Cock Shock

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1 Introduction

The Cock Shock is a remote-controlled electric cock-and-ball-torture device. There is only a small number of such devices explicitly markedted for this purpose, and the Cock Shock seems to be the most easily available and affordable one.

However, it has various shortcomings, both in documentation and the device itself.

Reverse engineering will result in better documentation, such as this document, and hopefully in hacks to address the device's shortcomings.

2 What is the Cock Shock?

The Cock Shock is a remote-controlled electric cock-and-ball-torture device by Master Series. It consists of a remote control and a shock unit. The shock unit is meant to be attached to male genitals and can provide electric shocks and vibration. The remote control sends commands to the shock unit via 434 MHz RF. There is some safety designed into the protocol to avoid accidental activation of the shock unit by other nearby 434 MHz devices. There is no security, so a deliberate activation of the shock unit by an attacker (e.g. a replay attack using a software-defined radio) would be easy.

Essentially, the Cock Shock is just a rebranded, repackaged dog shock collar with the collar band replaced by a shorter strip that better fits male genitals. The dog version is available from multiple sources, usually with a label reading "Trainer" on the remote control and a more verbose manual. Master series also sells a collar version for humans; apparently the difference to the dog version is again the rebranding and repackaging and a fancier-looking collar.

3 What is the Problem?

The Cock Shock is badly documented by the manufacturer, and has some shortcomings in functionality.

As can be seen from reviews (e.g. on www.amazon.com and on some blogs), some users didn't get instructions or maybe didn't notice the small folded piece of paper that contains the instructions, resulting in them being unable to get the device to work. Other users have trouble due to undocumented functionality, such as the 3-minute auto-shutdown timeout.

Many also miss some functionality, such as setting the shock level:

> I would have liked there to be two, or three, different levels of intensity for the jolts. Just to perhaps tease, or train, my slaves up through several levels of shock, rather than have them cry their safe word so quickly. So, consequently, all of my "cock-shocker" sessions have been quite short so far! [...] But, I haven't yet had any of the subs I've used it on, be able to take more than two or three jolts before they've cried their "safe word"[3]

> I've used a fair few electro sex toys and can use cock loops at maximum output on the powerboxes I have – this feels nothing like them at all. Where they can feel like a nice powerful vibration this feels more like how I imagine a taser feels, it is a powerful jolt that even my masochistic slave was fearful of – it hurts that much.[2]

Being able to disable the 3-minute auto-shutdown timeout would also be useful.

4 Using the Cock Shock

The vendor's instructions are rather short and incomplete:

> Instructions:
> To use the Cock Shock, first insert a 9v battery (included) into the remote control. Second, unscrew the electro contact points on the shock unit and remove the inner plate to reveal the battery compartment. Insert two AAA batteries (not included).
> A red and green light should come on in the shock unit, and the red light should be flashing. At this time hit either the shock or vibrate button to pair the remote to the shock unit. Reinstall the inner plate, and screw the electro contact points back on.
> Now strap the shock unit to his junk in whatever way you see fit, making sure that the contact points are pressing firmly into his skin. Now he either behaves, or you discipline him.[1]

The remote control (see Figure 1) has 4 buttons (Shock, Light, Vibrate, Sound) and 2 switches (On/Off, Volume). The Shock and Vibrate buttons send commands to the shock unit via RF. The Light button shines a blueish light from the front of the remote control. The Sound button sounds a bird noise from the back of the remote control, the volume depends on the setting of the volume switch. The On/Off button is mostly useful to prevent accidental triggering of any functions. The remote control consumes virtually no power even when switched on as long as no buttons are pressed (see Figure 2). There also are three LEDs, the top one for the light, the right one to indicate that the sound should be active (at low battery voltage, the sound can be inaudible, but the LED wills till light up), the left one to indicate that a command is being sent to the shock unit. The antenna can be extended to increase range.

The shock unit has two electrodes, for making contact with skin. While they have a good shape for their purpose, using a conductive electrode gel can further reduce resistance between the electrodes and the body. When the shock unit receives no commands for about 3 minutes, it goes into shutdown, reducing

Figure 1: Remote Control

Bat. volt.	Off	Idle	Shock	Light	Vibrate	Sound-	Sound	Sound+
8.4 V	< .1 µA	< .1 µA	30 mA	36 mA	35 mA	10 mA	30 mA	110 mA
9.0 V	< .1 µA	< .1 µA	35 mA	40 mA	37 mA	10 mA	30 mA	80 mA

Figure 2: Measured battery current draw of remote control at the nominal voltages of NiMH and Alkaline batteries

power consumption by about 20% (see Figure 3). In shutdown mode, the shock unit will not receive any commands from the remote control. The shock unit has a tilt sensor and can be brought out of shutdown mode by moving it. When the unit is not in use, the battery should be taken out, as the high current draw will quickly empty the battery even when in shutdown.

