OPTION

DC POWER SUPPLY

BP-70

SERVICE MANUAL

KENWOOD CORPORATION

BP-70 SPECIFICATIONS

Batteries	NiCad Batteries: 4000mAH × 10 (internal) Other external battery: (+11.5 V to +13.5 V)
Input current	2A (Approx. 2 hrs. use)
Output	+18 V, −18 V, +110 V, +150 V (each output voltage is unregulated)
Charging current	300 mA (16 hrs/charge)
Charging frequency	17 kHz
Switch	CHG-OPE (front) Internal and external (rear)
Dimensions	180 (W) × 41 (H) × 220 (D) mm
Weight	2.5 Kg
Ambient temperature and humidity	5°C to 35°C, 85% RH
Leak current	(Input current when the power is off) 200 μA max.
Other	• The input and output have a common ground. • The negative side of the input can be connected to the unit ground. • The oscilloscope cannot be used when the batteries are charging.

BP-70 CIRCUIT DESCRIPTION

Converter

The converter includes a DC-DC converter using power FETs, a switch signal generator for switching the converter, and a charge circuit for charging the battery.

DC-DC Converter

The DC-DC converter section creates the DC voltage needed for the oscilloscope circuits from the 12 V DC battery power. The primary stage is the oscillation output of the switch signal generator, and the Q1 and Q2 power FETs are switched ON alternately. Capacitors and resistors are connected in series between the drain of Q1 and gate of Q2 and the drain of Q2 and the gate of Q1. This creates a positive feedback loop with the transistors and improves switching efficiency.

Switch Generator

This section generates the oscillation waveforms for switching the power FETs in the DC-DC converter described above.

When this unit is operating from 100 VAC, Pins 1 and 2 of IC2 are at the high level, and oscillation is stopped.

