

# ANDROMEDA SPACE ROCKERS MK-3 Drum Machine v2

## TUNE Control

The Andromeda Mk-3 is a minimal analog synthesizer with a fixed frequency oscillator, envelope generator, VCA, and lowpass filter. The TUNE control adjusts the pitch of the oscillator.

## DECAY resistor

The decay time of the Mk-3's envelope generator can be altered by changing the resistor labeled DECAY. The stock value is 15k which gives a short envelope. Larger resistors (up to 100k) will make the decay time longer.

## IR Sync IN

This sensor is on the left side. It picks up the infrared beam from another Andromeda Space Rockers instrument. The sensor is underneath the board to reduce the ambient light hitting it. Avoid close incandescent lights and bright daylight.

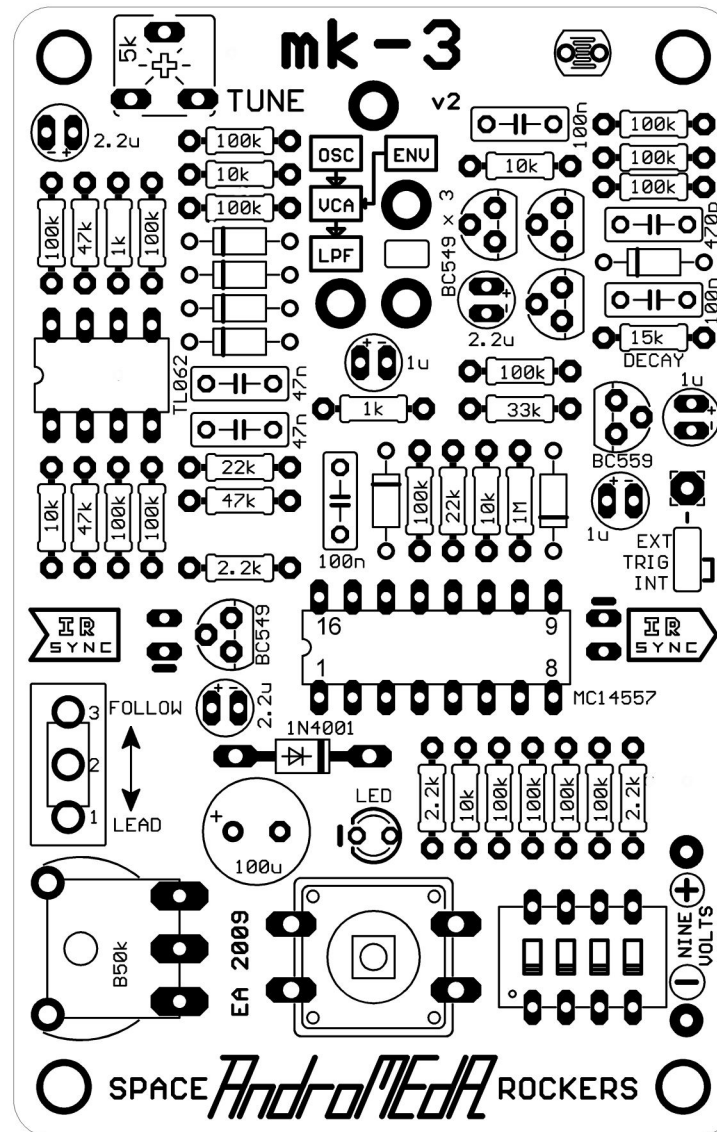
## Lead / Follow Switch

When this switch is on FOLLOW, your drum machine matches the tempo of the machine next to it. If there is no signal, the sound will stop.

Set the switch to LEAD and you can adjust the tempo independently with the thumbwheel

## Tempo Control

The thumbwheel potentiometer controls tempo in LEAD mode. Tempo is variable from 50 – 300 BPM, if we consider the clock as 1/16<sup>th</sup> notes



[ericarcher.net/devices/mk3](http://ericarcher.net/devices/mk3)

## Filter Photocell

This photocell controls the cutoff frequency of the low pass filter. Brighter light increases the filter frequency. The filter does not have a resonant peak; it is more like a tone control.

