

## Hertford Theatre technical equipment ERPB1



### HERTFORD THEATRE

### PROPOSAL TO INCREASE THE TECHNICAL INFRASTRUCTURE 2013

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#### **Brief description of the technical infrastructure within Hertford Theatre.**

After the refurbishment of Castle Hall into Hertford Theatre the demands on the technical infrastructure within the building have changed significantly, primarily away from tribute bands and the like to a higher calibre of shows along with our own pantomime production, as well as an increased use from hirers.

The incorporation of a digital cinema in the restoration project did give some scope to improve the technical infrastructure within the theatre from what was in the building previously.

The cinema demanded a high quality sound system, and as part of the overall package was designed to be multi-use in terms of delivering for the cinema but also for live events, this saved having two separate systems in place. This gave the theatre a quality sound system capable of delivering the needs of the cinema in whole and the live shows but only in part, as the rest of the sound installation applicable to this side of the theatre was unchanged and not invested in.

Apart from the addition of a new lighting desk which was born out of a need to acquire one for the newly developed studio space, which saw the existing lighting desk relocated to the studio and a more advanced desk capable of handling moving lights was acquired for the main theatre space, this was paid for jointly out of money set aside to equip the studio with a desk and taking some out of the first years pantomime budget.

Whilst generally the theatre is fairly well equipped with a reasonable stock of lighting and sound equipment, some of the equipment within the theatre remains unchanged and old, nearing the end of its useful working life, while there is a need to also expand the equipment in both the sound and lighting areas. These include the multicore cabling and stage boxes for the sound system incorporating new video and data infrastructure, replacement of the old follow spots, extra dimming power for lighting, as well as equipment we need for pantomime.

The current equipment budget, now with the additional demands of an extensive programme of events and the cinema placed upon it is insufficient to make any real changes to the technical offer within the theatre. The theatre runs at a much higher percentage of use compared to the days of old (whilst the budget remains roughly the same), consequently the draw on the budget for things such as stage lamps and consumables has increased and is far greater than it ever used to be, this is exaggerated by the need to keep a spares for the cinema projector. As the use on equipment is greater so is the need to spend more to keep everything up and running.

We have made some small advances over the last two years to add to the existing technical areas of the theatre and to bring some bits of equipment up to date as they approach the end of their lifespan. Some equipment has had to be replaced in the instances of CD players etc, or repaired as and when it has failed. One large investment we made last year which was long overdue was to buy new stage drapes for the stage but this put incredible pressure on the budget to take care of equipment breakdowns and general day to day purchases.

I cannot see how we can improve the overall technical offer of the theatre and consequently the quality of the shows that come through the theatre without any significant funding to support the purchase of some major key elements of technical equipment.

We do require additional equipment to be able to operate the pantomime successfully that has to be hired in every year as the theatre is not equipped with these bits of tech, these include a cue light system, good communications systems, hazer and moving lights, these hire costs with undoubtedly increase year on year.

As we currently hire such items in, we have in fact over the course of the last three years paid for the proposed moving lights outright, as well as going a long way to having paid out the amount to cover the cost of a new hazer, communications and cue light systems. This means if we continue to hire these items in, we are in my view wasting money that could be utilised elsewhere or on other areas if we had enough money up front to buy these items outright, which of course we don't. In terms of the pantomime more specifically and other shows generally these items of technical equipment are critical to the successful operation and delivery of the shows but are 'blind' to our audiences as they only see the 'bells and whistles' of any show and if we didn't have to spend so much on hiring tech equipment in we could spend more on the things that matter to the viewing public, such as pyrotechnics in the instance of the pantomime which can be seen by all and can add an element of turning the show into an amazing show rather than just making it a great show.

## **Proposal**

The proposal is to upgrade the rest of the sound system that has not been upgraded since first installation which in the case of the wiring would be as much as 30 years ago. This would then make the system as a whole complete which would need no further investment for many years.

