Have a Coke And a Light

I was recently given the opportunity to be the television lighting consultant to an industrial show that the sponsoring company decided to commit to tape. A consultant, you know, is one who must be erudite and pontifical, firm and definite, but always remaining sufficiently vague. He or she must know how to maintain a posture of concern and wisdom at all times, and, at the bottom line, must know when it is the best time to hide!

The show was the Coca-Cola bottlers convention held in San Francisco's Civic Auditorium. The organization which put the show together for them was Contempo Communication, Inc. of New York City. The scenery and lighting was designed by James Tilton, his assistant was Harry Silverglat and his production coordinator in San Francisco was Tom Mendenhall.

Equipment

The show was formulated as a multi-media program of film and slides, with the addition of speakers, interspersed with a musical stage show. The set was a multi-level stage with a white filled scrim back-drop, with the primary function of a projection screen. Everything was white, with color introduced through lights and costumes. There were 22 Xenon 35mm slide projectors, and three 16mm film projectors. The stage lighting was done from the sides of the stage to prevent direct light from hitting the scrim. Six of the eight Supertroupers were located in the front of the stage. The lights for the podiums, 12 Berkey 5 degree ellipsoidals, were aimed from the front beams to the podiums which were located at the outer perimeter of each side of the stage.

Jim's light plot called for 250 f.c. of 3200 degree Kelvin light to fall on the two podiums. He utilized the Berkey 5 degree ellipsoidals not only because of their beam-shaping ability. The Xenon and arc type projectors produce light in the 5500 degree Kelvin range. All of the other stage lights contained 3200 degree Kelvin sources, although for the most part they were gelled. The back lights were colored also and the scrim was washed for the stage show by PAR 56 500w strip lights.

With the dual color temperatures in mind, we first considered color-correcting all of the lights hitting the speakers to the higher Kelvin because it might be necessary at times to put both the speaker as well as the modules on the screen into the same picture. This idea was thrown out for three reasons: first, the need to increase the intensity of the light hitting the speaker to compensate for the drop in levels caused by the blue color-correcting filters, which transmit only about 35 percent of the light. Paradoxically, it was necessary to bring the Supertrouper down to 3200 degrees Kelvin. Secondly, we realized that a shot that included the speaker would be much too wide to be visually effective, and finally, because we expected the intensity of light bouncing off the screen to be extremely low, we knew that there was no way to balance the two light levels so that they'd be compatible. So it was decided to restrict the four cameras to either shooting the speaker or to shooting the modules on the screen ("modules" meant the various scenic elements involved).

For the stage portion, the cameras would be correctly color-balanced. The light levels from the modules were so low as to be below the acceptable limits of the system. The chief video operator, Raoul Proctor of Versatile Video, Inc., was forced to not only operate the cameras with the iris fully open, but the video gains were pushed to their absolute maximum. This resulted in the introduction of a great deal of video noise into the picture. However, it was the intention of the producer, Bob Ahrens, to re-record all of the slides and films in a standard editing session after the convention was history.

TV Adaptation

It should be emphasized that his show was in its essence a stage presentation and the adjustments for TV were to be kept to what was unavoidable. The stage performers were operating under an equity contract which specified that they were to be paid one week's salary for each day of taping (not a bad deal unless you happen to be the producer), so it was decided to tape all of the stage business on one day.

As it was a three-day convention

Coca-Cola trade show set.

running from 9 a.m. to 1 p.m., we had to do the Tuesday and Thursday segments on Wednesday afternoon and evening. The speakers and the multi-media show were taped over the three day period.

As the stage show totaled only about thirty minutes and as the cameramen became familiar with the dances and acts, watching them performed and rehearsing the shots, the actual taping went fairly smoothly. Mike Bernhaudt, the director, had a script the size of *Webster's Unabridged Dictionary*. It contained all of the music (all original, by the way), all of the speeches, and all of the slide and film sequences. He started going to rehearsals two to three weeks before everyone went to San Francisco. He used four cameras: two were located left and right of center in the balcony (where all of the projectors were located), a third was at the back center of the main floor and the fourth was a hand-held camera situated in the orchestra pit. The equipment was from Versatile Video, Inc., subcontracted from One Pass Video, Inc.

Intensity Problems

There were other built-in problems that were non-problems for the stage but taxed the electronic system. The white shirts, so much a part of the corporate image, were a consideration, but many of the speakers obliged us by wearing colored shirts. The white set did not cause too much anguish except in areas like the floor, where there tended to be a massive concentration of light at times. The filled scrim, a regular scrim with an extra thread added to the weave, worked well mainly because there was quite a bit of distance between it and the performers. The lighting changes on the stage were extremely effective, but often caused great F-stop changes in the cameras; and because our familiarity with the cue timing was somewhat limited, the video people really had their work cut out for them. Color television does not handle monochromatic lighting situations very well, particularly in reds (pictures appear fuzzy and out of focus). Jim had some effective light cues with only red lights on white costumes (red and white *are* the "Coke" colors, after all), but the cameras hated them. For the special taping session, additional white light was added to provide a more acceptable picture.

Another intensity problem which often occurs is when followspots are used. When three or four of the Supertroupers would overlap, a super amount of light would result when they dispersed, the light level would drop considerably, so the video operator had to be constantly grinding his iris and gain back and forth, often when the camera was on the air. The iris, a mechanical device for controlling the amount of light hitting the plumbicon tubes, is non-selective — so when the iris is set for the brightest part of the picture, the dimmest part is often much darker on the television screen than it appears to the naked eye (due to the limited contrast range of television). Control became even more difficult when the spots were constantly moving and overlapping in the dance numbers. Again, I must stress that these intensity problems were video problems; to the eyes of the audience, the lighting was just great: effective, colorful, and exciting.

All in all, it worked very well. To quote Bob Ahrens, "Cooperation from all elements, especially from Jim Tilton, was marvelous: there were no ego trips to cause any ill-will." It was a most rewarding experience. As you might imagine, the relationship between Jim and myself could have been a really horrendous one, but it turned out to be just the opposite. □

By Ron Jerit
Jerit/Boys Inc.
Arts Design Consultants

Catfish and Lighting

Writing about personal experience as a theatre consultant involved with lighting systems design has always given me an attack of cramps in my heart, head, and hand. After a paragraph or two I clutch. I suspect these constrictions result from excessive introspection. Is there really an interested audience? How will my peers receive the ideas? Is it true all that really counts is tending to an ongoing project? Opposites attract; so, torn by introspection I have always admired the elegant brashness of theoreticians and prophets who project private visions which circumscribe the magic properties of light and its application in the theatre. These visionaries never openly confess to cramps, but have been known to produce abdominal pain in many readers.

