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using the pots for more than 3 parameters

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using the pots for more than 3 parameters (#p1877)

by **Dragonsf** » Mon Oct 13, 2014 10:56 pm

Imagine you want to create a 6-Tap delay, where the delay time can be changed in real time.

Would it be feasible to do this:

```
read pot1
multiply value by 6
save in reg32
.
.
.
read pot2
save value in reg33+value(reg32)
.
.
copy reg33->addr_reg
do the delay1
copy reg34->addr_reg
do the delay2
....
copy reg38->addr_reg
do the delay6
....
```

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Re: using the pots for more than 3 parameters (#p1878)

by **Digital Larry** » Tue Oct 14, 2014 4:04 am

Well, already, there are the Three-tap, MN3011, 8-tap, and 10-tap delay blocks, which can all change their tap delay times in real time with the pot inputs, or an LFO, or whatever. I am not really sure what your suggestion is getting at but I can tell you more about how it all works in SpinCAD Designer.

First, there is the maximum value of ADDR_PTR which would be at the end of delay memory. I believe this is 32767 * 256 or 0x7FFF00. For any given delay block, we keep track of where it starts (as there could be multiple blocks allocating RAM, you can't assume that they begin at 0), and what the length is.

The control input is used to set the delay from 5% to 100% of the delay length. A SOF instruction calculates the correct scaling for this range which is further adjusted by the control input. If you don't want your control input to sweep over that wide of a range, just use a Scale/Offset in front to limit it.

All taps track together from one control input, except for the three-tap which has individual controls per tap. I think I've already solved the multi-tap delay problem in a pretty useful way.

Is there some other behavior you'd like to see?

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Re: using the pots for more than 3 parameters (#p1882)

by **Dragonsf** » Tue Oct 14, 2014 5:56 pm

The multi-tap was just an example. I'd like to have a general solution to handle more than 3 real-time values independently. My understanding of the assembler code is to very deep, but at the moment I can't a way doing it without using conditional jumps (indirect addressing seems a bit restricted).

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Re: using the pots for more than 3 parameters (#p1883)

by **Digital Larry** » Tue Oct 14, 2014 6:21 pm

I see. You would like one pot to control the routing of other pots. Can you give a specific example? At present SpinCAD doesn't support any pot-driven conditional control structures (although I was thinking recently about how to do it maybe).

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Re: using the pots for more than 3 parameters (#p1885)

by **Jacko** » Tue Oct 14, 2014 11:32 pm

Here is an example of a pot SKP routine:

[http://www.spinsemi.com/forum/viewtopic ... hlight=skp](http://www.spinsemi.com/forum/viewtopic...hlight=skp) (<http://www.spinsemi.com/forum/viewtopic.php?t=134&highlight=skp>)

Hope you get some ideas from it.

J

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Re: using the pots for more than 3 parameters (#p1886)

by **Digital Larry** » Wed Oct 15, 2014 5:51 am

Thank Jacko. I can see the concept when the entire patch changes, sorta like on my Boss Micro-Cube - effects knob spans 4 effects and effect "amount" as it rotates through each section. If you wanted to use one knob as a pot multiplexer, I think it could be done, only challenge I see is reliably selecting the desired parameter. This one's going to go on the back burner for now.

Back to Dragonsf, sorry I missed your intention originally. I agree that you only have conditional skipping and no such thing as indirect addressing.

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Re: using the pots for more than 3 parameters (#p1890)

by **Dragonsf** » Wed Oct 15, 2014 3:30 pm

I realized, that a parameter selection with a pot as such will be difficult to show. But I'm planning to use an Arduino with LCD as UI, the actual parameter name can be displayed directly.

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Re: using the pots for more than 3 parameters (#p1891)by **Digital Larry** » Wed Oct 15, 2014 4:37 pm

I see. In any case, you'll have to come up with a specific example as I don't think it's possible to come up with a block that would handle all possibilities.

