of glass having dissimilar thicknesses, and sloped to minimize glare and problematic sound reflections.

Above the parent rooms, we had an opportunity to do some significant, active bass trapping. In each corner, 928 sq. ft. of limp-mass material was installed to contain the massive amount of residual, sub- and low-frequency energy that the system would produce. This is one of the most significant elements of the overall acoustic design. Without these baffles, the room would have suffered the fate of so many other contemporary music rooms; general boominess or muddiness due to lack of sufficient low-frequency absorption.

4' x 8' plywood panels are used to create active, limp-mass bass trapping. These panels free-hang from structural points located in the back corners of the sanctuary, above the two parent view rooms (cry rooms). More panels are installed near the ceiling, along the upstage wall.

Similar active bass trapping was installed across the width of the upstage wall as well. For this project, the limp mass was a very common and inexpensive building material; ½", fire-treated, plywood.

It is possible to make a room such as this acoustically too dry or dead, thus the floor and seating treatments and finishes present another acoustical opportunity. The floor of the sanctuary is a concrete slab, with a gentle slope up from front to back.

Knowing that the room was going to be outfitted with fully padded theater-style chairs, we recommended that the floor under the chairs remain exposed concrete. The aisles and entry area inside the sliding glass doors are carpeted, which is appropriate. The exposed concrete has several advantages including improved support for congregational singing, ease of cleaning, and long term durability. Again, the appropriate acoustic treatment for the floor came at little or no additional cost to the project.

The upstage wall required another approach altogether. For starters, it had 90 degree corners relative to the point at which it joined the side walls. Acoustically, more geometry is generally better, so we had additional internal walls designed to cut down the corners and present a different angular feature from those of the parent viewing rooms in the back of the sanctuary.

Next, the entire upstage wall was finished in 2” Tectum from floor to ceiling. Tectum is a rigid, sound absorbing panel material. The Tectum is not visible to the public, because the upstage wall also has a heavy theatrical drape system that spans the entire width of the stage and beyond. Behind the drape is an upstage walkway that is used by musicians and pastors to get from stage left to stage right. Together the Tectum and drape materials create a soft, absorbent back to the stage wall, which is desirable for live, contemporary music performances.

The stage is quite large - a semi circle that is 60’ wide by 33’ deep. For mass and rigidity it was recommended that the stage be made of solid concrete. This was acceptable to all because it fit into the “industrial warehouse” look that the church liked. The stage is fully carpeted, with no other notable, structural features.

An overhead view of the stage.

Main Loudspeaker System

The Eastlake audio system was the driving element behind many of the design decisions that prevailed. The main loudspeaker package consists of a pair of QSC Wideline 10 line arrays, configured as a stereo pair. Each array has seven, dual 10" modules.

This package was key to addressing several of the most important design requirements. First was the need for a high-quality, high-powered, main loudspeaker package with an extremely wide horizontal coverage pattern - 140 degrees for the WL2102's.

The house-right QSC Wideline array is highlighted along with two, stacked, Sanyo PLV-HD150 IMag projectors. The center graphics screen can be seen in background.

Second was our need to keep the array package as small and light as possible. The Wideline 10's feature lightweight, cored composite construction weighing just 70 lbs per enclosure; less than half the weight of most conventional designs with similar components.

Third was the need to control the vertical dispersion of the main arrays as much as possible. Remember, the lower half of the back wall is glass. The goal was to steer the vertical dispersion into the chairs and floor, while keeping as much mid and high frequency energy off the back wall as possible.

Additionally, side fills and front fills were used to complete the main, full range portion of the system. More on these below.

Subwoofers

The design and implementation of the subwoofer "arrays" is possibly the most unique element of the entire project. Though the fundamentals have been well established by others in the past, to the best of our knowledge Eastlake's flown, vertical subwoofer array design has not been employed in any other facility.

As stated earlier, one of the specific performance goals was to design a system in which the front seating rows are not the worst seats in the room. In the author's opinion, that meant it would be unacceptable to rely solely on stage-front sub bunkers for all the system's sub energy.

I had been working with distributed subwoofer designs for a few years before this job came along, yet none of the previous designs seemed to fit the needs of this project. After considering and rejecting several preliminary ideas, I remembered a technique I had learned in a subwoofer array class that was presented by Meyer Sound. The technique is best described as an end-firing, cardioid, sub array created by placing two or more sub cabinets on the ground, in a line, front to back.