In my own reading, I must confess to a preference for creative speculation to mind cluttering statistics. Given a choice, I am more indulgent of fantasies built on the mystical properties of light and its "artistic" potential than a treatise on the physics of light or a quantitative analysis of luminaires, fixtures, control, and distribution for a new theatre. I suppose I am least tolerant of a benighted consultant's description of how he convinced a client to purchase more dimmers, circuits, luminaires, CRT's, and memory "power" than has ever before been installed in a theatre. Though I am more intrigued with the illusory properties of light in the theatre, I am also convinced that the application of science and stage practice to the design of systems is essential. There is a "genetic" link between these three aspects of theatre lighting and the systems designed for its control. This is the most general and possibly the most useful of all rubrics.

The Hokum And Flummery . . .

There is considerable hokum and flummery associated with all aspects of theatre lighting — what appears at times to be an endless parade of prophets and disciples, scalawag drummers, high stepping consultants, effete dilettantes, and at the rear, sloe-eyed, self styled, "real world" pragmatists. Quite frankly, I have come to enjoy the parade — the prologue to a new facility — and on occasion have been seen carrying a base drum thumping out my own bio-rhythms. Conversely, when I have seen this parade of word-juggling charlatans and pinch-purse rogues march through an entire project I have despaired the results: an incredible waste of money and human resources; or a severe limitation of one of the performing arts' most essential raw materials — light; or the potential stunting of gifted neophyte artisians who ply their craft in these runt theatres.

Everyone loves a parade and the announcement of funding for a new or renovated theatre always inspires a procession. A portion of the entourage trails a variety of banners with spirited messages, as in the following melange:

- Computerize Your Entire Theatre With Our Console
- Down With Scenery Up With Projection
- More Footcandles Than a Flaming Bullet
- Consulting For Minimum Wage and Bus Fare
- Ethnic Gel
- Six Light Plots For All Western Dramatic Literature: Cheap
- Expatriate Equipment For Foreign Jobs
- Don't Spoil Your Students — Bring Back the Resistance Dimmer

A Volley of Words . . .

It is not expected that practitioners in the fine, applied, and performing arts will ever experience the same necessity for precision in terminology as do scientists and engineers. Nevertheless, we are constantly faced with difficult communication problems. This difficulty results from our extensive use of technical shorthand, jargon, and our penchant to create a highly personal vocabulary. Communications is further complicated by the fact that design team responsibilities rest with professionals of varying levels of experience and expertise.

Architects, for example, may have great depth of experience in designing many building types, but may only be involved in designing one theatre in their entire career. Imagine their confusion when they are peppered with theatre patois. Structural, electrical, mechanical engineers and owners may be victimized by the same volley of words. Another major factor which often tangles communication is the broad base of "approval agencies" associated with passing facility design milestones — more groups, more words, greater likelihood of misunderstanding.

Those members of the team who assume major responsibility for lighting systems design are part of a communication network and must be prepared to effectively convey general and technical concepts to lay people as well as working professionals. It is likely that with the possible exception of an electrical engineer, the remainder of planning team and approval agencies will be unfamiliar with lighting practice and its technical vocabulary. Skill in communication must include verbal, graphic, and technical (specification) presentations commensurate with each phase of project development, and must be fashioned for a diverse audience. These skills may seem obvious to the reader but I have seen more than one performing arts center fall far short of its potential and long term requirements as a result of a design team member's lack of clarity. Most of a lighting systems designer's time (60-70 percent) is spent establishing concepts, guidelines, needs, budgets, and building provisions associated with actual equipment. This groundwork is a key factor in determining the overall success of a project from the standpoint of lighting systems.

The Challenge And Tasks . . .

To this point, I have not provided a tight definition or job description for a theatre lighting systems designer and that is intentional. The intent is to broadly outline the challenge and tasks associated with lighting these spaces and by implication to indicate the probable involvement of team members. Definition must remain flexible in the face of individual skills, the program, and projected building and equipment budget parameters. The pro-

ject architect has the responsibility of assembling a team of consultants and he serves as a clearing house and coordination point for all input. It is his responsibility to see that the team includes the necessary resource personnel. The only real error that can be committed in assembling a design team is to fail to cover a major planning area with a qualified consultant.

The manner in which the design team interacts to cover all basic design considerations is determined on a project-by-project basis. As a general rule, the gravest errors have occurred when there has been too little assistance or when consultants have been retained who interpret their responsibilities in a very narrow technical manner (applied, as opposed to comprehensive consulting).

Team Members . . .

On a large performing arts center, an architect may choose all or any combination of the following consultants to cover lighting systems responsibilities: electrical engineer; cost estimator or construction manager; landscape architect; interior designer; architectural lighting designer; theatre lighting systems designer; theatre consultant. The final choice is typically based on the architectural firm's in-house capability and available consulting fees, past association with consultants, and consultant interviews. In some instances, owners will insist on the retaining of special consultants.

Typically, an architect must pay a consultant out of his own fee; a trade practice which historically has drastically limited the use of special consultants. I have not mentioned the use of manufacturers as a primary source of design input because I don't believe this is an acceptable approach. The most responsible manufacturers play a significant role in the art and craft of theatre lighting as research and development labs. Likewise, their importance is undisputed when they provide excellent shop drawings, field coordination, thorough checkout and service. This is the province of the manufacturer.

The following summary is a job description showing planning tasks. As such, it suggests a broad definition of a lighting system designer's role viewed as a continuing interaction with each of the listed team members.

Responsibilities Defined . . .

Owner/Users: In conjunction with the architect, establishing of broad program goals for lighting systems and reviewing basic use requirements for "house" and "road" systems based on current practice and trends for touring, regional and local users. Review of the alternate systems approaches and state of the art developments in equipment design. Identification of support, rehersal, and public spaces having special task and production lighting requirements. Identification of major system components and probable cost ranges.

Architect: Establishing space planning guidelines for equipment (functional relationships, square footage), control points, and luminaire locations (slots, catwalks, followspot booth, pit, etc.). In conjunction with architectural lighting consultant, review space and equipment provisions for architectural and decorative lighting and control. Outline space provisions for special lighting in theatre support areas. Provide guidelines for all code related crowd control, circulation, emergency, and work lights, in conjunction with electrical engineer.

Acoustics Consultant: In conjunction with architect, the development of a theatre space concept which incorporates design aesthetic, acoustic, and production/audience lighting requirements. Development of background noise and isolation requirements for lighting control and distribution equipment and luminaires. Coordinate special orchestra shell lighting and lighting associated with adjustable acoustic devices (e.g. banners, canopy, movable ceiling pieces).