Bat. volt.	Idle	Shutdown	Shock	Vibrate
2.4 V	54 mA	41 mA	156 mA	140 mA
3.0 V	52 mA	41 mA	170 mA	160 mA
3.3 V	51 mA	41 mA	170 mA	172 mA

Figure 3: Measured battery current draw of shock unit at the nominal voltages of NiMH, Alkaline and NiZn batteries

5 The Remote Control

The remote control contains Princeton Technology PT2240B Encoder, which encodes 25-bit code words in a form suitable for RF modulation. Each code word consists of a 20-bit little endian address, followed by a 4-bit big-endian data nibble followed by a sync bit. The highest data bit indicates a shock

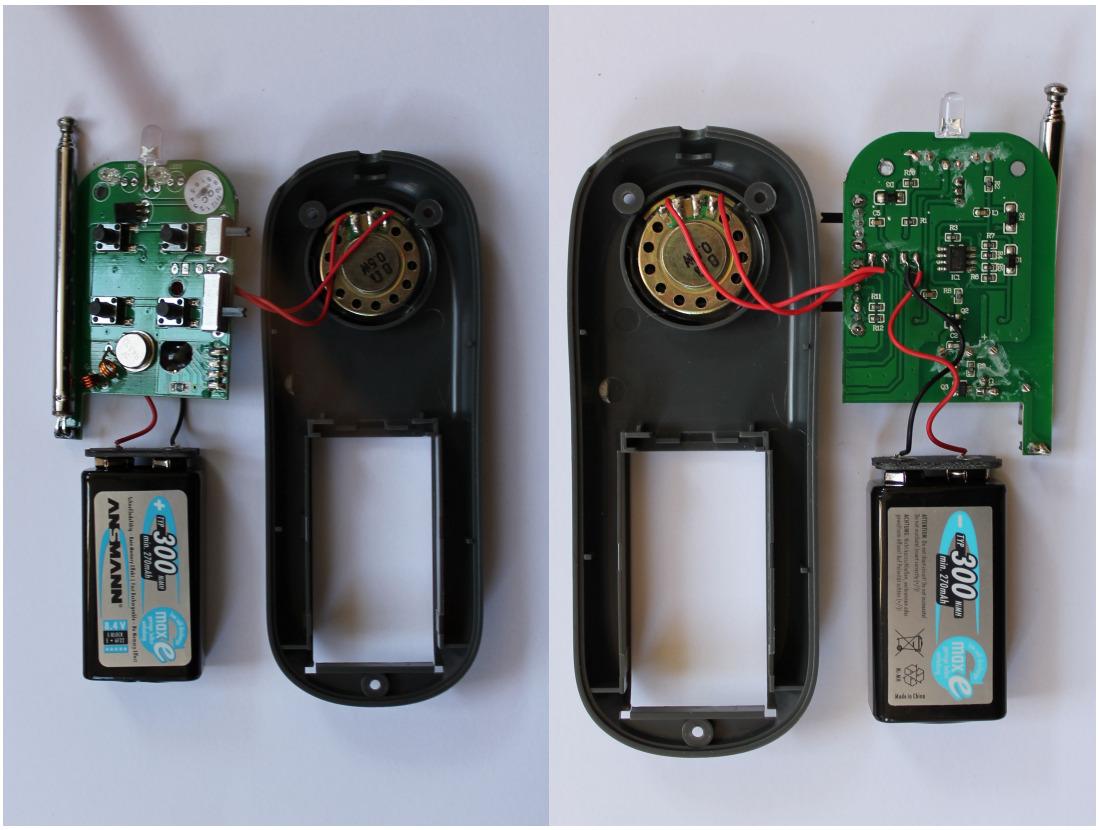

Figure 4: Disassembled remote control

command, the second-highest indicates a vibrate command, the lower 2 data bits are always 0 (the respective pins on the PT2240B have pull-down resistors). See Figure 4 for the disassembled remote, Figure 5 for the schematic.