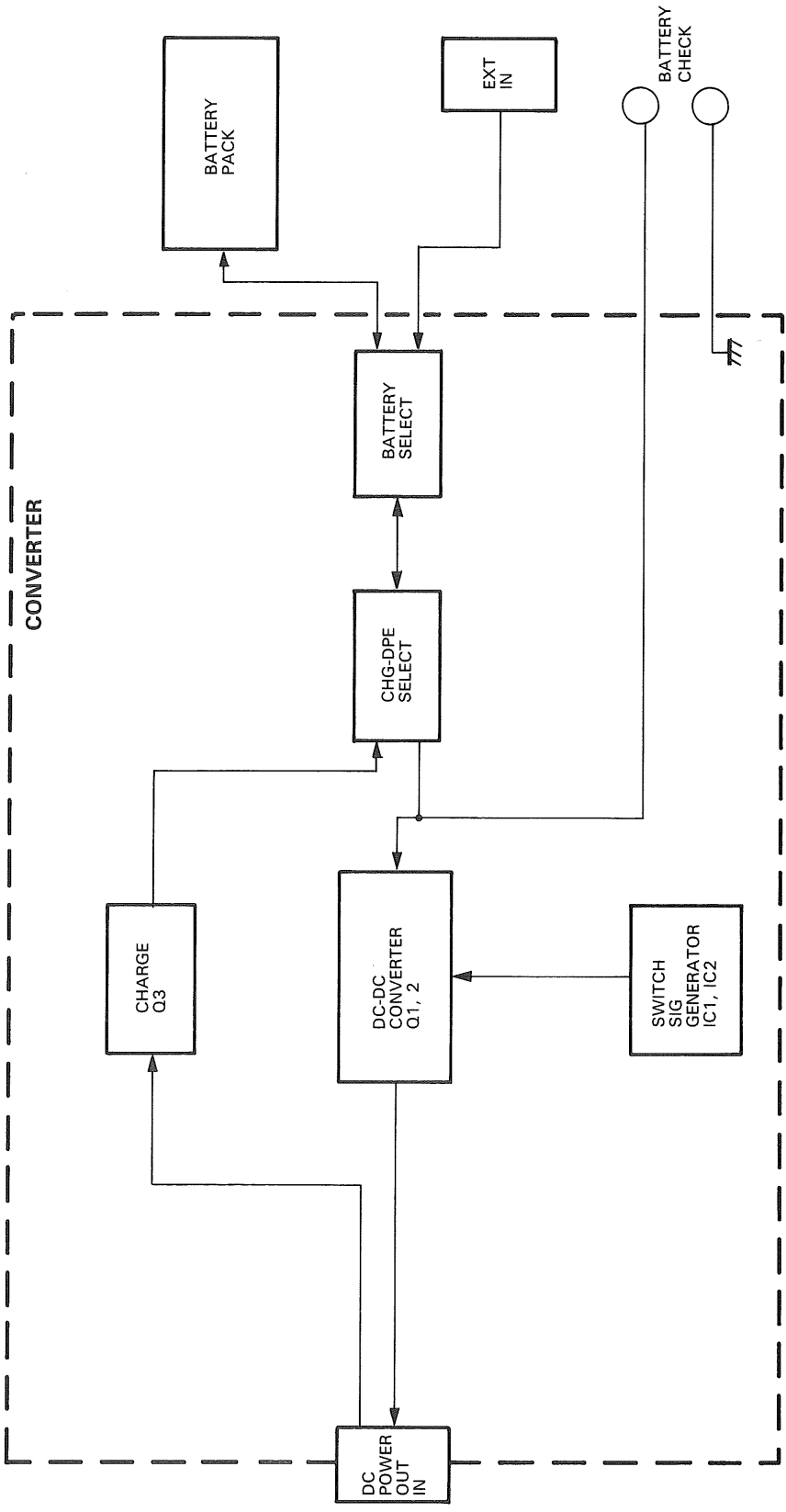
Charge Circuit

This is a circuit for charging the internal battery. It is a constant current using the forward drop voltage of the D3 LED.

Battery

The BP-70 is capable of operation from external batteries and also has a built-in 12 V × 4000 mAH battery. Operation for two hours is possible when this battery is fully charged. The battery consists of 10 ni-cad cells connected in series.

