Free State Theatre Organ Society Organ Project

HISTORY AND DESIGN

1/12/21

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INTRODUCTION

The Free State Theatre Organ Society is an organization formed to preserve and educate the public about a class of pipe organ known as the theatre organ. This is done through restoration and public performances.

This document is intended to give some history about our current project and design information. This is an evolving program.

Figure 1 Construction Warning

LOCATION

The society operates on the campus of Spring Grove Hospital Center (SGHC). Located in Baltimore County just outside the City of Baltimore.

Spring Grove Hospital Center was founded in 1797 and is the second oldest psychiatric hospital in the United States. The oldest psychiatric hospital in the country is the Eastern State Hospital in Williamsburg, Virginia, which was founded in 1773 and remains in operation today as a psychiatric hospital. Other than Eastern State Hospital of Virginia, no psychiatric hospital is older than Spring Grove.

Thomas-Rice Auditorium

Thomas-Rice Auditorium - Opened 1936. The building that is commonly known today as the "Rice Auditorium" is more formally named the "Thomas-Rice Auditorium," in honor of two men: Robert W. Thomas and G. Herbert Rice. Both Thomas and Rice were members of the Spring Grove State Hospital Board of Managers at the time the auditorium was built; and, not unlike Arthur D. Foster, after whom the Foster-Wade Building is named, Mr. Rice served as the Board's Secretary-Treasurer. The following description of the of the then brand new Thomas-Rice Auditorium appeared in a publication written in the year that it opened:

"The new auditorium building is now finished; it contains two floors. The upper one will be used as an amusement and lecture hall, with a seating of 750. The floor space [is] sixty by one hundred and four feet and [is] four times as large as the one now in use. The lower floor will be used for an occupational therapy department, and will afford much more space than the old one."* (The Beacon, 1936)

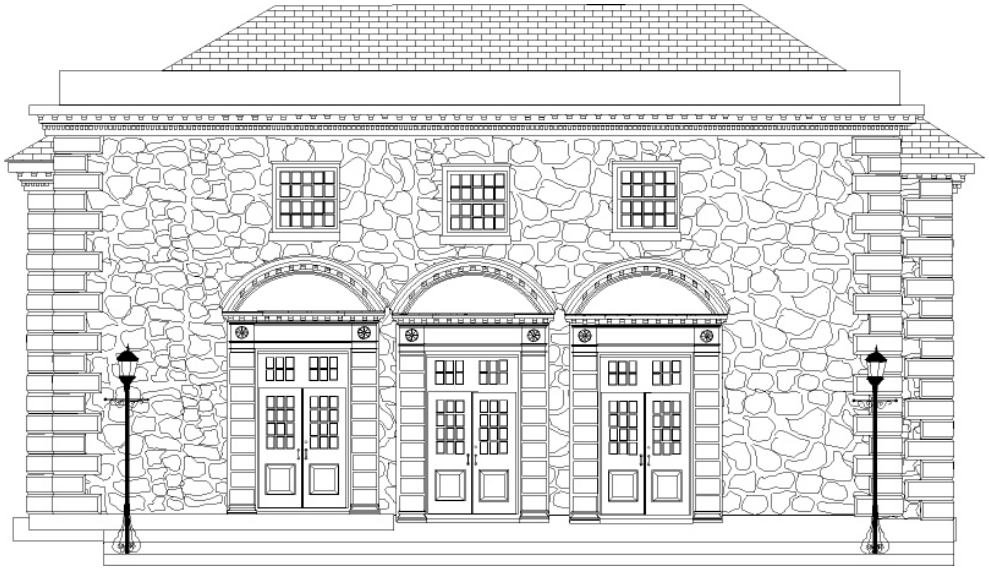

Figure 2 Rice Auditorium

An Annual Report, written several years before the building was completed, references a plan to use it for performances by an "orchestra of the musically inclined patients." However, evidently the referenced orchestra wasn't actually organized until 1938. The auditorium's two original carbon-arc movie projectors and sound system are still located in its projection room above the balcony. For many years feature films were shown in the auditorium twice a week -- on Wednesdays and Sundays. Dances were held there every Friday. While the upper floor of the building remains in regular use for the purpose for which it was originally intended, i.e. as "an amusement and lecture hall," the lower floor was converted a number of years ago into chapels and office space for the hospital's Pastoral Services program. Today the building has two pipe organs -- one on each floor. However, it should be noted that neither of these musical instruments was original to the building. The circa 1927 Wurlitzer-style theatre organ that is currently located in the auditorium section was installed in the building by the Free State Theatre Organ Society in the early 1990s.It is used on a regular basis for organ concerts and special screenings of silent movies. The second pipe organ, which is located in lower section of the building, was installed for use during religious services in the main chapel.

The activity room has for safety reasons now been reduced to 250 people on the main floor and another 100 in the balcony. The photo on the cover is of the activity room taken in the 1990's prior to the last renovations with the Robert Morton (Wicks built) organ with a Wurlitzer console.

Stone Cottage E

Figure 3 Stone Cottage E

Located also on the campus is the FSTOS workshop. Built about the same time as the auditorium, were a group of four, three story hospital wards. Complete with padded rooms. The society leases this building along with the organ space in Rice Auditorium from the State of Maryland.

Organ History

WICKS BUILT ROBERT MORTON

As mentioned before, the first instrument we installed was based on a Wicks built – Robert Morton Theatre Organ. Parts from a local theatre were used to erect this organ. The organ consisted of a Diapason, Violin, Flute, Vox, Tibia, Gamba, Tuba. The organ also had a typical set of toys and traps along with Chimes, Glockenspiel, Xylophone, and Marimba (not installed). Added to the organ was a Wurlitzer metal diaphone and 16' Gemshorn. This was tuned as a celeste in the 4ft octave.

A Wurlitzer console and relay were used with Relay Driver IC's to operate the organ. The relay became a big issue in the later years of the organ's use and contributed greatly to looking for an alternative. While designed as a two-chamber instrument, it was installed as a single chamber instrument on the left side of the building.

Figure 4 5hp Blower

The 5 hp blower was taxed to provide wind for this 8 rank organ and in an attempt to get more from it, the motor was moved to belt drive the fan (not recommended).

Figure 5 Toys and Traps

Figure 6 3 Rank Solo Chest

Figure 7 4 Rank Main Chest

DEVTRONIX ELECTRONIC ORGAN

The plan was to install a larger organ. Two chambers were planned. This chamber needed to modified so the organ had to be removed.

We were very fortunate when the late Dr. Paul Scott decided to upgrade to one of the new Allen digital pipe organs. Fred Markey of Allen Organ DC,) suggested that he give his Devtronix organ to us. This was to serve as a solution to how we would continue concerts while we worked to install the pipe organ.

Devtronix made Electronic Organ Kits, starting in the 1960's and up through the 1990's. They offered three and four manual consoles along with other items that would serve the pipe organ industry as well.

Pictured here is the 4 manual Devtronix from Dr. Scott. There are two cabinets behind the console that are as big as the console and enough speakers to make a 4th platform of the same volume. This organ was assembled by Dr. Scott in the evenings after work. There are as many wires here as in a real theatre organ!

Figure 8 4 Manual Devtronix Console

The Devtronix was amazing for having been constructed in the 1960's. As a kit you could pick what sounds you wanted and build the organ of your dreams, $$$. This organ had 256 Stop tabs. Thirty-six toe studs, three swell shoes, one crescendo shoe, eight general settable pistons and eight divisional pistons (one memory level), and another eight buttons and switches. There are four manuals and a pedal board, all with 2nd touch.

So how many ranks? A good question and not easy to define. The sound came from two types of oscillators. The first are independent rank oscillators. That is one oscillator and voice filter per note for each rank done this way. Like having a pipe per note per rank. Seven ranks were done this way along with a special set of 32ft oscillators for two stops of 32 notes. These ranks were: Post Horn, Tuba, Solo Tibia, Main Tibia, Viol, Celeste, and Vox.

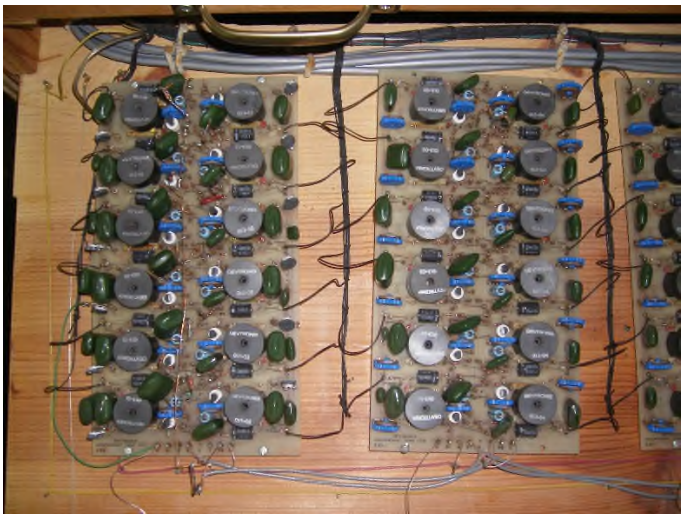

Figure 9 Oscillator Boards

Each board has 12 notes of the rank on it. While having the best sound and sounds like different ranks when played with other ranks it cost more to build and does not play the top note of the rank.

This part of the organ relay requires as much switching as a real organ relay. Here is the relay with the combination action on top.

Figure 10 Devtronix Organ Relay

The other ranks came from voicing filters. A special single oscillator could generate all pitches from 32 hertz to 17khz. These tones would be passed to a voice filter which would combine the pitches as different levels and phases to simulate the tone. This was much less to build but when combined with other sounds generated the same way it did not sound like different ranks but a new single sound. It was best used as a single voice or with the other independent oscillators.

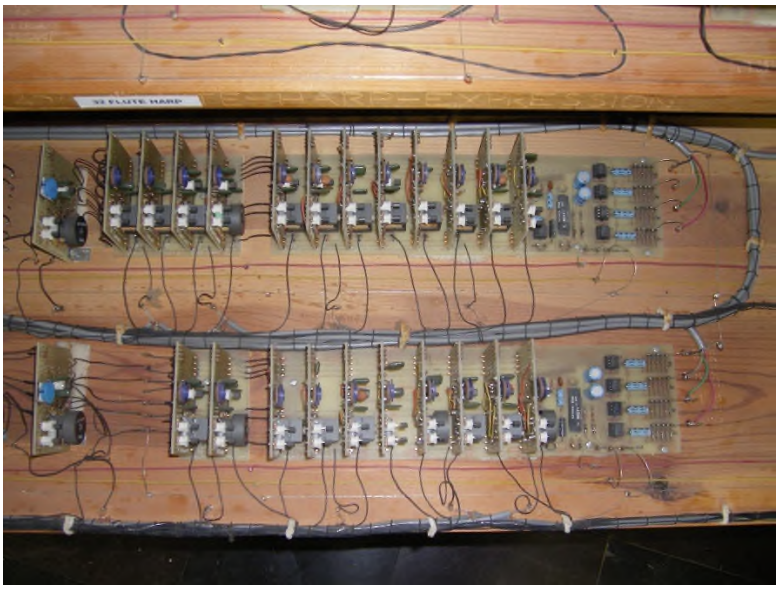

Figure 11 Voice Filters

So here is where counting ranks becomes a problem Each manual sends audio to a set of voice filters (pictured above) for that manual. One standing card per stop tab in a division. At this point the Trumpet 8' on the Great could sound different than the Trumpet 8' on the Solo. Or the Open Diapason 8' will sound different in tone than the 4' in the same division. They can even go to different tremulants and audio channels. If you counted these as different stops this organ goes from 23 ranks to 105 ranks.

The organ had real traps and tuned percussions that were struck by large electric magnets. This photo shows some of the percussions being mounted on the rear side of the audio cabinet. In the background is the relay cabinet.

