COMPLETE FAMILY PLAYSET

Complete mBot Remote Playset

Driving, music, hello, shy and a secret birthday song in one upload.



Created by Meredith C

Welcome to the complete playset

Patch is the small workshop robot who helps grown-ups turn ideas into playable machines. Patch keeps the instructions calm, checks one thing at a time and never treats a mistake as failure.

In this workshop, you will connect two activities inside one mBot:

- **Drive + Piano** - use the remote to move and play notes.
- **Hello + Shy** - wave to receive a greeting; move too close and mBot backs away.

Patch has also hidden a birthday-song Easter egg on the **D** key.

Once the program is uploaded, you can unplug the computer and switch between activities with the original IR remote.

What the remote does

Key	Mode
0 or the button on top	Stop and return to Drive + Piano
↑ ↓ ← →	Move one short step
1-8	Play Do Re Mi Fa So La Ti Do
A	Enter Hello + Shy
D	Play the secret birthday song

Compatibility

Tested with:

- First-generation mBot with the mCore board
- Original Makeblock IR remote
- mBlock 5 desktop, English interface, macOS
- Ultrasonic sensor connected to **port 3**

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This guide uses **Upload** mode and block programming. Uploading replaces the program currently stored on mBot. You can restore the original Makeblock program later through the firmware settings in mBlock.

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Patch's Quick Start

If this is your first mBlock project:

1. Add **mBot** as the device. Do not use CyberPi.
2. Select **Upload** mode.
3. Build one section at a time.
4. Save after every section.
5. Add the birthday-song Easter egg last.

You can right-click a completed block and choose **Duplicate** to copy it together with everything inside.

How to read this guide

- Indentation means a block sits **inside** the block above it.
- <…> means a hexagonal yes/no block.
- (…) means a rounded number block.
- Notes after ← show which mBlock category contains that block.

> **Patch Check**
> Every switch and mode section must sit inside forever. Anything placed before forever runs only once, so the remote may appear not to work.

Step 1 - Make two variables

Open **Variables** → **Make a Variable** and create:

Variable	Purpose
mode	0 = Drive + Piano; 1 = Hello + Shy
r	Chooses one of three greeting movements

Step 2 - Build the skeleton

```
when mBot(mcore) starts up          ← Events
set [mode] to 0                     ← Variables
stop moving                         ← Action
forever                             ← Control
  【① Switches: A and 0】
  【② mode 0: Drive + Piano】
  【③ mode 1: Hello + Shy】
  【④ D: Secret Song — add this last】
```

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Step 3 - Add the mode switches

Place these two independent if … then blocks at the top of forever.

```
if <IR remote [A] pressed?> then                ← Sensing
  set [mode] to 1
  stop moving
  play note C5 for 0.25 beats                   ← confirmation beep
  wait 0.5 seconds

if <<IR remote [0] pressed?> or <when on-board button pressed?>> then
  set [mode] to 0
  stop moving
  turn on [all] light with color red 0 green 0 blue 0
  wait 0.5 seconds
```

A enters Hello + Shy. **0** or the top button always returns to the safe, stopped state of Drive + Piano.

Step 4 - Build mode 0: Drive + Piano

```
if <(mode) = 0> then                            ← Operators "="
  if <IR remote [↑] pressed?> then
    move forward at power 30 % for 0.3 secs
  if <IR remote [↓] pressed?> then
    move backward at power 30 % for 0.3 secs
  if <IR remote [←] pressed?> then
    turn left at power 40 % for 0.2 secs
  if <IR remote [→] pressed?> then
    turn right at power 40 % for 0.2 secs
  if <IR remote [1] pressed?> then
    play note C5 for 0.25 beats
  if <IR remote [2] pressed?> then
    play note D5 for 0.25 beats
  if <IR remote [3] pressed?> then
    play note E5 for 0.25 beats
  if <IR remote [4] pressed?> then
    play note F5 for 0.25 beats
  if <IR remote [5] pressed?> then
    play note G5 for 0.25 beats
  if <IR remote [6] pressed?> then
    play note A5 for 0.25 beats
  if <IR remote [7] pressed?> then
    play note B5 for 0.25 beats
  if <IR remote [8] pressed?> then
    play note C6 for 0.25 beats
```

Patch Check
After upload, mBot should remain still until you press an arrow. Every press produces one short movement, which is easier to control than continuous driving.