BP-70 BLOCK DIAGRAM



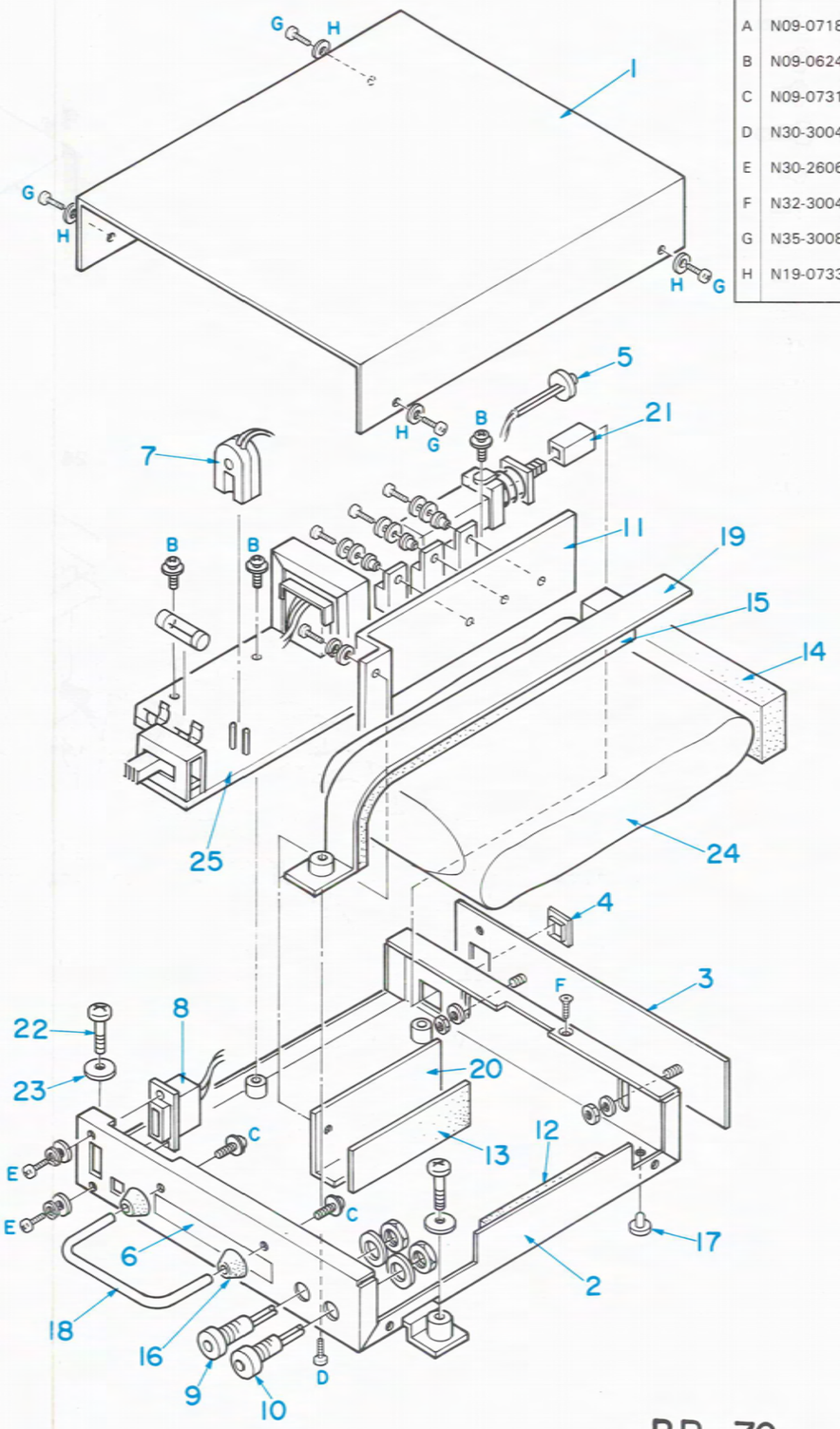
PARTS LIST

BP-70 UNIT

Y87-2440-00

REF.NO	PARTS NO	NAME & DESCRIPTION
	B42-1933-04	LABEL,MODEL NO.,FOR CARTON BOX
	B42-3618-04	LABEL,CARE MARK,FOR CARTON BOX
	B50-7684-00	INSTRUCTION MANUAL,ENG./JAP.
	E31-5616-08	WIRE ASS'Y(J4)
	E31-5617-08	WIRE ASS'Y(J3)
	F09-0517-08	DUST CAP
	H01-5903-08	CARTON BOX
	H12-0580-08	PAD,TOP AND BOTTOM
1	A10-1210-08	CASE,TOP
2	A10-1453-08	CASE,BOTTOM
3	A21-1149-08	DECORATIVE PANEL
4	B07-0719-08	ESCUTCHEON
5	B30-0967-08	LED
6	B42-3621-08	NAME PLATE,SIRIAL NO.
7	E03-0209-08	CONNECTOR
8	E03-0210-08	CONNECTOR
9	E13-0173-08	JACK,BLACK
10	E13-0174-08	JACK,RED
11	F01-0871-08	HEAT SINK
12	G13-0728-08	CUSHION
13	G13-0729-08	CUSHION
14	G13-0730-08	CUSHION
15	G13-0731-08	CUSHION
16	G13-0732-08	CUSHION,RUBBER
17	J02-0523-08	FOOT,RUBBER
18	J09-0507-08	FOOT
19	J21-4649-08	BRACKET
20	J21-4658-08	BRACKET
21	K27-0545-08	PUSH BUTTON
22	N09-0769-08	SCREW
23	N19-0734-08	WASHER,NYLON
24	W02-0461-08	BATTERY PACK
25	W02-0462-08	CONVERTER UNIT

BP-70 DISASSEMBLY



SCREWS

	Parts No.	Parts Name	Figure
A	N09-0718-05	Sems screw (M3×6)	
B	N09-0624-04	Sems screw (M3×8)	
C	N09-0731-05	Sems screw (M3×12)	
D	N30-3004-61	Pan head screw (M3×4)	
E	N30-2606-61	Pan head screw (M2.6×6)	
F	N32-3004-61	Flat head screw (M3×4)	
G	N35-3008-61	Binding head screw (M3×8)	
H	N19-0733-08	Nylon washer (ø3)	