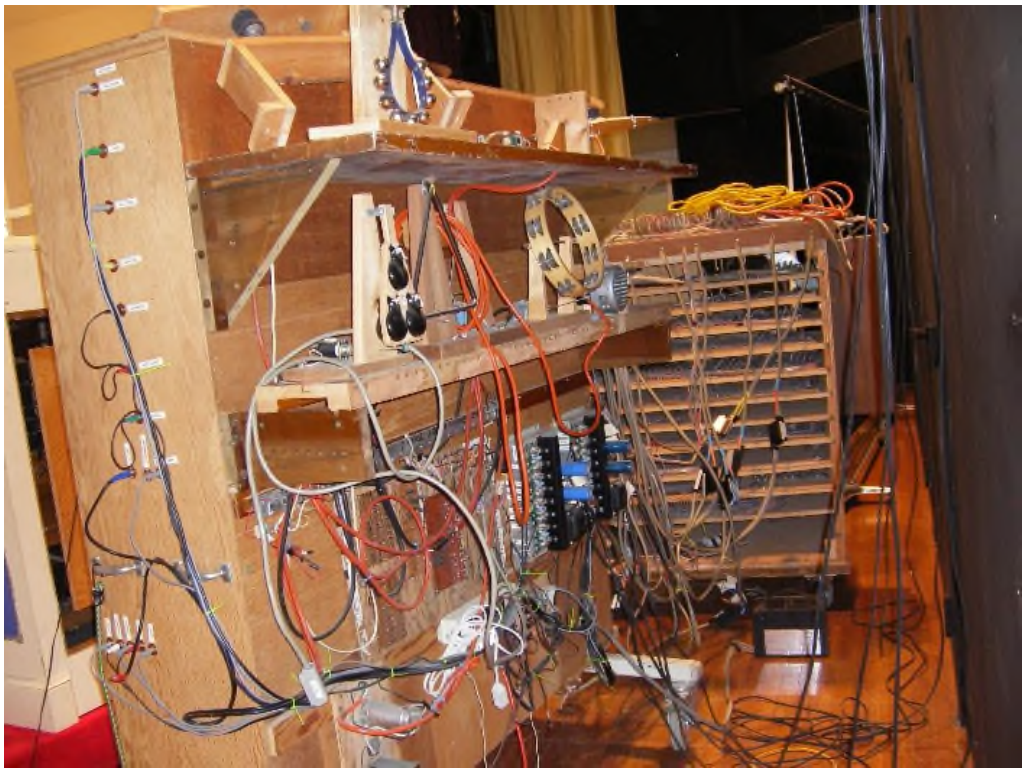

Figure 12 Real Traps

WURLITZER RESIDENCE ORGAN

The plan up to this point had been to install a larger than the Wicks pipe organ. The society had acquired parts of a 12 rank Wurlitzer Residence Pipe Organ that had one time been planned to be added to the famous Ocean Grove organ. They had abandoned this when they found that the smaller scale pipework and lower than normal wind pressures resulted in sound levels that would not meet their needs.

Here is a photo of the pipes and chest work standing in the workshop.

Figure 13 Wurlitzer Residence Organ

A stripped down 3 manual Wurlitzer console was acquired to drive the organ. This console would be used, but not for this organ.

We abandoned this plan for a few reasons. We were concerned about the ability of the pipes to fill the room in which it was being installed. The work that had been done on the organ up until now was of poor quality. We were offered a complete Wurlitzer Theatre Organ that would more than fill out needs.

VIRTUAL THEATRE PIPE ORGAN

A fill-in instrument was still needed and the Devtronix organ had some limitations. The sound was not that of a pipe organ. It also lacked a working combination action and some other items. After the first two years of use we had reached a point with the 3 manual console to be used on the pipe organ that it could be used and improve our concerts. New technology had come along that made it possible for the average Do It Yourself (DIY) to have a digital organ. At the end of the concert series, we started removing the Devtronix console and associated electronics and moved the Wurlitzer three manual console in place. We constructed a small electronics cabinet which would house two computers, power supplies, and 12 power amps to drive the 34 speakers we have to provide the sound. Now with a fully functional console and a full complement of pipe voices and effects this Virtual Theatre Pipe Organ (VTPO) provides a realistic impression of what is yet to come.

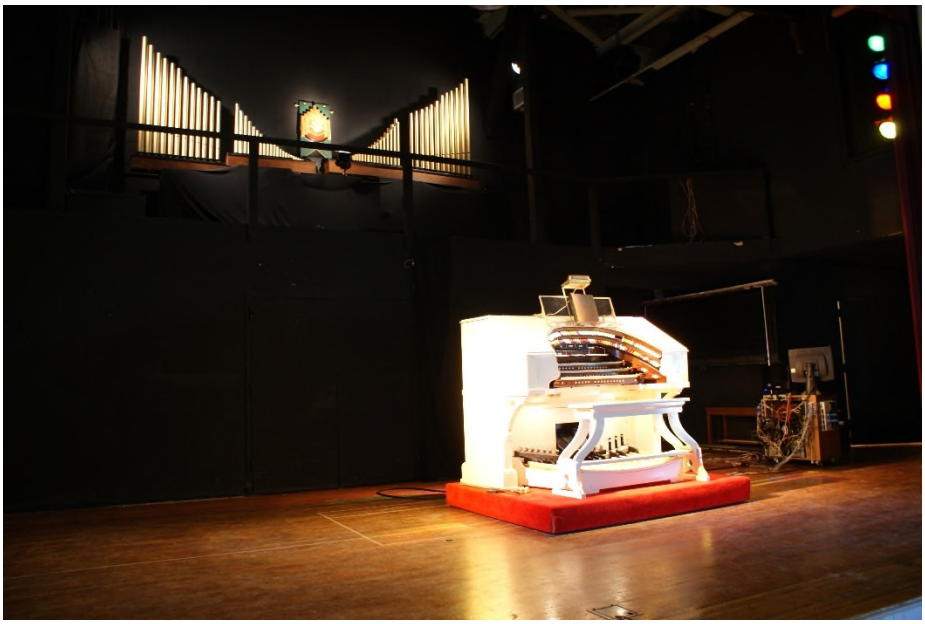

Figure 14 VTPO w/ Uniflex 3000 and Paramount 332 Samples

As time passed, we would alter the system to a Uniflex 4000 and the Paramount 450 Sample set. While the console only supports about 24 ranks the others may be substituted in a few minutes if the organist requests this alteration.

The Pipe Organ

The project is made possible by the generous gift of Mr. MARVIN LAUTZENHEISER of Springfield, Virginia. He started the process of installing it in his home in 1962. It was an historic instrument in that it had a electronic computer player system that Mr. Lautzenheiser designed and built for the organ, one of the first in the world. FSTOS started removing the organ from his home in the fall of 2010 and completed the work in the spring of 2011.

THE BEGINNINGS

The organ is made up of three different instruments, all from the Wurlitzer factory. The majority of it was Wurlitzer # 1699 installed in the Canal Street theatre of New York in 1927. The organ was later moved to the Triboro theatre we think in 1931 when the theatre opened. When Mr. Lautzenheiser went to get the organ, many of the chest in the main chamber had been damaged due to a roof leak. Dick Loderhose, who owned this and many other theatre pipe organs, offered Mr. Lautzenheiser the chest from the Broadway theatre, #724 and another, if he would help remove the organ. This was a style D (2/6) Wurlitzer organ. However the chest was so large that it had to be cut in half in order to remove it from the theatre. The other four-rank chest came from the Brooklyn Orpheum Theatre, OP 1112. These chest were identified by markings inside the chest.

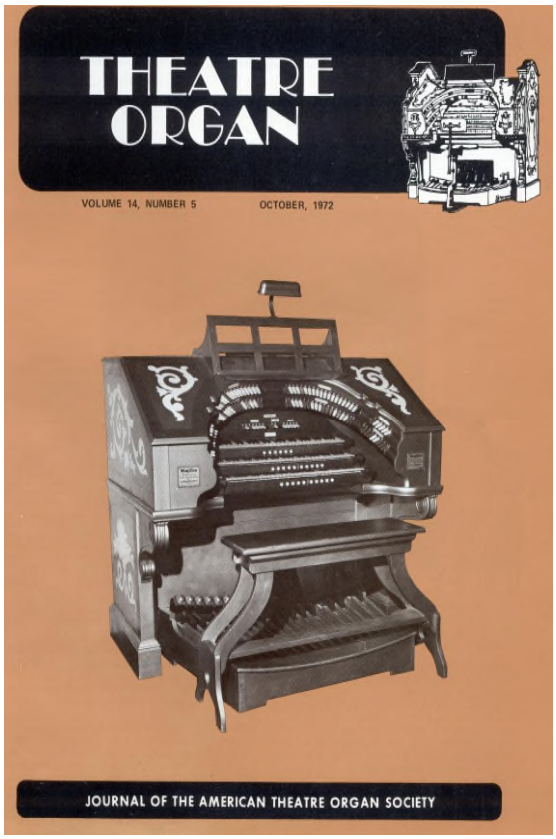

Figure 15 Cover from 1972 "Journal" of the ATOS

The final instrument that was being put together was 17 ranks of pipes (four more than original) and a grand piano.

My thanks to the New York chapter of the AGO for their history on the theatres.

Figure 16 Triboro Theatre

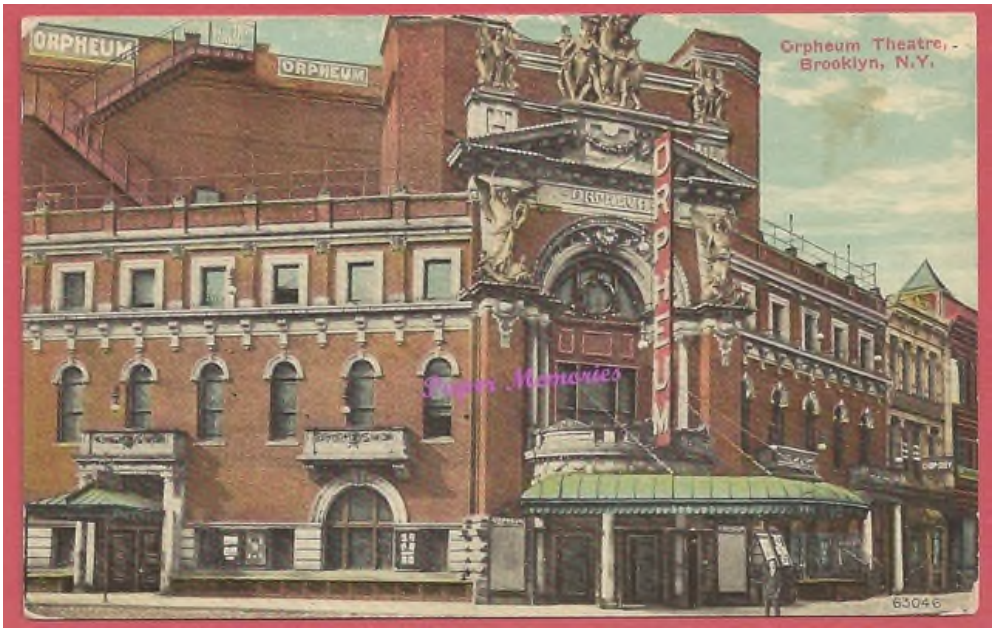

Figure 17 Orpheum Theatre

Figure 18 Canal St. Theatre

LAUTZENHEISER STUDIO ORGAN
7216 Neuman St., Springfield, Va.
3/13 Wurlitzer 235 Special

Opus No. 1699 Wurlitzer, a 3/13 235 Special with brass trumpet, was installed in the Canal Street Theatre in New York in 1927, but was removed to the Triboro Theatre in Queens, New York, in 1931.

The Triboro was (and is) a lavish, 3500 seat palace with an atmospheric ceiling, but by the early 40's had gone the way of most cinema citadels, and to make room for more seats, the organ pit was covered over with cement.

When Marvin Lautzenheiser discovered it in 1962, he had to chop through the cement like an archeologist. The organ had been sealed like King Tut's tomb for over 20 years, but it was in good condition.

To house his treasure, Marvin built a huge studio, adjacent to and equal in size to his Springfield, Virginia, home. It measures 28 x 42 feet, with a 17 foot ceiling. The solo chamber can be viewed through a large plate glass, and the two chambers speak into the arched ceiling, simulating a sound much like that of a large theatre.

