

SCHEMATIC SYMBOL

DESCRIPTION

B & K-PRECISION PART NO.

Fuse, 1/4 Amp, 250 V, 3AG, Slow Blow (100, 120 V operation)	190-251-3-104
Fuse, 1/8 Amp, 250 V, 3AG, Slow Blow (220, 240 V operation)	190-251-3-108
Fuseholder Body	742-038-9-001
Fuse Cap, 3AG	742-038-9-002
BNC Receptacle	772-024-9-001
Bracket, PCB Mount	251-559-9-001
Case, Bottom	252-044-9-001
Case, Top	253-107-9-001
Case, Side Panel Assembly, Left or Right	523-479-9-001
Front Panel	255-213-9-001
Rear Panel	262-041-9-001
Bezel Assembly, Tan, Front or Rear	539-125-0-000
Bezel, LED	380-463-9-001
Rubber Foot	381-061-9-001
Knob, Tan (4 used)	751-237-9-001
Knob, Tan (RANGE Switch)	751-238-9-001
START FREQ Dial/Knob, Tan	751-236-9-001
Pushbutton, Tan (10 used)	384-038-9-017
Handle Assembly	539-113-0-000
Hub, Detent	746-062-9-001
Spring, Handle	767-118-9-001
Washer, Flat (Retainer for Handle Spring)	725-040-3-210
Screw, #6 x 1/2" Dullite (Secures Handle Washer)	706-916-1-901
Instruction Manual	480-328-9-001

U.S.A. PARTS ORDERING INFORMATION

There is a minimum charge for each invoice. Orders will be shipped C.O.D. unless previous open account arrangements have been made or remittance accompanies order. Advance remittance must cover handling, postage or express charges. Specify model and serial number when ordering replacement parts.

ORDER REPLACEMENT PARTS FROM:

B & K-Precision, Dynascan Corporation
 Factory Service Operations
 6460 West Cortland Street
 Chicago, Illinois 60635
 Tel (312) 889-8870
 Telex: 25-3475

Also use this address for technical inquiries.