The "light bulb" moment came one morning with the idea of lifting the front-to-back array off the ground and hanging it from the ceiling, firing straight down. After some self-debate regarding the validity of the idea, and presenting the concept to the Eastlake team for aesthetic approval, we began the proof-of-performance process to answer the following questions:

A. Was the idea valid?

B. Would it performed the way it was expected to perform?

C. How many arrays are needed?

D. How would the arrays be attached to the ceiling?

E. How much would each array weigh and could the roof structure handle the load?

F. How would we keep the array energy from uncontrollably shaking the steel beams and roof structure?

The final design and installation include a combination of vertical, end-firing, cardioid sub arrays and stage-front subs. Each vertical array is isolated from the structure using Mason Industries' Spring Deflection Isolators. In total, the system has sixteen, Yamaha IS1118, single 18" sub cabinets.

Three vertical arrays are deployed over the main, fan-shaped seating area. The house left and right arrays consist of four cabinets each. The center array, located above and slightly forward of the FOH mix position, has only three boxes. In total, eleven, single 18's were flown. Five bunkers were built into the front arc of the semi-circular, concrete stage. A single, 18" cabinet is installed in each.

Every flown sub cabinet requires a discrete channel of DSP and amplification. The DSP and amps for the five subs under the stage are configured as two, mirror-imaged pairs and a single center channel. All 16 subs are intended to perform as one. Collectively, they can receive a discrete feed from any input channel via a post-fader, aux send buss.

Obviously, this design approach required the right opportunity, a great deal of time and money, and a dash of creative inspiration in order to succeed. The subs deliver great low end between 35Hz and 70Hz, and are capable of producing levels well in excess of 110dB. All this is available within +/- 4dB for every seat in the building. When coupled with a RT of 0.9 seconds at 60Hz, the room and system present an awesome experience.

The vertical, end-firing, subwoofer array is possibly the most unique application of technology in the Eastlake system. This array is suspended above the house-right seating area. Two more arrays hang above the center and house-left seating areas.

Side Fills and Front Fills

Because of the layout of the room's seating areas, additional side-fill arrays were required. WL2102s were used again. On the sides, the area of coverage is significantly more shallow, so only four modules were required on each side. The side-fills received a summed-mono signal, as there was no good way to present a stereo image to the extreme left and right sides of the room.

One of the tricks to making the side-fills perform well, when flown close to the main left/right arrays, is this: the discrete left/right mix busses are sent to two, 2 x 1 submixers in the DSP unit. Using the house right channel as an example, the right side array submix channel, which is located near the main right array, receives a signal that is 3dB lower than the left channel. In addition, extreme care was used in establishing proper time alignment between the main and side-fill arrays.

As is often the case, front-fill speakers were required. This is another key element in improving the experience for people in the front few rows of seats. Sitting on top of the five stage subs are five, custom, SLS FF6501 2-way loudspeakers. These speakers were selected because of their small physical size, power handling, narrow vertical and wide horizontal dispersion pattern.

Mixing Consoles

A Digidesign, Venue Series, D-Show digital mixing console was selected as the optimum choice for FOH duties. It fit all the requirements of the project; price, size, input and output capacity, user friendliness, and elegant connectivity to the Pro Tools recording option.

On the previous page there is a view from the FOH mix position, with the D-Show console in the foreground. The two console-mounted video monitors show the D-Show application file on the left and the NetMax DSP metering GUI on the right. In the background, the lighting trusses glow around the center graphics screen.

The D-Show was configured with a main control surface and two side cars, two stage racks, redundant digital snakes and a FOH rack. For the most part, the stage racks were loaded with analog input cards and AES output cards. The FOH rack has additional AES and analog I/O connectivity.

For live performance, a total of 100 inputs and 72 outputs are available. In addition, the HDx1 card in the FOH rack provides DigiLink bussing for 64 tracks of Pro Tools recording and playback.

The primary input connectivity on stage is done through four, custom, 50' Whirlwind drop snakes that patch to panels on the upstage wall. Each stage box can be positioned in just about any location on stage. Additionally, 6 Ace Backstage floor pockets are installed around the perimeter of the down-stage arc.

A second digital console, Yamaha O2R96, was installed in the ancillary tech room. This console received 16 channels of AES audio from direct outs and sub-group mixes that are sent from the D-Show console. The purpose of the secondary console is to provide optimized, real-time mixing for the distributed speakers inside and out, and for a program mix to the video recording decks. JBL LSR4326P nearfield monitors are used at this mix position.

