**WILSON F/X**

Wilson F/X Digital Control Systems

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**W F**/**X**

 **WIRELESS**

**Set-up and Use of your Wilson F/X Launch System**

Your Wilson F/X systems components will come to you pre-programmed and ready to use. Your pad-boxes will already be programmed to your specified designations. All hardwired connections between the controller and pad-boxes are thru 16/3 outdoor extension cords. It is recommended that “BANK-A” be the first bank connected closest to your LCU-64 or LCU-128 controller. Unless your system is completely “wireless” your “BANK-A” powers your LCU controller. And it

powers the controller thru the “ground-plug” of the 16/3 extension cord, so it too must be intact. (for Wireless users, see below)

Connect all of your hardwired pad-boxes to your controller BEFORE you connect any of your pad-boxes to their batteries at the pads. If you don’t you are likely to blow a fuse in at least one of your pad-boxes and/or your controller. Connect your pad-boxes to your controller using only 16/3 outdoor extension cords that are in good condition with the “ground-plug” intact. If a ground-plug is missing, replace the 16/3 extension-cord communications line immediately. The whole system will not operate if the communications polarity is reversed at any connection. No permanent damage will be done with reversed polarity, but the system will not operate with reversed polarity.

Reversing the polarity can blow the 2 amp mini-fuse inside each pad-box or in the LCU-64 controller. Replace only with another 2 amp mini-fuse. They can be purchased at any auto-parts store. I get mine from Digikey. The Digikey part number is: F986-ND and last I checked they are about $.25 cents each. Do not replace with any other sized mini-fuse. Use only a 2 amp minifuse.

**Using your LCU-64 or LCU-128 Launch Controller (*standard controller*)**

Your LCU-64 or LCU-128 controller is clearly labeled for ease of use. There

is a removable Key-switch which is labeled ON and OFF. The Key is only

removable in the OFF position.

Along the bottom of the controller are 8 pad select switches with the numbers 1 thru

8, in RED. You may launch one pad at a time or any combination of the 8 pads of

any single bank, or even all 8 pads at the same time with enough available battery

power.

Along the top edge of the controller are the 8 bank select switches (16 of them if

you have an LCU-128) labeled in BLUE. The Bank select switches are used to

select a single bank of pads at a time. If you accidentally select two or more banks

of pads at a time, the Wilson F/X launch system will sit there and ignore all

commands until you deselect all but a single bank of pads at a time. If your system

stops working, check to make sure you only have ONE bank selected at a time.

When you have selected a single bank of pads and a single pad on that bank, the

controller will automatically do a “continuity check” of that bank/pad designation.

If that bank/pad has good continuity then the controller’s LED will be on with a

steady light. If there is no continuity then the controller’s LED will blink a fast

blink, blink, blink, blink, (etcetera) that indicates that there is no continuity. When

doing drag races it is best to first select each pad separately in order to determine if

all the igniters in the drag race have continuity before you go on to select the pads

on that bank for the actual drag race. When multiple pads are selected, the

controller’s LED will blink out a slow blink, blink, blink, blink, (etcetera) to

indicate that multiple pads are selected.

There is a momentary-on “FIRE” button which is used to launch rockets. It will

close the relays in the one selected bank of pads pad-box and fire all the pads on

any one bank of pads that you have selected. It will continue to close each selected

pad’s relay for as long as you hold the button down.

The last switch is another toggle switch which is labeled “TEACH” and “VOLTS.”

This is a three-position toggle switch with two momentary-on positions, one for

putting the controller into “teach-mode” and the other for doing a “remote voltage

reading” of any bank of pads that you have connected to your controller.

That’s the basic layout and instructions for use of your standard W-F/X LCU-64 or

LCU-128 controller.

There are really only two operations done with a W-F/X controller that need more

than a cursory explanation. Those operations are “teach-mode” and “remotevoltage-reading.” You can read about that a little further on in this document.

GOING WIRELESS

If you are using WRU-c wireless units along with or instead of going

hardwired, a few additional instructions need to be taken into account. Pad-boxes

are available with built in wireless units. But separate plug-n-play wireless units

are also available for those who are augmenting WFX pad-boxes without built in

wireless units. The following instructions are mostly aimed at these non-built in

unit users.