Other areas to include that would benefit from investment would be the lighting system and communication systems within the technical areas as well as to buy some equipment that has been lost over the years due to becoming either worn out or unrepairable, these are subsequently listed in the breakdown that follows.

## **OUTLINE PROPOSAL UPGRADES**

- |         |   |
|---------|---|
| Item 1. | Sound desk  |
| Item 2. | Multicore patch bays(analogue)/stage boxes(digital) |
| Item 3. | Outboard rack                                       |
| Item 4. | Front fill speakers                                 |
| Item 5. | Q-Lab macbook                                       |
| Item 6. | Video & data lines                                  |
| Item 7. | Float microphones                                   |
| Item 8. | Radio microphone capsules                           |
| Item 9. | Lighting dimmers                                    |

- Item 10. Followspots
- Item 11. Moving lights
- Item 12. Hazer
- Item 13. Radio communications
- Item 14. Cue lights

### **SOUND DESK – Digital vs. Analogue**

There is a case to be put forward for each type of desk but we have to decide what works best for Hertford Theatre in both monetary and operational terms as well as the long term projection.

#### **Analogue desk**

The down side with an analogue desk of the proposed amount of channels will be its physical size compared to a digital desk that has the same capabilities. It will take up the entire work platform that is currently used as a sound platform thus limiting any extra equipment other users may bring in to aid their show support. The laptop can be positioned on a small shelf support above the desk at hand height (this shelf is already used for this purpose for laptops and CD players).

The Analogue desk will require considerable multi core cabling to the stage areas of high quality and considerable lengths which are quite expensive. The installation time is also very lengthy for this infrastructure.

The desk will require what is termed 'outboard' equipment to give the sound engineer full scope of creating the desired sound, this would include separate graphic equalisers for the main speakers and foldback or monitor speakers, effects units to create reverb and such like effects, feedback destroyers if found to be necessary, compressors, and gates again if necessary, these will add up to a small sum – although the theatre does already some of this outboard equipment. We would need to purchase extra outboard equipment.

Playback equipment such as CD players, MP3 players and minidisc players are needed equally for either type of desk, and again the theatre already owns these, nothing else would be required to be purchased.

The analogue desk takes longer to plug up in the instances of it being removed and reinstated for touring engineers bringing their own desks in for their show, although with the proposed new looms there would be no patch panels to worry about as these would not exist.

The desk would need very little instruction on use to hirers coming in on a hire or for a show as most people can quite easily use these types of desk especially with as little as 5 minutes tuition in the cases of some dance companies.

The analogue desk purchase price is considerably cheaper than a digital desk but this is offset by the cost of the cabling which is very expensive.

### **Digital desk**

These are more expensive than analogue desks but are physically smaller in size thus being easier for one person to move easily and taking up a smaller footprint on the table top.

The sound is transmitted down a fibre optic or Cat5 cable down to stage where it terminates in a stage box that has the traditional XLR input connectors, this cable, although not cheap is significantly cheaper than the multi core cables of the analogue system.

As there is only one 'data' cable the desk can be ready to use in a mere minute or two compared to 5 or 10 minutes of an analogue desk that requires plugging up.

The desk has all processors and effects built in so there is no need for any outboard equipment at all, thus saving space and allowing a smaller rack to be used for playback only.

The main thing about a digital desk is its ease of use – or lack of, we would need to have palettes stored in memory ready for playback so that the desk would effectively be ready to use, these can be recorded for each user style (much like a lighting desk) so that each technician would have his 'own' settings so that he is familiar with the desk setup and fader layout. Most people who would use the desk either be it a visiting engineer or one of our hire companies would potentially be unfamiliar with its operation and would draw on the technician to show them how to use it and where everything on the desk is accessed, as everything is layered on a small amount of faders. This would require the house tech to show the sound operator how to use the desk which would take an amount of time more than an analogue desk.

The other point to note is not all of our hirers would want to use a digital desk and some would and do bring in their own analogue desk for their shows which could then be quite easily plugged into the patch into the amps.