## IR Sync OUT

This is on the right side of the unit, underneath the board. IR Sync OUT sends a flashing infrared beam that communicates tempo information to the next device in the network.

## External Triggering

The INT-TRIG-EXT jumper functions like a switch, but you configure it by adding a blob of solder. For normal operation, connect INT and TRIG with a blob of solder between them. This connects the internal sequencer to the sound generator.

Or you can experiment with external triggering from a microcontroller, modular synthesizer, or drum machine. Just move the solder blob so it bridges TRIG and EXT. Connect the external trigger source to the EXT pad, and its ground should connect to the (-) terminal of the battery holder.

## Programmable Sequencer

This sequencer is an endless 1-track loop. Set the length of the loop using the DIP switch.

- 0000 = 4 steps
- 1000 = 8 steps
- 1100 = 1 bar (16 steps)
- 1110 = 2 bars
- 1111 = 4 bars

## The Button

Tap a rhythm on the button and it is recorded into the loop. Hold the button down for 2 seconds to erase the loop. Events are quantized to 1/16th note grid.

Quantization is not perfect. Some taps are not recognized and others may not be recorded in the intended location.

# ANDROMEDA SPACE ROCKERS MK-3 Drum Machine

Programmable Sequencer  
Manual Pitch Control  
Photocell Filter Control  
Infrared Wireless Tempo

## Tools you need for this kit

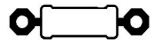
- Soldering iron (25W - 40W, narrow tip)
- Flush cutting pliers
- Needle nose pliers
- Philips screwdriver, drill, and 3/32" bit.

## Start here

You're about to solder all of the components to the circuit board. Check your soldering iron now. Touch the tip of the iron to some fresh solder. It should melt immediately with a puff of smoke and cling to the tip like a drop of water. Some cheap soldering irons have tips that solder won't cling to. Its difficult to make quality connections with this type.

After you solder a component, trim its leads flush with the bottom of the board. Wipe the tip of the soldering iron clean on a damp sponge frequently.

### Resistors



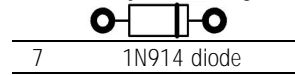
Bend the leads at a 90-degree angle to the resistor's body, then slip them into the holes on the board. Both leads are equivalent so it doesn't matter which way the resistor is rotated.

See the parts identification guide on the Mk-3 web page for help with color codes.

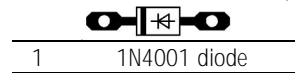
15	100k resistor
5	10k resistor
3	2.2k resistor
3	47k resistor
2	1k resistor
2	22k resistor
1	15k resistor
1	1M resistor
1	33k resistor

### Diodes

Orient the striped end of the diode to match the printing on the board. The 1N914 diodes are red with a black stripe. Be careful when bending the leads because the body is made of glass.



The 1N4001 is black with a white stripe.



### Potentiometers

The thumbwheel is located in the lower left corner of the board. Solder it to the top side of the board.

1	50k linear thumbwheel
---	-----------------------

The TUNE control is a small screwdriver-type potentiometer.

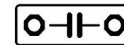
TUNE	5k [502]
------	----------

### Switches

The button has a separate plastic cap that snaps on.

1	pushbutton switch
1	4-position DIP switch
1	SPDT slide switch

### Poly & Ceramic capacitors



The polyester capacitors look like rectangular plastic boxes. Both legs are equivalent so it doesn't matter which way they go in.

3	100n poly
2	47n poly
1	470p ceramic disc

### Electrolytic capacitors



The electrolytic capacitors are polarized. Make sure their long leg goes into the hole marked plus (+).

1	100u electrolytic
3	1u electrolytic
3	2.2u electrolytic

### Photocell



There is a space for one CdS photocell on the board. It controls the cutoff frequency of the filter. We use photocells that have a resistance of 5k-50k in the dark, and ~0.1k in bright light.

1	VT90N1 photocell
---	------------------

### Transistors



The transistor's flat side must match the printing on the board.

4	BC549B transistor, NPN
1	BC559B transistor, PNP

### Visible LED



This LED is T1 3/4 (5mm) type. Do not use the smaller pink colored LED here. Insert its short leg into the hole with the bar printed next to it. (The flat edge of the LED faces the bar.)