Current WRU-c wireless units are all identical. Each unit is both a transmitter

and a receiver. So unless you have some of the very early WFX wireless units,

each of them has a female 16/3 extension cord communications line coming out of

it.

Carefully screw the antennae onto the WRU-c unit. The antennae is

adjustable so that it is easily set in the vertical position. It has a 90 degree hinge

that allows for vertical placement.

The WRU-c at the pad-box is the easiest to “hook-up” because all you have to

do is plug it in to the single 16/3 male extension cord coming out of the pad-box.

That single 16/3 male extension cord coming out of the pad box is the

communications line coming out of it which is the communications connection to

your WFX LCU unit hardwired or wireless. Plug your WRU-c into the pad-box

BEFORE you connect the pad-box to its battery at the pads. When you “power up”

the pad-box, the wireless unit will light up all four of its LED’s, then the three green

LEDs will turn off. The red light is a simple blinking power-on indicator. The

three green LEDs are for showing your relative signal strength. The greens at the

pad box only turn on when the LCU controller is sending out commands. Otherwise

the unit remains in a dormant listening mode waiting for commands from the

controller.

If your system is partly hardwired and partly wireless, you will have a simple

two line Communications Adapter that consists of a small aluminum housing with

two 16/3 male extension cord ends coming out of it. Plug one end of this into a

16/3 triple block at the controller where the communications line comes from your

first hardwired pad-box and the other end into your WRU-c that you’re using at the

LCO table on your LCU-64 (or 128). This wireless unit will automatically transmit

and receive communications from and to your controller. This cord also powers

both the LCU-64(128) and the WRU-c at the controller using power from the first

bank of pads that is hardwired to your controller thru its male 16/3 extension cord

which carries both communications and power for controllers and/or wireless units.

If your system is completely wireless, you have a three-way Power Adapter

with a small three-way aluminum housing with three cords coming out of it. Two

of them are the same 16/3 male connectors as the simple two-way adapter in the

previous paragraph, one of which is plugged into your LCU-64 (128) and the other

directly into your WRU-c at the controller. The third cord coming out of the Power

adapter is divided into two power connections for the battery at the controller.

Connect the RED “+” battery clip to the “+” positive side of your 12v battery at the

controller and the BLACK “-” battery clip to the “-“ negative side of your 12V

battery at the controller.

REMOTE VOLTAGE READING – (standard controller)

Doing the Remote Voltage Reading (RVR) from the LCU-64 or the LCU-128

of any bank of pads is very simple. But the pad-box of which you want to do a

remote voltage reading must be powered up, connected to the controller hardwired

or wireless, and the pad-box must be capable of doing Voltage Reading and Remote

voltage reading. If it has a push button labeled VOLT then it is capable. It makes

no difference if it is connected by hardwire or wireless. The operation is identical.

If the battery you are trying to “read” has no voltage, then this operation will not

work for all the obvious reasons. I have gotten readings from batteries with as little

as 7.2 volts, but that was not enough volts to fire an igniter, but it was at least

enough to report its low voltage back to the controller.

To remotely read the voltage of the battery at a bank of pads that is powered-up and

connected to your controller….

{1} You start out with all the pad and bank select switches on your controller, in the

off position.

{2} Then you turn your launch controller on (Key switch).

{3} Next on your controller, you turn on the bank select switch of the bank of pads

whose battery you want to check. DO NOT SELECT ANY PADS. Only turn on

the Bank Select switch of the bank of pads that you want to do check.

{4} Lastly, you find the TEACH/VOLTS toggle switch, and toggle it towards the

VOLTS side holding it in the VOLTS position. The LED on your controller will

blink out the reported volts in the battery at the bank you have selected in the exact

same manner as the volt switch on the pad-box itself. For instance, if your battery

at the pads has 12.5 volts, the LED will blink 1 time, followed by a brief pause.

Then it will blink 2 times followed by a brief pause. Then it will blink 5 times

followed by a longer pause, it will continuously blink out the voltage at the selected

bank of pads until you release the “volts” switch on the controller.

