MONOPHONIC SYNTHESIZER
SERVICE MANUAL MS-10

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KEIO ELECTRONIC LABORATORY CORPORATION
TOKYO/JAPAN
# 1. SPECIFICATIONS

**<CONTROL SECTION>**

1. Keyboard
   - F~C 32 Keys/(2-2/3 octaves)
2. Voltage controlled oscillator
   - Scales [32', 16', 8', 4, 1']/
   - +6 octaves (FM)
   - Wave form \( /\backslash\backslash\backslash,\ \text{PW/PWM},\ \text{Noise})/(4\ \text{modes})
   - PW adjust/PWM intensity
   - Pitch [1 OCTAVE OR MORE]
   - portamento
   - Frequency modulation intensity
     - by MG
   - Frequency modulation intensity
     - by EG/EXT
3. Voltage controlled low pass filter
   - Cut-off frequency
   - Peak [flat ~ self OSC]
   - Cut-off frequency modulation intensity by MG
   - Cut-off frequency modulation intensity by EG/EXT
4. Envelope generator
   - Hold time
     - Attack time
     - Decay time
     - Sustain level
     - Release time
   - Wave form \( \wedge\wedge\wedge\wedge\wedge\wedge\wedge\wedge\wedge\wedge\wedge\wedge\wedge\wedge \)
5. Modulation generator
   - CONTINUALLY
   - Frequency
6. External input
   - Signal level adjust
7. Manual controller
   - Control wheel CENTER CLICK STOP
8. Power, SW A volume
   - Volume

**<PATCH PANEL SECTION>**

1. Keyboard
   - Keyboard control voltage output (exponential)/0V~+8V
   - Keyboard trigger output/GND
2. VCO
   - VCO control voltage input (linear response)/0V~+8V
   - External frequency control input (OCT/V)/-3V~+3V
   - External pulse width modulation input/-5V~+5V
3. VCF
   - External signal input/3VPP max.
   - External cut-off frequency control input (20CT/V)/-5V~+5V
4. VCA
   - Initial gain control input/0V~+5V
5. EG
   - External trigger input/GND
   - Envelope signal reverse output/-5V~+5V
6. MG
   - Triangle output \( /\wedge\wedge\wedge\wedge\wedge\wedge\wedge\wedge/ \)
     - 5VPP
   - Rectangle output \( /\wedge\wedge\wedge\wedge\wedge\wedge\wedge\wedge/ \)
     - 0~5V
7. Noise generator
   - Pink noise output/5VPP
   - White noise output/5VPP
8. Manual controller
   - Control wheel output
     - -5V~0V~+5V
9. Signal out
   - Signal output/2VPP max.
     - (output impedance 3.5kΩ)
10. Power consumption
    - 5 Watts

- Dimension
  - 499(W) x 309(D) x 249(H) mm
- Weight
  - 6.3 kgs
- Accessories
  - Patch cord/35 cm x 1
3. CIRCUIT DIAGRAM
4. PRINTED CIRCUIT BOARD KLM-126B
5. PARTS LIST
(Mechanical parts not listed)

● CARBON RESISTORS
  not listed

● METAL FILM RESISTORS
  1/4W-100Ω x 1
  1/4W-403Ω x 16
  1/4W-427Ω x 16
  1/4W-2.94kΩ x 1
  1/4W-4.27kΩ x 1
  1/4W-5.11kΩ x 1
  1/4W-61.9kΩ x 15
  1/4W-100kΩ x 15
  1/4W-110kΩ x 1

● MYLAR CAPACITORS
  50V-0.001µF x 3
  50V-0.0033µF x 2
  50V-0.01µF x 1
  50V-0.022µF x 3

● TANTALUM CAPACITORS
  16V-6.8µF x 1
  16V-10µF x 1

● CERAMIC CAPACITORS
  25V-0.1µF x 1
  50V-22pF x 1
  50V-47pF x 1
  50V-100pF x 3
  50V-560pF x 1

● ELECTROLYTIC CAPACITORS
  16V-10µF x 10
  16V-33µF x 1
  50V-1.0µF x 2
  50V-470µF x 1