1	Visible LED, 5mm
---	------------------

### IR Sync IN



This is a phototransistor. It looks like a black LED. It goes on the bottom of the board with its flat edge toward the white line on the top side of the board. Bend its leads at a sharp 90-degree angle with needle-nose pliers before soldering it in place. Slip a piece of 1/8" diameter black tubing over the phototransistor after it is soldered.

1	PT204-6B phototransistor
---	--------------------------

### IR Sync OUT



This component emits invisible light. Solder it on the bottom side of the board with its flat edge matching the white line printed on the top side of the board. Bend its leads at a 90-degree angle like the phototransistor.

1	Infrared LED (940nm)
---	----------------------

### Output Jack

The jack mounts from the underside of the board and points outward. Solder the leads in place.

Note: Battery power is switched thru the ring terminal of the jack. This unit will not work with stereo plugs (tip-ring-sleeve).

1	1/4" Jack
---	-----------

### Output Jack Jumper



If your output jack is the type with 3 legs, you must add a solder blob to this jumper, so its two halves are connected together electrically. Otherwise the unit will not power on. The jumper is located directly over the output jack.

### Battery Pod

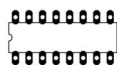
The battery pod covers up part of the bottom of the board once its installed, and it isn't very easy to remove. Inspect your work where the battery pod is going to sit and make sure all the solder joints look OK. All of the solder joints should look like isolated islands, with no metal touching between neighbors. If in doubt, use the iron to re-heat all of the points for 3 seconds. The solder will liquefy and tighten up from surface tension. This step can't hurt and increases your chances of success.

Trim the leads from the other components in this area short before installing the battery pod. That helps it sit flat. Solder the battery holder's two leads to the points marked NINE VOLTS.

Drill two holes into the battery holder thru the openings on the board. Use a 3/32" (2.5mm) drill bit. Install two screws from the top side of the board to keep the battery holder in place.

1	9V battery holder
---	-------------------

### I can has chipz now plz?



Install the two chips into their positions. Before you insert them, it helps to bend the leads inward slightly by pressing against a conductive surface like aluminum foil. This makes the rows of leads parallel and they will go into the holes easier. The chips must be inserted in the proper orientation! Align them so the text printed on the chip reads right side up like the text printed on the circuit board. Solder all of the leads.

1	MC14557
1	TL062

### My Legs My Legs!

Your drum machine needs its two front legs to sit flat on a surface. Install the legs, made of plastic tubing, using the screws provided. To make tightening it easier, you can grip the leg with pliers while you fasten the screw.

### TRIG Jumper



Before you use your MK-3 Drum Machine, you must configure it for internal triggering. Find the INT / TRIG / EXT symbol on the top of the board. Add a blob of solder that bridges the pads marked INT and TRIG. (EXT lets you connect a separate sequencer)

Now is a good time to wash your hands if you have been using lead solder.

## Testing

Now all of the parts should be in place and the unit is ready to test. Install the 9V battery and plug a cable into the jack. Switch the LEAD/FOLLOW switch to LEAD. Switch all the DIP switches to OFF. Tap the button a few times. The LED should be flashing. If it doesn't come on, it may be installed backwards. Did you remember to set the jumpers? Plug the unit in to a mixer or guitar amp and listen for sound.

### Solutions

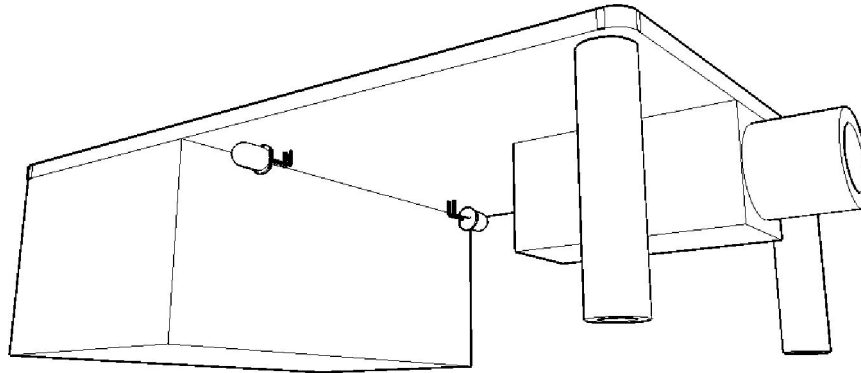
If you don't hear percussion, you have a problem or a dead battery. The first thing you can do is make sure all the parts are installed in the proper orientation. Check the photos on the Mk-3 web page for reference. And if that looks OK, you probably have a bad solder joint.