TEACH MODE

All of your pad-boxes will be shipped to you already pre-programmed to your

specifications. But occasionally, you may wish to change your layout. As your

pad-boxes will remember their bank and pad designations until somebody

reprograms them to a different bank and pad designations, this process is not used

very often. There are 9 steps to Teach mode. You may exit “teach-mode” at any

time by simply turning off your selected pad switch, your selected bank switch, and

finally turning off your controller’s key switch.

{Step 1} Connect your LCU-64 or LCU-128 controller to the pad-box that you

wish to re-designate as a different bank of pads (hardwired or wireless). Make sure

to connect ONLY pad boxes that you want “taught” by your controller to a new

designation. And this works for both hardwired and wireless pad-boxes connected

by hardwire or wireless to your controller. Any pad-box connected to your

controller when it is in “teach mode” can be “retaught” with new bank/pad

designations. So be careful to only connect pad-boxes you want “taught.” The

easiest and safest way to do this is to ONLY plug directly into your controller, those

pad-boxes you want to “teach.”

If you have a “pre-2014 W-F/X system,” you may need to connect your “Bank-A”

with the “red cross” power supply indicator sticker on top. During the earlier years

of Wilson F/X systems only Bank-A was internally configured to power the

controller thru the communications cord. With all current systems, all W-F/X padboxes now send power thru the “comms-plug” of the 16/3 communications line for powering controllers and wireless units. So for these earlier systems you will need to connect your Bank-A to power your controller as well as connect whichever bank of pads you wish to re-designate.

You may connect and power up as many other pad-boxes to the LCU-64 as you

would like to reprogram. They just need to be powered up and have their

communication lines connected to the controller. But again, for those with earlier

systems, a pad box with the red cross sticker MUST be the first pad box connected

to the controller in however long of a string of pad boxes as you'd like, because in

those early systems, a pad box with the red cross sticker is required to send power

back to the controller.

{Step 2} Make sure all the pad select switches, bank select switches, and your key-switch on the controller are ALL in the off position.

{Step 3} While you hold the teach/volts toggle switch in the teach position, turn on

the power key-switch on top of your LCU-64 or LCU-128 controller. Hold the

teach switch in the “on” position for a second or two and then release it. The

controller’s LED will blink a double-blink followed by a second or two of no light

followed by the double blink etcetera. It’s visually like a heartbeat. As long as the

double-beep is still blinking, your controller is in “teach-mode.”

{Step 4} If you do not see the double blink then you are not in “teach mode.” Turn

the key-switch power off again and recheck to see to it that all your bank and pad

select switches are in the off position. The controller will not go into "teach mode"

if any of the bank or pad select switches are in the “on” position. If after following

these steps, for some reason you cannot get your controller into “teach mode,”

contact me A.S.A.P., because there’s something wrong that needs fixing.

{Step 5} Now that the controller is in teach mode, (with its double-blink heartbeat)

select the bank that you wish to program by turning on that bank select switch

designated with the bank designation for which you want to program a pad

box. For instance, let’s say you want to reprogram bank F to become bank C. With

the controller in “teach mode” you select the bank C switch on the controller. The

system will continue to do its heartbeat double tap. That's as it should be. You are

now ready to program your new bank "C."

{Step 6} With the controller in teach mode and bank "C" selected, next select pad1 on the controller, the Controller is now basically sending out the question to all

connected pad-boxes asking “Who wants to be designated as Pad-1 of Bank-C?

You now push down the pad-one continuity switch button on your new bank

"C" bank-of pads pad-box and hold it down for a couple of seconds. When you

hold the #1 continuity switch down on the pad box, the controller teaches it who it

is. The controller's LED will turn on a solid light once that bank/pad selection has

been learned by the pad box. Let go of the now “taught” pad-one-bank C continuity

switch on the pad box. It is now bank C pad #1. It will remain bank-C pad-1 till

somebody reprograms it to something else. The controller is still in “teach-mode”

and the double-blink on the controller’s LED will return after you let go of the padbox continuity button you just pushed.

{Step 7} Turn off the #1 pad select switch on the controller.