Electrical Engineer: Prepare space, power, and distribution information for all special production, task, performance and public space lighting; schema for major conduit routing and requirements for unobstructed space. Review of systems costs and value engineering data relating to alternate power and distribution approaches. Establish locations for major "house" and "road" system components and review electrical code requirements.

Mechanical Engineer: Define theatre and support space heat load and duty cycle requirements. Identify HVAC provisions for equipment and control rooms. Guidelines for duct routing through areas where there is lighting control and distribution equipment.

Structural Engineer: Guidelines for catwalk, slot, bridge, and gallery location, loading, and luminaire mounting.

Cost Consultant: In conjunction with electrical engineer and architect, broad quantity survey information for power and distribution equipment and cost ranges for special control equipment and luminaires.

The responsibilities listed above are all cast in the language of early project work. Consequently, each item must be projected through the three to five years required to program, design, build, and check out a center. In addition to the major planning responsibilities outlined, the lighting designer prepares layouts, working drawings, and specifications for special theatre systems and equipment. Seen in this context, and coupled with the need for on-going research into new systems, the designer's task is seen as one of balancing theory, science, stage practice, and budget over a three to five year period. The stakes in this balancing act are high since special equipment is expensive and the potential for creative use of light for spectacle, decoration, and sculpting architectural form is great. But an even greater challenge remains: to insure that the artisans who work the theatre have the lighting control tools and space provisions they need to exploit the theatre's most versatile raw material — light.

. . . And the Catfish

I recall exploring, many years ago, a subterranean cavern in Yucatan. The cave had deep pools of water which were inhabited by a species of catfish which were blind. The cave was sealed

About the Author

Ron Jerit has taught at S.U.N.Y., University of Florida, University of Illinois and Memphis State University. He has directed and done scene and lighting design for university theatres and music departments, community and professional theatres and television. He has presented numerous lectures and seminars to professional groups. Drawing on his teaching, production and facility design experience, Ron established his own consulting firm, subsequently joined Bolt Beranek and Newman where he served as a director of performing and visual arts, and in 1978 established Jerit/Boys Incorporated.

off from all natural light. The only light that ever reached the deep cistern was the adventurer's lantern. The catfish in this cave had vestigal eyes only as a reminder that they once were sighted. Evolution supported the theory that without light the eyes are a passive organ. The catfish were left with two laterally placed decorative orbs. No light — no sight, that's basic. Energy in the form of light reveals shape, color, mass, and excites the kinesthetic sense of movement. It is known that the visual mechanism has an enormous dynamic range for light perception. These facts are also basic. For me, there is also the conviction that of the limitless number of raw materials that artisans bring to the theatre, light and its control is, next to the live performer, the most versatile vehicle for conveying emotion, meaning, and plastic space. If forced to choose, I would place light, the actor, and audience at the center of the art with everything else as peripheral.

With the exception of a catfish story, I have not dwelt on the ephemeral or abstract properties of light for fear of giving some readers abdominal pain. The focus has been the systems consultant's need to: evaluate aesthetics, science, and stage practice; endure flim-flam; and develop proficiency in coordinating input with the entire planning team. This stressing of job-related responsibilities should not mask the ultimate goals of lighting systems design for performing spaces. These goals include: the creative use of light to define and decorate architectural spaces and generate audience, space and event spectacle; the imaginative design of systems which provide theatre artisans with the tools they require to shape a performing event out of the sensatious, form-giving properties of light. ☐

American Ballet Theatre production of "Don Quixote, or Kitri's Wedding." Photo by Martha Swope.

They Don't Pay To Watch A Set-Up, Do They?

By Dan Butt, production manager
American Ballet Theatre

American Ballet Theatre is celebrating its 40th anniversary season this year, and it is somehow fitting that this world-famous road company should treat itself to a little birthday present. Not being known for doing anything in small scale, the birthday present was a custom lighting system designed for maximum efficiency and flexibility. Joyce Moffat, manager, and I tackled the problems involved and looked for solutions to them.

The Problem: Electrics load-in and set-up was taking about eight hours. In addition, carpenters, electricians, propertymen, and the house crew all had to share the stage at the same time, making life difficult and tempers short.

The Solution: Build a system that can go in fast and still be flexible enough to do the more than three dozen different ballets in ABT's active repetoire.

The System: 10 torms, 5 overhead electric pipes, 36' of ground row, a 300 circuit patch bay, 72 6K dimmers, a 72 x 5 scene preset console, 28 runs of multi-cable, 4 cable reels, workboxes, and about two dozen floor specials and stands.

The Big Question: When you request a totally custom lighting system of this nature, how do you know it will look and work the way you want when it arrives? The only answer to that big question is — You have faith in your ideas and in the manufacturer.