Monitors

The monitor package was configured to allow for any number of requirements that may arise immediately and into the future. The design includes wired wedge monitors, Yamaha IF2115/AS, as well as wired and wireless IEM options with Aviom personal mix stations. All monitor mix busses come from the D-Show console, starting with six discrete wedge monitor busses.

A 16-channel Aviom Pro64 system was installed to accept AES feeds from the D-Show console and convert them to A-Net. A combination of A-16R, A-16CS and A-16 II mix interface devices were installed to handle the needs of the wired and wireless in-ear monitoring.

Monitor connectivity is located in the stage floor boxes and on up-stage wall plates. The connectivity and/or control for the wedge monitors, and wired/wireless IEMs, is also bundled into the Whirlwind drop snakes.

Shure P7 wireless transmitters and receivers were installed, with Ultimate Ear and Shure earbuds.

Signal Processing and Amplifiers

Two Electro-Voice, NetMax N8000, 16 x 16 processing units were specified to handle all loudspeaker processing and routing. Though there are numerous DSP devices on the market, the N8000 is one of only a few units that offers AES3 input cards along with various other packaging, bussing, configuration and programming features that I consider important.

QSC PowerLight 3 and CX-series amplifiers are used exclusively. The PL-3s power the Wideline arrays and subs. The CXs power the monitors and all the distributed loudspeakers.

Aviom, NetMax, APC and Bittree units in the headend rack room.

A total of 27, 2-channel, QSC PowerLite 3 and CX amplifiers were used to power the audio system.

Microphones

A moderate-sized compliment of wired and wireless microphones was specified. The collection of wired mics includes models from Audix, Sennheiser and Shure.

MJ requested Shure UHF-R wireless systems for the lead vocalists, key guitarists, and senior and associate pastors. Twelve wireless channels are installed. A mix of KSM9, Beta87 and DPA headset and lapel mics are used with the wireless systems.

Because of Eastlake's close proximity to Tijuana, Mexico, we were concerned about the flood of RF signals that are regularly transmitted from just across the border. Twelve wireless mic channels, four wireless IEM systems, local San Diego broadcast channels, plus the signals being blasted north from Mexico were enough to encourage me to look for the best wireless coordination software available. The IAS software from Wireless Systems did the trick.

Production Team Communications

The production team at Eastlake consists of staff and volunteer workers. It takes eleven people to fully staff the operation of their new AV Systems. A 4-channel, Clear-Com party line system was installed, with RS-602 belt packs and CC-26 headsets.

The team lines up like this:

1 – Production Director, located in the FOH booth

1 – Assistant Director, located in the tech room

2 – Camera operators, with infrastructure for 3 more cameras in the future.

1 – FOH mix engineer

1 – Chyron graphics operator for IMag screen content

1 – Pro Video Player graphics operator for center screen graphics content

1 – Power Point graphics operator for on-stage confidence monitoring content

1 - Camera switching operator in the tech room

1 – Audio-for-video mix engineer in the tech room

1 – Production lighting operator

Ancillary Audio Equipment

The remaining ancillary audio equipment will not be discussed in detail other than to say that there are several 70V audio zones and a multi-channel, Williams Sound, assisted listening system installed. The ALS transmitter is configured to receive one of two signals; the live sound mix for the hearing impaired (which is rarely required) or a feed from an interpreter station for language translation.

Video Projection

While the audio system dominated many of the structural design and operational decisions, the video system was no less important to MJ's vision for the final product. From the beginning, there was a desire to create a "wow factor" with the video images, staging and lighting.

Eastlake church has and nurtures a highly produced worship style. Having the ability to produce a "full-on" concert experience was one of the guiding influences of the design process. They don't believe in, and therefore don't do your typical "televangelist", broadcast video. If you want to be a part of the church's community, you have to show up. And when you do, be prepared to be fully immersed in the sound, video and lighting that is used to facilitate Pastor Mike's message for the day.

One of the first things you notice when entering the Eastlake sanctuary are the huge video screens. Spread across three screens, there is 1,145 sq. ft. of Stewart Filmscreen material on stage. A 40' x 15' center graphics screen is flanked by two, 22' wide, 16:9 IMag screens.