Also to note, as some of our shows are operated by one technician then it is necessary to locate both a sound desk and lighting desk on the sound platform together, which is achievable with a digital desk but would require the larger analogue desk to be removed and replaced with a smaller analogue desk.

### **Sound**

Items 1&2.

The main area that needs to be brought up to a high standard demanded by our promotions and hirers alike and the increased quality of current shows compared to those of the castle hall era is the sound system. The cabling in the building has reached a life term of just over thirty years old, this is the audio lines that link the stage to the control room and control

room to the sound desk position via a 'telephone exchange type' patch bay, these cables are of an inferior quality which causes sound related issues of reliability and some interference because of poor screening on the older cables, some of the cabling has been added to over the years to try to increase the capacity of the system because of demand from users but this has been done using cheaper grade cables, again causing quality problems. The proposal would be to look into replacing all existing cabling with high grade multicore cables terminated in much increased size of stage boxes allowing greater flexibility for users. To reduce the need for cables to route via the control room from the stage (thus saving on extra cable and subsequently, cost) and to terminate at the sound desk instead thus saving on the need to cross patch and countless trips up to and down from the control room to set things up. To increase the audio lines from 24 as is currently to 48 and to include 'return' lines from the stage to the desk. To also incorporate some floor mounted positions in the forestage apron to allow direct connection to the sound desk for microphones on the stage edge.

Although the sound desk is a little over two years old and out of warranty now, has had a small catalogue of fixes in this time needed to it because of failings, this does not inspire confidence when using it and had to be replaced temporarily for the production of Dick Whittington due to a fairly major fault with its main outputs. The need to replace it with a larger desk of either analogue or digital properties is deemed necessary which has been highlighted, not only for our pantomime but Hertford Dramatic and some visiting companies that use the in house system as requiring more channels to fulfil the sound requirements and to allow these productions to realise their full potential. In fact the desk has now developed a major fault with its main output and has been removed from use and needs to be replaced.

Breakdown of proposed audio cabling for an analogue system only

- Minimum of 48 audio signal lines from sound desk to stage
- Minimum of 24 audio signal return lines from the stage to sound desk
- 8 signal and 4 return audio signal lines to pop up floor outlets in forestage
- 2 microphone lines to foh truss for float microphones
- 12 signal tie lines from the control room to stage
- 4 Speaker return cables to stage from foldback amps
- 8 signal tie lines from control room to foh bridge
- Cat 5 and VGA from control room to stage
- Cat 5 and VGA from sound desk to stage
- Cat 5 and VGA from sound desk to foh bridge

- Cat 5 and VGA from sound desk to foh truss
- 6 BNC video lines from control room to stage
- 2 BNC video lines from control room to foh bridge

#### Item 3.

To upgrade the existing sound outboard playback rack to allow the extra equipment needed to be mounted.

The rack to include.

- A power regulator to protect all the sound equipment outside of the control room at the sound position from any surges of power that could potentially render the equipment useless.
- A patch panel to allow connection by cable to the control room and to accommodate the communications lines, DMX, data and video lines
- Rack draws for safe storage of patch cables and connectors

In the instance of an analogue system to also include:

- The installation of a compressor for sound reproduction
- The installation of a several dual band graphic equaliser for monitor speakers on stage
- The installation of a dual band graphic equaliser for the centre fill speakers
- Other outboard equipment as required

#### Item 4.

To install speakers mounted behind the front fascia of the apron with a grill to cover them to give 'front fill' sound reinforcement to the centre section of flat floor seats at the front of the auditorium that presently suffers from a blind spot area of sound. These would need their own amplifier and associated cabling.

#### Item 5.

To purchase an apple Mac laptop computer to sync up to the sound desk incorporating Q-Lab software and licence to allow sound playback to be run through the sound system. This is industry standard now as the use of CD's and minidisc has but almost died out as everyone is turning to computers to record and run sound effects and music. CD's are notoriously problematic due to the simple fact that they do get scratched and some home 'burnt' recordings do not play on our cd players as the format is sometimes not compatible. The use of a laptop means we can take a selection of music given to us by someone or dance company and literally in minutes rip it to the computer, arrange it in an order that is

required ready for seamless playback whereas a CD or minidisc would need to be re-recorded in real time which is an option that is usually not available due to time constraints.