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Re: using the pots for more than 3 parameters (#p2097)by **Dragonsf** » Tue Jan 27, 2015 6:41 pm

I'm trying to locate the java blocks for the above mentioned delay blocks (Three-tap, MN3011, 8-tap, and 10-tap delay blocks), but only found MN3011, 8-tap (=MultiTap).

Can you direct me to the correct files for the others?

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Re: using the pots for more than 3 parameters (#p2098)by **Digital Larry** » Tue Jan 27, 2015 9:18 pm

Those other blocks are generated via SpinCAD Builder, so they are in the src-gen folder.

You should be able to find them here.

<https://github.com/HolyCityAudio/SpinCA.../CADBlocks> (<https://github.com/HolyCityAudio/SpinCAD-Designer/tree/master/src-gen/com/holycityaudio/SpinCAD/CADBlocks>)

For example, SpinCAD Builder turns this:

```
@name ThreeTap
@audioInput adcl Input
@audioOutput output1 Tap1_Out
@audioOutput output2 Tap2_Out
@audioOutput output3 Tap3_Out
@audioOutput output4 Delay_Out_Center
@audioOutput output5 Delay_Out_End
@controlInput cIn1 Delay_Time_1
@controlInput cIn2 Delay_Time_2
@controlInput cIn3 Delay_Time_3

equ inputGain 0.45
@sliderLabel inputGain Input_Gain 0.0 1.0 0.5 1000.0 2

// total allocated memory buffer for this delay
// create a Control Panel with a Slider Label
equ delayLength 32767
@sliderLabel delayLength Delay_Time 0 32767 16384 1 0 lengthToTime

// tap 1 length in % (control panel value)
// '@sliderLabel' ename = ID controlId = ID (minVal = SPINDOUBLE maxVal = SPINDOUBLE initVal = SPINDOUBLE
multiplier = SPINDOUBLE precision = INT (option = ID)?)?

equ tap1Ratio 0.85
@sliderLabel tap1Ratio Tap_1_Time 0.0 1.0 0.85 1000.0 2
// tap 2 length in % (control panel value)
equ tap2Ratio 0.60
@sliderLabel tap2Ratio Tap_2_Time 0.0 1.0 0.60 1000.0 2
// tap 3 length in % (control panel value)
equ tap3Ratio 0.45
@sliderLabel tap3Ratio Tap_3_Time 0.0 1.0 0.45 1000.0 2

equ delayOffset -1
```

```
// establish the base address for this module
@getBaseAddress
// then allocate the buffer
mem threeTap delayLength

// input connection must be there for any code to be generated
@isPinConnected Input
// read the input and write to base of delay line
rdax adcl, inputGain
wra threeTap, 0.0

// tap 1 -----

@isPinConnected Tap1_Out
equ output1 reg0
clr
or $7FFF00
@isPinConnected Delay_Time_1
mulx cIn1
@endif
@getDelayScaleControl tap1Ratio delayLength delayOffset
wra ADDR_PTR, 0
rmpa 1.0
wra output1, 0.0
@setOutputPin Tap1_Out output1
@endif

// tap 2 -----

@isPinConnected Tap2_Out
equ output2 reg1
clr
or $7FFF00
@isPinConnected Delay_Time_2
mulx cIn2
@endif
@getDelayScaleControl tap2Ratio delayLength delayOffset
wra ADDR_PTR, 0
rmpa 1.0
wra output2, 0.0
@setOutputPin Tap2_Out output2
@endif

// tap 3 -----

@isPinConnected Tap3_Out
equ output3 reg2
clr
or $7FFF00
@isPinConnected Delay_Time_3
mulx cIn3
@endif
@getDelayScaleControl tap3Ratio delayLength delayOffset
wra ADDR_PTR, 0
rmpa 1.0
wra output3, 0.0
@setOutputPin Tap3_Out output3
@endif

@isPinConnected Delay_Out_Center
equ output4 reg4
rda threeTap^, 1.0
wra output4, 0.0
@setOutputPin Delay_Out_Center output4
@endif

@isPinConnected Delay_Out_End
equ output5 reg5
```

```

rda threeTap#, 1.0
wrax output5, 0.0
@setOutputPin Delay_Out_End output5
@endif

@endif