6 The Shock Unit

The shock unit electronics consist of three parts: A RF module, the main part and the high-voltage module. The RF module consists of a separate PCB interfaced via 3 pins to the main module. The high-voltage part interfaces via two PCB traces to the main module. Both the RF module and the main module contain an IC. On both ICs, the markings have been sanded off. The main module also features a vibrator and a tilt switch.

The RF module is almost identical to the reference circuit in the datasheet of the HOPERF RF83C RF receiver IC. Thus, the IC is most likely a RF83C, though other RF ICs with a compatible pinout, such as the Micrel MICRF002/RF022 cannot be ruled out. When receiving data, lowest two data bits are apparently ignored.

The main module contains an SOIC-14 IC which is probably a µC. The unusual pinout could help identify it (see Figure 6). So far, the EM78P153A has been identified as a possibility.

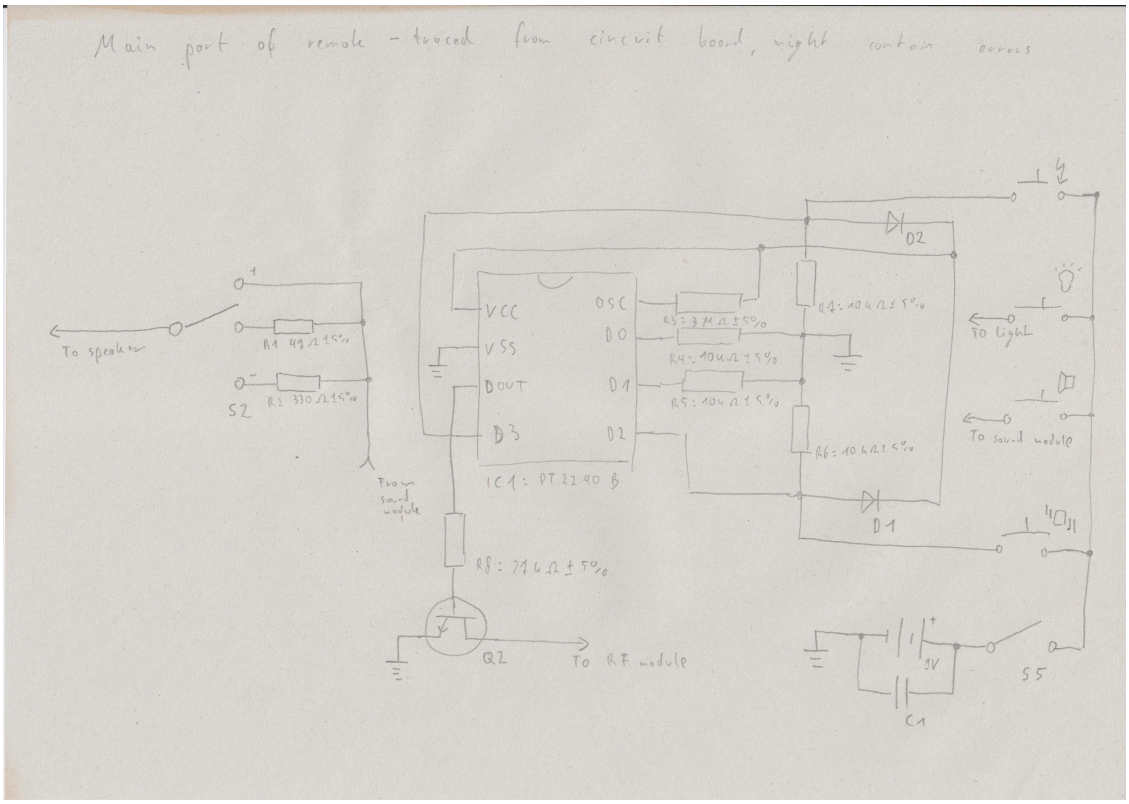

Figure 5: Schematic of remote (excluding sound module, RF module, light circuitry

Pin	Use
1	Not connected
2	Not connected
3	Not connected
4	3.3 V
5	Output to vibrator, connected to transistor via 2.2 kΩ resistor
6	Output to vibrator, connected to transistor via 2.2 kΩ resistor
7	Data input from RF module
8	Output to high-voltage module, connected to transistor via 150 Ω resistor
9	Output to vibrator, connected to transistor via 2.2 kΩ resistor
10	Input from tilt sensor
11	GND
12	Output, connected to LED via 1 kΩ resistor
13	Input, connected to battery voltage via 0 Ω resistor
14	Not connected