Although it is very much like it was in the theatre, the organ now has a portable console used for tuning; the key holder can activate any pipe in the organ. Also, Marvin's computer programming expertise led to the development of a very unique robot, which should prove to be a highlight of the convention.

photo by Richard Neidich

Figure 19 ATOS Convention Bio

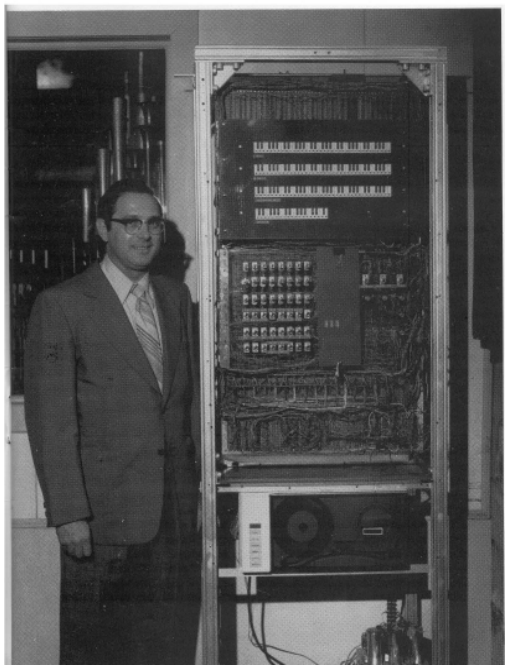

Figure 20 Marvin and Genii

TECHNICAL PAPER

"GENII"

by Marvin Lautzenheiser

Introduction

Today computers are used to do all kinds of things from controlling flights to the moon to keeping records of our charge accounts. It is only natural, then, to try to develop a computer system to play a theatre pipe organ. The GENII System does just that. The music played by GENII is generated

from the score itself without copying, mechanically or electronically, an actual performance by a musician. Its capabilities include the playing of any notes on three keyboards and pedal-board, changing stop tabs, controlling the swell shades, and operating the untuned percussion and traps. Up to 40 of these things may be operated simultaneously, giving, in effect, an organist with more than eight hands. It is with more than passing interest that we note that the computers involved in the GENII System are digital. In this system the meaning of the term "unit orchestra" on the Wur-litzer can come close to realization. In as much as GENII is already playing music of an advanced level, the question now is "How well can a computer be taught to play the organ?" The remainder of this article will describe the GENII System.

Development

The design of GENII began in 1966 with actual construction started in 1968. A multitude of concepts were analyzed and discarded before the current design was adopted. Much of the electronics could be described as "Early American" with many of the parts salvaged from scrapped electronic gear. The MUSICTRAN language has been through three major overall designs leading to a rather generalized, flexible language which combines reasonable ease of use with a thorough

control of the resulting music. The MARVEL computer program which translates the data from punched cards to data on a digital tape has undergone continual modification for over two years.

With all the above work in the past, the task of generating good music via a computer-organist is apparently just beginning. An unbelievably large amount of experimentation has already been mapped out to determine, if possible, some of the mathematical aspects of "good" music.

Items yet to be done include a systematic study of the effects of note timing, overlap, and separation. A special processor is under construction to capture in computer-usable format digital data representing the performance of artists. From this, perhaps a few of the secrets of music may be deduced. Other explorations include the application of orchestra score to the organ via GENII to try to exploit some of the extensive electronic/me-chanical skills now available. Of particular interest is the use of GENII to capture, edit, and replay music for making albums. With this capability, an artist may play into GENII, use the GENII computer programs to edit the playing, and replay the music for making the master audio tapes.

GENII Description

The GENII System is made up of six major components:

1. a language (MUSICTRAN) for translating score to data;

2. a computer program (MARVEL) which along with

3. an IBM 370/145 reformats the data;

4. a digital tape reader for reading reformatted data;

5. a controller (GENII) for interpreting reformatted data;

6. a 3/13 Wurlitzer pipe organ for making the music.

A brief description of each of these components follows.

I Musictran

MUSICTRAN is a language developed for the translation of music score into mathematical data for processing by a computer. It deals with seven categories of information:

1. Musical parts (melody, bass, rhythm, etc.)

2. Measures

0.

Notes

1. Percussion, toys, and traps

2. Volume

3. Registration (stop tablets)

4. Orchestration (the combinations of all the above items).

Data translated via MUSICTRAN is punched into standard computer cards for processing by the MARVEL program. The translation from music score to punched card data involves the following decisions and operations:

1. Parts

A part is defined by its function such as melody, bass, etc., and is identified by a digit in the range one to nine. During orchestration the part number is used to specify the method of playing the part; that is, the keyboards, octaves, and styles to be used for the part.

2. Measures

A measure generally carries its normal music definition. However, natural measures are often broken into two sections to allow for orchestration changes at more convenient points, such as at the ends of phrases. Measures are identified by a 3-digit number and their sizes are given in computer counts. A normal music beat is defined as 64 computer counts. Thus, a measure in 4/4 time may have a length of 256 counts. Of course, a measure may be of any length required to accommodate the notes and styling to be played in that measure.

Each measure carries with it two metronome settings: the speed as of the beginning of the measure and the speed as of the end of the measure. These are used during data translation to give a smooth decrease or increase in speed throughout the measure. If beginning and ending speeds are the same, of course, no speed changes are recorded within the measure. Occasionally a normal measure will be subdivided into two or more computer measures to allow for several changes of pace within it.

3. Notes

Notes are translated to data by spelling out for each: the measure number to which it belongs, its starting time in the measure, the duration, the relative octave in which it is written, and the name of the note. Starting

times and durations are specified in computer counts; thus a quarter note's length could be coded in the range of 56 to 72 with the expected value of 64; its starting time could be any value from one to an upper bound which permits the note to be completed within the measure. Octaves are numbered from one to five (six in the case of top C) and specify the relative octave on the keyboard to be used. The names of the notes are their normal letter designations with 'x' used to denote sharps. Flats are not used as such; the corresponding sharps are substituted.

0. Percussion, Toys, and Traps

The special effects as bass drum, triangle, etc., are translated in the same manner as notes with a 3-character name substituted for the note, octave and name. These are thought of as having their own keyboard and are given a special part designation. Thus the specification of a percussion includes the measure identifier, the part identifier, the starting count, duration, and the effect's name.

1. Volume

The volumes of the two chambers are independently controlled and may be changed at any instant. The range of volumes from completely closed to fully open is designated by a number from zero to nine. The larger the number, the

more open the given chamber will be. Only changes in volume need be specified, the GENII System maintains a given swell shade setting until a change occurs. Again, the volume controls are thought of as having their own keyboard and are given a special part designation. To specify a volume setting the user specifies the volume identifier along with the measure number, count within measure at which the change is to occur, the chamber abbreviation and the new setting number in the range zero to nine.

2. Stops

The stops are controlled by GENII by trapping the tablet on the console into the "on" or "off" position. To do this, a very short duration pulse is sent to the appropriate setter action magnet. The specification of the change of a stop includes a special part name; the measure identifier; the count within the measure when the change is to occur; whether the stop is to turn on or off; the keyboard designation (Pedals, Accompaniment, Great, or Solo) and the stop name abbreviation. Unlike a setter action, only stop tabs that are to move need be energized; thus, very few are actuated for normal changes. The trapping of the stop tablets allows an easy, visual identification of those stops in use at any moment and also permits GENII to ignore the stops when no changes are being made. Manual couplers are not actuated by GENII, and they are never used in conjunction with GENII since GENII can provide any and all coupling desired.

7. Orchestration

The orchestration is the most sensitive area of translation in that it really is the point at which the union of music parts and instrument is made. A great flexibility with respect to couplers, attack, speed, etc. is available here to bring out musical variation without modifying the basic data.

The orchestration may be changed between any two measures. It does the following:

a. assigns parts to keyboards

b. assigns parts to octaves

c. assigns transpositions of parts

d. assigns attacks to individual parts

e. assigns overall metronome adjustments

f. defines number of computer counts per beat

g. specifies coupling (a given part may be played on each of several keyboards at several octave levels if so desired)

h. specifies pizzicato touch where desired

II Marvel

The MARVEL computer program is a set of over 1300 instructions which tells an IBM 370 how to translate the MUSICTRAN data cards into information on a digital tape. It does the following:

1. reads cards

2. computes switch numbers for each operation

3. applies couplers as specified in the orchestration cards

4. transposes parts as specified

5. applies parameters for touch (degree of legato, staccato, etc.)

6. calculates start and stop times for all operations

7. sorts data in order of increasing time

8. writes switch numbers and control data on tape in time sequence (A large amount of redundancy is introduced at this point to help insure accurate reproduction of the music.)

9. prints cards for reference

10. prints computed data (optional)

III IBM 370

The MUSICTRAN data is processed at a commercial computer center via the MARVEL program on an IBM 370 using approximately 100,000 bytes of core. The digital tapes are written at a density of 800 bytes (numbers) per inch. Processing time is approximately 20 cards per second. A typical composition may include 500 - 1000 cards taking 25 - 50 seconds to process.

IV Digital Tape Reader

The tapes are read at the Lautzenheiser studio via a PEC digital tape reader. The read rate is 121/2 inches per second transferring up to 10,000 pieces of data per second to the GENII processor. A typical composition may run three minutes, use about 200 feet of tape and contain up to two million pieces of data.

V Genii

The GENII processor is a hand built electronic processor which accepts data from a digital tape transport, processes that data, and controls the pipe organ operation. The processor is made up of 152 printed circuit boards containing over 50 integrated circuits, 3000 diodes, 2000 transistors, 5000 resistors, 600 capacitors and a mile of wire. In addition, the cables connecting GENII to the pipe organ contain four miles of wire. The display panel contains over 250 light-emitting diodes. GENII has the following major elements:

1. tape read buffers

2. data checking circuits

3. data decoders

4. organ function memory circuits (512)

5. organ circuit switches (512, electronic)

6. display panel

7. test control circuits

Switching functions are controlled to such a timing accuracy as to become transparent to the music being created. Any operation may be started at the precise moment desired and may be held for any duration. The timing of any one note or operation is completely independent of the timings of the operations of other notes. Up to 40 notes and/or functions may occur simultaneously.

VI Wurlitzer Pipe Organ

The pipe organ controlled by GENII is a 3 manual 13 rank Wurlitzer which is installed in the Lautzenheiser studio in Springfield, Virginia. This organ was originally installed in the Canal Street Theatre in New York City in 1927. In 1931 it was moved to the Loew's Triborough Theatre in Queens, New York City. So far as is known it was last played there in the early 1940's. The Lautzenheisers purchased the organ in 1962 and have been playing it regularly since 1964.

GENII controls the following organ circuits:

1. 215 keys (3 — 61-note keyboards plus the 32-note pedal board)

2. 30 swell shades (2 sets, each having 9 steps)

3. 16 untuned percussions and sound effects

4. 90 stop tabs (using 180 circuits to trap the stop tablets into "on" or "off" positions

This is a total of 429 functions; GENII has room to allow for nearly unlimited expansion in the number of circuits controlled.

Summary

The feasibility of a computer playing an organ has now been demonstrated. Unlike player pianos of the past, GENII has not less, but more, mechanical skill than a human artist. At this point, we have not endowed the computer with any true musical creativity. We have given the musician a new tool that permits him to release his creativity from the slavery of his physical capabilities. Perhaps GENII can be thought of as a new musical instrument, one that responds to digital data instead of digital manipulation of its keyboards.

OCTOBER, 1972 THEATRE ORGAN 7

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And so ends the history lesson.

The Theatre Organ Project

The organ is planned for 4/20 theatre pipe organ. Located in two chambers on the stage of Rice auditorium. The console will be located on the stage but can be relocated any place in the auditorium. The tuned percussions, traps, and most of the effects will be located on a catwalk along the rear of the stage that runs between the two chambers at the same level as the pipes.

The air regulators and tremulants are located at the stage level in a separate equipment room under the pipe chamber. A 15hp blower is located in the lower level of the building directly beneath the Solo (right hand) chamber equipment room.