```

into this:

```

/* SpinCAD Designer - DSP Development Tool for the Spin FV-1
 * TripleTapCADBlock.java
 * Copyright (C) 2015 - Gary Worsham
 * Based on ElmGen by Andrew Kilpatrick
 *
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 * it under the terms of the GNU General Public License as published by
 * the Free Software Foundation, either version 3 of the License, or
 * (at your option) any later version.
 *
 * This program is distributed in the hope that it will be useful,
 * but WITHOUT ANY WARRANTY; without even the implied warranty of
 * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the
 * GNU General Public License for more details.
 *
 * You should have received a copy of the GNU General Public License
 * along with this program. If not, see <http://www.gnu.org/licenses/>.
 */

package com.holycityaudio.SpinCAD.CADBlocks;

import com.holycityaudio.SpinCAD.SpinCADBlock;
import com.holycityaudio.SpinCAD.SpinCADPin;
import com.holycityaudio.SpinCAD.SpinFXBlock;
import com.holycityaudio.SpinCAD.ControlPanel.TripleTapControlPanel;

public class TripleTapCADBlock extends SpinCADBlock {

    private static final long serialVersionUID = 1L;
    private TripleTapControlPanel cp = null;

    private double inputGain = 0.45;
    private double delayLength = 32767;
    private double tap1Ratio = 0.85;
    private double tap2Ratio = 0.60;
    private double tap3Ratio = 0.45;
    private double delayOffset = -1;
    private int output1;
    private int output2;
    private int output3;
    private int output4;
    private int output5;

    public TripleTapCADBlock(int x, int y) {
        super(x, y);
        setName("ThreeTap");
        // Iterate through pin definitions and allocate or assign as needed
        addInputPin(this, "Input");
        addOutputPin(this, "Tap1_Out");
        addOutputPin(this, "Tap2_Out");
        addOutputPin(this, "Tap3_Out");
        addOutputPin(this, "Delay_Out_Center");
        addOutputPin(this, "Delay_Out_End");
        addControlInputPin(this, "Delay_Time_1");
        addControlInputPin(this, "Delay_Time_2");
        addControlInputPin(this, "Delay_Time_3");
        // if any control panel elements declared, set hasControlPanel to true

