

# iPULL Sporting Clays Setup Manual

## Overview

This manual is intended for gun club personnel responsible for setting up Sporting Clays courses with iPULL target release controllers.

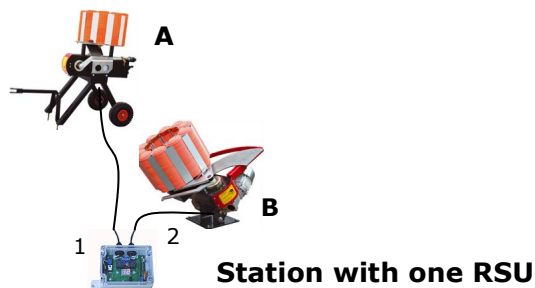
**iPull** controller is placed at each shooting station on the course, wirelessly controlling one or two Remote Base Units (RSU) connected to up to three target throwers. For installation, setup and use of the iPULL system components, consult the following documentation:

- For iPULL Controller use, see document 'iPULL\_UM\_Ver3.pdf'
- For iPULL Controller setup, use this Setup Manual.
- For Remote Switching Unit (RSU) Hardware/wiring configuration, see document 'RSU\_DC-V2\_ConfigManual.pdf'.
- For the *iPull Manager* software and RFID Desktop Reader installation, see document 'iPull Manager User Guide.pdf'.

## Hardware Installation

### Station configuration

You can use one or two Remote Switching Units (RSU) on each station. See section RSU RC Setup below and 'RSU\_DC-V2\_ConfigManual.pdf' for details.



 **Incorrect wiring can damage the RSU or the trap machine!**

## ***Installing batteries in iPull***

There is no special hardware installation associated with the iPull controller. To start using iPull, remove the protective rubber boot and open the battery door. First install one AA battery in the battery compartment. Now, press and Hold the ON/OFF [⊙] key and install the second Battery. Follow the battery polarity marking on the bottom of the compartment. Keep holding the [⊙] key for approximately 5 seconds and then release the key. The startup sequence will display on the LCD.

## ***Mounting iPull at the shooting stand***

**iPull** can be mounted on a standard camera tripod or bolted directly to the frame of the stand with a ¼"/20 screw.

## **Setup Programming**

First, review your course plan and determine how many stations and how many RSU's you will need. Each RSU can control two throwers. One RSU is sufficient for Following Pair or for two adjacent throwers. When the throwers are placed far from each other, instead of using long extension cables, a separate RSU can be attached to each thrower. You will need the following information for each shooting station:

- How many throwers? Can be A, B and C
- One or two RSU's?
- How many targets?
- What will be the shooting sequence?
- What is the switch hold (latch) time for the trap machine?
- If using a Following-Pair, what is the target reload delay of the trap machine?

## ***Accessing Admin Mode***

To access programming and setup functions on the iPull, you will need a special "Administrator" RFID card. "Admin" Mode functions include:

- Setup - Programming the shooting sequence and station number.
- Voice/Shot parameters setup.
- Wireless Remote Control (RC) setup of the RSU.
- Unlimited target release (No pay mode).
- Shutting down the iPull (clients cannot shut down the device).

### **To start programming in Admin mode:**

1. Turn **iPull** On: Press and hold the [⊙] key for 0.5 – 1.0 second and then release the key.
2. The version number and other information may be displayed. Wait for display to show the station information.
3. Momentarily hold the "Admin" Tag not more than 1" above the gray area on the iPull keypad. The display will show ADMIN MODE on line 1 and a scrolling ticker with function information on line 2. Table 1 lists the options at this stage:

Keys	ADMIN MODE MAIN MENU
[▶]	Access Setup Programming mode
[\$]	Access Remote control (RC) of the Remote Base unit (RSU)
[b]	Access fully Manual target release mode
[⊙]	Turn <b>iPull</b> OFF (press and hold for 3 seconds) Shows total number of targets released since last power up
[?] + [▶]	Exit Admin mode

### **Turning iPull OFF and getting total targets released**

iPull can be turned OFF only in Admin Mode. Press and hold the [⊙] key and wait for the count down on the display to complete. While the [⊙] key is pressed, the second line of the display shows the total number of targets released since last power up. This number is reset to 0 when the iPull is shut down. If the [⊙] key is released before a complete count down the iPull returns to the last mode without turning off.