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Step 5 - Build mode 1: Hello + Shy

```
if <(mode) = 1> then
  if <<(ultrasonic sensor port3 distance(cm)) > 1>
      and <(ultrasonic sensor port3 distance(cm)) < 5>> then … else …
    LED all shows color [pink] for 1 secs
    play note E5 for 0.25 beats
    play note C5 for 0.5 beats                    ← “oh-oh”
    move backward at power 30 % for 0.3 secs
    wait 1 seconds
    move forward at power 30 % for 0.3 secs
    turn on [all] light with color red 0 green 0 blue 0
  else
    if <<(ultrasonic sensor port3 distance(cm)) > 1>
        and <(ultrasonic sensor port3 distance(cm)) < 12>> then
      LED all shows color [green] for 1 secs
      play note E5 for 0.25 beats
      play note A5 for 0.5 beats                  ← “Hel-lo”
      set [r] to (pick random 1 to 3)
      if <(r) = 1> then                           ← wiggle
        turn left at power 40 % for 0.2 secs
        turn right at power 40 % for 0.2 secs
        turn left at power 40 % for 0.2 secs
        turn right at power 40 % for 0.2 secs
      if <(r) = 2> then                           ← nod
        move forward at power 30 % for 0.3 secs
        move backward at power 30 % for 0.3 secs
        move forward at power 30 % for 0.3 secs
        move backward at power 30 % for 0.3 secs
      if <(r) = 3> then                           ← spin
        turn right at power 50 % for 1.4 secs
      turn on [all] light with color red 0 green 0 blue 0
      wait 1 seconds
```

The > 1 checks prevent false reactions when the ultrasonic sensor receives no echo and reports 0.

A slowly approaching hand usually enters the Hello zone first. To trigger Shy, move a hand quickly to within 5 cm.

Spin time changes with the floor and battery level. Adjust 1.4 secs if needed.

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Step 6 - Add Patch's Secret Song

Build this section last. Place it inside forever, alongside the other top-level sections.

```
if <IR remote [D] pressed?> then
  set [mode] to 0
  stop moving
  turn on [all] light with color red 255 green 200 blue 0
  play note G4 for 0.375 beats
  play note G4 for 0.125 beats
  play note A4 for 0.5 beats
  play note G4 for 0.5 beats
  play note C5 for 0.5 beats
  play note B4 for 1 beats
  play note G4 for 0.375 beats
  play note G4 for 0.125 beats
  play note A4 for 0.5 beats
  play note G4 for 0.5 beats
  play note D5 for 0.5 beats
  play note C5 for 1 beats
  play note G4 for 0.375 beats
  play note G4 for 0.125 beats
  play note G5 for 0.5 beats
  play note E5 for 0.5 beats
  play note C5 for 0.5 beats
  play note B4 for 0.5 beats
  play note A4 for 1 beats
  play note F5 for 0.375 beats
  play note F5 for 0.125 beats
  play note E5 for 0.5 beats
  play note C5 for 0.5 beats
  play note D5 for 0.5 beats
  play note C5 for 1 beats
  turn on [all] light with color red 0 green 0 blue 0
```

The song takes about 10 seconds. mBot will not respond to the remote until it finishes. That is normal.

The **D** key returns mBot to Drive + Piano before the song begins, so it will not unexpectedly resume Hello mode afterwards.

Step 7 - Upload

1. Save the project.
2. Connect the USB cable and switch mBot on.
3. Select **Connect → USB** and choose the port containing usbserial.
4. Select **Upload Code**. A large program may take 30-60 seconds.
5. Unplug the USB cable before play.

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Patch’s Five-Minute Check

Test	Expected result
Switch on	mBot remains still
Press arrows	Short movements in the correct directions
Press 1-8	Rising musical scale
Press A, then wave at 8-10 cm	Green greeting plus a random movement
Move a hand quickly within 5 cm	Pink “oh-oh” and a shy retreat
Press 0, then wave	No greeting; mBot is back in Drive + Piano
Press D	Yellow light and the secret song
Press the top button	Movement stops and mode returns to Drive + Piano

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Troubleshooting

What happens	What to check
Remote does nothing	Confirm the sections are inside forever and point the remote at the top board
Arrows and piano do not work	Check that the mode condition is mode = 0
Hello reacts in every mode	Wrap the entire Hello section inside if mode = 1
It reacts when nothing is present	Add the distance > 1 check to both distance conditions
Shy is difficult to trigger	Move the hand in quickly; a slow hand enters the Hello zone first
Spin is too long or too short	Adjust the 1.4 secs value
Upload shows receiveData timeout	Restart mBot, reconnect and choose the usbserial port instead of Bluetooth
Blocks mention “joystick” or “button A”	The selected device is CyberPi; remove it and add mBot

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Safety

- Keep an adult within reach whenever mBot moves.
- Use it on an open floor. Do not rely on sensors to detect the edge of a table, bed or sofa.
- The ultrasonic “eyes” are sensors; do not press or poke them.
- Small screws and cables are a choking hazard.
- Switch the power off immediately if movement becomes unsafe.

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This is an independent, parent-made resource designed to make the first mBot experiments calmer and easier to share.

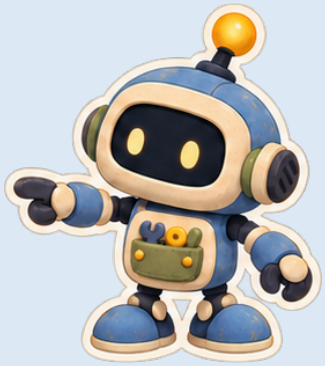
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One change at a time.

Let the machine show us what comes next.

- Patch, your quiet workshop guide





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