6460 West Cortland Street
 Chicago, Illinois 60635

SCHEMATIC DIAGRAM AND PARTS LIST



SWEEP/FUNCTION GENERATOR

PARTS LIST
 488-271-9-004D

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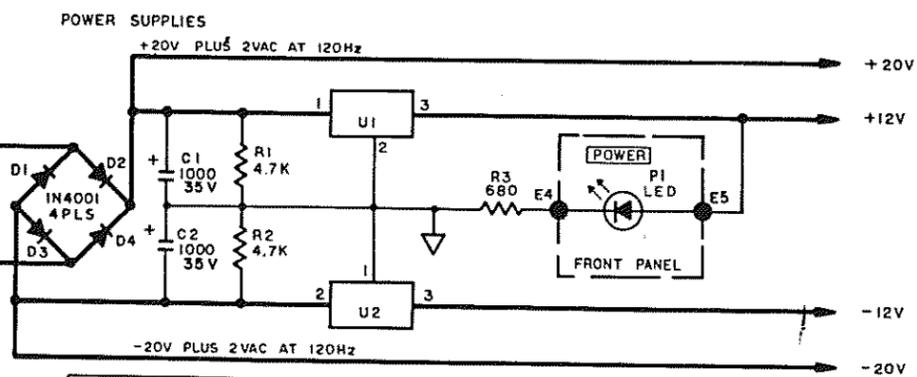
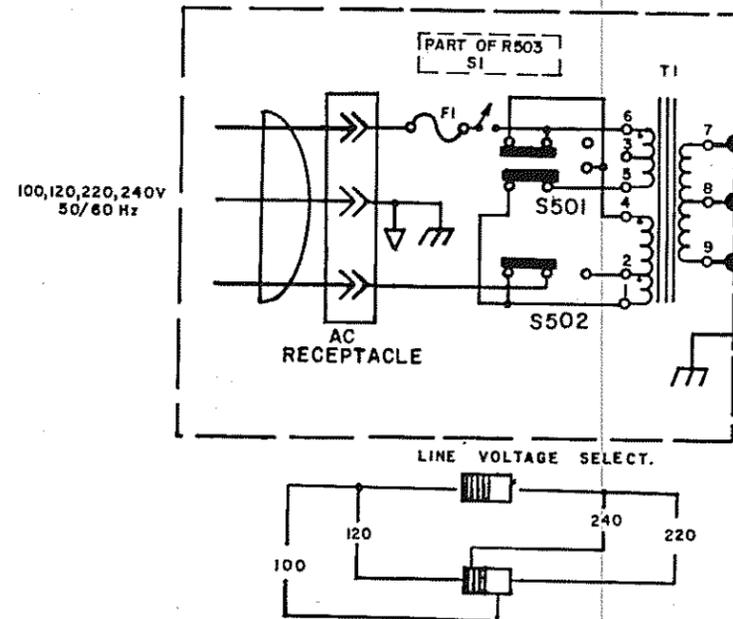
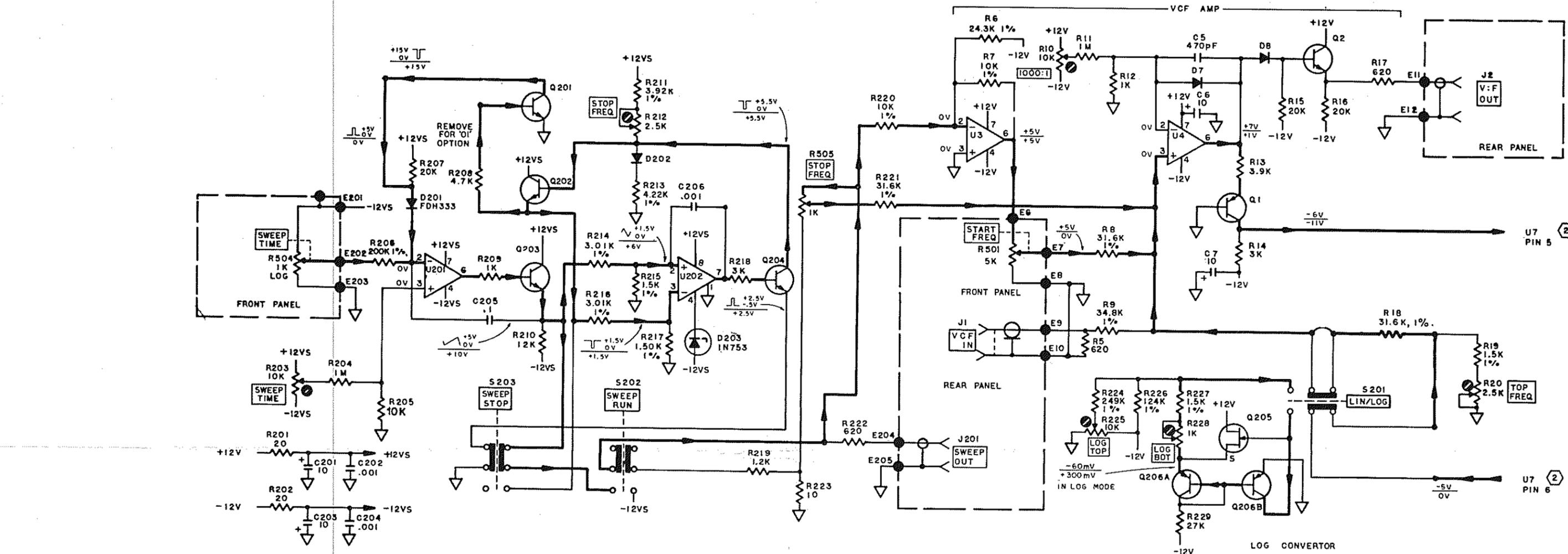
RESISTORS

Standard value resistors are not listed. These are readily available from your local parts distributor. See schematic diagram for value. Unless specified otherwise on schematic, resistors are ±5%, 1/4 W.

