Ft Hood, TX

## BES Scoring replacing BOSS and new Masking Units

48 lanes

Day 1 – Monday, October 28, 2013 – Arrived and unloaded tools and stored inside the center. Truck arrived and we unloaded stored in correct places, and inventoried all items. The order had DUAL bowler's scoring terminals and the current configuration is individual terminals:

The settee area is concrete with a 16″ drop at the start of the approach for the lanes footprint. Here (below) is a picture taken from under the ball storage rack toward the settee area showing the solid concrete settee area which has two conduits for running the bowler's terminal cables to each of the bowler's terminal pedestals:

There is no way to run the bowler's terminal wires for the new equipment without running the wires over the floor, or trenching.
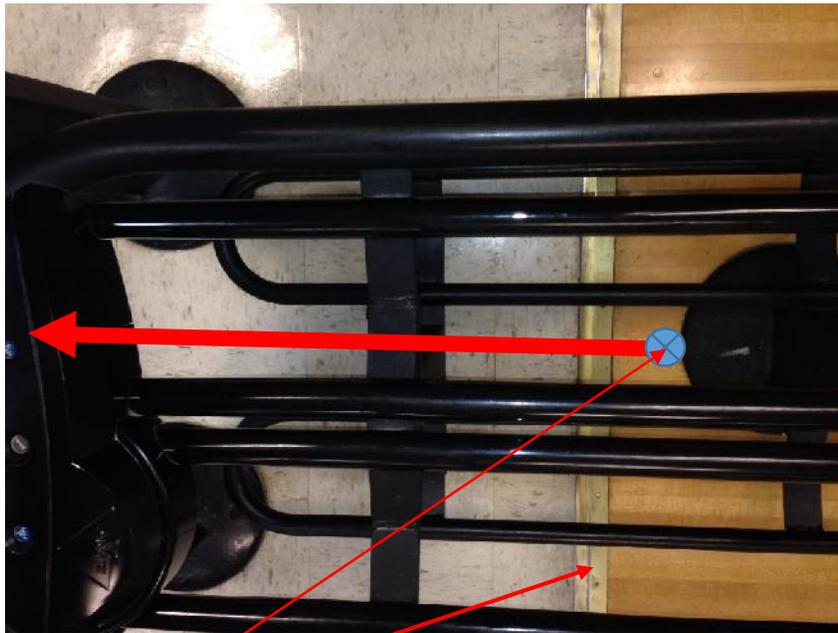
A hole could be drilled here   and wires run over-ground in a channel, but it would be difficult to make it look good since the threshold separating the approach from the settee tile is a significant drop-off.   I called Richmond and sent pictures and I informed the Manager, Melissa Hanson, of the issue and she was very opposed to a wireway and indicated that she would rather pay for 48 SINGLE pedestals and return-for-credit the 24 DUAL pedestals. My phone died at this point. We began installing the high end 4HD CPU's and mounting brackets to the monitor mounting brackets on lanes 25-48. I went to Home Depot to get some supplies, and the

mechanic stopped my people from working while I was gone, until we decide what the final situation would be regarding the pedestals. Daily hours: 9 (me) + 18 (skilled workers) = 27. Job hours: 9 (me) + 18 (skilled) = 27.

Tuesday, October 29, 2013 – We were not permitted to work by Ft. Hood.