```

```
        hasControlPanel = true;
        hasControlPanel = true;
        hasControlPanel = true;
        hasControlPanel = true;
        hasControlPanel = true;
    }

    // In the event there are parameters editable by control panel
    public void editBlock(){
        if(cp == null) {
            if(hasControlPanel == true) {
                cp = new TripleTapControlPanel(this);
            }
        }
    }

    public void clearCP() {
        cp = null;
    }

    public void generateCode(SpinFXBlock sfxb) {

        // Iterate through mem and equ statements, allocate accordingly

        sfxb.comment(getName());

        SpinCADPin sp = null;

        // Iterate through pin definitions and connect or assign as needed
        sp = this.getPin("Input").getPinConnection();
        int adcl = -1;
        if(sp != null) {
            adcl = sp.getRegister();
        }

        sp = this.getPin("Delay_Time_1").getPinConnection();
        int cIn1 = -1;
        if(sp != null) {
            cIn1 = sp.getRegister();
        }

        sp = this.getPin("Delay_Time_2").getPinConnection();
        int cIn2 = -1;
        if(sp != null) {
            cIn2 = sp.getRegister();
        }

        sp = this.getPin("Delay_Time_3").getPinConnection();
        int cIn3 = -1;
        if(sp != null) {
            cIn3 = sp.getRegister();
        }

        // finally, generate the instructions
        int delayOffset = sfxb.getDelayMemAllocated() + 1;
        sfxb.FXallocDelayMem("threeTap", delayLength);
        if(this.getPin("Input").isConnected() == true) {
            sfxb.readRegister(adcl, inputGain);
            sfxb.FXwriteDelay("threeTap", 0, 0.0);
            if(this.getPin("Tap1_Out").isConnected() == true) {
                output1 = sfxb.allocateReg();
                sfxb.clear();
                sfxb.or(0x7FFF00);
                if(this.getPin("Delay_Time_1").isConnected() == true) {
                    sfxb.mulx(cIn1);
```

```

    }

    sfxb.scaleOffset((0.95 * tap1Ratio * delayLength)/32768.0, (delayOffset + (0.05 * tap1Ratio *
delayLength))/32768.0);
    sfxb.writeRegister(ADDR_PTR, 0);
    sfxb.readDelayPointer(1.0);
    sfxb.writeRegister(output1, 0.0);
    this.getPin("Tap1_Out").setRegister(output1);
}

if(this.getPin("Tap2_Out").isConnected() == true) {
    output2 = sfxb.allocateReg();
    sfxb.clear();
    sfxb.or(0x7FFF00);
    if(this.getPin("Delay_Time_2").isConnected() == true) {
        sfxb.mulx(cIn2);
    }

    sfxb.scaleOffset((0.95 * tap2Ratio * delayLength)/32768.0, (delayOffset + (0.05 * tap2Ratio *
delayLength))/32768.0);
    sfxb.writeRegister(ADDR_PTR, 0);
    sfxb.readDelayPointer(1.0);
    sfxb.writeRegister(output2, 0.0);
    this.getPin("Tap2_Out").setRegister(output2);
}

if(this.getPin("Tap3_Out").isConnected() == true) {
    output3 = sfxb.allocateReg();
    sfxb.clear();
    sfxb.or(0x7FFF00);
    if(this.getPin("Delay_Time_3").isConnected() == true) {
        sfxb.mulx(cIn3);
    }

    sfxb.scaleOffset((0.95 * tap3Ratio * delayLength)/32768.0, (delayOffset + (0.05 * tap3Ratio *
delayLength))/32768.0);
    sfxb.writeRegister(ADDR_PTR, 0);
    sfxb.readDelayPointer(1.0);
    sfxb.writeRegister(output3, 0.0);
    this.getPin("Tap3_Out").setRegister(output3);
}

if(this.getPin("Delay_Out_Center").isConnected() == true) {
    output4 = sfxb.allocateReg();
    sfxb.FXreadDelay("threeTap^", 0, 1.0);
    sfxb.writeRegister(output4, 0.0);
    this.getPin("Delay_Out_Center").setRegister(output4);
}

if(this.getPin("Delay_Out_End").isConnected() == true) {
    output5 = sfxb.allocateReg();
    sfxb.FXreadDelay("threeTap#", 0, 1.0);
    sfxb.writeRegister(output5, 0.0);
    this.getPin("Delay_Out_End").setRegister(output5);
}

}

}

// create setters and getter for control panel variables
public void setinputGain(double __param) {
    inputGain = __param;
}

public double getinputGain() {

```

```

        return inputGain;
    }
    public void setdelayLength(double __param) {
        delayLength = __param;
    }

    public double getdelayLength() {
        return delayLength;
    }
    public void settap1Ratio(double __param) {
        tap1Ratio = __param;
    }

    public double gettap1Ratio() {
        return tap1Ratio;
    }
    public void settap2Ratio(double __param) {
        tap2Ratio = __param;
    }

    public double gettap2Ratio() {
        return tap2Ratio;
    }
    public void settap3Ratio(double __param) {
        tap3Ratio = __param;
    }

    public double gettap3Ratio() {
        return tap3Ratio;
    }
}