R6	24.3 kΩ ±1%, 1/4 W, Metal Film	015-144-2-432
R7, 50, 51, 220	10 kΩ ±1%, 1/4 W, Metal Film	015-144-1-002
R8, 18, 221	31.6 kΩ ±1%, 1/4 W, Metal Film	015-144-3-162
R9	34.8 kΩ ±1%, 1/4 W, Metal Film	015-144-3-482
R10, 35, 83, 91, 107, 128, 203, 225	10 kΩ Vertical Trim Pot	010-007-9-007
R19, 58, 215, 217, 227	1.5 kΩ ±1%, 1/4 W, Metal Film	015-144-1-501
R20, 138, 212	2.5 kΩ Vertical Trim Pot	010-007-9-005
R23, 25, 92, 101, 120, 306	1 kΩ ±1%, 1/4 W, Metal Film	015-144-1-001
R24, 44, 77, 228, 302	1 kΩ Vertical Trim Pot	010-007-9-004
R28, 29, 30, 33	2 kΩ ±1%, 1/4 W, Metal Film	015-144-2-001
R31, 76	1.91 kΩ ±1%, 1/4 W, Metal Film	015-144-1-911
R32	250 Ω Vertical Trim Pot	010-007-9-002
R41, 42, 48, 49, 143	499 Ω ±1%, 1/4 W, Metal Film	015-144-4-990
R43	9.09 kΩ ±1%, 1/4 W, Metal Film	015-144-9-091
R52	2.21 kΩ ±1%, 1/4 W, Metal Film	015-144-2-211
R53	665 Ω ±1%, 1/4 W, Metal Film	015-144-6-650
R54	15 kΩ ±1%, 1/4 W, Metal Film	015-144-1-502
R55, 56, 211	3.92 kΩ ±1%, 1/4 W, Metal Film	015-144-3-921
R57	402 Ω ±1%, 1/4 W, Metal Film	015-144-4-020
R59	619 Ω ±1%, 1/4 W, Metal Film	015-144-6-190
R60	432 Ω ±1%, 1/4 W, Metal Film	015-144-4-320
R61	909 Ω ±1%, 1/4 W, Metal Film	015-144-9-090
R62	6.81 kΩ ±1%, 1/4 W, Metal Film	015-144-6-811
R75	500 Ω Vertical Trim Pot	010-007-9-003
R78, 134	4.02 kΩ ±1%, 1/4 W, Metal Film	015-144-4-021
R79	442 Ω ±1%, 1/4 W, Metal Film	015-144-4-420

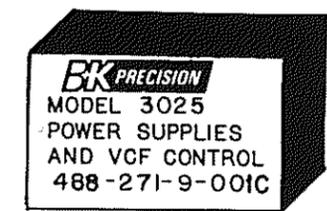
SCHEMATIC SYMBOL	DESCRIPTION	B & K-PRECISION PART NO.
R80	4.99 kΩ ±1%, 1/4 W, Metal Film	015-144-4-991
R84	88.7 Ω ±1%, 1/4 W, Metal Film.....	015-144-8-878
R85, 104	100 Ω ±1%, 1/4 W, Metal Film	015-144-1-000
R86, 103	100 Ω Vertical Trim Pot.....	010-007-9-001
R105	15 Ω ±1%, 1/4 W, Metal Film.....	015-144-1-508
R108, 109	8.45 kΩ ±1%, 1/4 W, Metal Film	015-144-8-451
R110	309 Ω ±1%, 1/4 W, Metal Film	015-144-3-090
R111, 112	9.76 kΩ ±1%, 1/4 W, Metal Film	015-144-9-761
R113	200 Ω ±1%, 1/4 W, Metal Film	015-144-2-000
R114, 115	19.6 kΩ ±1%, 1/4 W, Metal Film	015-144-1-962
