

# Classic Organ Works

A division of Artisan Classic Organ Inc.

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## PACKAGED CONTROL SYSTEMS

This 'pre-packaged' series of products is designed to be particularly attractive to the organ builder who wants to minimize his involvement with 'electronics'. The units are optimized for ease of installation, especially in retrofit situations. All systems come with the control electronics enclosed in metal-cased cabinets.

- CCU – Console Control Unit – for 2, 3, 4 or 5-manual consoles
- PCU – Pipe Control Unit – for 8 or 10 pipe ranks – expandable by adding slave" units
- OCU – Organ Control Unit – combines Console Control and Pipe Control for very small organs
- CAU – for Combination-Action only

### SOFTWARE

Each system box contains a computer in which a single "chip" defines the functions of that box, so that all Packaged Systems can be customized to suit the requirements of a particular organ. However, to reduce cost and shorten delivery time, some 'pre-engineered' configurations are available, which would be suitable for firms that build a standard line of organs. CCU's can be provided with selectable piston configurations and standard stop and coupler configurations, to make them cost-effective, even though some of the available stop, coupler, and piston inputs may not be connected.



A collection of OrganWorks project files is available, which will show you some of the possible configurations. These files may be used as templates, to create a unique file to describe a particular organ, or they may be used simply as a guide.

When we receive an OrganWorks file from you, we can quickly configure the console (CCC) and chamber (PCC) programs, and deliver a documented system fitted with all the input and output modules required to connect console inputs and drive console stop magnets and indicator lights, and chamber pipe-chests in the organ. Since the organ is defined in a single chip, updates and configuration changes are simple to implement.

For more information, and photos of the various components and installed systems, please go to our web site: <http://www.organworks.com>

## HARDWARE

All Packaged Systems are contained in ventilated metal boxes which can be easily mounted to a wall or wooden board within a console. The boxes contain all the electronics necessary for small to medium-sized organs and all the organ builder has to do is to wire up the various switches, magnets and power. As all units are the same physical size, it is easy to bolt two, or more, units together for a larger organ.

There are two basic systems – for the console (CCU) and the pipe chamber (PCU). A variant combines the two functions into a single box for a very small organ (OCU) while a fourth type contains only a combination action system (CAU).

There are several types of hinged ‘pin-board’ front panel (CCIO-1, CCIO-3, CCIO-5) to suit small or medium-sized consoles (from a small 2-manual organ with many stops and pistons, up to five manuals). These panels can also be used on very small organs where the pipe drivers can be in the same box as the console boards. At the hinged side are holes to allow cables to be tied down.

All switch inputs require +12V (active-high) to operate and are in rows of 64 inputs with various rows designated for keys, stops and pistons. All outputs (for stop-action magnets and indicator lights) are normally active-low (0V). Outputs are in rows of 48 outputs (Stop-action magnets require two outputs as they have On and Off coils, so one row handles 24 stops or couplers). Positive common is normally used on all switches and stop magnets but Negative common can be accommodated.

Outputs for pipe drivers are usually active-low (0V) but may be active-high (+12V) if required by using a different output module. All units may contain a mix of both types. The common for each row, whether +12V or 0V, is wired back to terminals on that row and each row has its own self-resetting fuse for protection so that an external short-circuit will not disable the whole system.

There is also a ‘pin-board’ panel on the left side for miscellaneous connections such as displays, lamps, expression shoes, MIDI In/Out.

A Transposer switch and the chamber cable(s) also connect to the side panel. Side-panel connections are fused with self-resetting fuses.

Other connectors on the side panel allow matrix-wired keyboards or Optical Keyswitch boards to be used, with or without velocity-sensing (OPKEYn/OPVKS<sub>n</sub>), in which case, the normal parallel keyboard inputs are not used.

Heavy-duty binding posts are used for the 12-volt DC input from the console power supply (or organ rectifier) and there is a terminal for grounding the metal case. The box is designed to fit in the back of the console (usually at the bass end) so that all connections are easily accessible and, by opening the panel, the internal plug-in modules may be reached.