```

and this:

```

/* SpinCAD Designer - DSP Development Tool for the Spin FV-1
 * TripleTapControlPanel.java
 * Copyright (C) 2015 - Gary Worsham
 * Based on ElmGen by Andrew Kilpatrick
 *
 * This program is free software: you can redistribute it and/or modify
 * it under the terms of the GNU General Public License as published by
 * the Free Software Foundation, either version 3 of the License, or
 * (at your option) any later version.
 *
 * This program is distributed in the hope that it will be useful,
 * but WITHOUT ANY WARRANTY; without even the implied warranty of
 * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the
 * GNU General Public License for more details.
 *
 * You should have received a copy of the GNU General Public License
 * along with this program. If not, see <http://www.gnu.org/licenses/>.
 */

package com.holycityaudio.SpinCAD.ControlPanel;
import javax.swing.JFrame;
import javax.swing.SwingUtilities;
import javax.swing.event.ChangeEvent;
import javax.swing.event.ChangeListener;
import java.awt.event.WindowEvent;
import java.awt.event.WindowListener;
import java.awt.event.ItemEvent;
import javax.swing.BoxLayout;
import javax.swing.JSlider;
import javax.swing.JLabel;
import javax.swing.JCheckBox;

```



```

import com.holycityaudio.SpinCAD.CADBlocks.TripleTapCADBlock;

public class TripleTapControlPanel {
    private JFrame frame;

    private TripleTapCADBlock gCB;
    // declare the controls
    JSlider inputGainSlider;
    JLabel inputGainLabel;
    JSlider delayLengthSlider;
    JLabel delayLengthLabel;
    JSlider tap1RatioSlider;
    JLabel tap1RatioLabel;
    JSlider tap2RatioSlider;
    JLabel tap2RatioLabel;
    JSlider tap3RatioSlider;
    JLabel tap3RatioLabel;

    public TripleTapControlPanel(TripleTapCADBlock genericCADBlock) {

        gCB = genericCADBlock;

        SwingUtilities.invokeLater(new Runnable() {
            public void run() {

                frame = new JFrame();
                frame.setTitle("ThreeTap");
                frame.setLayout(new BorderLayout(frame.getContentPane(), BorderLayout.Y_AXIS));

                inputGainSlider = new JSlider(JSlider.HORIZONTAL, (int)(0.0 * 1000.0), (int)(1.0 * 1000.0), (int)
(gCB.getInputGain() * 1000.0));
                inputGainSlider.addChangeListener(new TripleTapSliderListener());
                inputGainLabel = new JLabel();
                updateinputGainLabel();
                frame.getContentPane().add(inputGainLabel);
                frame.getContentPane().add(inputGainSlider);

                delayLengthSlider = new JSlider(JSlider.HORIZONTAL, (int)(0 * 1), (int)(32767 * 1), (int)
(gCB.getdelayLength() * 1));
                delayLengthSlider.addChangeListener(new TripleTapSliderListener());
                delayLengthLabel = new JLabel();
                updatedelayLengthLabel();
                frame.getContentPane().add(delayLengthLabel);
                frame.getContentPane().add(delayLengthSlider);

                tap1RatioSlider = new JSlider(JSlider.HORIZONTAL, (int)(0.0 * 1000.0), (int)(1.0 * 1000.0), (int)
(gCB.gettap1Ratio() * 1000.0));
                tap1RatioSlider.addChangeListener(new TripleTapSliderListener());
                tap1RatioLabel = new JLabel();
                updatetap1RatioLabel();
                frame.getContentPane().add(tap1RatioLabel);
                frame.getContentPane().add(tap1RatioSlider);

                tap2RatioSlider = new JSlider(JSlider.HORIZONTAL, (int)(0.0 * 1000.0), (int)(1.0 * 1000.0), (int)
(gCB.gettap2Ratio() * 1000.0));
                tap2RatioSlider.addChangeListener(new TripleTapSliderListener());
                tap2RatioLabel = new JLabel();
                updatetap2RatioLabel();
                frame.getContentPane().add(tap2RatioLabel);
                frame.getContentPane().add(tap2RatioSlider);

                tap3RatioSlider = new JSlider(JSlider.HORIZONTAL, (int)(0.0 * 1000.0), (int)(1.0 * 1000.0), (int)
(gCB.gettap3Ratio() * 1000.0));
                tap3RatioSlider.addChangeListener(new TripleTapSliderListener());
                tap3RatioLabel = new JLabel();
                updatetap3RatioLabel();
            }
        });
    }
}