### **Setup Programming**

The station number (ID) and shooting sequence are programmable. Since shooters do not have to remember which buttons to press, more complex shooting sequences can be set to provide a more interesting and challenging experience.

A sequence can be programmed with up to six steps, in any combination of targets from throwers A and/or B, for a total of up to 12 targets. For example, a station can be programmed for three steps each activated by the call "pull" or by pressing the [b] key:

- Step 1 – "TRUE PAIR": The first "pull" will simultaneously release targets from throwers A and B.
- Step 2 – "REPORT A>B": The second "pull" will release the first target of a Report Pair from thrower A and the first gunshot will release the second target from thrower B .
- Step 3 – "REPORT B>A": The Third "pull" will release the first target of a Report Pair from thrower B and the first gunshot will release the second target from thrower A.

### **Setup Programming in Admin mode:**

1. Press and release the [▶] key to access Setup programming.
2. Table 2 lists the key functions at this stage:

Keys	SETUP PROGRAMMING MENU
[▶]	Save Setup and exit
[?]	Select Setup parameter
[b/+]	Increase setup value

<b>[\$/-]</b>	Decrease setup value
<b>[?] + [▶]</b>	Exit setup without save
<b>[Ⓞ]</b>	Turn <b>iPull</b> OFF (press and hold for 3 seconds)

- The first parameter is the **Station Address** (Number). Think of it as your home number. The station number is the radio address for communicating with associated RSU's. To change the station number use the [↵]/(+) or [\$/-] keys. You can set to any number in the range 1-99. For simplicity, it is recommended to select the number corresponding with the actual station number.

 **Each station on a course must have a unique number**

- Press and release the [?] key for the next setup parameter: Step 1 of the shooting sequence. Use the [↵]/(+) or [\$/-] keys to change the step type. Repeat for each step of the sequence. There are maximum six steps for a total of up to 12 targets. Setting a step to "00 DISABLED", will end the sequence at the previous step. Table 3 lists available step types:

Code	Step Type	Description
00	DISABLED	Ends the sequence at the previous step
01	SINGLE-A	Single target from thrower A
02	SINGLE-B	Single target from thrower B
03	SINGLE-C	Single target from thrower C
04	REPORT-A>B	Report pair: first A on "Pull", then B on first shot
05	REPORT-A>C	Report pair: first A on "Pull", then C on first shot
06	REPORT-B>A	Report pair: first B on "Pull", then A on first shot
07	REPORT-B>C	Report pair: first B on "Pull", then C on first shot
08	REPORT-C>A	Report pair: first C on "Pull", then A on first shot
09	FOLLOW-A>A	Following pair first A, then after a delay A again
10	TRUE-PAIR A+B	True pair A and B simultaneously
11	TRUE-PAIR A+C	True pair A and C simultaneously
12	TRUE-PAIR B+C	True pair B and C simultaneously

- The last parameter is the **Field Address** (Number). Think of it as your Street name. The Field number is a common radio address for all the RSU's on the course. To change the Field number use the [↵]/(+) or [\$/-] keys. You can set to any number in the range 1-15.
  - 5.1. If you have only one course, do not change the Field Address.
  - 5.2. If you have more than one course, assign a different Filed Address to each course.

 **All stations on the same course should have the same field address**

- When setup is complete, press and release the [▶] key to save the settings and exit. The display will momentarily show the station number total number of targets and the step code for each step, then return to the Admin Main Menu.

## RSU - Remote Control (RC) Setup

To avoid external controls where water and dirt can penetrate the enclosure, the RSU's parameters are wirelessly programmable from any iPull (in Admin mode). The data is displayed on a numeric LED display visible through the clear cover. To setup the RSU, follow the steps below:

1. The RSU must be turned ON just a few seconds before starting the setup process.

**Notice:** Setup must begin within the first 2 minutes after the RSU was powered up

2. On iPull in ADMIN MODE main menu, press and release the [**\$**] key to access BASE RC mode.
3. Table 4 lists the key functions at this stage:

Keys	INITIATE BASE RC
[▶]	Start Remote control
[b/+]	Increase Station number
[\$/-]	Decrease Station number
[?] + [▶]	Abort Remote control mode
[⊙]	Turn <b>iPull</b> OFF (press and hold for 3 seconds)