R116	127 Ω ±1%, 1/4 W, Metal Film	015-144-1-270
R117	63.4 Ω ±1%, 1/4 W, Metal Film.....	015-144-6-348
R122	5.36 kΩ ±1%, 1/4 W, Metal Film	015-144-5-361
R140, 141, 142	150 Ω ±1%, 1 W, Metal Film.....	011-212-9-001
R144	54.9 Ω ±1%, 1/4 W, Metal Film.....	015-144-5-498
R206	200 kΩ ±1%, 1/4 W, Metal Film	015-144-2-003
R213	4.22 kΩ ±1%, 1/4 W, Metal Film	015-144-4-221
R214, 216, 309	3.01 kΩ ±1%, 1/4 W, Metal Film	015-144-3-011
R224	249 kΩ ±1%, 1/4 W, Metal Film	015-144-2-493
R226	124 kΩ ±1%, 1/4 W, Metal Film	015-144-1-243
R301, 307	21.5 kΩ ±1%, 1/4 W, Metal Film	015-144-2-152
R303	5.62 kΩ ±1%, 1/4 W, Metal Film	015-144-5-621
R501	5 kΩ Pot, Linear, START FREQ Control.....	008-415-9-001
R502	10 kΩ Pot with Switch, DC OFFSET Control	008-438-9-001
R503	1 kΩ Pot with Switch, AMPLITUDE Control.....	008-439-9-001
R504	1 kΩ Pot, Reverse A Taper, SWEEP TIME Control	008-441-9-001
R505	1 kΩ Pot, Linear, STOP FREQ Control	008-440-9-001
CAPACITORS		
C1, 2	1000 μF, 35 V Electrolytic.....	022-232-9-001
C5	470 pF ±5%, 500 V, Silver Mica.....	023-042-9-001
C6, 7, 26, 28, 37, 42, 45, 53, 201, 203, 303, 305	10 μF ±20%, 35 V, Low Leakage Electrolytic.....	036-005-9-018
C10, 19, 25, 27, 29, 30, 32, 36, 46, 51, 52, 202, 204, 206, 301	.001 μF ±10%, 500 V Ceramic Disc.....	020-155-9-001
C11, 44	10 pF ±5%, 500 V, Silver Mica	023-071-9-001
C15A-E	Capacitor Set (Frequency Range), Decade Matched within ±0.5%, approx. values 10 μF, 1 μF, 0.1 μF, .01 μF, 910 pF	033-057-9-001
C16, 17	39 pF ±5%, 500 V, Silver Mica	023-051-9-001
C18	8-50 pF Trimmer	028-067-9-001
C20, 50	47 pF ±5%, 500 V, Silver Mica	023-044-9-001
C21, 23, 24	2 pF ±0.5pF, 500 V, Silver Mica.....	023-070-9-001
C22	56 pF ±5%, 500 V, Silver Mica	023-040-9-001
C40	12 pF ±5%, 500 V, Silver Mica	023-072-9-001
C41	5 pF ±0.5 pF, 500 V, Silver Mica.....	023-001-9-001
C43	390 pF ±5%, 500 V, Silver Mica.....	023-026-9-001
C47	3-12 pF Trimmer	028-066-9-001
C48	2.2 pF ±0.5 pF, 500 V, NPO Ceramic Disc.....	031-013-9-001