Inspect all the solder joints and be sure there is no solder bridging adjacent points. Re-heat all joints with the soldering iron for 3 seconds (or until you see the solder liquefy and become shiny all over - then remove the iron). You can add a little bit of fresh solder here if it looks like there may be too little.

# FINISHED

# ANDROMEDA SPACE ROCKERS

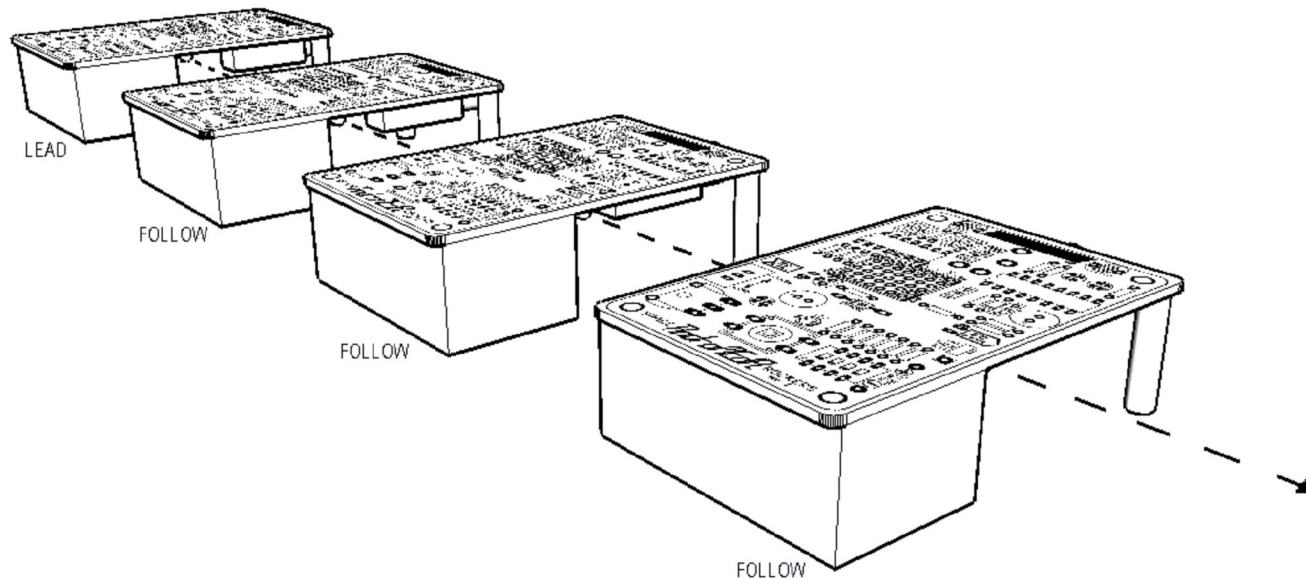
minimal analog drum machines



## Underneath the Board

This view shows the correct way to install the IR Sync transmitter and receiver. When installing the IR components, get the polarity right - be sure that the flat edge of the component is lined up with the white line marked on the top side of the board. (If your IR Sync OUT component is rectangular, its bump should face the edge of the board)

A short piece of 1/8" black tubing should be slipped over the IR Sync IN sensor to help it ignore ambient light.