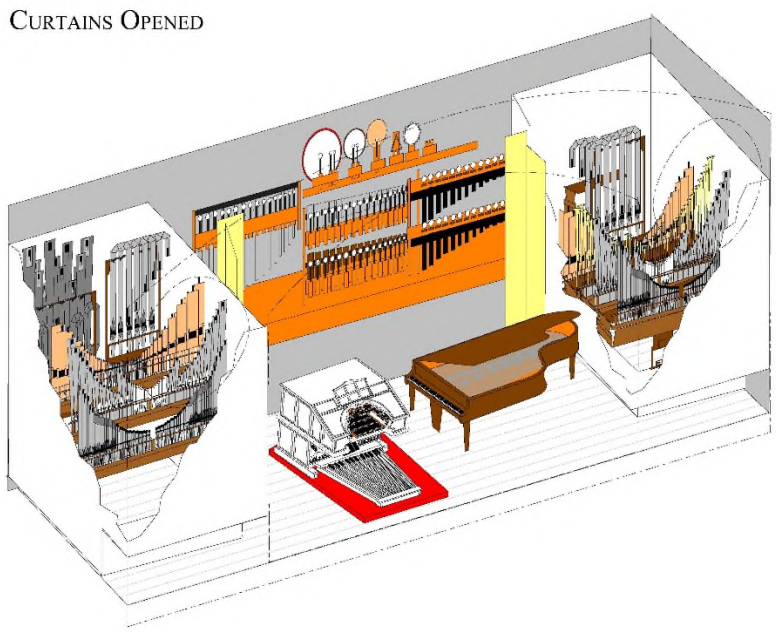

Figure 21 Early Concept Drawing

When this project was started, only the chamber space at the left existed. The right side had an large abandoned fan and steam heat exchanger for heating the room. So this sketch was used to show the State of Maryland of the project and what new construction would take place.

After a working set of drawings were generated the fastest awarding of a contract that has ever been witnessed occurred. FSTOS had agreed to fund half of the construction, the state with funds from the patient recreational account matched this. The total was about $25,000.

The formal drawings were given to the state at the start of November. The Request for a Quote was released at Thanksgiving. Bids were received by the middle of December and construction started in the middle of January.




Figure 22 Chamber Construction

ORGAN RANKS

MAIN	SOLO
61 8'Clarinet	61 8' Brass Trumpet
85 8' Viol 'd Orchestra	61 8' Kinura
61 8' Horn Diapason	61 8' Oboe Horn
73 8' Viol Celeste	61 8' Orchestral Oboe
85 16' Tuba Horn	61 8' English Horn
85 16' Diaphonic Diapason	61 8' Brass Saxophone
73 8' Tibia Clausa (10")	97 16' Tibia Clausa (15")
24 16' Contra Viol	73 8' Solo String
97 16' Flute	61 8' Vox Humana (Solo)

73 8’ Salicional
61 8’ Vox Humana (Main)

Exposed

Robert Morton Chrysoglott	Tap Cymbal
Wurlitzer Chrysoglott	Ride Cymbal
Chimes	Splash Cymbal
Marimba	Roll Cymbal
Sleigh Bells	Brush Cymbal
Glockenspiel	Temple Blocks
Xylophone	Chinese Block
Piano	Triangle
Bass Drum	Castanets
Snare Drum	Tambourine
Tom Tom	Triangle
Sizzle Cymbal	Effects

CHAMBER LAYOUT

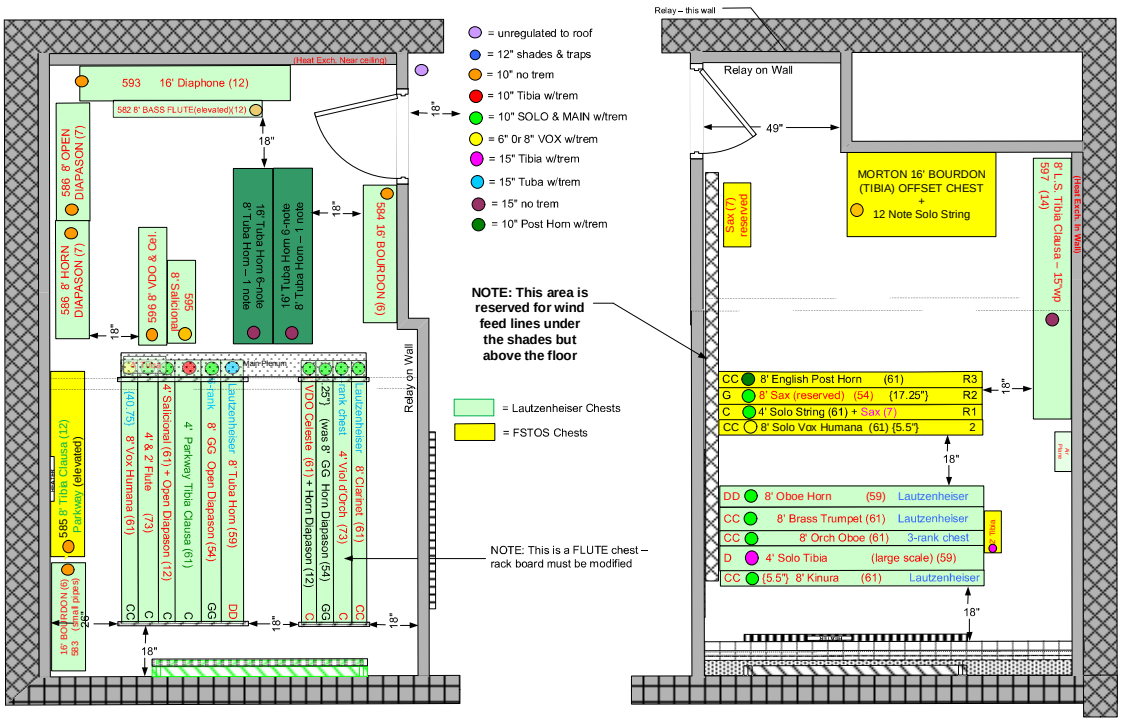

Figure 23 Chamber Layout

The chambers have two shutter openings, one to the front and one to the stage. The stage shutters can be disabled at the console or the size of the opening (number of blades) be reduced if the organist request.

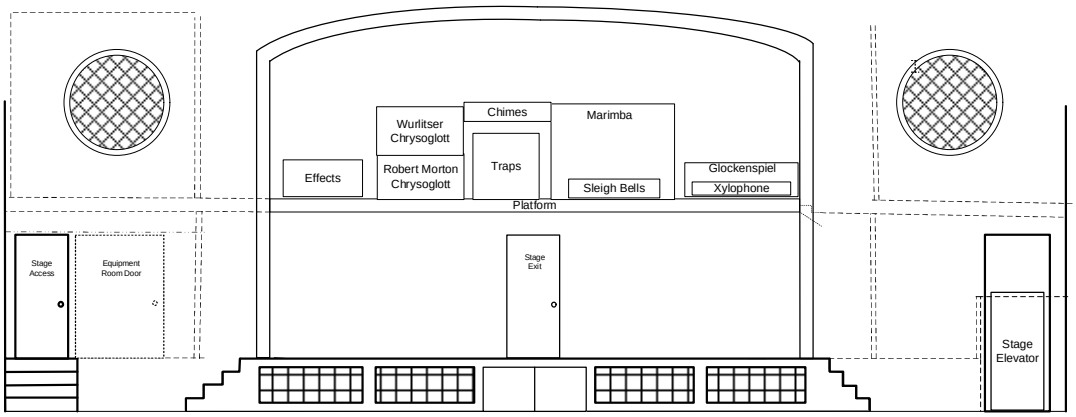

Figure 24 Tuned Percussion Layout

ORGAN WINDING

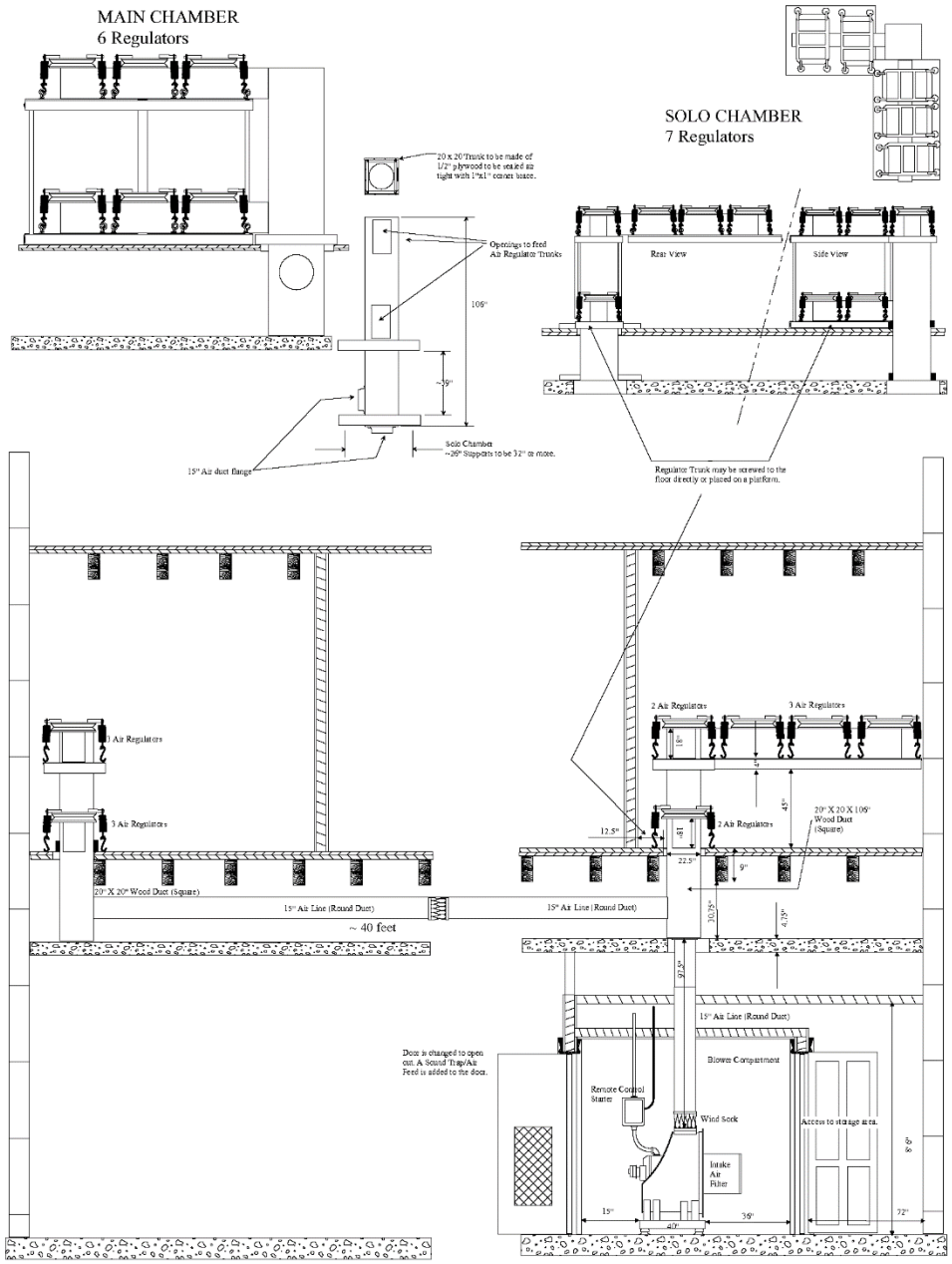

Figure 25 Organ Winding Plan

The organ is blown from a 3 phase, 15 horse power, two stage turbine fan made by the Spencer Blower Company. It is located in a sound isolated room in the lower level of the auditorium. The door to the room is

equipped with a sound trap which opens as the air demand increases. The inlet to blower has a 5 square foot air filter box attached to keep out dust.

Figure 26 Noise Trap

Figure 27 Air Filter on Intake

Air passes thru an 18" long by 15" diameter Rubber and Canvas windsock and then to an 8' spiral seam duct up to the auditorium floor. The duct attaches to a 22" x 22" x 120" wood box. This box goes up into the Solo Chamber Utility Room where it distributes air to 7 regulators.

Above the concrete auditorium floor and below the stage wood floor, an 15" runs 40ft. across the stage to the main chamber. There a similar wood duct extends up to the Main Chamber Utility Room and distributes air to 7 regulators.

Midpoint under the stage there is a break in the spiral duct with another Rubber Canvas duct. This reduces vibrations in the duct and adjust of any misalignment between the two sides of the building.

