VIDEO OUTLINER
<table>
<thead>
<tr>
<th>PIN</th>
<th>FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - A</td>
<td>+5 Volts DC (± 0.25 volt)</td>
</tr>
<tr>
<td>2</td>
<td>WHITE ON BLACK OUTLINE OUTPUT A</td>
</tr>
<tr>
<td>3</td>
<td>BLACK ON WHITE OUTLINE OUTPUT A</td>
</tr>
<tr>
<td>4</td>
<td>MODE BIT 1</td>
</tr>
<tr>
<td>5</td>
<td>MODE BIT 2</td>
</tr>
<tr>
<td>6</td>
<td>LINE WIDTH CONTROL VOLTAGE INPUT - A</td>
</tr>
<tr>
<td>7</td>
<td>THRESHOLD CONTROL VOLTAGE INPUT - A</td>
</tr>
<tr>
<td>8</td>
<td>VIDEO SIGNAL INPUT A</td>
</tr>
<tr>
<td>9</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>SYSTEMS BLANKING INPUT - LOOP THRU</td>
</tr>
<tr>
<td>11</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>-12 VOLT D.C. SUPPLY</td>
</tr>
<tr>
<td>13</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>+12 VOLT D.C. SUPPLY</td>
</tr>
<tr>
<td>15</td>
<td>VIDEO SIGNAL INPUT B</td>
</tr>
<tr>
<td>16</td>
<td>LINE WIDTH CONTROL VOLTAGE INPUT - B</td>
</tr>
<tr>
<td>17</td>
<td>THRESHOLD CONTROL VOLTAGE INPUT - B</td>
</tr>
<tr>
<td>18</td>
<td>MODE BIT 1</td>
</tr>
<tr>
<td>19</td>
<td>MODE BIT 2</td>
</tr>
<tr>
<td>20</td>
<td>BLACK ON WHITE OUTLINE OUTPUT B</td>
</tr>
<tr>
<td>21</td>
<td>WHITE ON BLACK OUTLINE OUTPUT B</td>
</tr>
<tr>
<td>22-2</td>
<td>GROUND</td>
</tr>
</tbody>
</table>
Suggested CARD WIRING

CONNECTOR
SHIELDED CABLE - R6-1744C

**VIDEO INPUT**

R1,2 = 5kΩ2
POT

C1,2 = 1 μF
10 VDC
ELECTROLYTIC
CAPACITOR

S1,1 = SPDT TOGGLE
SWITCHES
ON/OFF TYPE

**R2**

+5VOLTS DC

**R1**

C1 JACK

**C2**

7,17

**THRESHOLD CONTROL VOLTAGE**

**W1**

**6,16**

**WIDTH CONTROL VOLTAGE**

4,18

MODE BIT 1

3,19

MODE BIT 2

1,2,3 OPTIONAL
10μF CHOKES
FOR POWER SUPPLY NOISE
REDUCTION. J.W. MILLER #6306.
GROUND WITH BUS

1,4

2,2*

+5VOLTS DC

12

2,2*

-12VOLTS DC

14

2,3*

+12VOLTS DC

22,2

**OUTPUT CONNECTOR**

DON'T GROUND TO AVOID GROUND LOOPS

10 BLANKING

SOURCE

OTHER CARDS

75Ω

- ULTIMATE TERMINATE
Congratulations - you now own 4 Beck Video Outliners - 2 cores each containing 2 separate outliners. Features:

* Voltage control of line width from 1 µsec to 30 µsec
* Selection of black to white and/or white to black editing
* Positive and negative polarity video outputs: 0.8 volt nominal into 75 Ω load.

Each outliner may be visualized thus:

```
non comp video input
1.0 p-p 75 Ω

input stage

threshold control voltage input

control word

width control voltage input

output

video outputs 75 Ω

blank input
```
Power Supplies: +5 volts d.c. @ 150 ma is required for each card. This voltage powers logic I.C.'s and critically affects outline width. It should never exceed +5.25 volts as this may damage on-board I.C.'s.

+ and - 12 volts d.c. is also required at 50 ma each polarity per card.

System noise can affect the outline through the power supply lines. I have generously by-passed on-card power lines so that you should not have interference from this problem (commonly caused by ground-loop current noise). But if you do, try inserting 10 millihenry inductors (capable of safely passing the required current) in series with the various supply leads at the card edge connector.