This would also mean that we do rely on any incoming engineers to have to use their own laptops which may or may not be up to the job.

The added benefit of the software means that video content can be linked to be run off the sound software allowing us complete flexibility and seamless show operation with video content used on a show.

Item 6.

There is a very high demand for video reproduction within shows and presentations now and is constantly growing. To aid ease of setting up for laptops and projectors alike to include data and video lines to run alongside the audio infrastructure within the auditorium/stage areas. At present we are frequently running long lengths of data or video cables through the roof space or along the side of the auditorium to the stage to facilitate the operation of such equipment, which is time consuming and in the case of being in the auditorium quite unsightly.

Item 7.

To include in the package four high spec float microphones to pick up sound from the front of the stage, lecterns, above choirs or orchestras. These are used quite frequently and although the theatre does not own any of this type this means that we frequently have to advise users to hire these in. These will allow us greater flexibility and greater results for show amplification and will become a hireable item to user groups should they require their use.

Item 8.

To buy some top quality radio microphone lapel capsules, presently we have a stock of some cheap grade capsules that are designed as single use and are currently still being used after two years, these not consistent with good sound reproduction or even when compared to each other differences in sound are significantly noticeable.

## **Lighting**

We are suffering increasingly frustrating and growing problems with the frog2 lighting desk which was purchased in 2010, this has been found have a problem between the hardware and software. The desk automatically saves data to memory periodically using a function called autosave, this is becoming increasingly slow to execute causing the operator to stop and wait until the save is complete, more importantly we are experiencing more and more that the desk is crashing, this will lock all functions of the desk and no fader or keypress will be allowed thus rendering it in a state of suspension. This is happening during programming and playback during shows compromising the show. The impact of this is the lights remain in the state they were when the desk crashed until the desk is rebooted and



the operator regains control, this process takes about 2 to 3 minutes, not too much of an issue during programming but still extremely frustrating and obviously during a show is a potential show stopper.

Zero88 have said that although the desk is fairly new, our one has the first generation of hardware installed and subsequent software updates have apparently superseded the capabilities of the motherboard, these software updates cannot be reversed as they incorporate bug fixes and improvements to the programme software. The only solution to remedy this is to either pay for a hardware upgrade (includes new motherboard, compact flash drive, memory batteries and software) or to look into purchasing another lighting desk of a newer model). The cheaper option is to go for the upgrade kit whilst still maintaining our knowledge of this desk. A different desk will require training and familiarity. We have been assured by Zero88 that the upgrade kit will solve all our problems but one can only assume this is correct and that there are no further issues in the future with this desk.

#### Item 9

To provide more dimming power on stage to allow greater flexibility for lighting a show and to give more circuits to both floor level lighting and lighting bars alike. At present due to the requirements of a lot of shows there is an increasing demand on lighting at floor level and currently the theatre only has the facility of eight circuits at this level meaning very time consuming cable management from one area of the building to the floor positions in question and this has to be laid in for each show and stripped out after the show, again making for a longer working day.

The proposal is to install, in a movable flight case a series of 12 way digital dimmers (to match the existing digital dimmers) one in the stage right wing, this would be terminated in a multipole socket allowing either direct connection to the dimmer of a 12 way socket 'breakout' in situ or a longer link cable (socapex) to allow the end circuits to be placed where desired. This would need no additional power in this area as there is already a 63 amp three phase supply on the wall. Two 12 way dimmers to be placed on the juliet balcony high up stage left where the current lighting bar cables patch into the existing dimmer outlets, this would allow a greater flexibility on each of the two upstage lighting bars (where presently one has only 10 circuits and the lighting has to be paired on the bar, which again is not in line with some show requirements) this would also allow a long drop multipole cable (socapex) to drop down to stage level stage left again for floor circuits this side of the stage. This would require an two additional extra power supplies to be run in, again 63 amp three phase. We would need property to facilitate the installation of the power supply to this location, the distribution board in the basement for the stage dimmer rack has two spare circuit breakers already installed so would just require cable and wall socket on the balcony. These dimmers would also need DMX data to be located in this position to allow the dimmer packs to connect with the rest of the dimmer system.