Day 2 – Wednesday, October 30, 2013 – All systems go again. We finished all 48 lanes of installing the 4HD CPU's onto the mounting plates and installing both onto the Monitor frames. We ran the high side QDAK intercom phone cord from the QDAK location on the curtain wall to the front desk where the high end intercom phone will be located. We ran all home runs for the high half, back to the ScoringNet/Intercom Master Switch location in the back office. Three solid copper home runs were installed: two for slave ScoringNet Netgear switches – one for lanes 25-36 and one for lanes 37-48, and the third home run for the high side intercom Q-DAK. We ran 2 Cat-5 cables from the back office server location to the front desk for ConquerorNet to the two front desk work stations. We ran two additional Cat 5e cables from the back office to the front desk (cables only <Cat5e cable I purchased> - without RJ45 ends), just in case they need them. The Server and the Back Office Computer will be side-by-side in the back office. The Master ScoringNet/Intercom switch, the Conqueror Linksys switch and the Fortigate, will all be near the Server in the back office. The two Cat5 cables to the front desk will supply the Front Desk computers with ConquerorNet and the extra two that I ran can network the printer and leave a spare. We wired all of the ScoringNet on 25-48. Two Netgear slave switches, serving 12 lanes each, and the Cat5 from the Netgear switches to each 4HD Hub location for each lane pair. We tied wires neatly. We installed and wired the solid copper home run junctions for the two slave Netgear switches on the curtain wall. We installed the solid Copper home run junction for the QDAK on the curtain wall. We installed the QDAK on the curtain wall in the center of the high end. We plugged-in the intercom QDAK end of the intercom phone home run wire to the QDAK. We ran a short Cat5 Patch cable from the QDAK to the solid copper junction and ran patch cables to the ScoringNet Netgear switches to the solid copper junctions and tied the wires for all neatly. We cleaned-up completely and discarded all trash. Daily hours: 9 (me) + 16 (skilled) = 25. Job hours: 18 + 34 = 52.

Day 3 – Thursday, October 31, 2013 -

We removed all Boss for 25-28 and installed all BES. They are ready to fire up once all back office and front desk computers are installed. We installed the Solid Copper Home Run junctions in the back office and tested (good). We ran all front desk wire to the needed locations. We installed the Server in the back office. We had a prolonged conversation with management concerning the wireway from the hole we drilled in the approach lamanent, behind the ball rack support pedestal, to the new BES dual bowler's terminal pedestal. I had bought two wireway options, neither of which were acceptable to management. I asked what they wanted and a feasible option was conveyed to me. I bought only 1 pair worth of options I felt would work, so no big deal that they didn't like either. Management called upon their Electrician's expertise to help solve the issue, and we agreed on a proper wireway, which I agreed to search for and purchase. The electrical situation for power to the existing monitors was not addressed by the Center, and we made a deal, that I would rectify the Monitor Power situation, if they would provide the 2x4 boxes to install to code. The old system (monitors) were turned on/off by Boss. Accuvision monitors are powered by old style "computer" plugs – not normal 3-prong. We must

use the existing pigtails to the Accuvision, but incoming power is hard-wired. So a box between hard-wired incoming power and Monitors must be introduced to allow BES to work (to code). Concerning wireway situation, I went to Home Depot (2) and Lowes (2) and could not find the EXACT configuration of wireway conduit that the Center wanted, but got close. I bought enough of the EXACT wiremold they wanted to do some of the house (not all... hedging bet), and I will show the Center what was available, and ask them to provide the few unavailable parts of their ideal finished product desired, and ask their advice regarding next move. I think that the Post Electricians can provide me with the "exact" unavailable components, which I will gladly install (like the 2x4 boxes for the electrical that they neglected to address in accord with the electrical requirements for this job). Daily hours: 12 + 16 = 28. Job hours: 30 + 50 = 80.

Day 4 – Friday, November 1, 2013 – Today was the day to get ALL THINGS current, so we can simply rock 'n roll through conversion from Boss to BES. We installed ALL front desk (2), server, and back office computers and ran internet connection wires (2) to the center's internet connection. We ran one permanent connection to the Fortigate and a temporary connection to the Server so Fortigate could be configured. The assigned Team Viewer number for the center was 475 302 981. We bought and installed the 2x4 boxes to power the Accuvision Monitors to code, which center failed to do, and it worked great. We fired-up everything, and all systems communicated great! We bought the wiremold that the center wanted, but the end fittings were not available, so we installed what was available on the BES lanes and showed to the Manager for approval:

It wasn't EXACTLY what the Manager wanted, but what she wanted was <u>unavailable</u> at any of the four supply stores where I shopped, trying to find the exact configuration they wanted. The Manager liked the finished product very much even though it wasn't exactly what she wanted. All systems go. We configured Lane Setup for keyboard, monitors, Pinspotter/Q-vision, enabling intercom, on 25-28 which we installed yesterday, entering 4HD Hub serial numbers and reinitializing. All came up fine. We installed default Pinspotter Parameters into Conqueror and scoped-in cameras. We played with the 4HDMI screen-size for the existing monitors until the scoring grid was a perfect fit on the monitor screen and copied parameters to all 48 lanes. We threw balls testing all functions. All worked fine. Starting tomorrow we will do 3 pairs per day come hell or high water, so we can finish the scoring part of the job within the next 8 days. Daily hours: 10 + 16 = 26. Job hours: 40 + 66 = 106.

Day 5 – Saturday, November 2, 2013 – We removed all Boss and installed all BES on lanes 29-34. All came up fine and tested fine. We easily did 6 lanes in 8 hours. It was only one extra man-hour to get the monitors changed so they would work with BES. We had to remove the Boss control box and cut the wires into the Boss control box from the two TVs, and cut the plug off of the incoming power which is hardwired in the ceiling. We bought 2x4 low profile boxes/covers, and 3 Romex connectors per box. We knocked-out 3 holes in the boxes, installed the Romex connectors, and made the connections with the incoming power cable to the two monitor power cables.

We made the connections with wire nuts and put the box cover on. The box fits in the monitor support wireway nicely and is out of view. Daily hours: 9 + 16 = 25. Job hours: 49 + 82 = 131.

Sunday, November 3, 2013 – We had notified the manager on Friday that we were working both Saturday and Sunday and need to be allowed to enter and have access to both the locked storage room where we keep parts and tools, and the back office where the Server is located at 6:30 AM. Saturday was fine. Today, we arrived at 6:15 and waited for 2 hours and no one showed to let us in. They open late on Sundays, so probably no one is coming in until 10 AM or so. We took the day off, since we wouldn't have time to finish by when they need the lanes this evening.

Day 6 – Monday, November 4, 2013 – Had made arrangements yesterday to get in the building at 6:30 AM, but no one showed until 7:05 AM (like yesterday, someone didn't get the memo). Removed Boss and installed BES on lanes 35-40. All working fine. Had a bad Cat5 wire end (replaced) and had to reinitialize lanes 39-40 again after first reinitialize, but all came back up great. Lanes 35-40 tested good on all functions. Jeff arrived today and began training. Daily hours: 9 + 16 = 25. Job Hours: 58 + 98 = 156.

Day 7 – Tuesday, November 5, 2013 – Removed Boss and installed BES on lanes 41-46. All came up fine, and tested good on all functions. Here is the new curtain wall picture:

Here is old curtain wall picture:

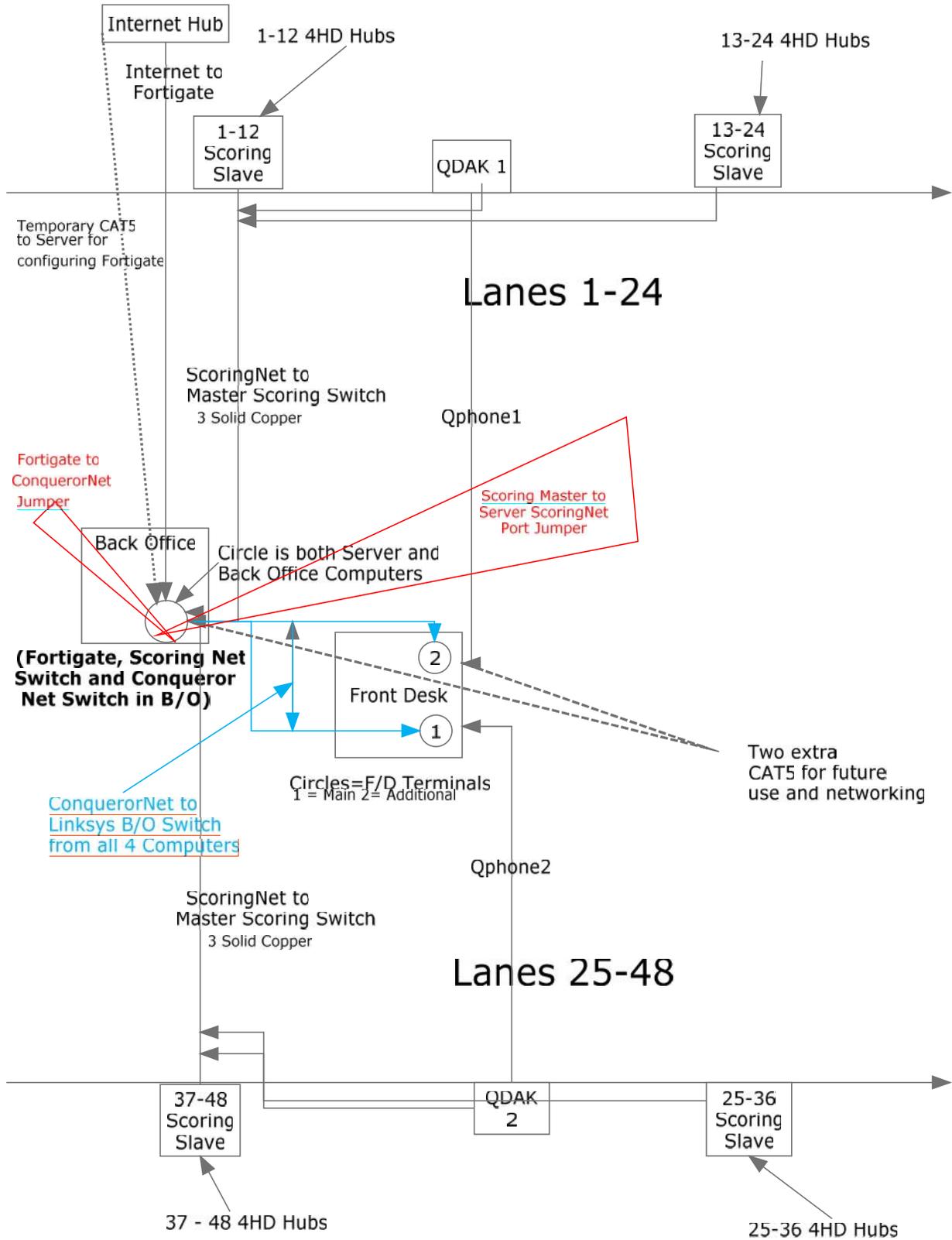Daily hours: 9 + 16 = 25. Job hours: 67 + 114 = 181.

Day 8 – Wednesday, November 6, 2013 – We installed BES and removed BOSS on lanes 47-48. They came up fine. Entire high-side finished (25-48). We installed all wiring for the low side. We mounted Netgear slave switches on low side curtain wall. We ran QDAK and two Slave Netgear solid copper cables for ScoringNet from low side curtain wall to back office where ScoringNet