4. Enter RC Mode:
  - 4.1. Verify the RSU is ON and the RSU's station number is steady (not flashing) on the dual LED display.
  - 4.2. Stand close to the RSU so you can observe changes on the display, but hold the iPull at least 3' away from the RSU.
  - 4.3. Use the [b]/(+) or [\$]/(-) keys to match the BASE ADDRESS shown on line 1 of the iPull display with the number currently displayed on the RSU.
  - 4.4. Press and release the [▶] key to start remote control. The RSU display will flash "**rc**" for a few seconds and then momentarily show "**Ad**" followed by the current station number.
5. Table 5 lists the key functions at this stage:

Keys	BASE RC
[?]	Select programming parameter
[b/+]	Increase current parameter value
[\$/-]	Decrease current parameter value
[▶]	Save changes to RSU memory
[?] + [▶]	Abort Remote control mode without change
[⊙]	Turn <b>iPull</b> OFF (press and hold for 3 seconds)

6. Setting the RSU station number:
  - 6.1. Line 1 of the iPull display shows "STATION #: +/-". Use the [↵]/(+) or [\$]/(-) keys to change the station number on the RSU.
  - 6.2. Observe the RSU's display to verify correct station number.
  - 6.3. When done, press and release the [?] key for the next setup parameter which is *Target Reload Delay*. The RSU display momentarily shows "**Ld**" followed by the current target reload delay in seconds and tenths of second.
7. Setting the RSU Target Reload Delay:
  - 7.1. Line 1 of the iPull display shows "RELOAD Sec: +/-". Use the [↵]/(+) or [\$]/(-) keys to change the reload delay in steps of 0.1 Seconds.
  - 7.2. Observe the RSU's display to verify correct value.
  - 7.3. When complete, press and release the [?] key for the next setup parameter which is *Switch Hold Duration*. The RSU display momentarily shows "**Hd**" followed by the current hold duration in seconds and tenths of second.
8. Setting the RSU Switch Hold Duration:
  - 8.1. Line 1 of the iPull display shows "SWITCH Sec: +/-". Use the [↵]/(+) or [\$]/(-) keys to change the switch hold period in steps of 0.1 Seconds.
  - 8.2. Observe the RSU's display to verify correct value.
  - 8.3. When complete, press and release the [?] key for the next setup parameter which is *Power Routing*. The RSU display momentarily shows "**Po**" followed by the letter (A or B) of the trap machine currently set to provide power via terminal 1 of the RSU.
9. Setting the Power Routing and thrower selection: Changing the power routing is necessary in case an RSU is connected only to thrower B or C. In such case, thrower B or C will be connected to the cable designated for the powering trap (marked 1/A). See Hardware Installation guide.
  - 9.1. Line 1 of the iPull display shows "POWER A/B: +/-". Use the [↵]/(+) or [\$]/(-) keys to select the following options: **Ab, AC, bA, bC, CA, Cb**.
  - 9.2. Observe the RSU's display to verify correct value.
  - 9.3. When complete, press and release the [?] key for the next setup parameter which is *Field Number*. The RSU display momentarily shows "**Fn**" followed by the current Field number of the RSU.
10. Setting the Field number: Changing the power routing is necessary in case an RSU is connected only to thrower B. In such case, thrower B will be connected to the cable designated for the powering trap (marked 1/A). See Hardware Installation section
  - 10.1. "FIELD #: +/-". Use the [↵]/(+) or [\$]/(-) keys to select the Field Number.
  - 10.2. Observe the RSU's display to verify correct value.
  - 10.3. When complete, press and release the [▶] key to save the new settings to the RSU's memory.
  - 10.4. If you want to abort without saving the changes, press and hold [?] key, then press the [▶] key release both keys.
  - 10.5. Upon exiting the RC mode, the RSU will momentarily display each setup parameter/value, then the station number will flash a few times. When the station number is steadily displayed, the RSU is ready to receive data from an iPull set to the same Station and Field numbers.

**Notice:** in RC mode, a timeout occur after 20 seconds of inactivity and the RSU reverts to normal operating mode. Any changes made before returning to normal mode are retained. Should timeout occur before completing the setup, start over from section 4.4 above.

