

Page	Contents	Page
3	THE DESIGN	32
4	How It Works	33
5	CONSTRUCTIONAL DETAILS	35
5	The Drawings	39
5	Materials	
6	The Bellows	41
7	The Casing	42
8	Drive Requirements	43
8	Internal motor drive # 15	
8	Testing The Bellows/Reservoir Assembly	
9	Operational Air Pressure	
9	Testing Pressure	46
10	Bellows Design	47
10	The Pipes	48
12	Method Of Making The Pipes	48
13	Accompaniment Pipes #6	49
13	Accompaniment Windchest #7	50
14	Melody Pipes #8 – Front Row	51
14	Main Windchest #9, #10, #11	52
15	Bass Pipes #11, #12	53
15	Open Pipes #13	54
15	Counter Melody	55
15	Octave Pipes #14	56
16	Melody Pipes – Second Row #8	58
16	Celeste Control #15	
16	Final Tuning	
17	General Tuning Procedures	D1
17	The Glockenspiel #16, #17, #18	D2
18	Vibrato #19	D3
19	Percussion #20, #21	D4
19	Casing Up	D5
20	The Conductor #19, #22	D6
20	Hand Cart #23	D7
20	Electrical Aspects	D8
20	Midi - Background	D9
21	Midi - On Topsy	D10
21	Basic Wiring	D11
22	Register Control Using Relays	D12
22	Register Control Using Electronics	D13
22	Tremulant Effect	D14
22	More Free, Virtual, Midi Outputs	D15
22	Connecting To The Decoder Board	D16
23	Midi Leads # 1	D17
23	Diodes	D18
24	Control Panel	D19
24	Power Supplies	D20
24	Optional Power supplies	D21
25	Topsy 3 Scales	D22
27	APPENDIX 1 - TOPSY OPTIONS	D23
27	20 / 21 Notes	D24
27	30/32 Notes	D25
27	42 Notes	DIAG J2 Juliana blower @ reeds
27	Non Electrical Optional Extras to Mix/Match	DIAG J3 Juliana Piccolos @ percussion
27	Further Options Using Non Electronic Wiring	DIAG J4 Juliana Pipes @ layout
28	Using The Electronic Circuitry	
28	Moving On To Bigger Things	
29	APPENDIX 2 - SET UP DECODER BOARD	
31	APPENDIX 3 – MAKING YOUR OWN MIDI MUSIC	
32	Off The Shelf Music For Topsy 3	
32	Register Commands	
	Adding Percussion	
	Midi Keyboards	
	APPENDIX 4 – JULIANA	
	DIAG J1 Juliana Scale	
	FINALE	
	Suppliers	
	Other project packs	
	APPENDIX 5 – THE ELECTRONIC CIRCUITS	
	FIG 1 Power supply protection	
	FIG 2 Basic solenoid /decoder wiring	
	FIG 3 Push-button control	
	FIG 4 Push-button control – with MIDI	
	FIG 5 Extra Control Board current capacity	
	FIG 6 Vibrato motor speed control	
	FIG 7 Auto Percussion changeover	
	FIG 8 Drive motor speed control	
	FIG 9 Tremulant	
	FIG 10A Simple CMOS Register	
	FIG 10 Relay register control	
	FIG 11 8-way Electronic register control brd	
	FIG 12 8 Output Relay control	
	DRAWINGS SECTION	
	#1 Bellows General	
	#2 Bellows Boards	
	#3 Bellows detail 1	
	#4 Bellows detail 2	
	#5 Basic frame measurements	
	#6 Accomp'ment pipes	
	#7 Accomp'ment windchest	
	#8 Melody pipes	
	#9 Main windchest	
	#10 Main windchest 2	
	#11 Bass pipe fittings	
	#12 Bass pipes	
	#13 Counter melody pipes	
	#14 Melody octave pipes	
	#15 Drive motor	
	#16 Glock 1	
	#17 Glock 2	
	#18 Glock 3	
	#19 Vibrato motor	
	#20 Crankshaft @Percussion	
	#21 External drum	
	#22 Conductor	
	#23 Cart	
	#24 compact 20 note Bellows	
	#25 Top box @ control panel	

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THE DESIGN

Topsy 3 is what I personally consider to be my ultimate portable organ. In the first six months of its life, it has received extensive acclaim from several top organ enthusiasts - and many requests for these plans. I have developed the construction methods used over about twenty five years of organ building. These methods have come in for many criticisms over the years, but with this set of plans I am presenting them quite unashamedly, as the results achieved are excellent, both for me and for others. My main aims for any of my organs are: excellent performance, ease and economy of construction, durability and reliability, easy turning, and light weight. This organ has delivered the lot, plus a bit more! Even the basic weight of only 68 lbs is amazing for an organ with such a specification. One extra requirement that was suggested to me, was that it should fit through the door of a caravan. This limitation, and the desire to reduce the weight of the organ itself, is the reason for the Glockenspiel being detachable.