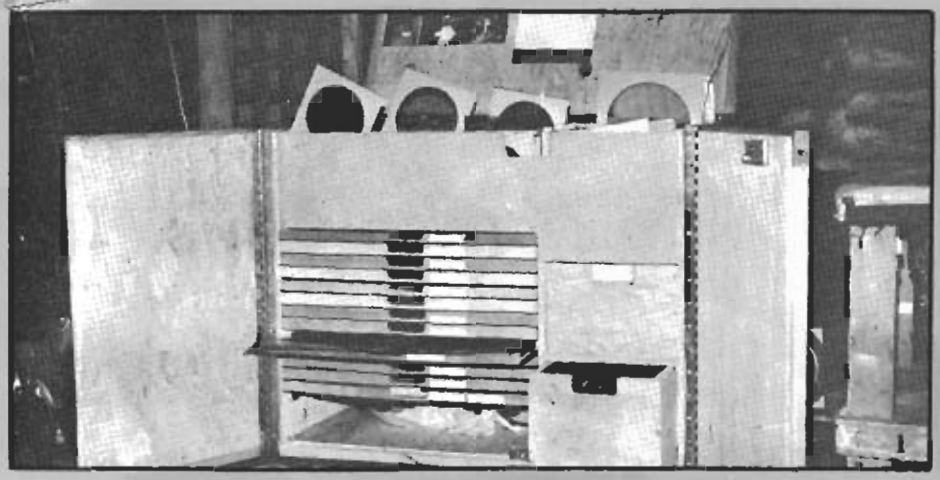
The Test

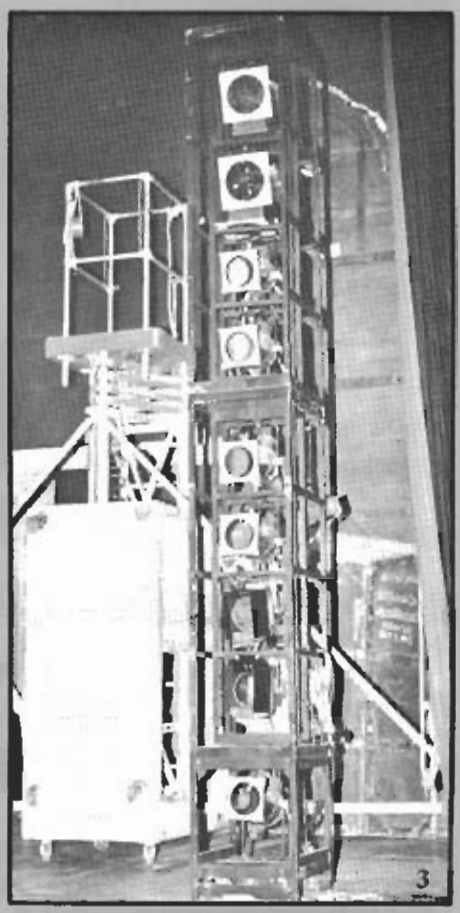
ABT did not have long to wait to put the efficiency of the system to a test. The second city on the tour with the new equipment was San Francisco. The crew closed the doors of the electric trailer (a newly acquired 45' air-ride drop frame) at 3:30 a.m., Monday, March 3, in Los Angeles. The crew hopped on a shuttle flight to San Francisco, expecting to see the equipment around lunch-time that same day. Because of bad weather the trailer didn't show up at the theatre until 2:10 p.m. A Gala performance was scheduled for 8:00 p.m. that same day.

ABT's three road electricians, working with the house crew, had the system up and focused at 6:00 p.m., just three hours and fifty minutes after the trailer arrived at the theatre.

The need for a system of this type was obvious. Since there are very few people who will buy a ticket to watch a load-in, ABT, with very few exceptions, has a policy of doing a "day of show load-in." There are also many times when the stage is shared with a Philharmonic or Symphony orchestra that will use the stage, complete with band shell, in the morning and afternoon. Then the crew starts restoring the stage at 4:30 in the afternoon for an evening performance.

In order to solve our dilemma, ABT had to find a manufacturer that would take all their problems into consideration when designing a system to take on tour. They selected Mater Dei Productions, primarily a dimmer manufacturer, with experience in doing world-wide tours with rock and roll, theatre, and ballet (Joffrey, Ballet West and Houston Ballet, to name a few). The dimmers are designed to tour first, then be adapted for permanent installation. They are modular in design, and therefore any part can be removed quickly and easily for repair or replacement. Of particular interest to ATA was the





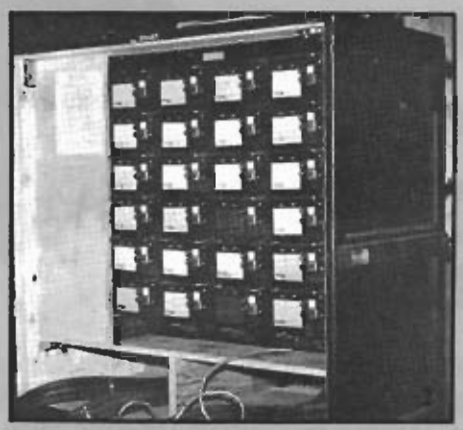
1 *Gel storage and workbox*

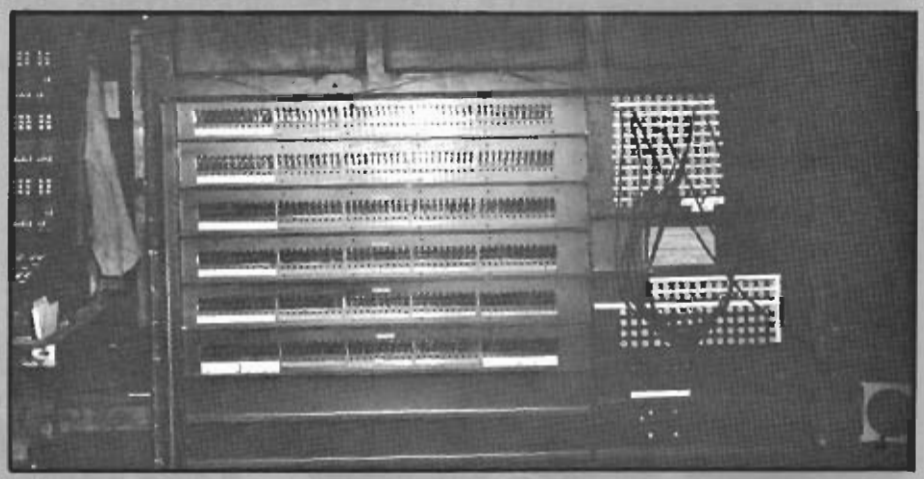
2 *Dimmer rack*

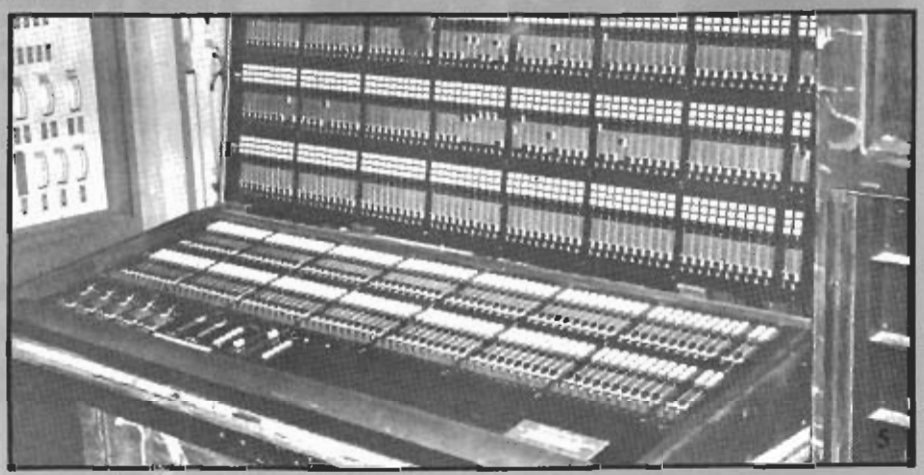
3 *Torms*

4 *Patch bay with circuit breakers*

5 *Console*







Parts of American Ballet Theatre's new custom lighting system.

aluminum construction of the dimmer chassis and rack, which reduces weight and aids in heat dissipation.