 A note to think about at this point: if you only teach pad one that it is now pad

one of bank C, the rest of the pads on that bank which was bank F will still respond

to the controller as bank F. You have not yet taught the rest of the pad-box

anything new, so they remain with their old designation till somebody teaches them

otherwise.

{Step 8} It is normal to program all the pads on a given bank/pad-box with the

same bank designation. So without changing anything else, turn on the pad select

switch on the controller designated as pad #2. The controller is still in teach mode

and still has bank C selected, and now with pad #2 of Bank C selected on the

controller, you push the continuity switch on bank-C pad #2 for a few seconds and

the controller's LED will once again give that solid light again to indicate that it has

reprogrammed what was F-2 to its new designation as C-2. Let go of the continuity

button on the pad box and turn off the controller pad select switch #2 and repeat the

process one at a time for pads #3 thru #8 of your newly reprogrammed bank C pads

1 thru 8 and you are done reprogramming bank C, pads #1 thru #8. Don’t forget to

change the Bank designation on the Pad-box itself or users will still think its bank

F.

Another note to think about: At this point you have completely

reprogrammed your old bank F to become your new bank C. But if you had a

former bank C, and it is still connected to your launch controller, it still thinks it is

bank C and it will respond to the controller as bank C until someone reprograms it

as a different bank designation.

That happened at the beginning of MWP-11; we somehow had two bank C's

connected to the controller at the same time. They both worked as bank C and each

gave continuity reports back to the controller as soon as bank C and any given pad

was designated. I discovered the problem and using this exact process

reprogrammed one of the bank “C” pad-boxes to an unused bank designation.

You may follow these teach mode instructions to re-teach any Wilson F/X

pad-box to become any bank/pad selection you want it to be. You may select a

different bank box and teach it to be bank F, pads #1 thru #8 to replace the pad box

that you just re-designated as pad C. Or you could reprogram every single pad in

your system to the exact same bank and pad designation. You could teach all of

your banks and pads to be bank C, pad 4, which might be a popular bank and pad

number if you know what I mean. Of course every time you select pad C-4 every

pad in your system would say "here I am" to your controller and every one of your

pads would fire if you pushed fire on bank C pad #4. If you want to do a mass drag

race I would suggest that you use an ARM Armageddon Switch instead. It's a lot

easier than reprogramming all the banks to the same bank and pad designation.

{Step 9} Turning OFF the Controller's Teach Mode. If you are done "teaching"

your bank of pads igniter leads/continuity switches who they are, merely turn off all

of your pad select switches and your bank select switch, followed by turning off the

key-switch on your controller. Your controller is now off and it has exited "teach

mode."

Programming PBU-1’s and PBU-4’s.

The process for programming a single-pad pad-box, a PBU-1, is identical to

the process for the PBU-8. The only difference is that you only have to program the

one bank/pad selection into the PBU-1 pad-box. The same goes for a PBU-4,

except for the fact that it has four pads.

Voltage Reading at the Pads

Built in Voltage Reading as a feature of Wilson F/X systems is a recent

addition to multi-pad pad-boxes and LCU-64/128 controllers. This feature may be

added to most older PBU-8 pad-boxes and LCU-64 controllers. Brand new singlepad controllers and single-pad pad-boxes are just coming off my assembly line

(April-2016) with this capability. The older versions of the LCU-1 and the PBU-1

do not have this capability and it cannot be added to them.

I’ve already talked about how to remotely read the voltage of a pad box from

the controller, but now I will describe the process of reading a voltage at the pads.

It is a very simple process. With the pad-box connected to either its wireless unit or

the communications line to the controller, power it by connecting it to its battery.

The Pad-box will automatically read its battery’s voltage as soon as it is powered

up. To do subsequent voltage readings, all you have to do is push the “volt” button

on top of the pad-box and listen for the sequence of beeps. Reading the voltage

sequence is identical to reading the voltage blinking/beeping sequence at the

controller. One-beep, followed by 3 beeps, followed by 5 beeps, means you have

13.5 volts in the battery connected to that pad-box.