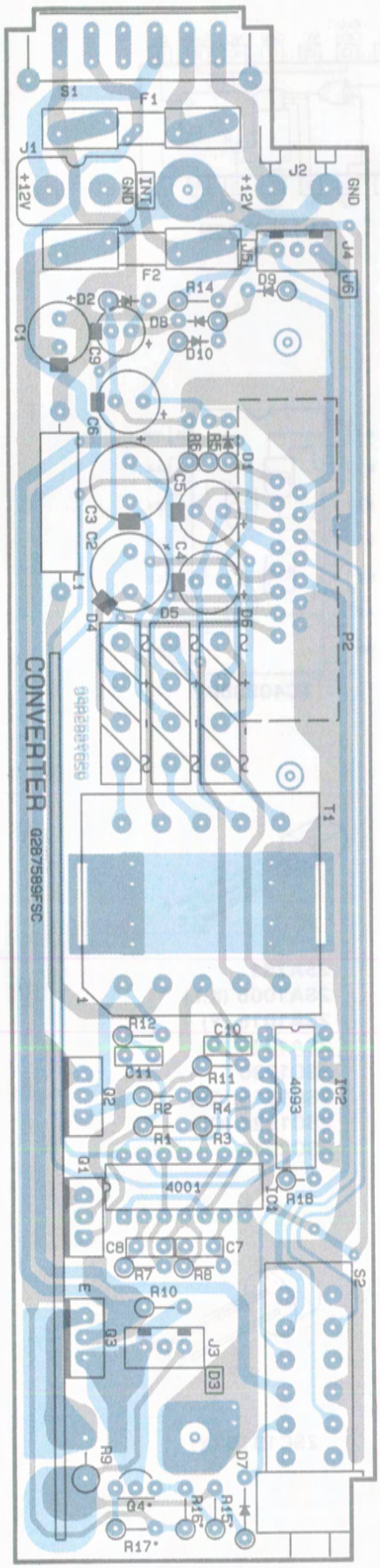
BP-70 CONVERTER UNIT

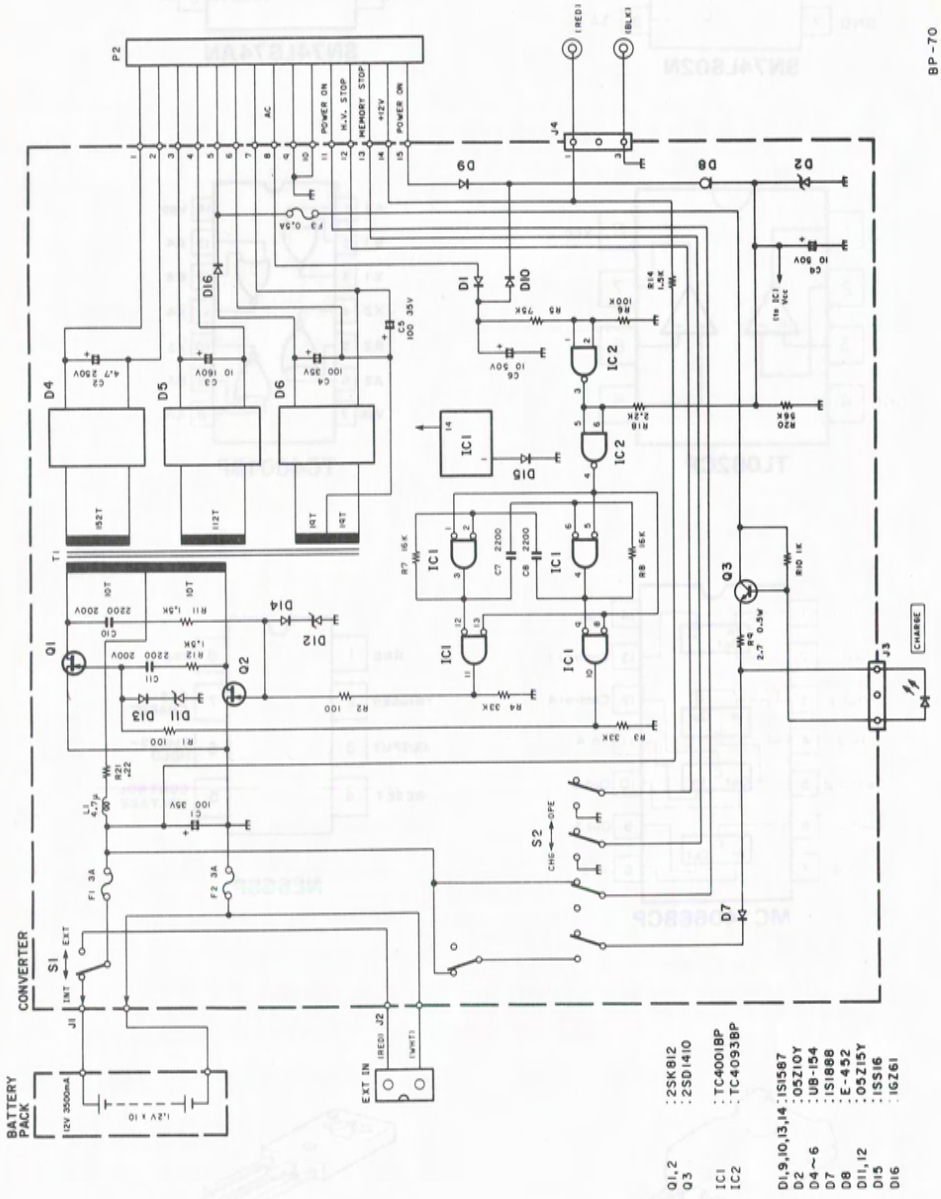
X80-1310-00

REF.NO	PARTS NO	NAME & DESCRIPTION			
	F20-0682-08	SPACER(Q1,Q2)			
	F29-0512-08	SPACER,M2.6(Q1,Q2)			
	J13-0510-08	FUSE HOLDER			
	J25-5326-08	PCB (UNMOUNTED)			
C001	C90-0992-08	CAP. ELECTRO	100	20%	35V
C002	C90-1000-08	CAP. ELECTRO	4.7	20%	250V
C003	C90-0999-08	CAP. ELECTRO	10	20%	160V
C004	C90-0992-08	CAP. ELECTRO	100	20%	35V
C005	C90-0992-08	CAP. ELECTRO	100	20%	35V
C006	C90-0995-08	CAP. ELECTRO	10	20%	50V
C007	CF92V1H222K	CAP. POLYESTER	2200P	10%	50V
C008	CF92V1H222K	CAP. POLYESTER	2200P	10%	50V
C009	C90-0995-08	CAP. ELECTRO	10	20%	50V
C010	CF92AN2D222K	CAP. POLYESTER	2200P	10%	200V
C011	CF92AN2D222K	CAP. POLYESTER	2200P	10%	200V
D001	1S1587	DIODE			
D002	05Z10Y	DIODE, ZENER	10V		
D003	NO USE				
D004	UB-154	DIODE			
D005	UB-154	DIODE			
D006	UB-154	DIODE			
D007	1S1888	DIODE			
D008	E-452	DIODE, CURRENT REGULATOR			
D009	1S1587	DIODE			
D010	1S1587	DIODE			
D011	05Z15Y	DIODE, ZENER	15V		
D012	05Z15Y	DIODE, ZENER	15V		
D013	1S1587	DIODE			
D014	1S1587	DIODE			
D015	1SS16	DIODE			
D016	1GZ61	DIODE			
F001	F06-3027-05	FUSE(5X20MM)	3A		
F002	F06-3027-05	FUSE(5X20MM)	3A		
F003	F04-5011-08	FUSE WITH WIRE	0.5A		