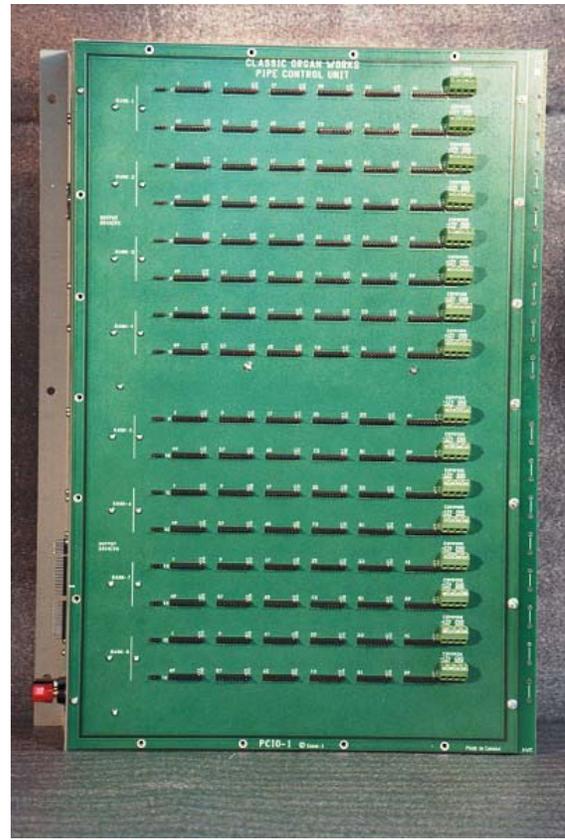
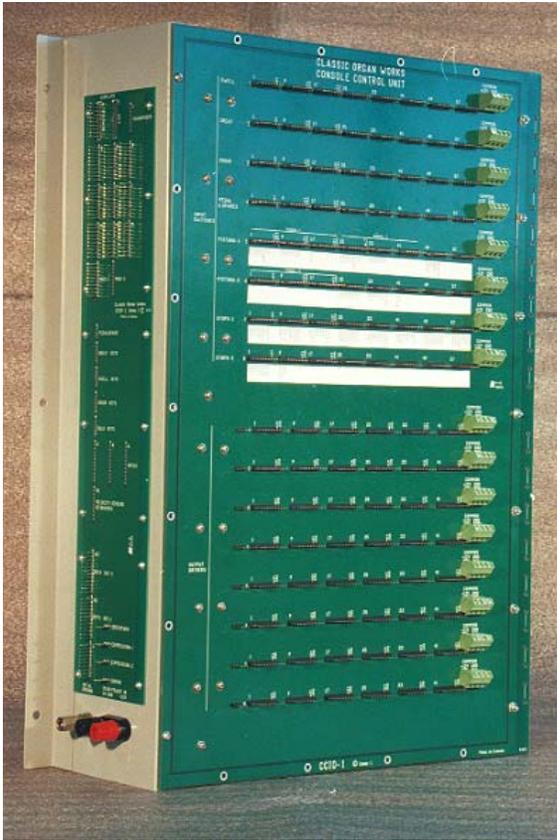
CCU, OCU and CAU versions each contain a Console Control Computer board (CCC) internally, so all features available for it are also available in these versions. See document CPOCS<sub>nn</sub>.DOC.

The PCU contains only pipe drivers and a Pipe Control Computer (PCC) and is intended to be mounted in a chamber. There are also two types of hinged front panel for this box, PCIO-1 for 8 ranks and PCIO-2 for 10 ranks. For more ranks, extra “slave” boxes can be added (these do not have a PCC) up to 24 ranks per PCC.

As ranks are usually 61, 73 or 85 notes long, two rows are needed per rank. The extra outputs may be used for offset chests, expression engines, lamps, tremulants, etc. In extremely tight cases, large ranks can be split over two, or more, rows to make optimum use of the available outputs.

For custom variations, you can specify the requirements in terms of keyboards, stops, pistons and other controls, and we will design the wiring and plug-in modules necessary (as well as the quantity of boxes). Then all that is required is installation. We highly recommend the use of self-terminating connectors so that you do not need to strip the wires before pushing them into the appropriate pins – no soldering necessary.