Checking Continuity at the Pads

To get a read on the continuity of your igniter at the pads is also a very simple

and safe thing to do. Hook up your igniter to the igniter lead’s alligator clips just

like you are ready to fly your rocket. Make sure your alligator clips are not

touching or you’ll get a false positive reading of continuity where it may not

actually exist. Follow your igniter lead back to its pad-box and push the continuity

button of your igniter lead. Don’t be afraid. Go ahead and push the continuity

button down. You can even check an old-style “flash-bulb” igniter safely with

Wilson F/X technology. WFX continuity check uses a max of only 1.5 milli-amps

of power. So test away! If you have good continuity when you push the continuity

button, the piezo of the pad-box will give a solid tone. If you get no solid tone with

a commercial igniter, then you probably have a “bad” igniter and need to replace it.

But you may also need to check your igniter leads at the pads by connecting

the alligator clips together and pushing the continuity switch on the pad-box. The

piezo should give off a solid tone. If there is no solid tone with the alligator clips

touching, make sure the battery is connected at the bank of pads you are at. If it is

connected correctly “+ to +” and “- to -” and you still get nothing check the battery

voltage. If the battery has a charge, but you still get no continuity thru the

connected alligator clips, then probably one of the zip cords has become

disconnected between the alligator clips and the rest of the igniter lead. It may be

necessary to replace a bad igniter lead or at least replace a bad alligator clip.

**Using the new LCU-64x or LCU-128x Wilson F/X Custom Controller**

Using your custom LCU-64x or LCU-128x controller is, as far as the various

functions are concerned, the same as using one of our standard Launch Control

Units. The earlier instruction are quite good. The differences are mostly in the area

of how the unit reports the various status reports from the various functions of

which the controller is capable. The controller has RGB-LEDs capable of giving

you the status of a switch’s command by the color that the switch’s RGB-LED is

indicating.

When you turn on your controller with the key switch, the key switch’s LED

turns RED. The red LED color is used to give the user the warning that the

controller itself has be turned on and is now capable of actions.

When the controller is first turned on, the LCD screen reports the voltage of

whatever battery is powering the controller. When you select a single bank and

then toggle the Remote Voltage switch, the LCD screen will report the voltage from

the selected bank of pad’s battery. The LED for the selected bank will turn green as

soon as it is selected. If however, you select a bank of pads that is not connected to

the controller, the LED for that bank will be red indicating that nothing is connected

to that bank. If you try to get a voltage reading from that bank, the LCD screen will

flash the words “NO READ,” again to indicate that there is no bank that matches

that designation connected to the controller. Remote Voltage Reading works

whether the selected bank of pads is hardwired or wirelessly connected to the

controller. If the voltage is below the minimum, 7.2 volts, the remote voltage

reading will not operate.

When the LCO wants to fire a pad, the LCO will need to select a single bank

of pads and from 1 to 8 pads on that single bank of pads. If you select two banks at

once, the two bank LEDs will both turn red. If however, the LCO selects one bank

and a single pad then both the bank LED and the pad LED will light up to indicate

the status of that particular bank and pad. If there is a good igniter on the igniter

leads of the pad/bank selected then both the selected bank LED and the selected pad

LED will light up green to indicate that all is good to go. The pad-box will also

light up its warning light and its piezo to warn people that this particular bank of

pads has been armed. The LED of each selected pad (up to 8 of them) will be

shown in case there’s a drag race or the user is using the multi-pad pad-box as a

cluster box.

The operator puts the controller into TEACH mode in the exact same way as

the standard W-F/X Launch Control Unit. But when you first turn on the key

switch with the TEACH toggle held on, the Key switch’s LED will turn GREEN to

indicate that the controller is on and receiving a teach mode command. When you

let go of the teach toggle switch, the key switch’s LED will turn a blue color

indicating that the controller is now in TEACH MODE. If your controller has a

piezo buzzer and you have it turned on, it will also be beeping out the standard

double-tap heart-beat of teach mode.

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If you have any questions contact me at rocketrev@wilsonfx.com for further

information.

In emergencies, I may be contacted by cell phone at 630-254-3953

Well there you have it. Enjoy your Wilson F/X launch system.

Brad, the "Rocket Rev.," Wilson

PS: This document was last updated on 03-16-2019