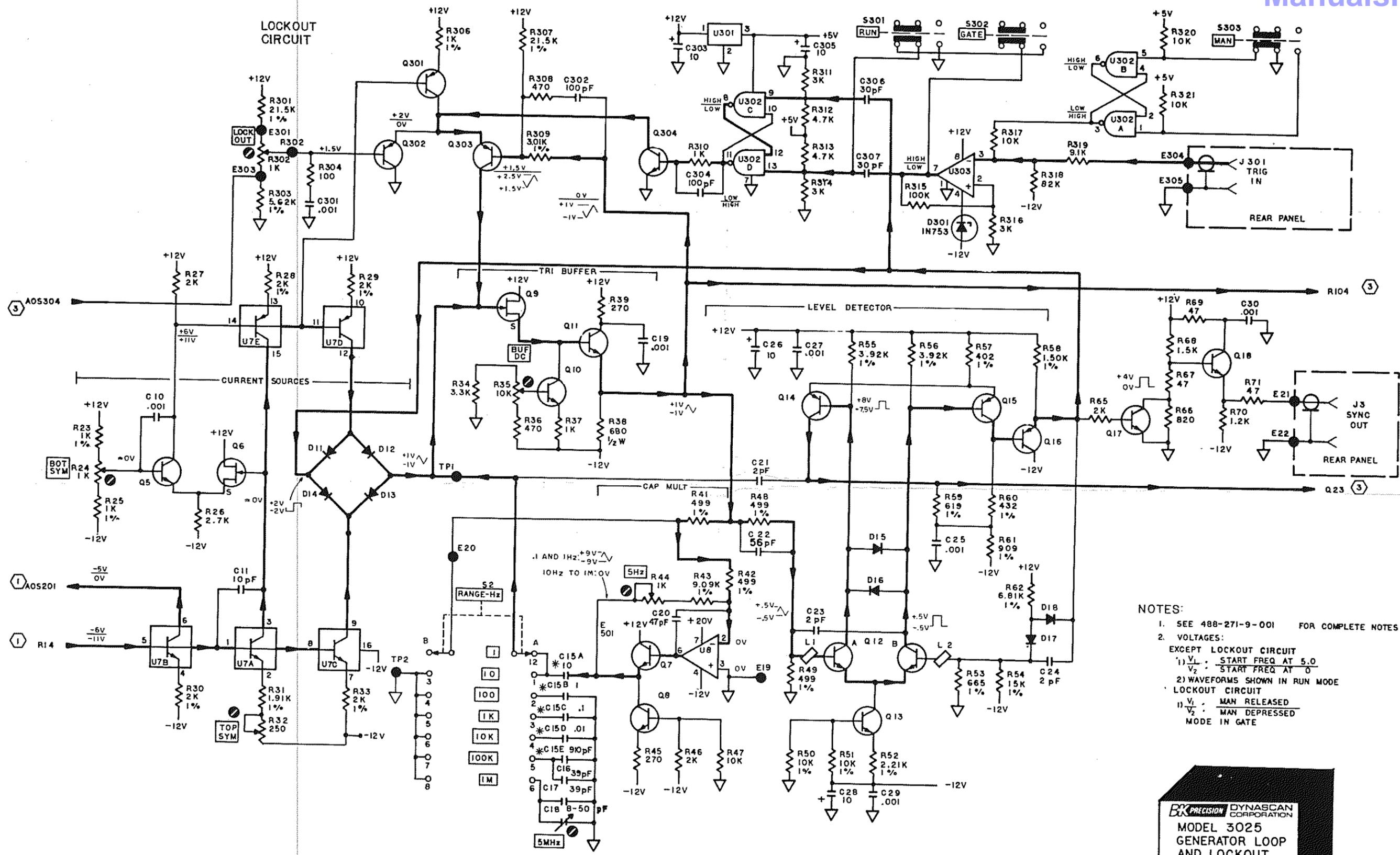
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C54	0.01 μF +80/-20%, 25 V, Ceramic Disc.....	020-104-9-001
C205	0.1 μF ±20%, 100 V, Polyester.....	025-109-9-001
C302, 304	100 pF ±5%, 500 V, Silver Mica.....	023-003-9-001
C306, 307	30 pF ±5%, 500 V, Silver Mica	023-073-9-001
DIODES AND TRANSISTORS		
D1-4	1 Amp, 600 PIV Silicon Diode.....	151-050-9-001
D7, 8, 11-18, 27-33, 202	1N4148 Silicon Diode.....	151-038-9-001
D24A, B, C, D, 25A, B, C, D, 26A, B, C, D	Silicon Diode Set, Matched Set of 4, replace as set	157-017-9-001
D201	FDH333 Diode.....	151-055-9-001
D203, 301	6.2 Volt ±5%, 400 mW Zener Diode.....	152-071-9-001
P1	LED, Red	158-049-9-001
Q1, 301	2N5087 PNP Signal Transistor	177-034-9-001
Q2, 5, 7, 8, 10, 13, 201, 202, 203	2N5210 NPN Signal Transistor.....	176-083-9-001
Q6, 9, 205	2N5485 Field Effect Transistor.....	182-067-9-001
Q11, 17, 28, 29, 33, 34, 204, 304	2N3904 NPN Signal Transistor.....	176-084-9-001
Q12A, 12B	Matched Transistor Pair (2N3904's).....	178-004-9-001
Q14, 15, 16, 23, 24, 27, 30-32, 35	2N3906 PNP Signal Transistor	177-035-9-001
Q18, 36	2N2219 NPN Power Transistor.....	172-045-9-001
Q25, 26, 302, 303	MPS3640 PNP Signal Transistor	177-014-9-001
Q37	2N2905 PNP Power Transistor.....	173-005-9-001
Q206A, 206B	Matched Transistor Pair (2N5087's).....	178-005-9-001
INTEGRATED CIRCUITS		
U1	7812-UC +12 Volt, 1.0 Amp Regulator	307-164-9-001
U2	7912-UC -12 Volt, 1.0 Amp Regulator.....	307-165-9-001
U3, 8	741C Op Amp.....	307-016-9-001
U4, 201	CA3140-AE MOS Op Amp.....	308-191-9-001
U7	CA3096-AE NPN/PNP Transistor Array.....	307-287-9-001
U202, 303	710C Differential Comparator.....	307-017-9-001
U301	LM-78L05 +5 Volt Regulator.....	307-129-9-001
U302	7400 Quad 2-Input NAND Gate	307-015-9-001
SWITCHES		
S2	Rotary Switch (RANGE)	083-279-9-001
S3-5, 201-203, 301-304	Pushbutton Switch (10 station).....	088-077-9-001
S501, 502	Slide Switch, dpdt (LINE VOLTAGE SELECT).....	084-088-9-001
MISCELLANEOUS		
L1-7	Ferrite Bead.....	870-007-9-001
T1	Power Transformer.....	065-164-9-001
	Shoulder Washer (for U2).....	347-107-9-001
	Mica Insulator (for U2).....	350-005-9-001