ATA received custom equipment. All equipment was totally specified from console size, shape, and orientation to dimmer rack size and back panel configuration. Furthermore, a technician who was totally familiar with the equipment and capable of checking out the entire system accompanied the first load-in and set-up.

ABT's system was made up of several different elements: 1) torms 2) overhead pipe bars 3) multi-cable 4) ground row 5) patch bay 6) dimmers 7) console 8) roadboxes.

Torms

The goal that ABT was striving for was a practical end to the traditional boom, base, and side arm routine. In addition, we wanted a unit that had casters to enable the crew to roll the torm into the wings for changeovers.

The principle of the torm is to mount each instrument (eight plus the shin buster) into a framework so that they are totally enclosed and still have individual freedom of movement. What developed was a modular aluminum torm that was built to travel as two vertical units. Each torm is 14'0" high and 20" x 23" wide. The outer framework allows an electrician to climb the torm and focus or change gels without a ladder.

Since ABT has a great deal of scenery, it was decided to mount all the lighting instruments on an inner frame that pivots within the outer frame. By doing this, each instrument can be focused individually, and all the instruments can move as a unit to slice light off a piece of scenery. This operation can be done from the floor in a few seconds.

All the instruments plug into a plug-in box mounted on the frame. Each torm, in addition to the nine instruments, has two spare circuits to be used for cue, guide or floor lights. The unit lag bolts to the deck. There is no need for an overhead spotline.

Overhead Pipe Bars

The light plot calls for 150 instruments on five electric pipes. The need was to have all instruments pre-hung and pre-wired on light bars to hang on house pipes. Fifteen pipe bars were fabricated from 5" x 2 1/2" structural channel. Each bar is 12' 6" long and has ten circuits with two spares. Threaded "T-nuts" are mounted every 5". Union Connector's flush mount pin connectors (2P&GF-FL) are installed at regular intervals. The multi-connector is mounted on the end. 3/8" aluminum bar stock is bent to make hooks for holding the multi-cable from other bars, eliminating using tie-line.

The final step is to hang the bar from the J.R. Clancy "Sure-clamps". With these clamps all of the electric pipes can be hung and cabled without having to use a single tool.

Multi-Cable

The cable used is UL listed 14 awg 30 conductor that was manufactured to Mater Dei Productions' specifications. The multi-connectors were manufactured by Litton Precision Products in Connecticut. The connectors are military-spec "tank" connector. All cable mounted connectors use a basket-weave cable grip. The connector uses a "bayonet" mount design.

Ground Row

The previous method of mounting their ground rows onto individual wooden dollys was literally tossed out the door. 13' 0" aluminum frames, complete with casters and floor trunions, were built to house two sets of strip lights. A plug-in box is mounted between the two strip lights and they remain premanently patched. There are also spare circuits on each ground row section for floor specials.

Patch Bay

Because ABT's basic light plot has remained the same over the years, it was decided to patch the circuits internally and control them with individual breakers. The breakers are mounted geographically and divided into rows and sections to represent the stage. For instance, the first row has 54 breakers altogether, representing all the lights "in one", i.e. torms and overheads. The group of 12 breakers on the far left present the stage left torm; breaker number one is the top instrument on the torm. The next 30 breakers are divided into three groups, one group for each light bar. The final 12 breakers are the stage right torm.

The reason for this orientation is that the electricians can look out on stage, find a light they want on or off, count instruments, then turn around and count circuit breakers, and they've found the right circuit. All this can be done in a matter of seconds without consulting the plot or memorizing circuit numbers.

Even though the majority of the circuits are patched internally, specials can be assigned to open dimmers through the matrix cord patch. If there ever comes a time when they would need to change the patch for some reason, at least two people can fit inside the patch bay to reassign circuits. Some of these circuits can also be patched over to either the non-dim circuits in the console or to the stage manager's console. The stage manager has two columns of six illuminated push-button switches with submaster and master switches. He can either cue someone in any of the wings or patch something like a fog barrel heater through his console so he knows it's hot and standing by.

The 28 runs of multi-cable plug into the top of the patch bay. The circuit breakers and matrix patch make up one side and the output to the dimmers is on part of the other side of the patch bay.

Dimmers

ABT bought its dimmers and consoles two years ago from Mater Dei Productions. The racks were repackaged to reduce floor space. There are three dimmer racks altogether. Each rack has 24 dimmers mounted four across, six high. Each rack is fan cooled, has cam-lok input, and has a 400 amp main breaker. Two racks have convenience outlets on the back panel. The third has a pin and sleeve device for power to the non-dim circuits in the patch bay. Each rack has four 25' "umbilical" cords for interconnection of dimmers and patch bay. Each cord is a 6 awg 9 conductor with a Litton connector on the end. This cable stores under the dimmers in the rack.

Console

The console is a 72 channel, 5 scene preset, with A-B-C submasters, independent channel, and dipless crossfader. The control snake uses 101 conductor cable with a multi-connector on each end. The cable plugs into a junction box

with the cables from the three racks. Dimmer circuits can be assigned to any console channel through this box. The console also has the capability for a computer interface which would enable it to act as a back-up and manual control memory board.