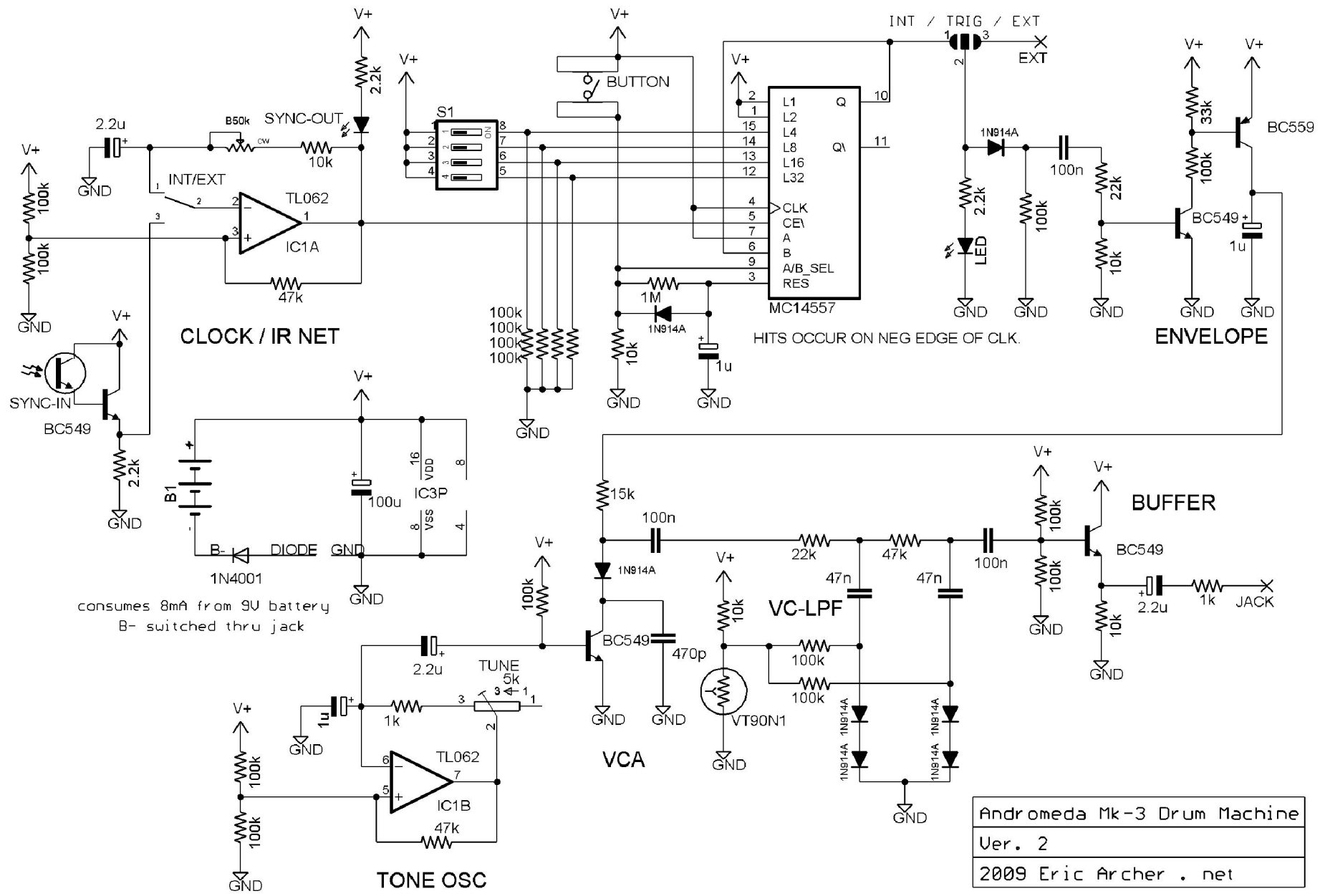


## IR Sync Network Connection

Arrange multiple units in a line as illustrated, with their output jacks pointing away from you. Set the unit on your far left to LEAD. Set all the others to FOLLOW mode. Up to 12 units can be chained together.

The maximum working distance for an infrared link is about 12 inches (30cm). Avoid bright incandescent lights and bright daylight. These can interfere with the network and stop the sequencers from playing. If this is an issue, move the drum machines farther from the light source or try a different angle to reduce the amount of light hitting the IR Sync IN sensors. Compact fluorescent, fluorescent, and LED lighting do not cause interference.

<http://ericarcher.net/devices/ir-net>



Andromeda Mk-3 Drum Machine
Ver. 2
2009 Eric Archer . net