

Reflections on an Organ Acquisition and Installation

September 2003

Had someone claimed a year ago that Streetsville United Church would have a new organ at this time, belief would have been difficult to find. A donation in August 2002 changed the outlook.

We started our search for an organ with little information (other than a middle six figure number as the cost for a new traditional pipe organ) and no exposure to the church organ market. As there was little reference information to guide us in our search, we quickly realized we would have to rely on our music personnel and our own inherent business intuition and acumen in representing the congregation's interests.



With our installation having occurred just over four months ago, the subsequent voicing sessions and its use during about a dozen services, we can now reflect on where we have arrived.

Meeting our objectives

First we had two primary objectives:

- To acquire an organ that produced an authentic traditional pipe organ sound while providing appropriate and inspiring accompaniment to our music ministry
- To acquire an organ that would be totally familiar to a traditional organist.

We can definitely claim we achieved these objectives. Especially after recent visits from two established and widely recognized organists, there is no doubt that we have authentic traditional pipe organ sound; this is certainly reflected in comments (or the lack thereof) from members of our congregation – it has never come up as an issue. And the way that our own organist, our music director and visiting organists have been able to sit down and immediately play says we have met our second objective.

But we have learned a lot as well: first the additional features and then observations and feedback that have substantiated our selection of a 'digital pipe' organ to be an appropriate organ for church music accompaniment.

Additional Features

Multiple organ styles (Voicing Specifications); we certainly have the three Voicings ordered (and in fact an undisclosed fourth one).

Consistently in tune through all weather conditions ... well not quite in tune because Phoenix incorporates a slight detuning into their voicing protocol to reflect decades of authentic pipe organ experience where changing environmental conditions continuously impact the tuning of an organ; in practice a traditional organ is never totally in tune. But we do not have tuning drift associated with weather changes and season changes. This was born out in late June 2003 during

the first hot spell since installation when a visiting organist was able to obtain consistent music quality and tonality during his evaluation.

Total volume control – there are several ways to control volume – both overall volume and volume of the various divisions. But the main point is that volume can be readily adjusted – it took a few weeks to determine a volume level that was satisfactory in our “hall” and to our congregation but we appear to have found that level (and can change it readily if appropriate for special circumstances)¹. But the main observation here is that volume modifications can be readily accommodated.

Minimized space requirements: having gone from 13 ranks of traditional pipes to effectively over 50 ranks of digital pipes has required no additional space; in fact, it has left our pipe chambers relatively vacant, being occupied by the new organ’s Choir, Pedal and Swell division speakers. According to recommendations from traditional pipe organ manufacturers, we would have required about 500 additional square feet to accommodate all the “ranks” that came with our new organ. No way in our 1800 sq. ft. sanctuary!

Voicing time requirements: our organ (with the equivalent of 3100 pipes) was voiced over the course of about four three to six hour sessions. We know of a new traditional pipe organ with 6900 pipes that will require eight months (yes, months) to complete the voicing (and then will require a full time voicer to keep it relatively in tune). While the voicing of a Phoenix organ could put it fully in tune, Phoenix employs techniques to slightly detune it to maintain the authenticity of the tonal output from a traditional pipe organ which can never be kept fully in tune due to constantly varying environmental conditions.

Multi-organist adaptability: through its control panel this organ can be easily programmed to allow multiple organists to create and recall their own set of thumb and toe piston combinations, adjust for temperament and make other customization selections to suit his/her individual tastes and thirst for artistic expression.

Cost: A traditional pipe organ delivering the same capability (but with only one style) would have cost about three to five times as much as our new ‘digital pipe’ organ.

Observations and Feedback:

First and foremost – does it contribute to inspiring worship? On this count one can say an unequivocal yes. With much better sound presence throughout the sanctuary and volume levels appropriate to the entire sanctuary, the new organ does provide the music accompaniment and acoustical environment sought.