Roadboxes

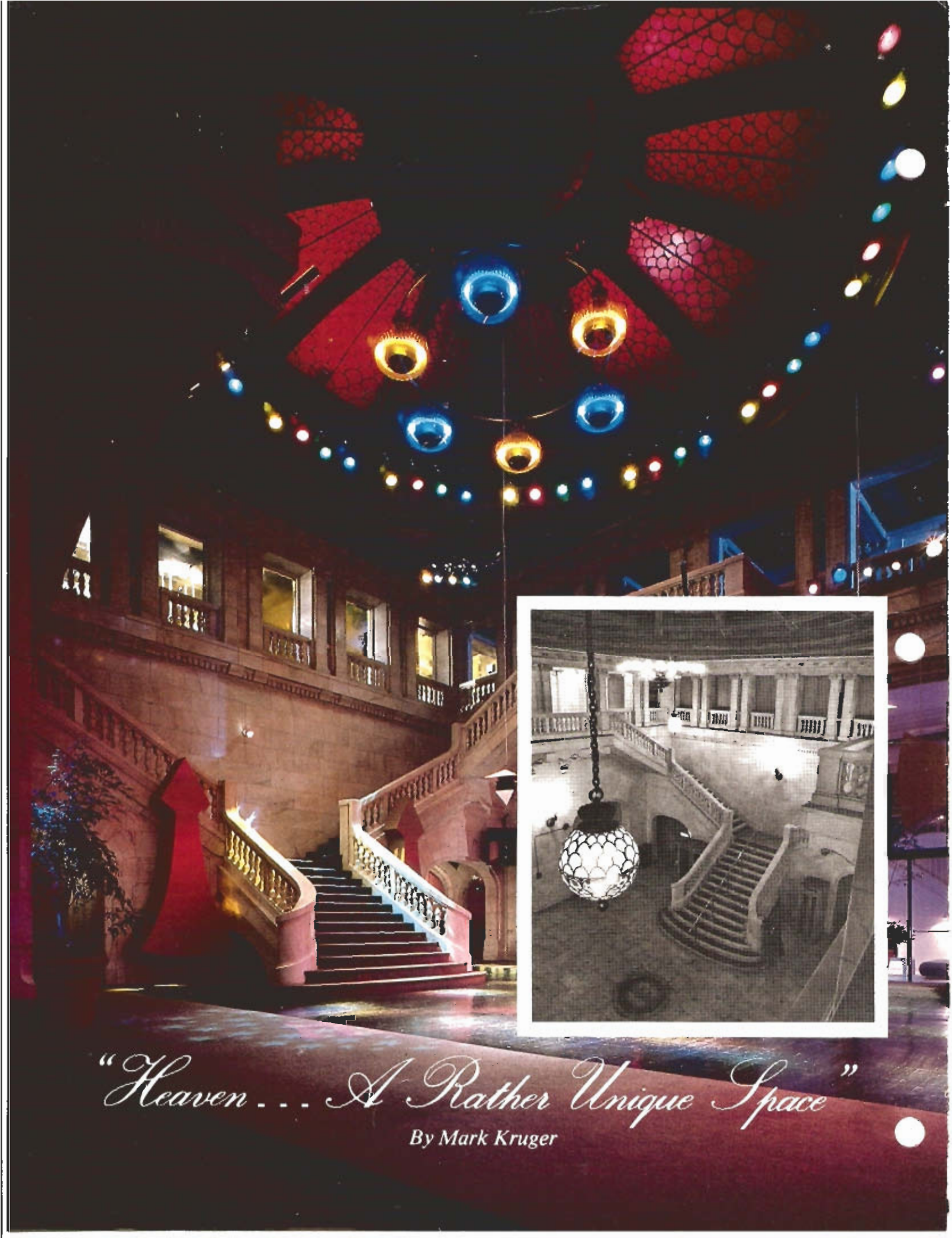
All of the roadboxes employ a very specific design that distributes any shock through the frame of the box rather than into the equipment inside the box. The box has a 5/4" x 2 5/8" frame made of clear pine. The panels use AC exterior glue plywood with a minimum thickness of 3/8". All joints are glued and stapled with staples up to 2 1/2" long. Doors fasten with Dual-Lock fasteners by Simmons Fastener. Casters are a heavy-duty swivel unit with a poly-urethane wheel that resists oil and gravel, something that will ruin a dance linoleum. The caster size is proportionate to the load.

The torms travel in two roadboxes, one stage left, one stage right. The box is 10' long and 45" wide. The over-head pipe bars and the ground row fit into three boxes 13' x 29-1/2". Both the torm and the pipe bars are almost the full height of the inside of the trailer, allowing just enough clearance to travel up a ramp into the truck. The multi-cable fits onto four 45" x 42" cable reels mounted on steel frames (just about the only place steel is used in the entire system.)

The dimmer racks are 66" x 29-1/2" x 42" and are equipped with storage drawers. Two small workboxes were built to house spare gel, the gel for each ballet pre-cut and pre-numbered, and drawers for lamps, adaptors, tools, etc. In addition, a large workbox houses a four drawer file cabinet, large storage drawers for tools, two plot storage drawers, and a drafting board complete with straight edge.

The three dimmer racks, the console, the patch bay, one large workbox, two small workboxes, a spare lamp box, and assorted floor stands all fit in the nose of the trailer over the fifth wheel. Next come the three pipe bar boxes followed by the two torm boxes and finally the four cable reels. Any extra boxes and loose equipment stack on top of the cable reels. All this leaves about 12" on the back of the truck. A couple of load bars and a few straps and it's set to roll.

QUITE A BIRTHDAY PRESENT! □



"Heaven . . . A Rather Unique Space"

By Mark Kruger

In April of 1979 Richard Stern of Stern Entertainment Systems appeared at our offices with a small black portfolio of 8 x 10's...those photos were our first glimpse of "Heaven."

Rick had arranged to meet with us to discuss a discotheque lighting system for a club that he planned to build in the old Fulton Building in downtown Pittsburgh, Pa. The building, currently a 14 story office building, was constructed in 1902 as a luxury hotel. The original designers spared no expense in terms of architectural detail and took full advantage of the building's view of the Allegheny River. Rick had come prepared with detailed photographs of the "...rather unique space" he had mentioned in our earlier phone conversations... the grand foyer and rotunda of the building. Spread before us over the drafting table were a series of shots of what appeared to be a miniature Grand Central Station...soaring Corinthian columns, a spectacular marble staircase, and vaulted ceilings. Crowning all of this was a leaded glass dome in a stippled fishtail pattern.

As we sorted through the pictures, Rick explained his plan to convert offices on the main and mezzanine levels into five bar areas, service bars, an elegant French restaurant, private offices for staff and management, and a video/film screening room. A Certificate of Occupancy would be filed for 2,000 people. The project presented us with a wonderful space and opportunity...we were hooked!

Once we had signed the contracts to begin work and were, at last, viewing what would become "Heaven" in person, the tactfulness we would have to exhibit struck us in full. This was not an everyday disco conversion, and the usual solutions would not be sufficient to create a club equal to the challenge presented by the architecture. As we critically appraised the space, the white marble walls, delicate overall detailing, the bronze beams, and that marvelous dome, preserving the integrity of the room became our major concern...enhancing it in such a way that the turn of the century charm blended with 1980's entertainment technology.

Design Challenge

Unlike conversions of parking garages and vacant supermarkets where the rough edges are smoothed over with flat black paint, industrial carpeting, and "dark" lighting, we were eyeing a totally light reflective room of white marble topped off with an incredible light box of a dome. Creating a mood beyond the architecture would take imagination!

On Heaven's walls there would be no dark tones of paint. Every wall would be treated as the light-reflective surface that it was. The walls would become featured players in the light show. Having made the commitment to highlight the walls, the dance floor took on a different aspect. A typical floor would be a light toned parquet or a milk-white "Travolta" floor. To isolate this particular dance floor and to give it a special treatment, the architect specified black polyurethane surrounded by dark grey carpet. In overview, the room had broken with contemporary disco design traditions, and the visual balance was dramatically reversed.

