New Modules for Buchla #200.

(1) VOL. COND. CON. VOL. SMOOTHER NO. 1
(2) NO. 2
(3) ANALOGUE SHIFT REGISTER
(4) AUDIO-PULSE-CON.VOL. MATRIX GATE

Design:
Fukushi Kawakami
CON. VOL. SMOOTHER NO. 1 (I)  (Paxne1)

IN [OFFSET] OUT

CON. VOL. IN

RATE

WAVE CONTROL

TIME CONST. CONT.

(VOLTAGE FOLLOWER)  (VOLTAGE FOLLOWER)

IN [IN]

(VOLTAGE FOLLOWER)

IN [OUT]

(CON.VOL. IN)

(INTEGRATOR)  High Input Imp. Stage

(Photocell Driver)

(Function)

INPUT

OUTPUT (NORM)

OUTPUT (WAVE)

T = OFFSET + RATE x CON.VOL.
CON. VOL. SMOOTHER NO. 2

\[ T_{\text{main}} = T_{\text{offset}} + (\text{rate} \times \text{CON.VOL}) \]

- \( T_{\text{main}} = \) main time constant
- \( T_{\text{offset}} = \) offset time constant
- \( \text{rate} = \) rate of change
- \( \text{CON.VOL} = \) control volume

**Graphs and Waveforms:**
- Waveforms for different control modes and time constants.
- Curves for exponential, linear, and free responses.
-ảiograms for pulse and hold-out conditions.

**Symbols:**
- Red for control, black for pulse.
- \( \text{CON.VOL} \) and \( \text{PULSE} \) indication.

**Diagram:**
- Circuit diagram showing connections and labels for various components.
- Various control knobs and indicators for rate, offset, and control volume.

**Additional Notes:**
- By pitching pulse (Auto Sw).
- Time constant (Time Const).

**Legend:**
- Definitions for normal, hold, and hold-out states.
- Periods and amplitudes for long and short conditions.
CON. VOL. SMOOTHER NO. 2 (4) (Math., Note for Curve Correction of Photo-cell)

Characteristics of Each Section

Integrator
- High Input Response Stage (FET)
- Power Supply: +22 V, -15 V
- C: 5.5μF, R: 15kΩ (200Ω/Stage) (Stable)
- (50/50 Ω x 2) Rise Time (0-15V): 1 ms/20 ms

Differential Amplifier (1)
- Power: ±15 V
- Gain: 10/15k = 2/3 (OUT: ±10 V)

Differential Amplifier (2)
- Power: ±15 V
- Gain: 220/39k = 5.6 (OUT: ±3.5 V)

Dynamic Limiter
- Input: 0~±6 V
- Output: 0~±8.5
- Limit Input: 0~±6 V
- Limit Output: 0~±8.5 (Soft Limit)
- Power: ±15 V
- L1 gain: 86/10 (Exponential) ~ ±∞ (Linear)

Photo-cell Curve Correction

Analogue Shift Register
- Sample: Rise Time: 200 μsec
- Hold: 10 min (1% change)
- Power Supply: +22 V, -15 V
- (for Fr. Fr.: (Hold) OUT: +22 V, -15 V)

Photo-cell Driver
- Average Gain: ±10 V/5.5 kΩ
- Power Supply: ±15 V

Shifter - Shift pulse generator
- Rise time: ±22 μsec
- (22~5 μsec full part)

(Photocell curve correction)
ANALOGUE SHIFT REGISTER  (Function, Block-Diagram)  

- Hold: max 5min
- Sample: 1msec (91% rise)

Level Indicator

(PULSE)

(IN) 0~+15V
(OUT) -
(PULSE IN) 0/+5V
DC Power Supply (+15V, +22V)

---

Function

(IN)
---

Pulse (shift)

(Block Diagram)

Sample ch

Hold ch
**Function**

- \( Q_{0} \): 0, 0
- Sw, AND : OFF (usual)
  
  - \( P_{10} \) : \( \text{ON (for } O, 0) \)
  
  - \( P_{10} \) : \( \text{OFF (for } O, 0) \)

- Sw AND : ON (line (3) \( \rightarrow \) AND)

**Function**

- \( Q_{0} \): \( x \)
- Sw, AND : OFF (usual)
  
  - \( P_{10} \) : \( \text{ON (for } O, 0) \)
  
  - \( P_{10} \) : \( \text{OFF (for } 0, 0) \)

- Sw AND : ON (line (3) \( \rightarrow \) AND)

**Audio-Pulse-Cont. Vol. Matrix Gate**

- DC Power Supply: \( \pm 15 \text{V} \)
- \( \pm 22 \text{V} \)
- \( \pm 5 \text{V} \)

- \( Q_{0} \): 0 or 1
- Sw, AND : OFF (usual)
  
  - \( P_{10} \) : \( \text{ON (for } O, 0) \)
  
  - \( P_{10} \) : \( \text{OFF (for } 0, 0) \)

- Sw AND : ON (line (3) \( \rightarrow \) AND)