Secondly -- challenge the musician: any quality musical instrument should not only produce the expected sound but also challenge the musician to be creative and to fully express his/her artistic talents. The main observation from watching organists at this console is how readily they pick up on how it offers that type of challenge. What is appropriate for an English voicing?; what is appropriate music for a Baroque voicing?; how can they combine the various instruments available in the ‘English with Orchestral Instruments’ voicing to authentically produce traditional music pieces? – I recall hearing one of our visitors play a very familiar Bach Aire that

¹ We are aware of another (hybrid) installation where the pipes were not appropriately matched to the hall with the result that they were too loud and require significant adjustment (Phoenix only supplies the controls for traditional pipes but the pipes themselves are specified and supplied by a third party).

requires violin/cello, bass and flute sounding exactly as it would have on its normal instruments. So instead of discussing the merits of ‘digital pipe’ vs. ‘traditional pipe’ organs, you can see the various organists’ wheels ‘going round’ trying to determine how artistic and creative they can be in playing it. Once an organist has experienced this organ, discussion centers on the artistic potential of such an organ, not the relative merits of a new technology.

Traditional user interface: after watching several organists experiment with the organ, consistently I have noticed that they are quickly into using the couplers, tabs and other features of the console (including the stops, of course) with no additional input such as responses to queries, assistance from the manual, training, etc. In implementing any new technology, the importance of a traditional user interface combined with transparency of the technology cannot be over-emphasized. The only additional explanation required is how to set the parameters and, after realizing that there are multiple styles (Voicing Specifications) available, how to change to the alternative styles.



Sanctuary acoustics: the most notable impact has been the presence of full organ sound throughout the sanctuary. Two contributors to this result: the ability to manage volume of the various divisions and the creation of openings (with grill covers) on the sides of the pipe chambers facing the congregation. But also we have noticed some interesting acoustical properties of our sanctuary that were masked by the previous physical configuration as well as the limitations on volume range. A listener can now sit at any location in the sanctuary and experience the full “sound presence” of the organ.

Low maintenance: we replaced our previous organ due to the impossibility of adequately maintaining it (including parts availability); with our ‘digital pipe’ organ all the associated maintenance issues have gone away. We just have to make sure nobody damages the finish by trying to apply a wax or some other in appropriate coating. No tuning or revoicing, no blower to worry about, no solenoids to stick open, easily adjusted volume are amongst the elements that contribute to this low maintenance. We can focus on musical presentation.

The role of reverberation: one of the complaints about electronic organs is their ability to provide (usually inappropriate) reverberation levels for reverberation’s sake rather than a reverb level appropriate to the “hall” or “sanctuary”. With a carpeted floor, our sanctuary has a “dry acoustic” that requires minimum reverberation; the organ has been set to provide a level that is appropriate to this acoustic property (and has received many complements on how this has been addressed).

Temperament: while it never played a role in our deliberations all of our visiting organists have commented on, and often experimented with, the Temperament settings available on this instrument.

Location of speakers (i.e. sound output of the various divisions) : we were fortunate in having appropriately located housings readily available for the speakers of the various divisions. The Great is at the absolute rear of the choir loft (front of the sanctuary) behind a façade of traditional pipes that comprised a Principal 16' rank of the previous organ. The speakers are spread out such that, when combined with some programming in the console's computer, one achieves the same spread of sound as one would have from this rank of pipes. The Choir and Pedal division speakers are located in the former pedal division pipe chamber on one side of the balcony while the Swell division speakers are located in the former Swell division pipe chamber on the opposite side. This physical displacement has turned out to be fortuitous in separating the sound sources from the various divisions and creates some interesting acoustical effects.

Attention to details: From the construction of the console through to the generation of sound, there were many details that have ensured an authentic traditional pipe organ experience. About 60% to 70% of the construction involves building the console itself, not only ensuring ergonomic placement of the manuals, stops, couplers and pistons but also providing a standardized but robust pedalboard and adequate lighting in appropriate places. The sound generation technology takes into account not only providing a relevantly appropriate reverberation level and volume control but also wind effects, physical displacement of traditional pipe sound sources, time delays between pressing a key and hearing the responding sound, voicing considerations and speaker protection circuitry.