## Admin Release Modes

Admin Mode allows unlimited target release in fully Manual, Voice, or Manual Sequence Modes. The fully manual mode is useful when setting up and testing the target throwers.

1. On iPull in ADMIN MODE main menu, press and quickly release the [b] key to access fully Manual mode.
2. Table 6 lists the key functions at this stage:

Keys	ADMIN Full MANUAL/VOICE MODE
[b]	Press and quickly let go, release target C if available on auto sequence
	Press, hold and release before complete count down - Exit Manual Mode
	Press and hold for complete count down - Enter Voice/Manual Sequence release Mode
[▶]	Manual Mode - Trap A
	Voice Mode - see User Guide
[?]	Manual Mode - Trap B
	Voice Mode - see User Guide
[\$]	Manual Mode - Trap A and Trap B
	Voice Mode - see User Guide
[⊙]	Turn iPull OFF (press and hold for 3 seconds)

3. Use [▶], [?] and [\$] keys to release targets.
4. Press and quickly release the [b] key to return to ADMIN MODE main menu
5. Press and hold the [b] key to access Voice Mode.
  - 5.1. In voice mode, use voice or the [b] key to release targets according to the target setup programmed into the iPull.
  - 5.2. Press and hold the [?] key to Exit Voice Mode to Pause Mode.
  - 5.3. From Pause Mode Press and hold the [?] key and the [▶]key, then release both keys to return to ADMIN MODE main menu

## Voice/Shot Parameters Programming

In some situation it may be necessary to access certain parameters that determine the voice or gunshot detection.

### Access the Voice/Shot Setup menu

From the main ADMIN menu, press and hold the Use the [?] key then press and hold the [b] key, release both keys.

Table 7 lists the key functions at this stage:

Keys	SETUP PROGRAMMING MENU
[▶]	Enter or Save Setup and exit
[?]	Select Setup parameter
[b/+]	Increase setup value
[\$/-]	Decrease setup value
[?] + [▶]	Exit setup without save
[⊙]	Turn <b>iPull</b> OFF (press and hold for 3 seconds)

Now, press and release the [▶] key you will see the Shot parameters screen:

TRG	STH	WIN	DCY
▶176	080	002	020

A blinking arrow indicates which value is selected. The number to the right of the blinking arrow can be increased or decreased using the [b]/(+) or [\$]/(-) keys. Press and release the [?] key to move the arrow to the next parameter. After the last parameter is selected you will see the next screen:

TOD	SEN	FRM	MAR
▶006	004	004	010

Table 8 lists list the parameters and their function

Parameter	Default value	Recommended range What it does	
TRG	176	DO NOT CHANGE!	
STH	080	076 - 092	gun shot sensitivity – lower is more sensitive
WIN	002	001 - 002	Decay factor
DCY	020	See below	Decay threshold
TOD	006	004 - 006	Target Time out delay in seconds
SEN	004	003 - 005	Voice detection sensitivity
FRM	004	004 - 005	Voice duration factor
MAR	010	DO NOT CHANGE!	

## Setting the Shot parameters

Depending on proximity to other stations and the topography, (trees, water, slope, etc.), each station may require individual settings for optimal shot detection. The purpose of the shot setup is to insure the following:

- A gun shot from the station (within 2-3 yards from the shooter) is reliably detected by the iPull controller.
- Gunshots from adjacent stations are not detected by the iPull controller.

1. Set the iPull to release three steps each with a Report A > B (see setup section above).
2. Setup a preliminary shot detector parameters based on the station's terrain description as shown in table 9 below:

Station Terrain Description	STH	WIN	DCY
Open field, no trees, structures or water surface within 40 yards	80	001	040
High grounds position, shooting towards low grounds, no water surface, no trees	85	001	035
Trees, structures or water surface near the station (less than 20 yards)	90	002	020

3. You will need the following:
  - 3.1. Note pad and pencil
  - 3.2. Another person to help with adjacent station testing
  - 3.3. Sub gage shotgun (28 GA), or very soft shells.
  - 3.4. A 12 GA with "hot" loads (1290 fps or faster)
4. At the station, log as ADMIN and access Voice release mode: from ADMIN main menu, press the [b] key to access MANUAL mode, then press and hold the [b] key to access the Voice mode. DO NOT talk! You will be releasing targets with the [b] key.