Control Voltages

All control voltages should be from 0 to +5 volts and not exceed this range. Use fairly low value source impedance on control voltage sources, less than 5 kΩ.
A non-composite video signal is applied to video signal input. When the incoming signal is terminated into 75Ω it should be 1 volt-peak to peak amplitude. Using composite video may result in the sync tip edges being outlined. A threshold control voltage of from 0→+5 volts determines the amplitude at which outlining occurs. When incoming video level goes from just below threshold level to just above threshold level a black to white transition occurs (B→W). When the opposite action occurs a white to black transition occurs (W→B). I notate these as B→W = 1
W→B = 1

Both transitions can generate an outline and the 2 bit control word determines which if any, transition is outlined. This is a binary or digital function, allowing only 2 possible voltages at each word bit pin of the control word, namely ground, designated 0, and an open circuit, designated 1.
THE CONDITIONS OF OUTPUT VS. THESE WORD BIT STATES IS:

<table>
<thead>
<tr>
<th>Bit 2</th>
<th>Bit 1</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>NO OUTLINES</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>↑ OUTLINES ONLY</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>↓ OUTLINES ONLY</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>BOTH ↑ AND ↓ OUTLINES</td>
</tr>
</tbody>
</table>

USE OF TOGGLE SWITCHES IS SHOWN IN THE HOOKUP DIAGRAM. OTHER LOGIC OUTPUTS CAN ALSO FUNCTION HERE PROVIDING THAT:

1 = +16.5 VOLTS OR MORE (≤ 5 VOLTS)
    AT 40 MA

0 = <0.8 VOLT BUT ≥ 0 VOLTS
    AT 1.6 mA

(These are standard TTL logic levels)

LINE WIDTH CONTROL VOLTAGE

BY VARYING VOLTAGE AT THE WIDTH CONTROL VOLTAGE PIN FROM 0 → +5 VOLTS
THE RESULTANT OUTLINE WILL VARY IN WIDTH FROM 800 nsec (very thin) TO 80 μsec (very thick), DUE TO CERTAIN VARIATIONS
OUTLINE ADJUSTMENT LOCATIONS

TOP VIEW

"B" OUTLINE ADJUSTMENTS

R1B

R2B

"A" OUTLINE ADJUSTMENTS

R1A

R2A

A

Z

BOARD NUMBER

* NOTE: ON BOARD #101 R2A WILL BE FOUND UNDERNEATH THE TOP SIDE
In power supply voltage, circuit operating environment and desired range or outline width, there are two circuit adjustments for each outline generator, designated R1 and R2. These adjust minimum and maximum line width respectively. To adjust them, set width control voltage (WCV) at +5 volts (or whatever maximum used) for widest edge desired. Then set WCV = 0 volts and adjust R1 for thinnest line. This will affect the widest value, so jockey back and forth to obtain good range.

I have adjusted for +5.00 volt supply but you may want to trim them for your supply. Note: if R2 is not set low enough a +5v WCV will cause oscillating output, instead of outline, and then clamp off.

It's easy to do!
OUTPUTS.

The two outputs are of opposite polarities, and are in non-composite form only when blanking is applied to the card. The outputs are designed to terminate into 75 ohms and deliver +0.8 volts peak level for positive outlines, blanking referenced to ground:

\[ +0.8V \quad \text{---} \quad 0 \text{ volts} \quad \text{BL} \quad \text{---} \quad +0.8V \]

One scan line

Non-terminated output voltage can rise to +4.0 volts.

Blanking

Standard negative going blanking pulses are coupled through a moderate impedance d.c. restorer and processed. One each card to blank output signals. Delay from input of blanking edge to corresponding edge on output is 40 nsec.

Blanking input on card is 10 k\(\Omega\) or more, so loop through is possible with many cards. Blanking amplitude should be 3 volts peak to peak, and 75 ohms terminated at the end of the loop.
FINALLY,

TRY IT OUT - YOU CAN FEED THE INPUT FROM A SONY B&W CAMERA DIRECTLY, AND FEED THE OUTPUTS INTO A SEG-7, WHERE THEY WILL GET SYNC ADDED. THIS IS A POWERFUL GRAPHIC UNIT, AND, HOPEFULLY IT WILL AID YOU IN THE CREATIVE SEARCH IN IMAGES. THAT WE ARE ALL HUMAN MEDIA THROUGH WHICH THE IMAGES FIND THEIR WAY INTO COMMON REALITY IS HOW I'M VISUALIZING IT ALL THESE DAYS. SOON I'LL GET YOU THE COPY FOR MY PROPOSED TOURING "ACTS."

I HAVE TO SAY - RIGHT NOW IT SEEMS IMPORTANT TO ME THAT YOU NOT DISCULGE THIS CIRCUITRY IN ITS RAW FORM - THOUGH DEDUCTION OF ITS FUNCTION IS NOT DIFFICULT. PLAY LIKE IT IS A MAGICAL APPARATUS - PLEASE USE IT WELL.

SEND BREAD WHEN YOU CAN, SOONER THE BETTER FOR ME; PRINTED CIRCUIT
-8-

Version coming along soon. Very minute!!

Best to you & when do we rendezvous in Venezuela.

Stephen

Jan 8 1973 Berkeley, California