The three main projection screens grab your attention when you first enter the sanctuary. It is approximately 95 feet between the outer edges of the IMag screens on the left and right sides of the stage.

A fourth, 12' x 6.75' rear-projection screen hangs above the seating area, about 50' away from the front of the stage. This screen provides confidence monitoring for the band and pastors on stage.

Seven Sanyo projectors, with a total of 56,000 Ansi lumens are required to deliver the video content at Eastlake. Each IMag screen has a stack of two, PLV-HD150s. The center screen image is an edge-blend of two, PLC-XF46Ns. The confidence monitor uses a PLV-WF10. All projectors are suspended from the steel roof structure with shock-mounted hardware.

All the Sanyo projectors have PJ-Net Organizer cards installed. This provides a simple solution for managing the seven projectors from the FOH booth. The PJ-Net option allows TCP/IP communication with any of the many computers that are connected to the building's LAN.

In the video projection arena, one of the least used or mentioned technical specs is the Lamberts value. A fundamental goal for any good video projection design is the understanding of, and the calculation for, the number of on-axis, foot Lamberts that will be presented to the viewing audience.

A target value of 50 ft. Lamberts was used for each of the screens at Eastlake. The Lamberts calculation takes into account the projector lumens, the screen size, the screen gain, and the use of front or rear projection material.

With a little extra number crunching, which includes the average amount of ambient light that is measured or anticipated, you can calculate the net contrast ratio of the projected image. I call this "projection system modeling". Do this homework up front and you can be confident that the projected images will look great.

Choosing the Right Digital Video Format

Through most of the design phase, we had hoped to use the native 1080p resolution of the HD150 projectors. This thought was based on the desire to keep the pixel size to an absolute minimum on the 22' IMag screens. We knew that there was a cable run of about 200' between the final distribution amp and the HD150 projectors. We also knew that the only way to access the full 1080p resolution available from the projectors was through either a DVI-D or HDMI connection.

This was such a critical part of the design that it became necessary to prove to ourselves that we could successfully transport a 1080p signal 200+ feet over some form of DVI-D or HDMI signal extending device. Though the technology was beginning to appear on the market, we had never actually used any of it. Well, this proof-of-performance exercise proved to be one of our best and most relevant decisions.

We contacted three different manufacturers and requested both CAT5 and fiber optic demo units. In total five different extenders were tested in our shop. All failed to deliver what we needed; a full motion, 1080p image. We had a big problem.

Enter HD-SDI at 720p. Problem solved. The JVC HD250 video cameras have a native resolution of 720p and come standard with an HD-SDI output. After checking through the rest of the signal path, it was determined that HD-SDI at 720p would work as the global signal distribution format in most areas.

Another design element that had to be monitored closely was the total video latency through the system, between the cameras and projectors. By starting and staying HD-SDI, we were able to keep the latency of the live, IMag signals to about 200 msec. or about 6 video frames; not perfect, but generally acceptable to all.

The IMag Signal Path

Though we had a significantly large budget to work with, it was not unlimited. We had to keep a particularly close eye on the video system as it could easily explode beyond the means of the project.

MJ had a strong desire to work with the highest possible level of graphics insertion hardware and software. After researching a few other products, we settled on his original favorite, the Chyron, LEX 2HD system. The LEX 2 system provides the platform for Eastlake's creative production team to create custom lower-third graphics, logos, full-screen lyric overlays, and an alpha-channel buss to insert a live camera feed from the upstream, Panasonic HD camera switcher.

The Chyron workstation is located next to the FOH mix console. The processing engine is mounted in a custom, acoustically-isolated rack that is tucked below the counter.

The JVC GY-HD250U cameras were an early choice because they had the proper balance of features, options and cost. So we had all the key ingredients in place - cameras, switchers, processors, projectors and screens. From here, it was fairly easy to fill in the remaining monitors, converters and distribution devices.

The final IMag signal path flows like this: JVC cameras – Panasonic AV-HS400N HD-SDI switcher with Viewsonic N5021w preview and program monitors – Chyron LEX 2 video graphics processor with Viewsonic VX2255wmb monitors – AJA HD10 DA HD-SDI distribution amp and HD 10MD3 HD-SDI to YC format converter for monitoring and recording paths, and an Ensemble Designs BE 11HD HD-SDI to YPbPr format converter for distribution to several large-format plasma and small format LCD displays. Tying all this together was a Rosendahl Nanosync HD video sync generator.

