dous, and Dr. Williams was pleased with the results. His Wurlitzer has been playing perfectly since the spring of 1984.

After reviewing the excellent results of both installations, the company realized that there could be a good market for such a versatile and simple system, but that the use of such an expensive commercial business computer was not practical for many reasons. Rights for the use of the basic computer design were negotiated. This was desirable because it had proven to be a reliable, trouble-free system based on thousands of production units. A new computer was then designed for organ control, and interface boards for this computer, built by Devtronix, are now in their third production run.

To describe this new system and its capabilities, there are only three sections to it — the computer, the INPUT and the OUTPUT boards. The 10 x 12 inch computer board is mounted in a neat 17 x 13 x 5 inch enclosure which also contains the regulated power supply and a 3½ inch drive and disk which permanently contains the special operating system and program. It connects the console to the pipes by software.

Every switch contact in the console is an INPUT signal to the computer. A 5 x 9¼ inch printed circuit, designated an INPUT board with 18 eight-pin connectors, can handle up to 128 contacts. For example, two 61-note keyboards can be connected to one board. As many INPUT boards are required as there are total contacts (pistons, stop switches, playing keys, expression, etc.) divided by 128.

The third part of the system is also a 5 x 9¼ inch printed circuit, designated an OUTPUT board, which has 12 eight-pin connectors and can drive up to 96 magnets (either chest magnets, dual magnet stop assemblies or lights). For example, one OUTPUT board can control a full Tibia rank or up and down coils of 48 stop assemblies.

Stop action OUTPUT boards are used in the console with INPUT boards. All the console boards are daisy-chained together with a small, flat ribbon-cable which plugs into the computer. A second identical ribbon-cable runs from the computer into pipe chambers and daisy-chains with all pipe chest magnet driver OUTPUT boards. This is all the wiring necessary for computer control. Expansion of the organ, both in console contacts and pipe ranks, is as simple as adding the necessary INPUT and OUTPUT boards.

The relay is a software multiplex sampling system and is capable of every known relay action through software control. The system also supports an elaborate capture-type combination action with an almost unlimited number of separate sets of memories, each of which may be recalled instantly. Each of an almost unlimited number of pistons may be considered to be generals and may be assigned to any of the stop switches to function as division pistons. Any stop in the console may be programmed to be a neutral on any piston.

The system is also capable of recording and playing back for up to two or four hours on a 3½ inch floppy memory disk. Total recording time is a function of the number of keystrokes made, not how long the recording takes. Recordings may be made up of any number of selections, and each may be played back instantly from the name or number given the recording. Each recording may be overdubbed up to 17 times, but such a complex recording would be reduced in playing time. The computer, in this case, plays back the previous recording at the same time it is recording the new part being played — try that on your home recorder some time!

Computer control systems are usually ordered in two steps. All INPUT and OUTPUT boards are ordered first and are delivered with an instruction manual with pre-printed wiring sheets so the customer can easily keep track of where each organ connection is on the interface boards. After the wiring is complete, the connection sheets are returned to Devtronix where the organ specification is programmed into the memory disk. The computer is then ordered with the memory disk — the customer plugs the small, flat console and pipe chamber ribbon-cables into the back of the computer — and the pipes will play from the console. An instruction manual is included which explains how to make tests of wiring, how to change mis-wired connections without touching a soldering iron, how to set up combination action, record, playback and overdub, plus a host of standard features not described here.

Reliability is the key feature of the system since all complex circuits are in software which can easily be changed to perform new functions. The standard INPUT and OUTPUT interface PC boards are extremely simple circuits as their only purpose is to reduce the number of console and chamber wires to two small, flat ribbon-cables.

There are ten of these systems now in operation, and ten others being wired for installations. New Mexico Military Institute in Roswell, New Mexico, was the first to install one, and Lyn Larsen played the dedication of that Wurlitzer in October 1985. Lyn is now installing the same system on a 3/25 church instrument in Phoenix. He recently completed three compact disk recordings on the 4/37 Wurlitzer, which has been equipped with the computer system, in the Wichita Civic Auditorium. Nor-Cal Chapter will have one on the 4/30 Wurlitzer being installed in Berkley Community Theatre, and Bob Maes has ordered one for the 3/20 Barton being erected in the Granada Theatre in Kansas City, Kansas. □

ORGAN-IZING POPULAR MUSIC

by AL HERMANNS

There are three ways to play popular music on the organ: by note, by ear, and by a combination of both methods. Classical and church organ compositions should be played as written by the composer. This usually requires from six to twelve years of music study with primary emphasis on note reading.

On the other hand, popular music was not intended to be played on the organ! The composers usually had in mind performances by dance bands, pianists, or vocals with piano or orchestra accompaniment. Therefore, the organist who performs popular music on the organ must be able to play by ear and/or study keyboard harmony and arranging techniques in order to play popular songs in a musical manner. The best way for most people is to read the melody notes, use the chord symbols for harmony, and develop your accompaniment by rules or by ear. The disadvantage of playing a published arrangement as written is that you will always sound the same. If you learn to make your own arrangements, your arrangements will improve as you learn more about harmony and what to do with it.

During the performance of an ordinary popular song on the organ there are six musical elements all working together to make the total sound that the listener hears:

1. Melody — the obvious "tune" that everyone hears
2. Harmony — simple or advanced
3. Bass — alternating, sustained, walking
4. Rhythm — many varieties
5. Tone Color — choice of stops or other tone controls
6. Style — solo or chord melody, phrasing, expression, etc.

If any of these details are not carefully considered, the result is poor, unmusical arrangement.

In subsequent articles, I shall present the necessary arranging techniques to enable you to make a good sounding arrangement of anything you want to play. This is not difficult and can be learned by anyone who loves music enough to make the effort. □