JOHN SMITH WITH TOPSY 3

As shown, Topsy 3 has a very full specification: 68 effective MIDI commands, 100 pipes, it can be hand turned, motor driven, or even operated by a blower. It has 4 musical registers, it has True Vibrato and Tremulant functions, a Glockenspiel can be attached, and there are 6 percussion effects. All this in a unit that I can load single-handedly into my estate car!

There is no need to feel intimidated by all the electronic circuits shown. For those who do not want to get too involved with extra electronics I have described how to start with perhaps just a 20 note organ, but I also include a number of optional specifications - right up to my 98-key dance organ. The Topsy options are listed in Appendix 1. Please note that the details that follow are for building the *full* specification 'Topsy 3' 68 key organ, so not all sections will apply if you decide to build a simpler version. It would be sensible therefore, to read Appendix 1 before deciding which way to proceed. Also, Appendix 4 contains the information about the larger organ - Juliana - which could be another alternative to consider.

If you have already made any of my other organs then this project will present many familiar jobs, but also some very new ones. I have tried to incorporate within these construction notes everything needed for the first time builder, and also included some theoretical points to increase your understanding of what really makes organs work well.

From the very beginning I have always tried to make sure that anyone purchasing my organ plans has the right background skills to complete the construction of a working organ. With this in mind, I do not attempt to explain basic wood or metal work practices - the methods I use have proven to be simple and reliable. There is, however, lots of scope to incorporate more sophisticated engineering or cabinet making - many fittings for instance could be made from metal, such as the connecting rod and motor drive components. Be very careful not to overdo this, however, and always bear in mind the final weight of the organ. Under no circumstances change the working systems for what might be seen as more traditional methods. Attempts by previous builders to do this have invariably caused them all sorts of serious problems, and wasted a lot of their time. This organ, when built *exactly* as shown, gives results which are second to very few others, of any make.

HOW IT WORKS

Topsy 3 is a MIDI controlled organ. This means - if we disregard the electronics for a moment - a very straight forward building process, just bellows, pipes, and a windchest (a box with holes in it). In other words, the tracker bar or key frame, music media transport, and full pneumatic operating system (the difficult and problematic bits) used in other organ types are not needed.

The double acting bellows are designed to be very efficient, and can be made without some of the difficulties found with traditional methods of construction. Air from these bellows is pumped into the combined reservoir, which smoothes out the bellows 'puffs', and gives a constant air pressure. The spill valve releases excess air - it is not a safety valve. The pressurised air is fed to the windchests, which have holes into which the pipes are inserted. Beneath each pipe hole is a magnetic valve - called a pallet magnet, or solenoid valve. The pipes are graduated in size from 3 feet to 3 inches in length, and are all basically constructed in the same way - the fully adjustable mouths ensuring optimum performance. The basic wiring for the pallet magnets uses a common +12 volt rail connected to one side of each coil. The other end of each coil is connected to a single wire which leads off to its own screw terminal on the Decoder board. The Decoder board is a bough-in item, and can be thought of as simply 64 on/off switches for the pallet valves.

MIDI music comes in the form of files of musical notes compiled in a computer, usually on a screen that looks exactly like a piano roll, with the mouse being used to draw the 'holes' representing the notes. The resulting MIDI file is presented to the organ's decoder board 'all squashed up' (to use a non-technical term) enabling it to be fed down just 2 wires. The decoder board unscrambles this information, and turns each of the pallet valves 'on' when its 'hole' in the MIDI file occurs. To feed the MIDI files to the decoder board, a small portable unit for just playing the MIDI files is usually either built in, or mounted close to the organ.

As well as 'holes' to operate the organ pipes, others are used for controls which determine which sections of the organ play at particular parts of the music. These controls are called 'Registers'. In Topsy, four further 'holes' are used to control the percussion instruments. There are some extra Register controls - that can be generated with the discrete electronic circuits - to operate a mechanically produced Vibrato, and also a Tremulant - which chops long notes on the Melody pipes into pulses. Both of these effects are well worth having - whether they are controlled by register commands you have inserted into the MIDI files, or simply by using push button switches on the organ. As you will discover in later sections, if you wish to keep the electronic side of things simple, the whole organ can be manually controlled.