Center Screen Graphics

Another of MJ's visions was to have a really large graphics backdrop above and at the backline of the stage. The screen would be used to present various types of scenic imagery. This video backdrop is needed to allow for quickly and easily selecting and setting the proper mood for the theme and message of the day.

A few alternative options were discussed and explored, but in the end a 40' screen was installed. The screen required a custom aspect ratio because it needed to fit above and behind the band and other staging fixtures and props. After much careful calculation it was determined that a ratio approximating 8:3 was the largest and best fit.

A Stewart Filmscreen AT-3 screen with SnoMatte 100 material was specified to provide for the custom requirements. Obviously, no single projector could handle the aspect ratio and the 600 sq. ft. image. Moreover, for edge-blending applications, screen gain greater than 1.0 is not a good option.

Fortunately, we live in a time of wonderful technological advancement. A combination of two Sanyo PLC-XF46Ns, and a pair of TV One C2-2250 scaling processors was all it took to present the 24,000 AL, 2048 x 768 resolution image necessary to give MJ the powerful and flexible backdrop he needed.

The source material for the center screen is created and managed on an Apple Mac Pro computer running Renewed Vision's Pro Video Player software. To help manage the budget, we determined that a 5-component, analog signal path would be sufficient for the center screen graphics.

The Pro Video Player workstation is located on the left side of the FOH mix console. A Mac Pro computer is mounted under the counter

AV Network

As designers and integrators, it's just not enough to cover only audio, video and acoustics anymore. If you want to play in the major leagues of the professional AV industry, you need to have some networking chops too. Part of the design plan was to lay out a network topology that could connect to, and support both the campus Gigabit LAN, and the needs of the new AV System.

With the help of Eastlake's data network vendor, we were able to design, install and implement a Gigabit network that provides all the necessary connectivity, including:

A. Campus LAN with internet access

B. Chyron and Pro Video Player file transfer between the sanctuary, tech booth, tech room, and various staff offices

C. Remote monitoring and control of the EV NetMax audio DSP, and the Shure UR-series wireless microphones, from the FOH mix position

D. Communication with the seven Sanyo projectors from any connected browser and the correct IP addresses

Timeline

Oh yeah, did I forget to mention that this project was "fast-tracked" more than usual? Perhaps, this is another story for another day. Suffice it to say that Sound Image was not the first company to work on the project's AV and acoustical design. The first company was terminated for reasons that will not be explained here.

Then, if that was not enough, the original architectural plan was scrapped just a few weeks before construction was to begin. This meant that three months into our re-design for the first structure, it too needed to be mostly scrapped because the Owner needed to start over with a different building envelope. Yes, there were change orders involved at this point, but for reasons related to a geological survey finding, it would cost less to start over than to stay with the original plan.

The construction schedule was only delayed long enough for the architectural team and the new, steel structure vendor to regroup and put together another plan. Unfortunately, the AV and acoustic design process had to be delayed while the new structure was being defined.

Ah yes, just another wild ride in the wonderful world of AV contracting.

Conclusion

Even with all the trials and tribulations that were presented, this was quite possibly the most creatively challenging and ultimately gratifying project that I have had the privilege to work on. Through all the construction craziness, the people at Eastlake Community Church were, and continue to be great to work with. Throughout the process, Pastor Mike, MJ and their team knew what they wanted, and were clear and open about communicating their ideas, budget and schedule. There were no hidden agendas.

We also had an excellent relationship with the architectural team from Manuel Oncina Architects. Without their patience, creativity and cooperation, there is no telling how much differently this project might have turned out.

As for the Sound Image team, what more could we ask for? An open and honest customer, a realistic budget and timely payment schedule, and the creative freedom to explore, design and implement some of the finest AV technology available in today's market.

Project Teams

Sound Image:

Michael Fay, CTS – Sales engineer; design consultant; audio, video and acoustics system designer; executive project manager; wireless frequency coordination; system commissioning; operational training; D-Show programming; photo shoot director; author of *The Eastlake Community Church Story.*

Michael Martin, CTS, NICET I, BICSI 2 – Installation project manager

Ryan Ash, CTS, EAVA, ACE Programmer – Programmer for audio DSP, D-Show and O2R96 consoles; video programming for HD-SDI switcher and edge-blending processors; and AV networking engineer

Dave Paviol – Director of operations, Jeff Schmitz – Project engineer, Jason Schwartzel (AVBR) – Project engineer

Bob Delson – Rigging and much more, Rich Davis – Rigging and assistance with audio commissioning

Eastlake Community Church:

Mike Meeks – Lead Pastor, Marcus Jones – Worship Pastor, Kevin McPeak – Creative Director, Matt Carol – Audio, video and lighting operations.