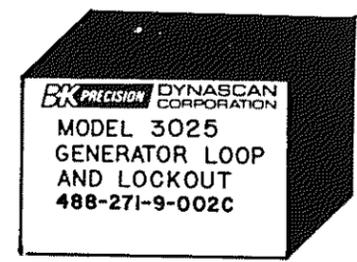
FUSE	VOLTAGE
1/4 AMP SLO-BLO	100
1/4 AMP SLO-BLO	120
1/8 AMP SLO-BLO	220
1/8 AMP SLO-BLO	240

- NOTES: UNLESS OTHERWISE SPECIFIED
- ALL RESISTORS ARE IN OHMS AND ARE 1/4 W 5%
 - ALL CAPACITORS ARE IN MICROFARADS
 - ALL DIODES ARE 1N4148
 - * DENOTES MATCHED SET
 - VOLTAGES EXCEPT SWEEP MODE
 1) V_1 : START FREQ AT 5.0
 2) V_2 : START FREQ AT 0
 NOT IN SWEEP MODE
 SWEEP MODE
 1) $\sqrt{\frac{V_1}{V_2}}$: SWEEP RUN
 2) $\frac{V_1}{V_3}$: SWEEP STOP





- NOTES:
- SEE 488-271-9-001 FOR COMPLETE NOTES
 - VOLTAGES:
 EXCEPT LOCKOUT CIRCUIT
 1) V_L : START FREQ AT 5.0
 2) V_2 : START FREQ AT 0
 LOCKOUT CIRCUIT
 1) V_1 : MAN RELEASED
 2) V_2 : MAN DEPRESSED
 MODE IN GATE



SPECIFICATIONS

Waveforms	Sine, triangle, square, haversine.	SYNC OUTPUT	Square wave, TTL level, greater than +3 V. 50 Ω output impedance.
Modes of Operation	Continuous run, sweep (linear or logarithmic), triggered (tone burst or single-cycle), external VCF.	VCF Range	0 to +5 V input for 1000:1 linear (10,000:1 log) frequency change.
Frequency Range	0.005 Hz to 5 MHz.	Gate and Trigger	Requirement: Manual or external voltage of approximately +1.4 volts for turn-on. Input: dc coupled, approximately 10 kΩ input impedance.
Frequency Accuracy (linear mode)	±5% of full scale.	V:f OUTPUT (Voltage Proportional to Frequency)	0 V to +5 V output for 1000:1 linear (10,000:1 log) frequency range.
HI OUTPUT	50 Ω output impedance. 20 V p-p open circuit. 10 V p-p into 50 Ω.	Sweep Generator Modes of Operation	Start, run, stop.
LO OUTPUT	50 Ω output impedance. 2 V p-p open circuit. 1 V p-p into 50 Ω.	Sweep Rate	Approximately 10 ms to 1 min, continuously adjustable.
DC OFFSET	Variable, switched on or off by detented control. + 10 V to - 10 V open circuit; + 5 V to - 5 V into 50 Ω.	Sweep Limits	Up to 3 decades (1000:1) linear, 4 decades (10,000:1) log. Starting and stopping frequencies set by individual controls; allows sweeping up or down in frequency.
Square Wave		SWEEP OUTPUT	Ramp waveform when sweep mode is RUN. (0 V to +5 V).
Rise and fall times	< 50 ns.	Power Requirements	100/120/220/240 VAC; 50/60 Hz; 25 Watts.
Overshoot and ringing	< 5% of max. p-p voltage (50 Ω termination).	Size (HWD)	21 x 8.9 x 28 cm (8.3 x 3.5 x 11").
Symmetry (Time)	± (1% + 10 ns), 1 Hz to 5 MHz.	Weight	2.3 kg (5 lbs).
Sine Distortion	< 0.5%, 1 Hz to 100 kHz; All harmonics > 30 dB down, 100 kHz to 5 MHz.		
Sine Frequency Response	< ±0.2 dB to 500 kHz. < ±1.0 dB to 5 MHz.		
Triangle Non-linearity	< 1% (Best straight line method), 1 Hz to 100 kHz.		