Figure 28 Air Duct Photos from under the stage

Regulator Assignment

The reason for all these regulators is as follows. Different ranks like the Tuba, Flute, and Vox are all on different wind pressures and need separate regulators. The bottom octaves of many ranks need an un-tremulated air supply, so an additional regulator is needed. And then some ranks sound better with a different vibrato or tremolo than another like the Flute and the Tibia in the main chamber which use the same wind pressure. A different regulator is needed.

Main Chamber Regulators

Rank	Manual Chest Regulator	Offset Regulator
61 8'Clarinet	10" Reg 1 (C size)	None
85 8' Viol 'd Orchestra	10" Reg 1 (C size)	10" Reg 2 (B size)
61 8' Horn Diapason	10" Reg 1 (C size)	10" Reg 2 (B size)
73 8' Viol Celeste	10" Reg 1 (C size)	10" Reg 2 (B size)
85 16' Diaphonic Diapason	10" Reg 1 (C size)	10" Reg 2 (B size)
97 16' Flute	10" Reg 1 (C size)	10" Reg 2 (B size)
73 8' Salicional	10" Reg 1 (C size)	10" Reg 2 (B size)
85 16' Tuba Horn	15" Reg 3 (A size)	15" Reg 4 (A size)
73 8' Tibia Clausa (10")	10" Reg 5 (A size)	10" Reg 2 (B size)
61 8' Vox Humana (Main)	8'Reg 6 (A size)	None
24 16' Contra Viol (located on roof of Main Chamber)		8" Reg 7 (A size)

Regulators 1,3,5, and 6 will each have a tremolo attached to them

Solo Chamber Regulators

Rank	Manual Chest Regulator	Offset Regulator
61 8' Brass Trumpet	10" Reg 8 (C size)	None
61 8' Kinura	10" Reg 8 (C size)	None
61 8' Oboe Horn	10" Reg 8 (C size)	None
61 8' Orchestral Oboe	10" Reg 8 (C size)	None
61 8' Brass Saxophone	10" Reg 8 (C size)	None
73 8' Solo String	10" Reg 8 (C size)	10" Reg 12 (A size)
61 8' English Horn	10" Reg 9 (A size)	None
61 8' Vox Humana (Solo)	10" Reg 10 (A size)	None
97 16' Tibia Clausa (15")	15" Reg 11 (A size)	15" Reg 13 (A size)
.		10" Reg 12 (A size)
Tuned Percussions & Toys	12" Reg 14 (B size) (No Trem)	

Regulators 8, 9, 10, and 11 will have tremolos attached.

ORGAN CONSOLE

The console will be the Devtronix 4 manual console that was given to the society by Dr. Paul Scott. After modifications it will have the following specifications.

Console Specification

Manuals

- Four 61 note manuals

Solo
Bombarde
Great (with 2nd touch)
Accompaniment (with 2nd touch)

Pedal Board

- Wurlitzer built 32 notes (with 2nd touch)

Stops

207 Stop Tabs on the Horseshoe
- 24 Pedal Division
- 33 Accompaniment Division
- 75 Great Division
- 38 Bombarde Division
- 37 Solo Division

62 Back Rail
- 2 Pedal 2nd Touch

14 Accompaniment Division
5 Great 2nd Touch
10 Generals (Trems and Controls)
2 User Define Tabs
10 Pedal Traps
13 Accompaniment Traps

Console Controls

Key Desk

5 User Defined Buttons on the Key Desk
4 User Defined Buttons on the Right Key Cheek
1 (Three Position) Harp Select Switch

Display (Two Digit, 0 – 99)

Shoes – 3

Main Swell Shoe & Piano Sustain Button
Solo Swell Shoe & Sostenuto Switch
Crescendo Shoe (256 position)

Toe Studs

Left Side

10 Effects
6 General Pistons
6 Pedal Division Pistons

Right Side – 14 Effects

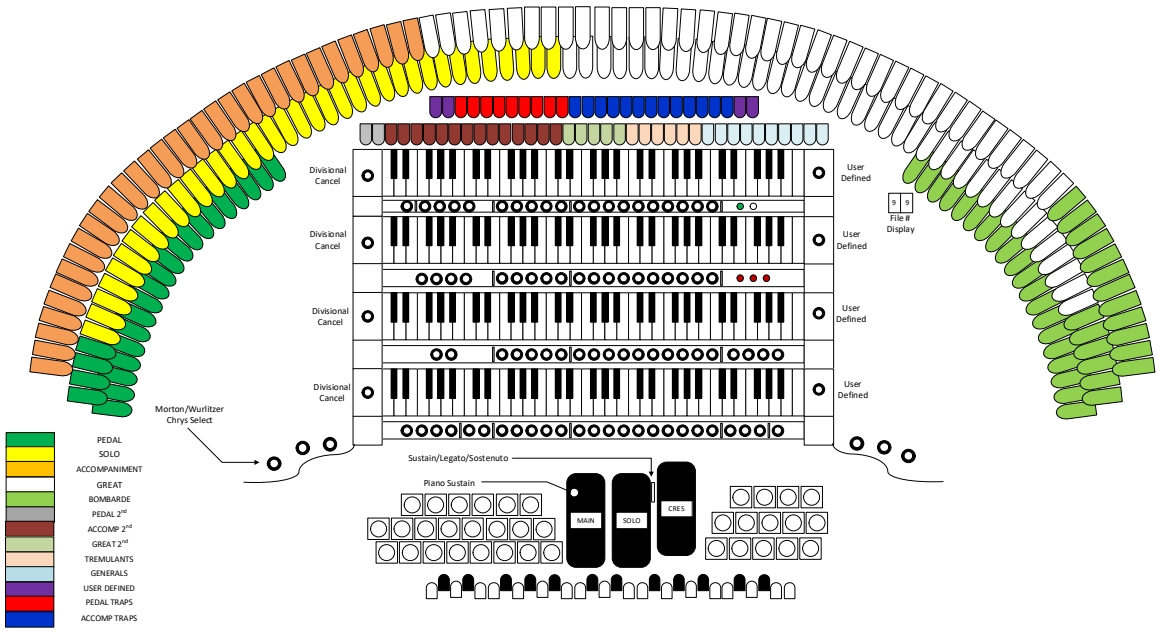

Figure 29 Console Layout

Piston Rails

The combination action will be detailed in an independent section. Pistons will only be mentioned as to locations. The rails include not just the pistons for the combination action but also controls for loading and saving combinations, recording and playback, and indicators as to the status of the organ.

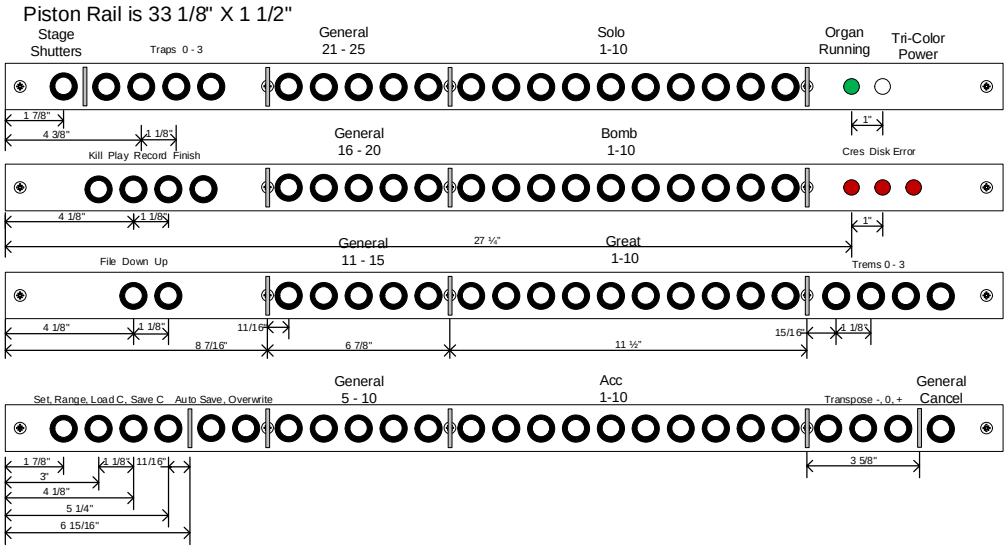

Figure 30 Button Layout

ACCOMPANIMENT PISTONS	GREAT PISTONS	BOMBARDE PISTONS	SOLO PISTONS
Set	Down File	Kill	Stage Shutters Off
Range	Up File	Play	Traps 0
Load Combination	General 11	Record	Traps 1
Save Combination	General 12	Finish	Traps 2
Auto Save	General 13	General 16	Traps 3
Overwrite	General 14	General 17	General 21
General 6	General 15	General 18	General 22
General 7	Great 1	General 19	General 23
General 8	Great 2	General 20	General 24
General 9	Great 3	Bombarde 1	General 25
General 10	Great 4	Bombarde 2	Solo 1
Accompaniment 1	Great 5	Bombarde 3	Solo2
Accompaniment 2	Great 6	Bombarde 4	Solo 3
Accompaniment 3	Great 7	Bombarde 5	Solo 4
Accompaniment 4	Great 8	Bombarde 6	Solo 5
Accompaniment 5	Great 9	Bombarde7	Solo 6
Accompaniment 6	Great 10	Bombarde 8	Solo 7
Accompaniment 7	Trem 0	Bombarde 9	Solo 8
Accompaniment 8	Trem 1	Bombarde 10	Solo 9
Accompaniment 9	Trem 2	Crescendo (Red LED)	Solo 10
Accompaniment 10	Trem 3	Disk Busy (Red LED)	Organ Running (Green LED)
Transpose -		Error (Red LED)	Power (TRI Color LED)
Transpose 0			
Transpose +			
Gen Cancel			

Combination Action

The combination action is part of the UNIFLEX 4000 System (the organ relay). There are many features to this system, but first is the ability to behave in a manner like the original Electro Pneumatic system. Stops are controlled by pressing a piston but can also be left neutral on that button.

The modern Combination Action is known as a “Capture Action”. This system also has a “Range” feature which will allow any button to control any stop tab or button.

Memory Levels or how many different sets of combinations can be stored in the organ. Each organist folder (the location where combinations, recording, and organ design information is stored) can contain 9,999 levels. An organist can have more than one folder. The organist can access 99 levels from the console and more from a control pad. The average file size is 5Kb. That’s only 50 Mb., or about 7% of the information on a CD.

The Crescendo Shoe is also part of the combination action. It can be setup to be the same for all memory levels as part of the definition or set to be different for each set of combinations. This last setup can be copied from one combination set to another.

The combination setting and crescendo pedal can be printed out for further study.