The possibility of an additional 6 way dimmer on the front of house bridge, allowing for more lights to be positioned in these areas.

#### Item 10.

To purchase two new follow spots. The current Strand follow spots are very old indeed and long past their expected working life, they are very cumbersome, power hungry, the workings on them are stiff and in some case not functional, they have limited focus, they can only accommodate one colour at a time in a large frame meaning changing between colours is either avoided or it becomes a fiddly task in the dark, the large frames mean extra expense when using colour gel. They have limited movement in their current position on the lighting bridge due to their size meaning the very front of the stage is out of their useful range. They are removed from the bridge to the back of the auditorium for pantomime meaning (due to their weight and size) an unnecessary amount of effort is involved in facilitating this.

In fact the two old follow spots are now attracting retro status along with many lights from that era, and I have seen some on eBay after refurbishment being offered for around two thousand pounds apiece once converted for domestic use, we could potentially sell these and if lucky may get a return of around £700-£800 each in their current state.

It is proposed to purchase two smaller follow spots that are much lighter in weight and have better heat insulation on the handles that are used in operation. These would have an added advantage of allowing us to position them more effectively on the lighting bridge to allow the full area of the stage to be within their operational scope. These would be a discharge lamp version thus reducing the power consumption compared to the present day units whilst having an increase in light output, lamp life would be considerably extended compared to standard halogen bulbs that we currently use. The follow spots would come with integral colour magazine frames fitted to the front of the light, ballast for the lamp and tripod stand. To fit sights to each follow spot so the user can position the light using an infrared beam to pick out the actor in total darkness ready for their cue to switch on.

#### Item 11.

To purchase some moving lights, due to the very high price of these units new (around £5,000 each) I would look at having to purchase used units, this may sound like false economy but chosen carefully would be a good investment. These units are fully refurbished before they are sold and the units in question are very reliable industry standard fixtures. This would mean a cost saving in the technical budget for pantomime as we would not have to hire these in which usually amounts to the bulk outlay of the budget in lighting. It would also mean that the technical team would have far more knowledge of the lights in relation to the lighting desk and as familiarity throughout the year from all would result in a far smoother operation for lighting the panto. These could additionally be hired out as extras to the lighting rig for the likes of dance companies that would need something a little more special than the general lighting we carry. Some theatre company users do actually hire moving lights in for their shows so we could offer these as another source of revenue, all be it quite modest.

#### **Ancillaries**

#### Item 12.

Haze machine, currently the theatre does not have one as the previous one had broken twice and needed repair, the second time the manufacture advised it was not economical to repair it again, it also had a heavy usage of fluid.

Having seen and used pretty much every brand on the market and comparing purchase cost and more significantly running costs of fluids, especially this last year's panto where we had to hire a machine in, the cost of the fluid was quite considerable. If owned we would save around £400 to £500 out of the panto budget yearly in terms of having to hire one in.

The proposal is to buy a very good quality haze machine at a significant cost that will last, the make that was demonstrated to me is a very reliable and known brand leader in the event, theatre, film and TV world - Peasouper, in fact, apparently it is now the standard use machine by the BBC. This has a fluid based chamber that is injected with CO2 to produce a very fine mist haze, just a minute or two of hazing, once dissipated will hang in the air for a couple of hours and is almost invisible to the human eye except where light beams intersect it, so you get the effect the lighting designer wants but without creating that FOG look. It will, if required produce a dense smoke field that will disperse relatively quickly if desired.

#### **Communications.**

The theatre currently owns 6 communication sets that are cable linked into a wall plate, these allow the technical team in differing working areas to communicate between each other on a closed circuit, currently they do suffer from minor repairs needed to each unit but as they are robust they are easy to repair at a relative small cost.