● POLYPROPYLENE CAPACITORS
  200V-0.22µF x 1

● POLYSTYRENE CAPACITORS
  50V-6200pF x 1

● POLYESTER CAPACITORS
  100V-1µF x 1

● TRANSISTORS
  2SA-564A(S) x 3
  2SC-644(R) x 1
  2SC-945(L/K) x 1
  2SC-1583G x 1
  2SC-1685S x 7

● FET
  2SA-30A(O) x 1
  2SA-30A(RG) x 2

● DIODES
  1S-1555 x 24
  1S-1885 x 4

● LED
  GD-4-203RD x 1

● IC
  KORG35 x 1
  MC14007 x 1
  µPC4556 x 8
  µA7815 x 1
  CA3140 x 1
  TL081(071) x 2
  µA7915 x 1
  MC14068 x 1

● SEMI-FIXED RESISTORS
  SR19DS 10kΩ x 2
  SR19DS 100kΩ x 4

● ROTARY VARIABLE RESISTORS
  EVH-5LA802B15 x 3
  EVH-5LA802B14 x 3
  EVH-5LA802A15 x 4
  EVH-5LA802A16 x 2
  EVH-5LA802B16 x 2
  EVH-5LA802A26 x 3
  EVC-BQ6518B14 x 1
  RJAP20B14 x 1

● ROTARY SWITCH
  SRM-103420P x 2

● KEY
  F-E 32 key x 1

● CONNECTORS
  BE6P-SHF-1 x 1
  BE7P-SHF-1 x 1
  BS3P-SHF-1 x 1
  BS4P-SHF-1 x 1
  Female Connectors
  3P MS-1002 x 1
  4P MS-1003 x 1
  4P MS-1004 x 1
  7P MS-1005 x 1
  9P MS-1006 x 1
  MLR-03TRC-1 x 1
  MLR-03TRC-150 x 1

● PHONE JACKS
  2P SG-7501 x 11
  2P SG-7615 x 5

● PC BOARD
  KLM-130A x 1
  KLM-126B x 1
6. BLOCK DIAGRAM
7. ADJUSTMENT PROCEDURE

7-1 Power supply check
1. Positive ripple.
   Should be no more than 2mVp-p.
   Set oscilloscope vertical gain at 10mV/cm and check that power supply ripple is 2mV or less.
2. Negative ripple.
   Same as positive, should be no more than 2mVp-p.

7-2 Pitch adjustment
1. VCO-1.
   Perform adjustment with synthesizer controls at “normal setting” (Scale=8, Waveform= ”LJ”, Master Tune, Pitch, and all other knobs at “0”).
   See figure 1.
   a. Play C-3 (high C) on the keyboard and adjust the high ① semi-fixed screw until you obtain the correct tuning as indicated by WT-10A (connected to the SIG OUT jack).
   b. Play key C-1 and adjust the low ② semi-fixed screw.
   c. Repeat steps a and b as many times as necessary until both are tuned to the correct pitch.
   d. Check the tuning of C-1, C-2, and C-3 on the WT-10A meter to make sure pitch deviation is within ±2 cents for each.
   e. Change the scale to 32’, 16’, 8’, and 4’ and check the tuning of all four C keys to make sure that the pitch deviation of each is within ±10 cents.

7-3 KBD CV adjustment
Use a 4-1/2 digital voltmeter to measure the KBD CV OUT signal.
   a. Measure output voltage first when you play key C-3, then when you play key C-2. The output voltage for C-3 should be exactly half that for C-3. Adjust the KBD CV high ③ semi-fixed screw as necessary so that C-2 produces half the voltage of C-3.
   b. Measure C-2 and then C-1 in the same way. Adjust the KBD CV low ④ semi-fixed screw as necessary so that C-2 produces exactly half the voltage of C-3.
   c. Repeat steps a and b as many times as necessary until the output voltage of each of C-1, C-2, and C-3 is exactly half that of the next.

![Diagram](attachment:fig_1.png)
7-4 VCF Fc adjustment
Connect a frequency counter to the Sig out jack.
1. VC LPF
   Refer to the settings shown in figure 2. Set the Fc knob at "5", and the LPF PEAK knob at "10". Then adjust the semi-fixed screw as necessary so that the LPF oscillation frequency is 500Hz.

Fig. 2