switch is located. They had an issue with late pinfall NOT being recognized on 25-46 yesterday. The 82-90XL Chassis were set on 0.75 seconds of Start Time (the time from sweep getting to first guard, to the time that camera data is sent to the system). They said they have always had an issue with late pinfall... no wonder! I set the 82-90XL Chassis (1-48) to our 82-90 XL MCU "Spec 19", the USBC norm for sending data, and problem was solved. We tied-up all low end curtain wall Slave/QDAK solid copper wire, and installed the junctions on the curtain wall. We installed solid copper junctions for low side QDAK and scoring slaves in the back office and tested all three cables. Good. We connected the low side QDAK and slave junctions to ScoringNet in the back office after testing. We installed the low end QDAK and ran the Qphone cable from the QDAK to the front desk. We ran and tied-up all 12 4HD Hub runs on the low side from the slaves to the 4HD Hub locations, ready for installing the low side scoring. Went to Home Depot to buy more 2x4 electrical boxes that the Army Post electricians said that they would be happy to provide. That was a six days ago and not box #1 has been supplied for us. I have given-up on them – I had been buying a few boxes at a time hoping that they would come through, but today I went to buy enough boxes to finish, since they are only $1.20 each + $1.00 for the covers. It just vexes me that we have bent-over backwards for them and they couldn't hold-up their miniscule part of the bargain (explained in Day 3 above). They have cost us three days between the 2 day "shutdown" and not having anyone show up to let us in for a third day of no work, after we had made specific arrangements to be let in the building at 6:30 AM on EVERYDAY, even when the usual employees are off. They have 30-40 distributor jams PER DAY! They need pinspotter training BADLY. I could solve their distributor issues in a day. Keeping my mouth shut, but it's not right. Daily hours: 9 + 16 = 25. Job hours: 76 + 130 = 206.

Day 9 – Thursday, November 7, 2013 – We set up the intercom system, and configured both QDAKS and rebooted. Connected fine and both QPhones have dial tone. Tested the lanes that are installed (25-48) and all worked fine. We installed 6 more lanes of BES-X and removed BOSS, moving BOSS terminator to the new "last" pair (of BOSS). The detailed procedure is: Move BOSS terminator to the "new" last Boss CPU, so the center can still use BOSS on remaining lanes. Remove BOSS CPU's from curtain wall. Run overhead 4HD CPU cables using old BOSS wiring to pull to the front, removing the old wire in the process, and connect overhead wires to 4HD CPU's mounted to Monitor frames on Day 1. Install new BES 4HD hubs on the curtain wall and install bumper control unit on the curtain wall between Bumper controller and 4HD Hub. Remove old BOSS wiring underground, using it to pull the beige and yellow Cat5's and the ground wire (three wires) for the new BES bowler's terminals. Add the Camera-to-front end box cable, a blue 4-conductor COM cable and the Qvision-to 82-90 XL scoring cable, and rout the 6 wires up the pinspotter frame (4 wires go to 4 HD Hub - yellow Cat5, beige Cat5, ground, and 4-conductor LCOM cable, one wire goes to the front end box and one wire goes to the 82-90 XL

pinspotter chassis). Tie to length and continue tying down the pinspotter leg so the excess in underground. Remove the old BOSS bowler's terminals and install/wire new BES pedestals and keypads. Wire Camera LCOM plus a jumper wire, for the Bumper Control Unit into the 4HD Hub LCOM port. Wire other end of the jumper wire to first four (LCOM) terminals in BCU. Send a four-conductor from the next four BCU terminals to even and odd bumper control board, joining the wires already there which are the Front Desk Bumper Control box wires, so both Front Desk switches or BES can control Bumpers. Install the ground wire from BES bowler terminals to 4HD Hub frame. Install 82-90 XL Scoring wire (from Camera) to "Scoring" port in 82-90XL Chassis. Install Qvision Cameras and plug-in the wire from "Scoring" port in 82-90 XL Chassis to the RJ45 port on the Qvision board, plug-in the wire from the 82-90 XL front-end box to the port next to the Qvision LCOM plug, and wire the Qvision LCom 4-conductor wire from the 4HD Hub to the Qvision Lcom plug. Secure the camera at the measured distance and install the guard behind the camera. Install the camera ball detect reflector on the common, at the measured distance. Here we had to remove the old BOSS monitor interfaces and wire the incoming Monitor power to the two monitors in a 2x4 Box. Turn bumper boards back on, turn Monitor power back on, turn Pinspotter chassis back on, and plug-in the 4HD Hubs. Switch Monitor input from PC to HDMI via TV remote control. Enter 4HD Hub serial numbers and configure new lanes in Lane Setup. When all monitors show "reinitialize" prompt, reinitialize the new pairs. During reinitialize, tie up wires neatly on curtain wall and adjust Qvision ball detects. When they come up to BES-X image, install Conqueror pinspotter parameters in Pinspotter/Camera technical setup and reboot. After they come back up, open the lanes and center Camera image, then AUTO and send to cameras. Bowl on the lanes, testing gutterballs in all gutters many times, foul, second ball no score, pinfall counts, timing of data sent to scoring (not too late, not too soon – about 2 seconds after sweep reaches guard), smart cycles, and bumper controls. Clean-up COMPLETELY – ready for play on the new pairs. We had a bad Qvision board on 43-44. Replaced and working fine now. Lanes 19-24 installed and tested fine today. 18 Lanes left. Daily hours: 9 + 16 = 25. Job hours: 85 + 146 = 231.