Figure 6: Pinout on the unmarked IC on the main module

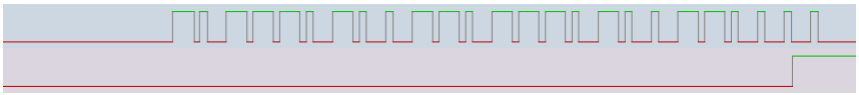

Figure 7: Top: Shock command sent by remote control 0x9765d as received from RF module at pin 7, bottom: pin 8 (total length of sequence: 50 ms, measured using LWLA1034 logic analyzer at shock unit)

In the protocol, 1 bits are encoded as a 1.2 ms high pulse followed by a 0.4 ms low, 0 bits are encoded by a 0.4 ms high pulse followed by a 1.2 ms low (see Figure 7).

While shock commands are received, the shock module delivers a short pulse of about 3 µs at about 3 kV (see Figure 8), about every 50 ms.

TODO: PCB pictures.

TODO: Schematics.

TODO: Measure shock voltage and waveform. Under no load, the voltage is in excess of 2000V (upper limit of measurement device used so far).

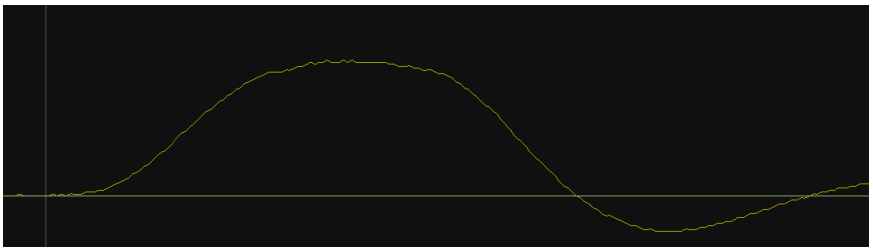

Figure 8: Shock waveform (measured using BitSCOPE BS-310N and Testec HVP-08 probe)

7 Hack: Disable the 3-minute auto-shutdown timeout

A simple modification would be replacing the tilt switch in the shock unit by a slow (0.01 Hz to 10 Hz) Oscillator to disable the 3-minute auto-shutdown timeout.

The oscillator could be built from just three small components: A 74LVC1G14 inverting Schmitt-trigger buffer, a 1 µF capacitor and a 100 Ω resistor.

8 Hack: Adjustable shock intensity

So far, this is just an idea.

One should be able to adjust the shock intensity by setting the supply voltage for the high-voltage module. In the unmodified device, this is the minimum of the battery voltage and 3.3V. One should be able to adjust the shock intensity by providing an analog signal to R3. This would require a different µC (programmed to use the lower two data bits, and set the output to R3 accordingly, be it by integrated DAC, or some other form of DAC), either in addition to or replacing the exisitng µC. Replacing the µC would also get rid of the 3-minute auto-shutdown timeout at the same time.

The volume switch on the remote control is repurposed to adjust the shock intensity, while the sound volume is fixed. To this end, the resistors R1 and R2 are removed from the PCB. The trace from the sound module is cut near the switch. The speaker wire connecting to the switch is removed and resoldered to the now-empty pad on R1 or R2 (this fixes the sound to high volume - if a lower volume is desired, a 47 Ω resistor can be placed in series with the wire for the middle volume, a 330 Ω resistor for low volume). The common point on the switch is connected to battery voltage, and the contacts for low and medium volume are connected to the data pins D0 and D1 on the encoder. Figure **??** shows the modifications.

Modified remote controls can still be used with unmodified shock units and vice versa (of course then the shock volume will not be adjustable then).

References

[1] A small pice of paper folded to a size of 32 mm by 121 mm that comes with the device.

[2] Justin Decerous. Review | Master Series Cock Shock Remote Controlled Cock Ring, 2016 (accessed 2018-07-14). http://www.justindecerous.com/master-series-cock-shock/.

[3] Katie Ellison. Modesty Ablaze reviews the “Master Series Cock Shock Remote Controlled Cock Ring” from @UberKinky, 2016 (accessed 2018-07-14). http://modestyablaze.com/2016/07/04/modesty-ablaze-reviews-master-series-cock-shock-remote-controlled-cock-ring-uberkinky/.