The three story height of the dome provided us with a greater problem as it ruled out utilization of standard vocabulary discotheque fixtures fixtures such as PAR-36 #4416 pin beams. This type of lamp, used in spinners and oscillators in hundreds of clubs around the country, would not be adequate in either intensity or beam spread from the trim height of 34 feet. The solution involved 12V PAR-56 aircraft landing lights and other high-power long-throw equipment.

Many types of discoteque installations tend to create a "high tech" look with suspended equipment and exposed conduit. At Heaven every care was taken to minimize the exposed equipment and to blend the installation into the architecture. All visible fixtures were custom painted at the shop to match the bronze beams of the dome. HVAC and low voltage control lines were routed throughout the building in concealed runs, often within the walls and columns rather than applied to surfaces. All exposed raceway, gem boxes, and conduit were painted egg-shell white by the local painting contractors.

The extra time and money spent on the details of the environment and installation proved worthwhile: the desired objective of integration was achieved.

The Concepts

The implementation of our design decisions evolved a plot consisting of nine basic elements, as follows:

1) Recessed Floor Strobes;
2) Dry Ice Fog;
3) PAR-64 Color Washes;
4) Dual-Scan PAR-36 Fixtures;
5) Template Projection;
6) Neon Highlights;
7) Dome Washes;
8) PAR-56 Pin Beams;
9) Beacon Chandelier.

The recessed floor strobes, inset around the sunken dance floor, were large Diversitronics 50-joule units, sequenced by the SQ5-6 controller. The strobes fire in unison or sequence around the dance floor, and their location, in close proximity to the dancers, adds much to the "freeze-frame" effect.

The dry ice fog system, installed to create Heaven's clouds, is comprised of three 120-gallon fast-recovery water heaters and five 50-gallon drums. The hot water is discharged via remote controlled solenoid valves into the drums. After allowing a moment for build-up, relay activated fans pump the billowing fog out onto the dance floor through ports at the base of the staircase, from between the elegant exponential bass horns suspended on the column across the way, and from the main landing. The distribution and use of over-sized fans create a waist-high blanket of "pea soup" fog that totally engulfs the dancers.

One important aspect of this system is its economy. As the hot water is poured onto the block of ice and drained almost immediately, the block does not deteriorate in size from sitting in 20 or so gallons of lukewarm water. The block of ice stays intact, ready to be utilized later in the evening for additional discharge.

From the shallow angle of the mezzanine mounting position, we located three circuits of mixed wattage PAR-64's to provide a series of general washes to the dance floor. This equipment serves multiple functions as it is refocused and recolored for special events, fashion shows, etc.

Around the mezzanine level we installed dual-scan PAR-36 pin beams, developed from fire engine signal lights. These cam-activated units focus down to the dance floor and track across the room in repeating "figure-8s." This unique movement is unlike the more standard rotation of spinners and oscillators. As we were interested in penetrating the color wash, we selected a "no-color" and pale amber palette.

Template production is handled by standard 6 x 16" ellipsoidal spots, ganged four to a drive motor that pans the units across the dance floor. Organized in two circuits, the units project a pattern of stars and Heaven's logo onto the dancers, the walls, and grand staircase in broad sweeps. This effect is quite beautiful when combined with dry ice fog, creating an ethereal mood.

Arched tubes of red-orange neon were installed around the perimeter of the vaulted ceilings over the main bar area

and in the entrance way. The four-channel chaser, set to "music advance," is used judiciously throughout the night to punctuate the music and activity.

The dome, with its broad expanse of leaded glass, offers a lighting designer countless options and possibilities. Economics, however, dictated a simple building block approach, with the first basic step being a two-color back lit wash. After some research, the ADB cyc lighting fixture was chosen for its compact size, excellent dispersion, and high wattage capacity. The colors selected were a deep value aqua blue and a ruby red, both in stripped glass media. The beautifully even distribution and deep saturated color provide an excellent basis for future expansion of concepts such as neon lightning bolts, egg-strobe "constellations," etc. It should be noted that the installation of the fixtures and hardware above the glass dome was done by a crackerjack crew of New York "beamwalkers" who braved below-freezing temperatures and other elements...and not one crescent wrench was dropped through the glass!

Encircling the dome we found cast-bronze filigree panels covering potential cove positions that provided us with the only semi-recessed mounting locations in the ceiling. By removing these panels and welding 2" pipe in the coves, we prepared each of the twelve positions to receive four PAR-56 cans with #4543 low-voltage aricraft landing lights. These were to become the heart of the system... brilliant, alomst opaque shafts of animated light streaking down to the dance floor. Control of these units was assigned to a Litelab L-4000Z with keyboard, which allowed the operator to "play" the effect.

At the center of the plot and the dome, we specified a multi-circuit slim profile chandelier of rolled tubing and double PAR-46 police beacons. These beacons rotate in the horizontal plane while the light sources within rotate in the vertical.

The chandelier raises and lowers 25 feet via three one-ton CM Loadstar chain hoists mounted in the cupola. This central piece "plays" the entirety of the space, accentuating the height with its movement and splashing the walls with saturated and animated light.

As usual the client was interested in getting the maximum effect from a rather limited budget. The development of all the ancillary space to various functions put a substantial dent in Stern's overall budget. At various stages throughout the design phase of the project we carefully assessed the cost effectiveness of the desired concepts and the possible components and options that could be used. From the process evolved a plot that was fairly economical with emphasis on control and firepower.

Control

Our assessment of the current and future needs of the club led us to develop the control aspects of the system to a high degree of sophistication. Operator convenience, as always, was a prime goal. All of the controls for the lighting system are within easy reach, and organized according to function and ease of operation. In cooperation with Wesiberg Sound Inc., we divided the fairly narrow booth in such a way that both the light and sound engineers face the dance floor for the bulk of all operations.

With an eye to future expansion, we had the electrical contractor run spare HVAC and low-voltage control cable to all of the major areas of the club where new concepts might be added later.

The console was comprised of three 30° sloped desktop modules at the front of the booth. These E.I.A. racks housed all of the custom and stock controllers for the various effects.