Here is the Wiring diagram for Ft Hood:

Internet Hub

Internet to
Fortigate

1-12 4HD Hubs

13-24 4HD Hubs

1-12
Scoring
Slave

QDAK 1

13-24
Scoring
Slave

Temporary CAT5
to Server for
configuring Fortigate

Lanes 1-24

ScoringNet to
Master Scoring Switch
3 Solid Copper

Qphone1

Scoring Master to
Server ScoringNet
Port Jumper

Fortigate to
ConquerorNet
Jumper

Back Office

Circle is both Server and
Back Office Computers

2

Front Desk

**(Fortigate, Scoring Net
Switch and Conqueror
Net Switch in B/O)**

1

Two extra
CAT5 for future
use and networking

ConquerorNet to
Linksys B/O Switch
from all 4 Computers

Circles=F/D Terminals
1 = Main 2= Additional

Qphone2

ScoringNet to
Master Scoring Switch
3 Solid Copper

Lanes 25-48

37-48
Scoring
Slave

QDAK
2

25-36
Scoring
Slave

37 - 48 4HD Hubs

25-36 4HD Hubs

Ordered a replacement Qvision Camera board 288-300-002 (red text needs RFCI) for the bad one on 43-44.

Day 10 – Friday, November 8, 2013 – There was an issue yesterday on Lanes 41-42. It would stop scoring as if it lost LCOM. I checked all LCOM connections and all were good. I changed the BCU and still the same problem, so I changed the 4HD Hub. Strange situation... when I changed the 4 HD Hub number in Lane Setup to the new 4 HD Hub number that was on the new 4HD Hub (1914). Screen came up RED and the S.N. shown on the screen was 1753!!! I changed in Lane Setup to 1753 and the pair came up BLUE. Serial number on the Hub vs. actual were different. I uploaded programs to the new 4 HD Hub and it came up fine. Bowled on the new Hub and it worked fine. Testing tonight to see if that fixed the problem. We removed BOSS on Lanes 13-18 and installed BES. All came up fine, except the monitor on Lane 14 showed "check signal." Overhead wire checked fine with tester. Changed HDMI cable – still the same. Swapped the output from 14 out of the 4HD CPU to 13's monitor and it displayed the proper data, so the HDMI port in the Monitor MUST be the issue. Mechanics are going to change the Monitor, since all of our stuff is communicating fine. Tested Lanes 13-18 for all bowling functions and all was good. Daily hours: 9 + 16 = 25. Job hours: 94 + 162 = 256.

Day 11 – Saturday, November 9, 2013 – Removed BOSS and installed BES on Lanes 7-12 as described above. All came up fine and we tested for all bowling functions. All worked great. Lanes 41-42 worked perfectly all night last night and all day today, so the problem must have been the 4 HD Hub that we changed yesterday morning. I am ordering a new 288-250-018 4 HD Hub Serial number 1876 (red text needs RFCI) to replace their spare. Daily hours: 9 + 16 = 25. Job hours: 103 + 178 = 281.