Organ Specification

STP1: 16' PEDAL TUBA HORN
STP2: 16' PEDAL DIAPHONIC DIAPASON
STP3: 16' PEDAL TIBIA CLAUSA (SOLO)
STP4: 16' PEDAL COUNTRA VIOL
STP5: 16' PEDAL CONCERT FLUTE
STP6: 10-2/3' PEDAL CONCERT FLUTE
STP7: 8' PEDAL ENGLISH HORN
STP8: 8' PEDAL BRASS TRUMPET
STP9: 8' PEDAL TUBA HORN
STP10: 8' PEDAL DIAPHONIC DIAPASON
STP11: 8' PEDAL HORN DIAPASON
STP12: 8' PEDAL TIBIA CLAUSA (SOLO)
STP13: 8' PEDAL TIBIA CLAUSA (MAIN)
STP14: 8' PEDAL CLARINET
STP15: 8' PEDAL BRASS SAXOPHONE
STP16: 8' PEDAL ORCH REED
STP17: 8' PEDAL VIOL D' ORCHESTRE
STP18: 8' PEDAL SALICIONAL
STP19: 8' PEDAL CONCERT FLUTE
STP20: 4' PEDAL DIAPHONIC DIAPASON
STP21: 16' PEDAL PIANO
STP22: 8' PEDAL PIANO
STP23: 8' ACCOMP to PEDAL
STP24: 8' GREAT to PEDAL
STP25: 8' SOLO ENGLISH HORN
STP26: 8' SOLO BRASS TRUMPET
STP27: 8' SOLO TUBA HORN
STP28: 8' SOLO DIAPHONIC DIAPASON
STP29: 8' SOLO HORN DIAPASON
STP30: 8' SOLO TIBIA CLAUSA (SOLO)
STP31: 8' SOLO TIBIA CLAUSA (MAIN)
STP32: 8' SOLO CLARINET
STP33: 8' SOLO KINURA
STP34: 8' SOLO ORCHESTRAL OBOE
STP35: 8' SOLO SOLO STRING
STP36: 8' SOLO VIOL D' ORCHESTRE
STP37: 8' SOLO SALICIONAL
STP38: 8' SOLO BRASS SAXOPHONE
STP39: 8' SOLO OBOE HORN
STP40: 8' SOLO CONCERT FLUTE
STP60: 5-1/3' SOLO to SOLO
STP61: 4-4/7' SOLO to SOLO
STP62: 8' ACCOMP ENGLISH HORN
STP63: 8' ACCOMP BRASS TRUMPET
STP64: 8' ACCOMP TUBA HORN
STP65: 8' ACCOMP DIAPHONIC DIAPASON
STP66: 8' ACCOMP HORN DIAPASON
STP67: 8' ACCOMP TIBIA CLAUSA (MAIN)
STP68: 8' ACCOMP CLARINET
STP69: 8' ACCOMP SOLO STRING
STP70: 8' ACCOMP VIOL D' ORCHESTRE
STP71: 8' ACCOMP SALICIONAL
STP72: 8' ACCOMP BRASS SAXOPHONE
STP73: 8' ACCOMP OBOE HORN
STP74: 8' ACCOMP CONCERT FLUTE
STP75: 8' ACCOMP VOX HUMANA (SOLO)
STP76: 8' ACCOMP VOX HUMANA (MAIN)
STP77: 4' ACCOMP DIAPHONIC DIAPASON
STP78: 4' ACCOMP HORN DIAPASON
STP79: 4' ACCOMP TIBIA CLAUSA (MAIN)
STP80: 4' ACCOMP SOLO STRING
STP81: 4' ACCOMP VIOL D' ORCHESTRE
STP82: 4' ACCOMP SALICIONAL
STP83: 4' ACCOMP CONCERT FLUTE
STP84: 4' ACCOMP VOX HUMANA (SOLO)
STP85: 4' ACCOMP VOX HUMANA (MAIN)
STP86: 2-2/3' ACCOMP CONCERT FLUTE
STP87: 2' ACCOMP CONCERT FLUTE
STP88: 8' ACCOMP PIANO
STP89: 4' ACCOMP PIANO
STP90: 16' ACCOMP MARIMBA
STP91: 8' ACCOMP MARIMBA
STP92: 8' ACCOMP CHRYSOGLOTT (WURL)
STP93: 4' ACCOMP to ACCOMP
STP94: 8' SOLO to ACCOMP
STP95: 16' GREAT ENGLISH HORN
STP96: 16' GREAT BRASS TRUMPET
STP97: 16' GREAT HORN DIAPASON
STP98: 16' GREAT DIAPHONIC DIAPASON
STP99: 16' GREAT TIBIA CLAUSA (SOLO)
STP121: 8' GREAT SOLO STRING
STP122: 8' GREAT VIOL D' ORCHESTRE
STP123: 8' GREAT SALICIONAL
STP124: 8' GREAT BRASS SAXOPHONE
STP125: 8' GREAT OBOE HORN
STP126: 8' GREAT CONCERT FLUTE
STP127: 8' GREAT VOX HUMANA (SOLO)
STP128: 8' GREAT VOX HUMANA (MAIN)
STP129: 5-1/3' GREAT TIBIA CLAUSA (SOLO)
STP130: 5-1/3' GREAT TIBIA CLAUSA (MAIN)
STP131: 4' GREAT TUBA HORN
STP132: 4' GREAT DIAPHONIC DIAPASON
STP133: 4' GREAT HORN DIAPASON
STP134: 4' GREAT TIBIA CLAUSA (SOLO)
STP135: 4' GREAT TIBIA CLAUSA (MAIN)
STP136: 4' GREAT SOLO STRING
STP137: 4' GREAT VIOL D' ORCHESTRE
STP138: 4' GREAT SALICIONAL
STP139: 4' GREAT CONCERT FLUTE
STP140: 4' GREAT VOX HUMANA (SOLO)
STP141: 4' GREAT VOX HUMANA (MAIN)
STP142: 3-1/5' GREAT TIBIA CLAUSA (SOLO)
STP143: 3-1/5' GREAT TIBIA CLAUSA (MAIN)
STP144: 2-2/3' GREAT TIBIA CLAUSA (SOLO)
STP145: 2-2/3' GREAT TIBIA CLAUSA (MAIN)
STP146: 2-2/3' GREAT CONCERT FLUTE
STP147: 2' GREAT TIBIA CLAUSA (SOLO)
STP148: 2' GREAT TIBIA CLAUSA (MAIN)
STP149: 2' GREAT VIOL D' ORCHESTRE
STP150: 2' GREAT CONCERT FLUTE
STP151: 1-3/5' GREAT TIBIA CLAUSA (SOLO)
STP152: 1-1/3' GREAT TIBIA CLAUSA (SOLO)
STP153: 1' GREAT TIBIA CLAUSA (SOLO)
STP154: 16' GREAT PIANO
STP155: 8' GREAT PIANO
STP156: 4' GREAT PIANO
STP157: 8' GREAT CATHEDRAL CHIMES
STP158: 8' GREAT MARIMBA
STP159: 8' GREAT MARIMBA
STP160: 8' GREAT CHRYSOGLOTT (WURL)
STP181: 8' BOMB TUBA HORN
STP182: 8' BOMB DIAPHONIC DIAPASON
STP183: 8' BOMB TIBIA CLAUSA (SOLO)
STP184: 8' BOMB TIBIA CLAUSA (MAIN)
STP185: 8' BOMB CLARINET
STP186: 8' BOMB BRASS SAXOPHONE
STP187: 8' BOMB OBOE HORN
STP188: 8' BOMB SOLO STRING
STP189: 8' BOMB VOX HUMANA (SOLO)
STP190: 4' BOMB TUBA HORN
STP191: 4' BOMB TIBIA CLAUSA (SOLO)
STP192: 4' BOMB TIBIA CLAUSA (MAIN)
STP193: 4' BOMB SOLO STRING
STP194: 2-2/3' BOMB TIBIA CLAUSA (SOLO)
STP195: 2-2/3' BOMB TIBIA CLAUSA (MAIN)
STP196: 2' BOMB TIBIA CLAUSA (SOLO)
STP197: 2' BOMB TIBIA CLAUSA (MAIN)
STP198: 1' BOMB TIBIA CLAUSA (SOLO)
STP199: 8' BOMB PIANO
STP200: 8' BOMB MARIMBA
STP201: 8' BOMB CHRYSOGLOTT (WURL)
STP202: 8' BOMB XYLOPHONE
STP203: 8' BOMB GLOCKENSPIEL
STP204: 16' GREAT to BOMB
STP205: 8' GREAT to BOMB
STP206: 4' GREAT to BOMB
STP207: 16' SOLO to BOMB

STP41: 8' SOLO VOX HUMANA (SOLO)

STP42: 4' SOLO TUBA HORN

STP43: 4' SOLO TIBIA CLAUSA (SOLO)

STP44: 4' SOLO TIBIA CLAUSA (MAIN)

STP45: 2-2/3' SOLO TIBIA CLAUSA (SOLO)

STP46: 2' SOLO TIBIA CLAUSA (SOLO)

STP47: 1-3/5' SOLO TIBIA CLAUSA (SOLO)

STP48: 1-1/3' SOLO TIBIA CLAUSA (SOLO)

STP49: 8' SOLO PIANO

STP50: 8' SOLO CATHEDRAL CHIMES

STP51: 16' SOLO MARIMBA

STP52: 16' SOLO CHRYSOGLOTT (WURL)

STP53: 8' SOLO SLEIGH BELLS

STP54: 8' SOLO XYLOPHONE

STP55: 8' SOLO GLOCKENSPIEL

STP56: 16' SOLO to SOLO

STP57: 8' SOLO unison off

STP58: 4' SOLO to SOLO

STP59: 6-2/5' SOLO to SOLO

STP100: 16' GREAT TIBIA CLAUSA (MAIN)

STP101: 16' GREAT CLARINET

STP102: 16' GREAT ORCHESTRAL OBOE

STP103: 16' GREAT SOLO STRING

STP104: 16' GREAT VIOL D' ORCHESTRE

STP105: 16' GREAT SALICIONAL

STP106: 16' GREAT BRASS SAXOPHONE

STP107: 16' GREAT OBOE HORN

STP108: 16' GREAT VOX HUMANA (SOLO)

STP109: 16' GREAT VOX HUMANA (MAIN)

STP110: 16' GREAT CONCERT FLUTE

STP111: 8' GREAT ENGLISH HORN

STP112: 8' GREAT BRASS TRUMPET

STP113: 8' GREAT TUBA HORN

STP114: 8' GREAT DIAPHONIC DIAPASON

STP115: 8' GREAT HORN DIAPASON

STP116: 8' GREAT TIBIA CLAUSA (SOLO)

STP117: 8' GREAT TIBIA CLAUSA (MAIN)

STP118: 8' GREAT CLARINET

STP119: 8' GREAT KINURA

STP120: 8' GREAT ORCHESTRAL OBOE

STP161: 8' GREAT XYLOPHONE

STP162: 8' GREAT GLOCKENSPIEL

STP163: 16' GREAT to GREAT

STP164: 8' GREAT unison off

STP165: 4' GREAT to GREAT

STP166: 16' SOLO to GREAT

STP167: 4' SOLO to GREAT

STP168: 16' SOLO to GREAT

STP169: 8' SOLO to GREAT

STP170: 16' BOMB ENGLISH HORN

STP171: 16' BOMB BRASS TRUMPET

STP172: 16' BOMB TUBA HORN

STP173: 16' BOMB DIAPHONIC DIAPASON

STP174: 16' BOMB TIBIA CLAUSA (SOLO)

STP175: 16' BOMB TIBIA CLAUSA (MAIN)

STP176: 16' BOMB SOLO STRING

STP177: 16' BOMB BRASS SAXOPHONE

STP178: 16' BOMB VOX HUMANA (SOLO)

STP179: 8' BOMB ENGLISH HORN

STP180: 8' BOMB BRASS TRUMPET

STP208: TRAPS TO PEDAL 2ND

STP209: 8' SOLO to PEDAL 2ND

STP210: 8' ACCOMP 2ND ENGLISH HORN

STP211: 8' ACCOMP 2ND BRASS TRUMPET

STP212: 8' ACCOMP 2ND TUBA HORN

STP213: 8' ACCOMP 2ND DIAPHONIC DIAPASON

STP214: 8' ACCOMP 2ND TIBIA CLAUSA (SOLO)

STP215: 8' ACCOMP 2ND CLARINET

STP216: 16' ACCOMP 2ND MARIMBA

STP217: 8' ACCOMP 2ND CATHEDRAL CHIMES

STP218: 8' ACCOMP 2ND GLOCKENSPIEL

STP219: 8' ACCOMP 2ND PIANO

STP220: 4' GREAT to ACCOMP 2ND

STP221: 8' BOMB to ACCOMP 2ND

STP222: 8' SOLO to ACCOMP 2ND

STP223: TRAPS TO ACCOMP 2ND

STP224: 16' GREAT 2ND ENGLISH HORN

STP225: 8' GREAT 2ND ENGLISH HORN

STP226: 8' BOMB to GREAT 2ND

STP268: ACCOMP SLEIGH BELLS

STP269: 8' ACCOMP SOLO STRING

STP270: Relative transposer -1

STP271: Absolute transposer +0

STP272: Relative transposer +1

STP273: Stage Shutters Off

STP274: SOLO RT CHEEK

STP275: BOMBARDE RT CHEEK

STP276: GREAT RT CHEEK

STP277: ACCOMP RT CHEEK

STP278: AUTOSAVE

STP279: KILL

STP280: Stop #280

STP281: RECORD

STP282: WOOD BLOCK I

STP283: PROGRAM TOE 1

STP284: AUTO HORN

STP285: WIND

STP286: SURF

STP227: 8' SOLO to GREAT 2ND

STP228: 8' SOLO to GREAT 2ND

STP229: MAIN TREM

STP230: SOLO TREM

STP231: TIBIA CLAUSA TREM (MAIN)