### Station test - Verify consistent gunshot detection on the station

1. Use the sub-gage gun or a soft load (under 1100 fps). With the gun pointed at the direction normally used to shoot the target, release a target and shoot one shot.
2. Quickly look at the iPull screen. For a few seconds, you should see four numbers on the bottom line. See examples below. Write the numbers down.

Open filed example



Wooded area example



3. If a target is released - GOOD:
  - 3.1. If the first number is more than 10 points larger than STH, increase STH by 8 points (make it less sensitive) and try a few more times to ensure consistent release.
4. If a target is NOT released - BAD:
  - 4.1. No numbers displayed on the bottom line, try again. If still no numbers, access the VOICE/SHOT setup menu and reduce STH by 8 points (i.e., make it more sensitive). Try again.
  - 4.2. If numbers are shown on the bottom line but target is not released, or release is inconsistent, you need to calculate the decay. See below
  - 4.3. If the result is larger than the value set for DCY, increase DCY by the difference + 8 points. For example: DCY = 020 and result was 21, increase DCY to 27. Try again.

**Adjacent station Test** - Verify gunshot from adjacent station is not detected

1. This procedure is required if stations are positioned less than 30 yards away.
2. The iPull controller should remain in the same position as tested on the station.
3. The shooter, with a 12GA and "hot" loads, should stand at the adjacent station with gun pointed at the direction normally used to shoot the target on that station.
4. Release a target. The shooter at the adjacent station should now shoot one shot.
5. Quickly look at the iPull screen. For a few seconds, you should see four numbers on the bottom line. Write the numbers down.
6. If a target is NOT released - GOOD:
  - 6.1. If no numbers on the bottom line, you are done.
  - 6.2. If numbers are shown on the bottom line. Calculate the decay (see below). If the decay result is more than 6 points greater than the value of DCY, you are done. Otherwise, decrease DCY so it is 6 points smaller then the result. Repeat this test a few times to ensure consistent results. Repeat the station test (above) to ensure gun shots are detected OK.
7. If a target is released - BAD:
  - 7.1. Calculate the decay (see above) for WIN = 001 and for WIN = 002 and determine which ever is larger.
  - 7.2. Verify the WIN is set for the number corresponding with a larger value.
  - 7.3. Decrease DCY so it is 6 points smaller then the result. Repeat this test a few times to ensure consistent results. Repeat the Station test (above) to ensure gun shots are still detected OK.
8. When setup is complete, press and release the [▶] key to save the settings and exit.

**Calculating the shot decay**

If WIN = 001, Decay = first number – second number.  
In Screen examples shown above:

*Open filed Result = 95 - 62 = 33*  
*Wooded area Result = 103 - 95 = 8*

If WIN = 002 calculate: first number – third number.  
In Screen example shown above:

*Open filed Result = 95 - 22 = 73*  
*Wooded area Result = 103 - 89 = 14*

## Setting the target Timeout Delay

After voice or auto release, iPull will wait for gunshots during a Timeout delay. The default timeout delay is 6 seconds. To set an individual timeout period for a station:

1. Using a stop watch, determine the period after which it is no longer possible to hit the target(s). For example: after the target hit the ground or went behind obstacles. Consider the affect of changing wind patterns.
2. Access the TOD Setup and adjust the TOD accordingly.
3. When setup is complete, press and release the [▶] key to save the settings and exit.

## Setting the Voice parameters

The SEN and FRM parameters determine the sensitivity of the iPull to voice commands.

1. If voice activation is too sensitive (targets flying al over the place) or not sensitive enough you can adjust the voice parameters:

Table 10 Voice parameters setup:

Sensitivity description	Unintentional release	SEN	FRM
Very sensitive, any speech sound will release	Very likely from speech 2-3 yards from station	6	3
Sensitive, for people with soft voice		5	3
Average sensitivity		4	4
Less sensitive – requires a loud “Pull”	Unlikely from normal conversational levels 2-3 yards from station	3	4
Low sensitivity – requires a loud and long “Pull”		3	5

2. When setup is complete, press and release the [▶] key to save the settings and exit.