```

```

        frame.getContentPane().add(tap3RatioLabel);
        frame.getContentPane().add(tap3RatioSlider);

        frame.addWindowListener(new MyWindowListener());
        frame.setVisible(true);
        frame.pack();
        frame.setResizable(false);
        frame.setLocation(gCB.getX() + 100, gCB.getY() + 100);
        frame.setAlwaysOnTop(true);
    }
});
}

// add change listener for Sliders
class TripleTapSliderListener implements ChangeListener {
public void stateChanged(ChangeEvent ce) {
    if(ce.getSource() == inputGainSlider) {
        gCB.setInputGain((double) (inputGainSlider.getValue()/1000.0));
        updateinputGainLabel();
    }
    if(ce.getSource() == delayLengthSlider) {
        gCB.setdelayLength((double) (delayLengthSlider.getValue()/1));
        updatedelayLengthLabel();
    }
    if(ce.getSource() == tap1RatioSlider) {
        gCB.settap1Ratio((double) (tap1RatioSlider.getValue()/1000.0));
        updatetap1RatioLabel();
    }
    if(ce.getSource() == tap2RatioSlider) {
        gCB.settap2Ratio((double) (tap2RatioSlider.getValue()/1000.0));
        updatetap2RatioLabel();
    }
    if(ce.getSource() == tap3RatioSlider) {
        gCB.settap3Ratio((double) (tap3RatioSlider.getValue()/1000.0));
        updatetap3RatioLabel();
    }
}
}

// add item listener for Bool (CheckBox)
class TripleTapItemListener implements java.awt.event.ItemListener {
public void stateChanged(ChangeEvent ce) {
}

@Override
public void itemStateChanged(ItemEvent arg0) {
}
}

private void updateinputGainLabel() {
    inputGainLabel.setText("Input_Gain " + String.format("%.2f", gCB.getInputGain()));
}
private void updatedelayLengthLabel() {
    delayLengthLabel.setText("Delay_Time " + String.format("%.0f", (1000 *
gCB.getdelayLength())/gCB.getSamplerate()));
}
private void updatetap1RatioLabel() {
    tap1RatioLabel.setText("Tap_1_Time " + String.format("%.2f", gCB.gettap1Ratio()));
}
private void updatetap2RatioLabel() {
    tap2RatioLabel.setText("Tap_2_Time " + String.format("%.2f", gCB.gettap2Ratio()));
}
private void updatetap3RatioLabel() {
    tap3RatioLabel.setText("Tap_3_Time " + String.format("%.2f", gCB.gettap3Ratio()));
}

class MyWindowListener implements WindowListener
{

```

```

@Override
    public void windowActivated(WindowEvent arg0) {
    }

@Override
    public void windowClosed(WindowEvent arg0) {
    }

@Override
    public void windowClosing(WindowEvent arg0) {
        gCB.clearCP();
    }

@Override
    public void windowDeactivated(WindowEvent arg0) {
    }

@Override
    public void windowDeiconified(WindowEvent arg0) {
    }

@Override
    public void windowIconified(WindowEvent arg0) {
    }

@Override
    public void windowOpened(WindowEvent arg0) {
    }
}
}

```

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Re: using the pots for more than 3 parameters (#p2100)

by **Dragonsf** » Tue Jan 27, 2015 9:36 pm

I see. What I'm actually looking for is a four tap delay, where each tap is at a relative position and the overall delay-time can be varied with a pot. For example: tap1 at 25%, tap2 at 50, tap3 at 75 and tap4 at 100%. With this setup, the taps would always equal distant, independent of delay time. Maybe you have already defined something like this. If yes, I'll have a look.

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Re: using the pots for more than 3 parameters (#p2101)

by **Digital Larry** » Tue Jan 27, 2015 9:47 pm

I think you can do this with the 8-tap delay. Mix the two outputs (MIX_1 and MIX_2) to one and then turn the gain controls on the odd numbered taps to zero.

If that doesn't float your boat I can pretty easily make a 4-tap delay block.

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Re: using the pots for more than 3 parameters (#p2102)

by **Dragonsf** » Tue Jan 27, 2015 10:12 pm

I had a look at the code. This looks promising.

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