#### Item 13.

To enhance the communication infrastructure in the theatre to allow for the use of radio headsets, thus freeing up the technician who is restrained by a cable link to a fixed position, this will allow freedom of movement for the technician to carry out scene changes as well as completely removing the possibility of tripping over the cable or the cable potentially catching on something, this would be especially true of operating in the fly floors and roof space areas. It would also allow the stage manager to attend any issues outside of the stage area whilst still maintaining constant contact with the production.

To facilitate this would require an interface to connect to the wired system and radio transmitter belt packs and headsets. There would also be additional items as a once only purchase such as a battery charger and a set of spare batteries.

This is one piece of equipment that is necessary for our pantomime and is hired in annually for the duration at great expense; the amount is in the region of £600.00 for five weeks.

#### Item 14.

To install a cue light system to all operational areas used in a show backstage to allow users to take cues without a verbal instruction where is sometimes necessary, it also allows

for continual running of a show should the communications system go down or power to it be interrupted.

The proposal is to install a 16 way master station on the prompt desk with 12 outstations at the relevant points around the theatre, the system will allow easy expansion to accommodate 4 more outstations in the future without the need to upgrade the master station. Cable will be necessary to facilitate this but as the system proposed will allow outstations to be daisy chained from one another this will save on cost of cable runs and installation time as other systems require each outstation to go directly back to the master station individually. This would also be a cost saving for pantomime both in terms of hire spend and time taken to run the system in and to take it out again at the end of the run, which is very time consuming.

### **Installation.**

The proposal for the installation of the upgrades outlined would be taken in-house in the respect of the vast majority of the works with the exception of a few items that we would require support from the property department.

Item 1.

No specialist interaction required.

Item 2.

It is proposed to take on board all the sound and signal cabling in house, mainly for cost saving purposes, quotes can be sourced but we would expect to pay in the region of £2000.00 to £3000.00 for an outside contractor to come in and complete these works in terms of installing infrastructure for an analogue system.

The sound signal cables would have to be run in through the roof space, after the existing ones are stripped out, the ends of these cables to be terminated in stage boxes made up by us to exactly our requirements, the stage boxes are expensive to have premade to specific requirements and no off the shelf items exists. Estimated time to complete all cable works including box and patch bay terminations, two weeks.

Estimated time to complete installation of a digital system would be one to two days as this just involves running a handful of Cat5 cables.

Item 3.

The outboard rack needs nothing other than swapping the equipment out of the existing rack and fitting to the new rack along with the other additional equipment. Estimated time to complete works is one day.

Item 4.

The front fill speakers, again can be installed in-house, once a site has been located for the amplifier, if required may need an electrical supply for it somewhere in the stage area but we would look at using the existing supplies that are available to us already in situ, simply plugging into an existing 13 amp outlet. Estimated time one to two days to complete works.

Item 5.

No installation required.

Item 6.

The data, video and lighting signal cables can be ordered in pre made and terminated ready to just plug into the rear of the patch panels. Estimated time to complete installation would be two to three days.

Item 7.

No installation required.

Item 8.

No installation required.

Item 9.

The dimmers would be delivered readymade to our specification and would just require flight casing up or bolt to the wall in a rack. The DMX lines can be run in as and when we have some down time, estimated time to complete DMX cable works, one day. The mains supplies to be installed by property from the dimmer distribution panel in the basement to the desired location as the circuit breakers are already installed from the previous overhaul of the digital dimmers.

Item 10.

To remodel the mounting brackets on the lighting bridge to accept the new spigots. This can be achieved in-house.

Item 11.

No installation required.

Item 12.

No installation required.

Item 13.

The only installation required would be a simple interface to be plugged into the existing master station.

Item 14.

The cue light system to be installed in-house, these systems run on a micro-voltage arrangement and subsequently can be installed using microphone cable linking each outstation to the master station located on the prompt desk. Estimated time one to two days to complete installation.