STP232: VOX HUMANA TREM (MAIN)

STP233: TUBA HORN TREM

STP234: ENGLISH HORN TREM

STP235: VIBRAPHONE

STP236: GLOCKENSPIEL REIT

STP237: MARIMBA REIT

STP238: XYLOPHONE REIT

STP239: GREAT sostenuto

STP240: SWELL TO MASTER

STP241: STRING CELESTE OFF

STP242: TRAPS REIT OFF

STP243: STAGE LIGHTS ON

STP244: STAGE LIGHTS TRIGGER

STP245: PEDAL RIDE CYMBAL

STP246: PEDAL BASS DRUM

STP247: PEDAL SNARE DRUM TAP

STP248: CYMBAL X

STP249: PEDAL CRASH CYMBAL

STP250: PEDAL TAP CYMBAL

STP251: PEDAL BRUSH CYMBAL

STP252: PEDAL SIZZLE CYMBAL

STP253: PEDAL TRIANGLE TAP

STP254: PEDAL RIDE CYMBAL

STP255: PEDAL COWBELL

STP256: ACCOMP SNARE DRUM ROLL

STP257: ACCOMP TOM TOM 1

STP258: ACCOMP CYMBAL X

STP259: ACCOMP TAP CYMBAL

STP260: ACCOMP BRUSH CYMBAL

STP261: ACCOMP SIZZLE CYMBAL

STP262: ACCOMP SAND BLOCK

STP263: ACCOMP MARACAS

STP264: ACCOMP WOOD BLOCK I

STP265: ACCOMP TAMBOURINE

STP266: ACCOMP CASTANETS

STP267: ACCOMP TRIANGLE TAP

STP287: AHOOGA HORN

STP288: DIVE ALARM

STP289: POLICE SIREN

STP290: PROGRAM 2

STP291: ------

STP292: CRASH CYMBAL

STP293: BASS DRUM ROLL

STP294: TRIANGLE TAP

STP295: HORSE HOOVES

STP296: AIRPLANE

STP297: ROLL CYMBAL1

STP298: GONG

STP299: SPLASH CYMBAL

STP300: MACHINE GUN

STP301: DOOR BELL

STP302: FIRE GONG

STP303: BOAT WHISTLE

STP304: TRAIN WHISTTLE

STP305: BIRD 1

STP306: RT DESK 1

STP307: RT DESK 2

STP308: RT DESK 3

STP309: LF DESK 1

STP310: LF DESK 2

STP311: MORTON HARP

STP312: WURLITZER HARP

STP313: ------

STP314: ------

STP315: Kick Switch

STP316: Piano Sustain

UNIFLEX 4000 ORGAN CONTROL SYSTEM

The organ control system is made up of three components. A combinations system as previously detailed, an organ relay system, and a recorder/player system.

An Organ Relay System is that which takes information from the Stop Tabs and marries it with information from the keyboards and then sends it to the pipes. When these organs were built this was done by a large Electro-mechanical system with electrical cables with 100's of wires. With the introduction of semi-conductors these could be made a lot smaller but still contained about as much wiring. With computers, this work could be processed in a box as small as 2"x 3"x 1". And the long cable runs are reduced to 8 wires (network cable).

The UNIFLEX system is the best of all the systems on the market today (2021). Not every organ would benefit from the best or warrant the cost associated with the better systems. But any instrument, regardless of size, installed in a public venue should have a system of this level. What separates this from the competition is:

1. Lack of the memory restrictions of other systems with limits on the number of Organist (User) data.
2. Human interface which allows for simple adjustments and changes to meet the needs or desires of the organist.
3. Flexibility and completeness. This system can do anything that any other system can do out of the box (no need for adaptive special programs). All functionality is included and there is no need to add additional hardware beyond what is needed to support the system.

This is the system setup plan. In the console there are 12 Input and Output Cards. These are connected together by a 26 wire ribbon cable. *In earlier versions of the system this cable connected to an interface at the system computer. The earlier cards still work with the current system.* The ribbon cable terminates in an interface board. This board provides communication via either net. It attaches to a dual band, high speed router. This router is "Bridged" to a master router located in the Main Chamber Equipment Room. *This router may be eliminated by using a network cable to the master router.*

The system computer is located in the Main Chamber Equipment Room but can be used at the console location. It can be connected by WIFI or one of the open ports.

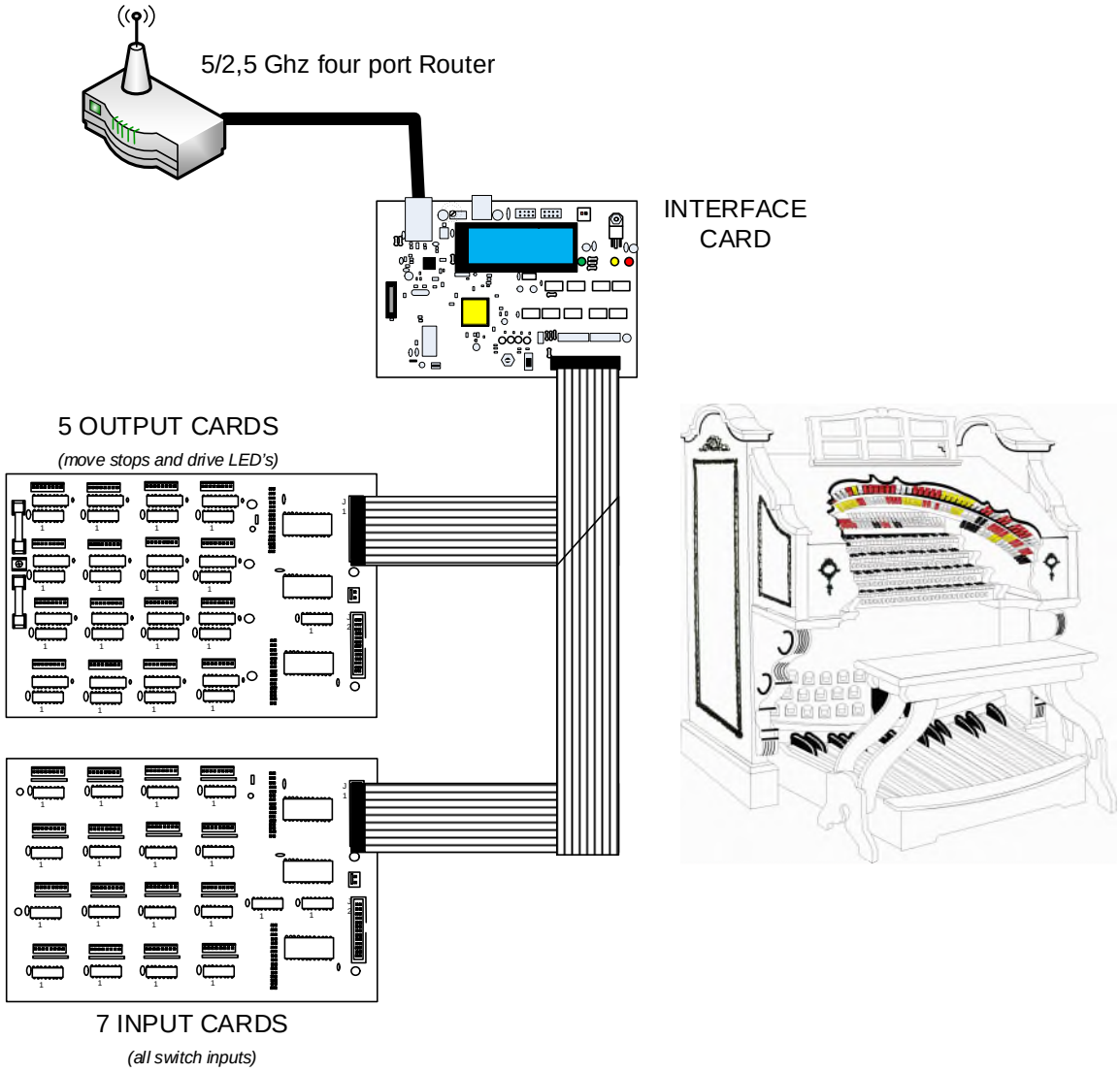

Figure 31 Console Uniflex Setup

Located in the two chambers are two interface cards and nine output boards in the solo and eleven in the main chambers. The interface cards are connected by Ethernet cables to the master router in the Main Equipment Room.

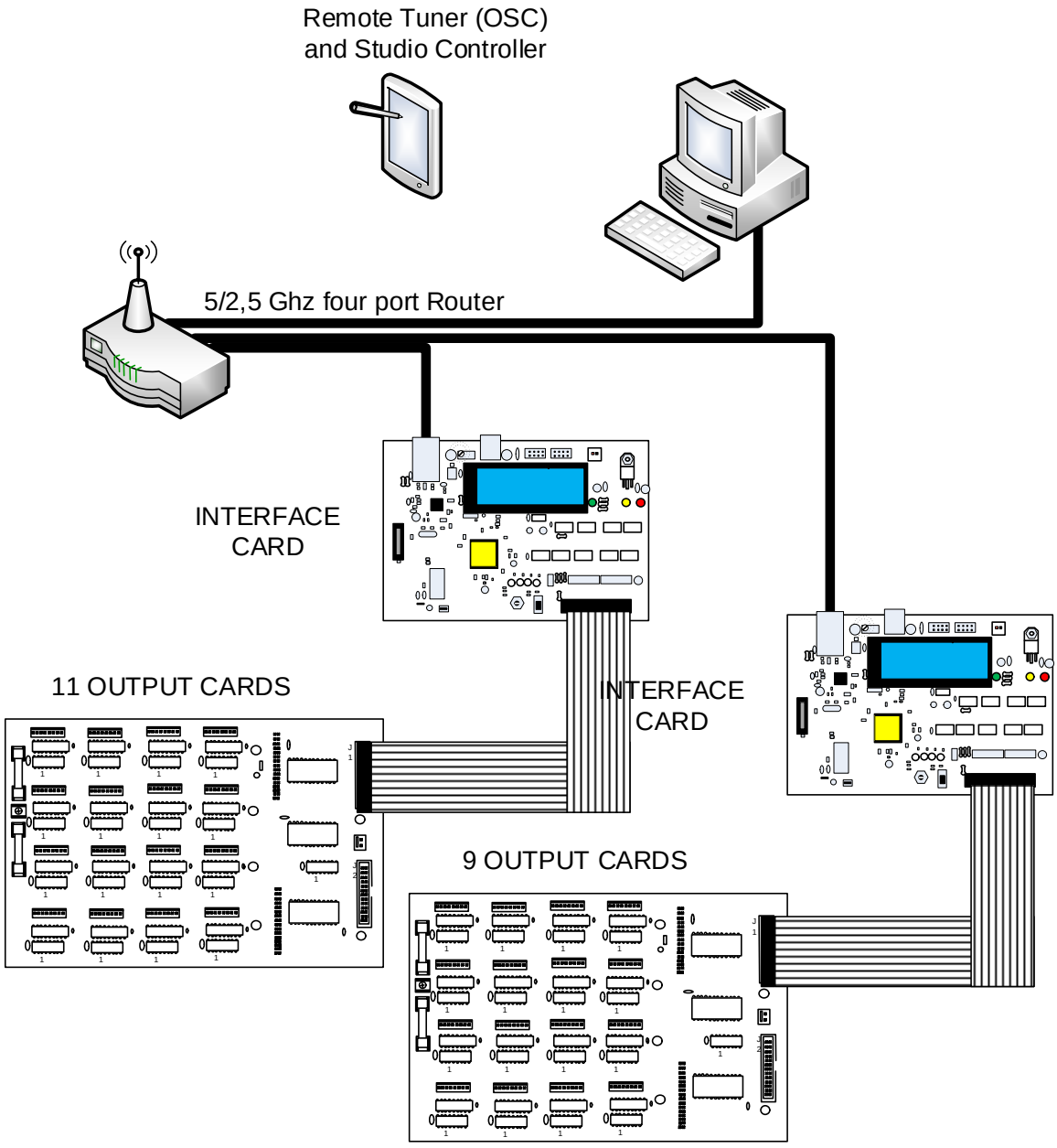

Figure 32 Chamber Setup

Uniflex Program

The user interface is what makes the Uniflex system ahead of all other system. This statement needs to demonstrated. But this demonstration is not intended to be a programing manual. There is more than one way to do this but this represents the simplest way to accomplish the task.