## PACKAGED CONTROL SYSTEMS



Left: The front of a CCU with a CCIO-1. Right: A PCU with a PCIO-1 front panel, capable of driving 8 ranks of pipes.

The various versions are shown in the following table:

	CCU (3-man.)	CCU (4-man.)	CCU (5-man.)	OCU * (3-man.)	OCU * (4-man.)	CAU	PCU	PCU
Front Panel	CCIO-1	CCIO-3	CCIO-5	CCIO-1	CCIO-3	CCIO-1	PCIO-1	PCIO-2
Manual Inputs	3x 61	4x 61	5x 61	3x 61	4x 61			
Pedal Inputs **	1x 32	1x 32	1x 32	1x 32	1x 32			
Spare Inputs	32	32	32	32	32			
Stop/Coupler Inputs	128	192	256	64	128	128		
Piston Inputs	128	192	192	128	192	128		
Stop Outputs ***	2x 128	2x 224	2x 288	2x 64	2x 96	2x 128		
Spare Outputs	0	32	32	0	32	0		
Ranks ****				4	5		8	10
Outputs ****				5x 48	6x 48		16x 48	20x 48
Size (W x H x D)	15" x 21" x 6" (inches)							
Power	12-15V DC (organ rectifier). Typically 50A Peak.							

\* Approximate quantities as stops and ranks share the same block of outputs so a compromise is necessary.

\*\* The pedal row has 32 spare inputs.

\*\*\* Stops and couplers have 2 coils – On and Off.

\*\*\*\* Output rows have 48 outputs, so a typical pipe rank requires less than two whole rows.

## PLUG-IN INPUT and OUTPUT MODULES

*Packaged Systems are made up to suit the application by plugging appropriate Input and Output modules on the inside of the 'pin-board' front panel. Each output module has an LED for test purposes. These modules are:*

### **SIB-4 Switch Input Board**

This board is used for all switch inputs. It has 64 inputs, which are sensed as On if the input voltage is greater than about four Volts (4V). Inputs will normally be connected to a switch, whose common is connected to a fused output (+12V) on the front panel. Inputs are protected against high voltage and electrostatic discharge. Input load is 2200 Ohms which ensures sufficient current to keep contacts clean.

### **OUTN-1 Negative Output Board**

This board is used to provide active-low (0V) outputs to drive stop-action magnets, chest magnets, lamps, etc. Outputs are capable of sinking up to 350mA (continuous) or 1A (pulse load). The OUTN-1 is used to drive stop-action magnets as low as 21 Ohms (12V) or chest magnets as low as 40 Ohms (12V). It has either spark-suppression diodes or voltage-dependent resistors (VDR) depending on the application. Outputs are fully protected against short-circuited loads and will shut down if overloaded.

### **OUTP-2 Positive Output Board**

This board is used to provide positive outputs (active-high) to drive stop-action magnets, chest magnets, lamps, etc. Outputs are capable of sourcing up to 600mA (continuous) or 6A (pulse load). They are used to drive chest magnets as low as 20 Ohms (12V) and have built-in spark-suppression diodes. Outputs are fully protected against short-circuited loads and will shut down if overloaded.

OUTN and OUTP boards are interchangeable and may be mixed in the same system, as long as the correct 'common' voltage is observed for each row.

### **OUTL-1 Lamp Driver Board**

This board is used to provide Negative (active-low) outputs to drive console indicator lamps, pushbutton lamps, bargraphs, etc. Outputs are capable of sinking up to 150mA (continuous). They are used to drive lamps or LEDs at 12V, and include appropriate series resistors to limit current to LEDs, or to reduce in-rush current to incandescent lamps (to ensure long life). Outputs are fully protected against short-circuited loads and will shut down if overloaded. They are not suitable for inductive loads.

### **OUTT-1 Output Test Board**

This optional board plugs onto to the output connectors on the outside of the front panel of any packaged unit. The stop/chest magnet cable may be plugged via the OUTT-1 so that the bi-colour LEDs can indicate the status of outputs for diagnostic purposes. No colour indicates that the output is open (possibly a break in the cable to a magnet), Green indicates that the output is Low (On for OUTN, OUTL or Off for OUTP) while Red indicates that the output is High (Off for OUTN, OUTL or On for OUTP).

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