Day 12 – Sunday, November 10, 2013 – We finished the final 6 lanes today and all 48 are now on the BES system. These final six lanes (Lanes 1-6) all came up fine and we tested for all functions, and all worked properly. The 4 HD Hub we changed on Friday (Day 10 above) worked great again yesterday evening and all day today. It appears certain that the Hub was the problem on 41-42. I sent Nicole the serial number and request for replacement. All 48 are working fine as of today. The 4 HD Hub needed will replace their spare. The Qvision board needed from Day 9 will also replace their spare. Daily hours: 9 + 16 = 25. Job hours: 112 + 194 = 306.

Day 13 – Monday, November 11, 2013 – We started the Masq install today. We removed the old Options Masks and stanchions from Lanes 25-48. We located the correct distance from 7-10 line and drew a stringline to mark the back of the new Masq stanchions. We installed the new stanchions plumb. We put the frame pivot hardware on the stanchions, and also the ball-studs in the upper holes of the stanchions (no lights). We hung the Masq shocks on the stanchion ball-studs. We unpacked the Masq frames and installed the pivot brackets, shock ball-stud brackets and ball-studs onto the frames. We installed the 1-2 ball light boxes on the frames. We installed the "Electricity" scenes on the frames, hung the frames on the stanchions and attached the lower end of the shocks to the frame ball-studs. We wired the 1-2 ball light boxes, installing the Mask Switch, and tried to find the three wires from the 82-90 XL front end box Mask cable that we needed for the new masks. The pins we needed from the 82-90 XL front-end box mask wire were: pin 1 (first ball), pin 7 (12 Volt), and pin 9 (2nd ball). Called Richmond to identify the wire colors involved, but they only had pin numbers (which I already knew). So, I tore a

Strike-Foul Board end of an 82-90 XL Front End Box-to- Strike-Foul Board Cable apart completely, and identified the wire colors for each pin in the cable: Pin #1 is Black, Pin #2 is Brown, Pin #3 is Red, Pin #4 is Orange, Pin #5 is Yellow, Pin #6 is Green, Pin #7 is Blue, Pin #8 is Purple, and Pin #9 is White. The three pins I needed for Masq installation were Pin #1 - First Ball which was WHITE, Pin #7 - 12 Volts which was BLUE, and Pin #9 – 2nd Ball which was WHITE. I put the Blue on the common of the 1-2 Ball Light Masq box, the Black on the first ball of the 1-2 Ball Light Masq box and the White on the 2nd ball of the Masq 1-2 Ball Light box and tested. It worked fine so we wired all 24 lanes that way. We tied-up all the wires neatly and tested all 24 lanes. All good. We cleaned-up completely and disposed of all trash. Daily hours: 9 + 16 = 25. Job hours: 121 + 210 = 331.

Day 14 – Tuesday, November 12, 2013 – We removed the Options Masking Units on Lanes 1-24 and installed Masq as described above.

All work is complete and all BES-X is working fine. The replacement items (1 ea. Qvision board and 1 ea. 4HD Hub) came in today and we will send back the bad ones with RFCI. Synchronized BES Animations and uploaded to 1-48. We will work tomorrow removing the front desk BOSS and dress-out the new wiring. Same in back office. Daily hours: 10 + 16 = 26. Job hours: 131 + 226 = 357.

Day 15 – Wednesday, November 13, 2013 – We went in to remove the old BOSS terminals/wiring from the front desk (2) and the back office, and permanently route the wire to the BES terminals and back office in their final resting places and dress-out the wires. We found a bowler's terminal EasyKey Keyboard that was bad. All worked fine, except the Microphone/speaker to intercom system stopped working. Changed EasyKey keyboard and intercom worked fine. Ordered a new EasyKey Keyboard. Packed the bad 4HD Hub and bad Qvision camera board with RFCI's send with replacements that were received yesterday, and shipped the two bad parts back to Richmond. Mechanic will return the Keyboard once the one ordered today is delivered with RFCI. We got sign-off paperwork done and packed our tools. Daily hours: 6 + 10 = 16. Job hours: 137 + 236 = 373. Scoring: 323, Masq: 50. Scoring: 6.7 man-hours per lane, 13.4 per pair. Masq: 1 man-hour per lane, 2 hours per pair.