Funding: having a seed donation covering more than 50% of the cost from which to build out an Organ Fund was key to even the possibility of acquiring a new organ. But once seeded, raising the matching funds became much easier; in fact, we got to the point where we placed the Organ Fund on low priority (we do need to meet our operating expenses in a timely manner). Yet, even with the awareness of these priorities, additional unsolicited funds showed up to support the purchase. There is something about organs that brings out an emotional response that makes the fund raising relatively easy. (And we still met our budget goals for 2002; in fact, for the first time in over thirty years, we are entering the summer period without an operating deficit – one would like to speculate that the presence of a new organ has inspired a new awareness of a church's operating requirements.)



Terminology: there is a crying need for consistent terminology within the organ community. But then being the world's longest ongoing technology development process (going back to 300 B.C.) means that confusion can reign.

For example, you will notice the use of the term 'digital pipe' organ throughout this document; yet, having seen the internals of our previous pipe organ I could make a case for calling it a digital 'pipe organ' as some late 50's digital technology, in the form of diode matrix switching arrays and a rack of on/off switches, were used to control this traditional wind-driven pipe organ. On the other hand the use of digital sampling to store authentic organ pipe information in a digital memory creates "digital pipes" stored in memory banks, thus, the term 'digital pipe' organ. A picture of these memory banks (digital pipes) is shown on the right.

What defines an electronic organ (which has many negative connotations in terms of music quality after several decades of usage of this term)? Is it:

- an organ that attempts to synthesize and amplify audio signals to generate organ sounds but cannot compensate for the geometry of the pipes (Hammond, Rogers, Allen, etc.)?
- an organ that has electronic controls such as our previous digital, but traditional, wind-driven pipes?; most current builders of traditional pipe organs incorporate at least this degree of electronic technology.
- an organ such as our new one that is fully digital and electronic with ‘digital pipes’, digital signal processing technology, digital control algorithms, highly linear amplifiers and speakers designed for sound generation, not simply amplification?

The author’s recommendations for terminology and their origin are contained in a [separate note](#). But it would appear the term ‘*digital pipe*’ organ would fairly represent our acquisition.

The technology – as mentioned elsewhere, organs have evolved from one of mankind’s longest running technology development processes. The author, on the other hand, has been exposed to digital sound processing technology (and other signal processing technology, such as that employed in magnetic resonance imaging and vibration analysis) for over thirty years. Our organ represents the culmination of several technology developments but only those of the past five to ten years have made it financially viable:

- Development of very high speed processing chips (CPU’s, sound processors, etc.)
- Advances in memory technology resulting in significantly lower cost per megabyte of memory (this organ required over 1GB of memory)
- Accumulation of several years of experience with the implementation of digital sampling techniques

Role of church members



Climbing through a 127 year-old attic, removing and storing over 500 organ pipes (and the associated console), constructing appropriate modifications to the organ/choir loft and pipe chambers, running speaker and electrical supply wiring, moving the console into the building – these were all challenges associated with preparing the sanctuary and church infrastructure for this installation.



We were fortunate in having a diversity of talent and enthusiasm such that each of these requirements was not a challenge but rather an opportunity for members with various skills to contribute to the overall mission of our congregation.

Appropriate acknowledgement must be given to all those who contributed carpentry, electrical and even basic physical skills to allow our installation to not only achieve the level of success implied here but also to come in under budget.

As a result some of the surplus funds have been used to enhance the final skill required to optimize the incorporation of our organ’s many resources into worship, namely, to provide upgrade training to one of our longest term employees: our organist.

Conclusion

We have met our objectives; our musicians have new challenges and our congregation has become even more involved and committed. However, maybe the best summation came in these remarks sent back by one of the visiting organists (who had visited several Phoenix installations):

“I want to like the Uxbridge installation best, as the church was to me by far the most attractive. However, my mind keeps returning to Streetsville. For placement, convincing visual installation and authenticity of sound (sounds emanating from the right places in the building) I thought you created a real work of art. It absolutely could not be distinguished from a pipe organ.”

Methodists were never known for their church architecture but have been known to be significant contributors to religious music.