NOTE: Unless otherwise stated, specifications apply from 10% to maximum output amplitude terminated into 50 Ω. Specifications are valid for frequency settings between 0.5 and 5.0 on the START FREQ dial at 25° C ±5° C. Specifications are subject to change without notice.

CONTROLS AND INDICATORS

FRONT PANEL (see Fig. 1)

1. **Pilot Light.** Glows when unit is on.
2. **START FREQ Dial.** Selects the basic operating frequency; also sets the starting frequency for sweep operation. Dial has two scales; LIN/LOG switch (3) selects either linear (outer) scale, or logarithmic (inner) scale. Frequency is dial reading times RANGE-Hz control (5) setting.
3. **LIN/LOG Switch.** Selects linear or logarithmic characteristics for VCF circuit in all modes.
4. **TRIGGERED OUTPUT Switches.** These two switches select continuous run or triggered operation as follows:
 - a. RUN depressed, GATE released or depressed: Instrument runs continuously at the frequency selected (or sweeps, according to SWEEP (13) setting).
 - b. GATE depressed, RUN released: Gated tone burst operation; generates output for duration of trigger signal from TRIG INPUT jack (16) or MAN switch (14).
 - c. RUN and GATE both released: Single-cycle operation; instrument outputs one cycle for each trigger signal from TRIG INPUT jack (16) or MAN switch (14).
5. **RANGE-HZ Control.** Provides decade changes in frequency. Multiplication of the selected range times the START FREQ dial (2) setting gives the actual output frequency.
6. **Waveform Switches.** Select one of four output waveforms: square wave, triangle wave, sine wave, and haversine.

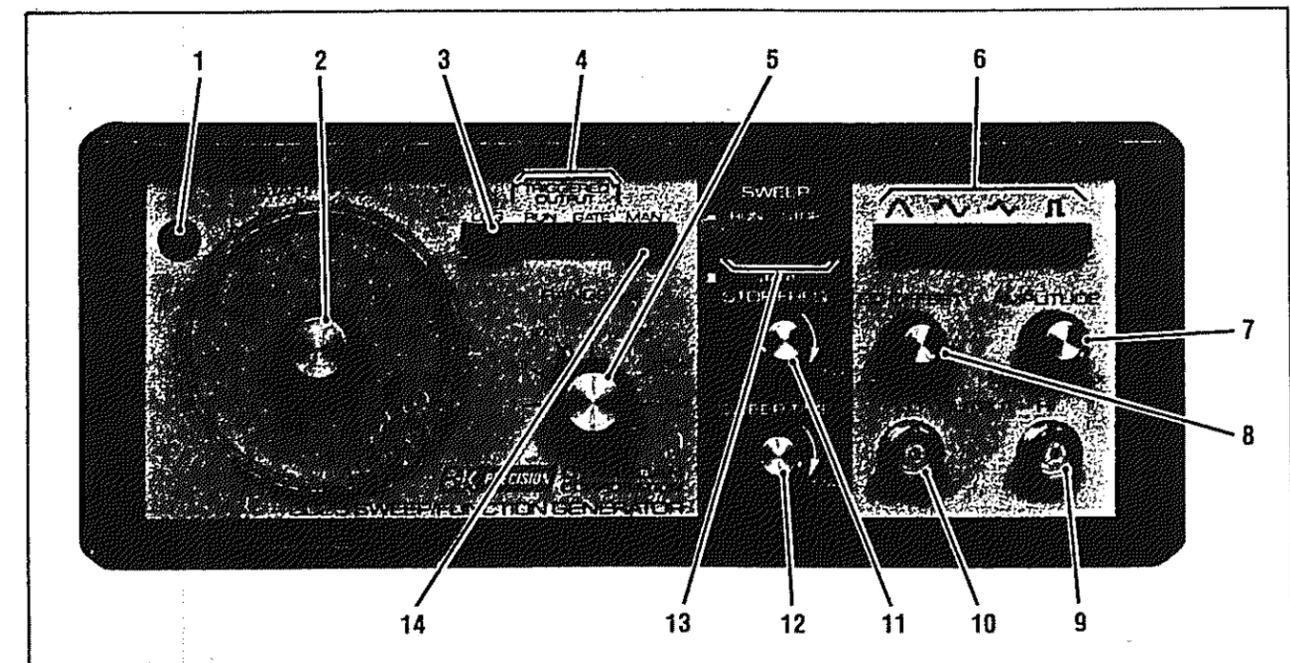


Fig. 1. Front panel controls and indicators.