The demonstration is to have the Great Keyboard play the Flute Rank at a 2 2/3 pitch.

Start by loading the pin address for the Flute Rank.

Rank name: Flute
Rank type: Physical pipes Rank type 1
Pizzicato timing table: ------
Reiterate timing table: ------
Reiterate control unit: ------
Rank delay time: ------

	32'	16'	8'					4'	2'	1'	1/2'
C	EE-B5	EE-D1	EE-E5	EE-G1	EE-H5	EE-J1	EE-K5	EE-M1	EE-N5	EE-P1	
C#	EE-B6	EE-D2	EE-E6	EE-G2	EE-H6	EE-J2	EE-K6	EE-M2	EE-N6		
D	EE-B7	EE-D3	EE-E7	EE-G3	EE-H7	EE-J3	EE-K7	EE-M3	EE-N7		
D#	EE-B8	EE-D4	EE-E8	EE-G4	EE-H8	EE-J4	EE-K8	EE-M4	EE-N8		
E	EE-C1	EE-D5	EE-F1	EE-G5	EE-I1	EE-J5	EE-L1	EE-M5	EE-O1		
F	EE-C2	EE-D6	EE-F2	EE-G6	EE-I2	EE-J6	EE-L2	EE-M6	EE-O2		
F#	EE-C3	EE-D7	EE-F3	EE-G7	EE-I3	EE-J7	EE-L3	EE-M7	EE-O3		
G	EE-C4	EE-D8	EE-F4	EE-G8	EE-I4	EE-J8	EE-L4	EE-M8	EE-O4		
G#	EE-C5	EE-E1	EE-F5	EE-H1	EE-I5	EE-K1	EE-L5	EE-N1	EE-O5		
A	EE-C6	EE-E2	EE-F6	EE-H2	EE-I6	EE-K2	EE-L6	EE-N2	EE-O6		
A#	EE-C7	EE-E3	EE-F7	EE-H3	EE-I7	EE-K3	EE-L7	EE-N3	EE-O7		
B	EE-C8	EE-E4	EE-F8	EE-H4	EE-I8	EE-K4	EE-L8	EE-N4	EE-O8		

Figure 33 Flute Rank

Next define the Great Manual.

Keyboard name: Great
Keyboard type: Physical key contacts Keyboard type 1
Debounce time: 10 milliseconds
Pass key signals Yes
Pass trap signals Yes

	32'	16'	8'					4'	2'	1'	1/2'
C			AB-A1	AB-B5	AB-D1	AB-E5	AB-G1	AB-H5			
C#			AB-A2	AB-B6	AB-D2	AB-E6	AB-G2				
D			AB-A3	AB-B7	AB-D3	AB-E7	AB-G3				
D#			AB-A4	AB-B8	AB-D4	AB-E8	AB-G4				
E			AB-A5	AB-C1	AB-D5	AB-F1	AB-G5				
F			AB-A6	AB-C2	AB-D6	AB-F2	AB-G6				
F#			AB-A7	AB-C3	AB-D7	AB-F3	AB-G7				
G			AB-A8	AB-C4	AB-D8	AB-F4	AB-G8				
G#			AB-B1	AB-C5	AB-E1	AB-F5	AB-H1				
A			AB-B2	AB-C6	AB-E2	AB-F6	AB-H2				
A#			AB-B3	AB-C7	AB-E3	AB-F7	AB-H3				
B			AB-B4	AB-C8	AB-E4	AB-F8	AB-H4				

Figure 34 Great Manual

The next step is to create a Function (Fnc). There are many types but this one will take inputs from the Great Keys, shift them to the appropriate pitch, and send them to the flute rank.

Function name: 8' ------ ------
Function type: Normal rank output Function type 3
Keyboard: ------
Rank: ------
Pitch offset: (0) 8'
Bottom note limit: ------
Top note limit: ------

Figure 35 Blank Function Screen

This is a blank Function Screen with the Normal Rank Output already selected. As information is filled in the name will be automatically generated. You can change this if you need.

Function name:	2-2/3' Great Flute	
Function type:	Normal rank output	Function type 3
Keyboard:	Great KBD-4	
Rank:	Flute RNK-2	
Pitch offset:	(+19) 2-2/3'	
Bottom note limit:	------	
Top note limit:	------	

Figure 36 Function for Grt 2 2/3 Flute

At this point you create a stop tab.

Stop name:	2-2/3' Great Flute	
Stop type:	Dual magnetic stop	Stop type 2
Stop contact address:	AD-C1	
ON magnet address:	BB-A1	
OFF magnet address:	BB-A2	
Indicator address:	------	
Output function:	2-2/3' Great Flute	FNC-119
Debounce time:	------	
Combination status:	Active	
Record/play status:	Active	

Figure 37 Stop Tab Defined

The order this was done in is not mandatory. It appears to be the easiest with the least amount of typing. You can create parts like all the basic tab information and then go back and finish with the function.

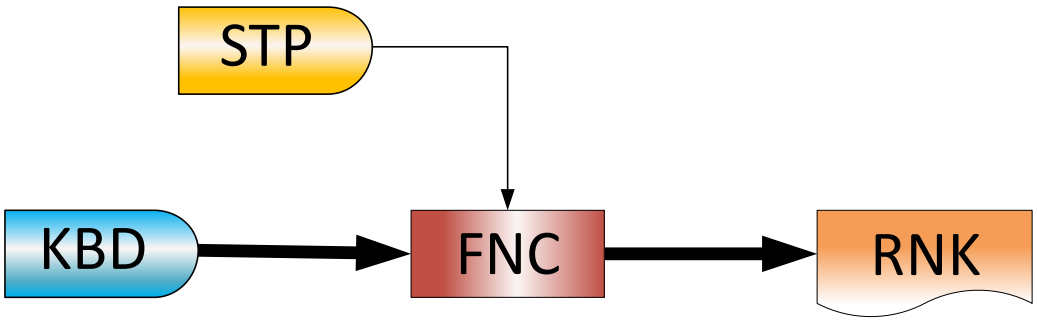

Figure 38 Functional diagram of a basic rank/stop

Touch OSC Interface

Additional organ control is available by a software program by Hexler.com. An Android, iPad, or cell phone can be used to run the program. This program sends MIDI messages via WIFI to the UNIFLEX computer. UNIFLEX provides two easily modified programs or screens that allow for tuning the organ from the tablet or controlling the organs recorder system.

Tuning Screens:

Figure 39 Remote Tuning Pages

These represent the customize screens for tuning this organ from a tablet. These were modified from the examples provided with Uniflex. The Main Screen (left) controls the organ and sets up how the organ might be tuned. The middle screen, Ranks, allows you to select one or two ranks and any pitch offset. The Tune screen (right) controls how you move up and down the rank with control of the step based on the pipe layout on the chest. The "Work It" is a variable speed reiteration feature.

Studio Screens:

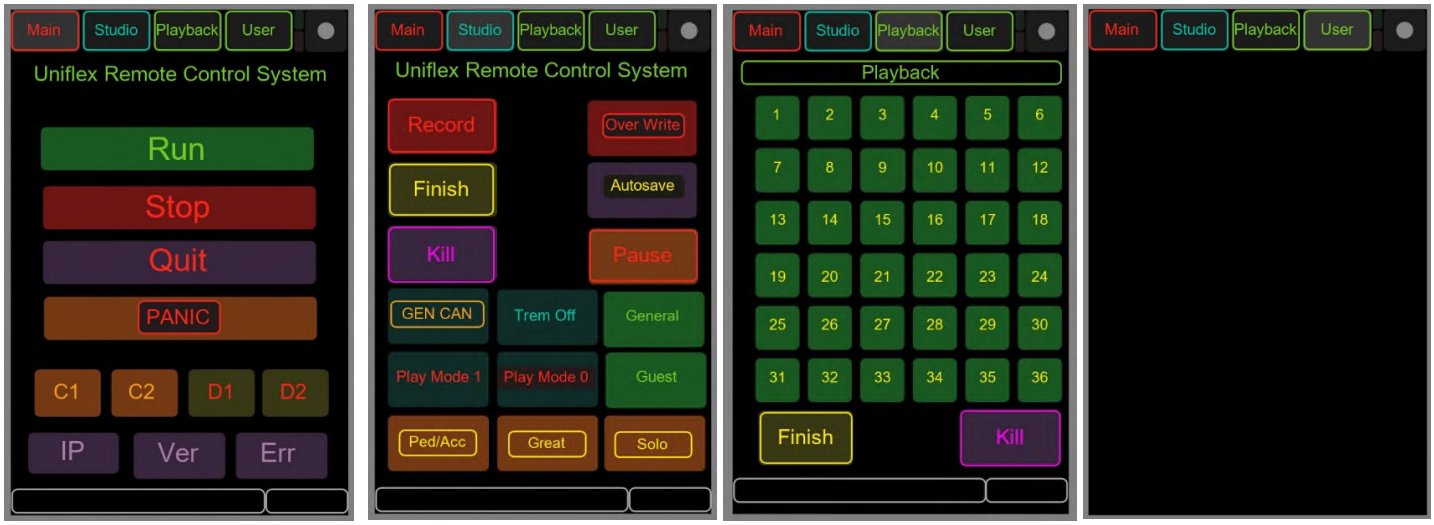

Figure 40 Studio Pages

The screens above are the customized (under development) screens for the studio feature of the organ. Originally developed for the three manual Wurlitzer VTPO, these screens allow for basic organ control and playing and recording performance while sitting in the auditorium and not at the computer.

Uniflex Record/Playback

The Uniflex program is equipped with a Record/Playback ability. This feature predates MIDI systems. The system allows Juke Boxing recordings and simultaneous recording and playback. The system allows multitrack recording of up to 9,999 tracks.

The system can respond to external MIDI players and generate MIDI files.

9,999 files can be stored in a User directory and the first 99 can be played from the console. A 45 minute recording use about 300 kb of disk space. In the original system, the operation system, Uniflex definitions, combination files, and 2 hours of recording, all fit on a 3.5", 750kb disk.

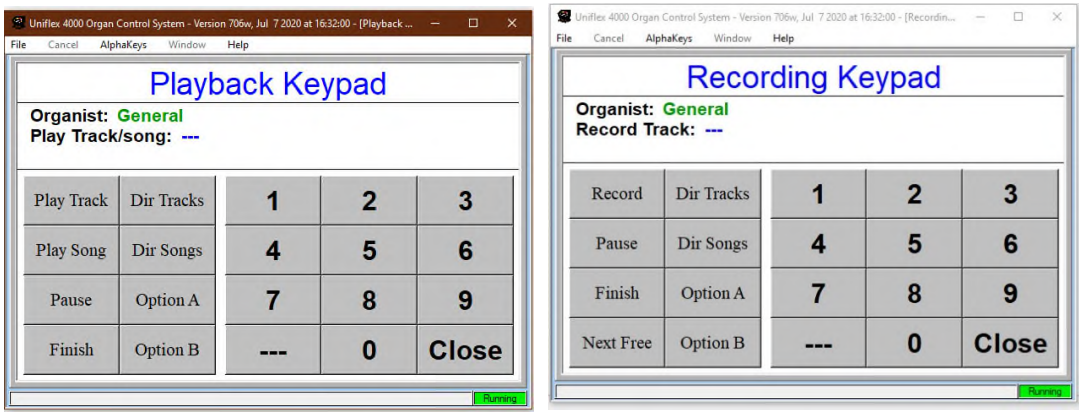

Figure 41 Playback & Recording Windows

CONSOLE FINISH

Figure 42 Console Finish Plans

This console produced by the Allen Organ Co., is the direction we plan to go with our console. Figure 8 on page 9 shows the original console. The black paint on the horseshoe, keyboards, and key desk has been stripped so far.