Three Litelab Corp. L-4000 control logics, and one keyboard, provided the basic animation of light for the club. The Litelab units were selected for their reliability and their U.L. listing. The power

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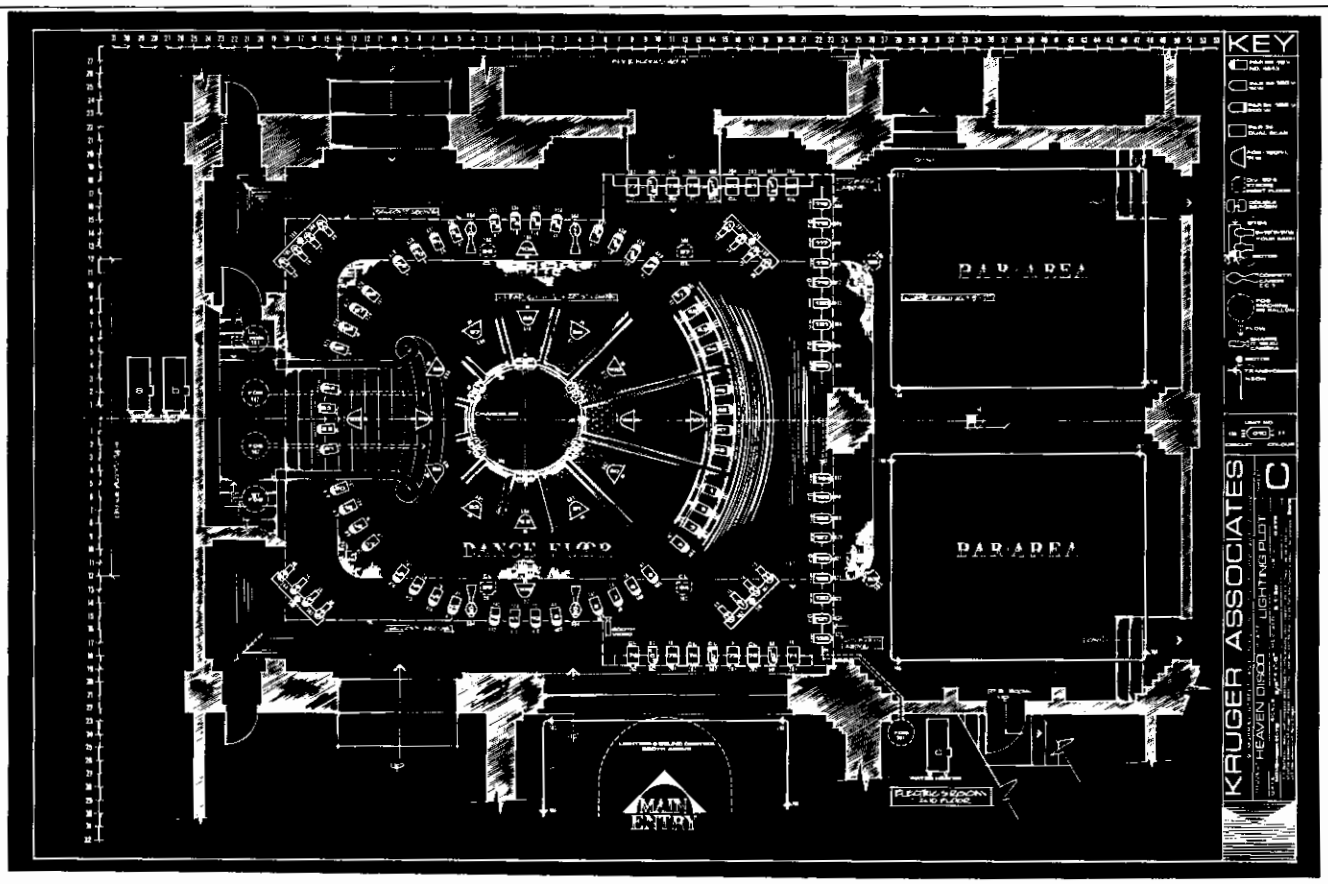

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packs were distributed throughout the space, near the lighting units they were to control. The triacs in some of the power packs were upgraded to deal with heavier loads.

A custom designed non-dim relay switching panel, fabricated by Custom Audio Electronics Inc. of Ypsilanti, Mich., provided mercury relays of mixed 20A, 60A and 100A configurations for bulk switching of effects and lighting.

An 18 channel, two-scene dimmer board, with split cross-faders, A –, B – and C – submasters, and "bump" buttons was provided once again, by CAE. The board also features dual power supplies, a four-band color organ, and a programmable chase module which allows for animation of dimmers and loads. The board powers 16 Grandmaster 1200W dimmers.

The booth, suspended within the entrance vault on heavy thread rod, provided the light jockey with a fairly good view of the dance floor and a somewhat restricted view of the dome above. In the interest of safety and operator convenience, one of our first steps was the installation of a Sharpe IT-25Z CCTV console with the monitor located just above the main lighting console. This allowed the jockey to gauge high trim on winched effects and to see the light sources ringing the dome.

Conclusion

The construction of the club took three months. Opening night turned out a capacity crowd who got the full treatment in terms of light and sound. It was a tremendous success. The club has gone on to become the in-place in town, which is gratifying in itself.

The real challenge of Heaven was to resist the very human urge to change things, to put an indelible mark upon the space that says, "this is us." Our aim was subtler, and by designing only what the room could artfully handle we made an even greater impact.

Heaven is enjoying tremendous success and public acceptance in the greater Pittsburgh area. Along with its contemporary dance format, the club has featured "Big Band" evenings, ballroom dancing, the Steeler's Super Bowl Party, and, believe it or not, even a wedding or two.

Plans are currently being discussed to celebrate the club's first birthday with a gala "reopening" party, featuring new lighting and effects to enhance and refresh the visuals for the disco-files. And so, we look forward to our second trip to Heaven.

About the Author

Mark Kruger is director and principal designer for Kruger Associates Inc., a New York based lighting and scenic design firm He graduated from New York University School of the Arts with a degree in Scenic and Lighting Design, and did postgraduate work at Polakoff Studios. Mark's design credits include the South American tour of New York Pro Musical Concert Ensemble for the U.S. Dept. of State, and Resident Lighting Designer for the American Heritage Festival and the Great Lakes Shakespere Festival.

He has provided lighting and scenic designs for such artists as Barry Manilow, Kiss, Daryl Hall & John Oates, Jeff Beck, Todd Rundgren's Utopia, Parliment/Funkadelics, and Mahavishnu Orchestra. Discotheque credits include N.Y.C.'s famous Studio 54, "Emmanuelle's" in Columbus, Ohio, "Heaven" in Pittsburgh, Pa., "Sultan's Cabaret" Akron, Ohio, and "Paradise Garage" in N.Y.C.