Manuel Oncina Architects:

Manuel Oncina – Principal, Patrick Banning – Job Captain

Legacy Builders – General Contractor

Baker Electric – Electrical Contractor

Larry Peterson Lighting Productions - Lighting Design

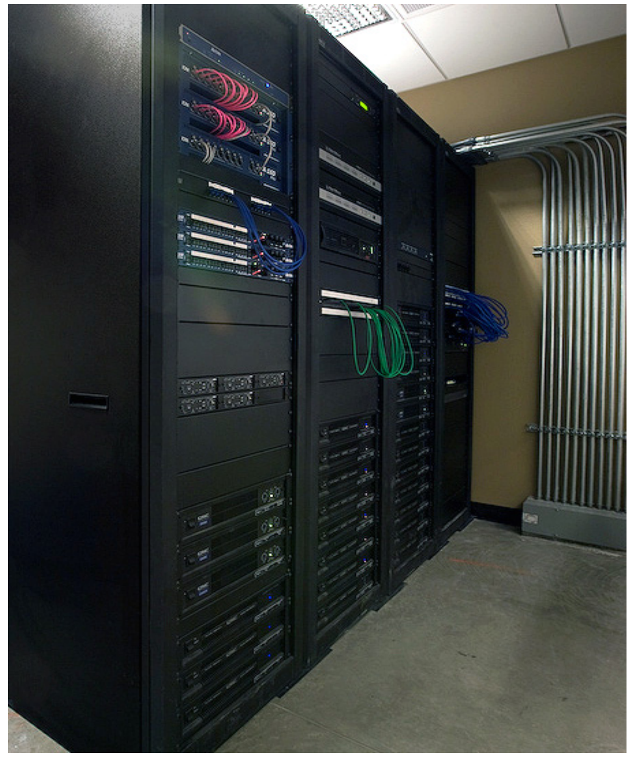
3D Stage Lighting – Theatrical lighting contractor

Hyphenet – Data Networking

Additional project photos below

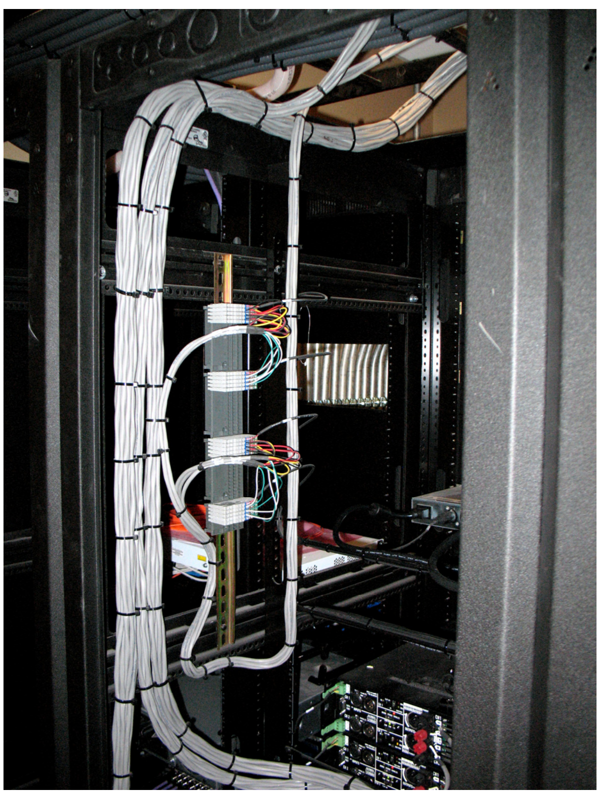
Another overhead view of the stage with the Widelines highlighted in the foreground, and the center graphics and IMag screens in the background.

The unique, center-forward design of the FOH tech booth improves the lateral sightines for the technical crew while adding geometry and character to the room.



The house-left camera position in the FOH tech booth.

The headend rack room.



The highly-organized cable infrastructure compliments the overall quality of the installation.

The Eastlake band during worship. The background is the center screen graphic