IC001	TC4001BP	IC, QUAD 2 INPUT NOR GATE			
IC002	TC4093BP	IC,QUAD 2 INPUT NAND SCHMITT			
J001	E23-0576-08	TERMINAL	1P		
J002	NO USE				
J003	E40-7045-08	PIN CONNECTOR	3 P		
J004	E40-7045-08	PIN CONNECTOR	3 P		
L001	L33-0812-08	CHOKE COIL	4.7UH		
P002	E08-2581-08	CONNECTOR	15P		
Q001	2SK812	FET, N-CHANNEL			
Q002	2SK812	FET, N-CHANNEL			
Q003	2SD1410	TR, SI, NPN			
R001	RD14BB2E101J	RES. CARBON	100	5%	1/4W
R002	RD14BB2E101J	RES. CARBON	100	5%	1/4W
R003	RD14BB2E333J	RES. CARBON	33K	5%	1/4W
R004	RD14BB2E333J	RES. CARBON	33K	5%	1/4W
R005	RD14BB2E753J	RES. CARBON	75K	5%	1/4W
R006	RD14BB2E104J	RES. CARBON	100K	5%	1/4W
R007	RD14BB2E163J	RES. CARBON	16K	5%	1/4W
R008	RD14BB2E163J	RES. CARBON	16K	5%	1/4W
R009	RD14DB2H2R7J	RES. CARBON	2.7	5%	1/2W
R010	RD14BB2E102J	RES. CARBON	1K	5%	1/4W
R011	RD14BB2E152J	RES. CARBON	1.5K	5%	1/4W
R012	RD14BB2E152J	RES. CARBON	1.5K	5%	1/4W
R013	NO USE				
R014	RD14BB2E152J	RES. CARBON	1.5K	5%	1/4W
R018	RD14BB2E222J	RES. CARBON	2.2K	5%	1/4W
R019	NO USE				
R020	RD14BB2E563J	RES. CARBON	56K	5%	1/4W
R021	R92-0660-05	RES. FIXED	0.22	10%	2W
S001	S31-1504-08	SLIDE SWITCH			
S002	S40-1526-08	PUSH SWITCH			
T001	L19-0425-08	CONVERTOR TRANSFORMER			

CONVERTER UNIT
(W02-0462-08)

BP-70 P.C. BOARD/SCHEMATIC DIAGRAM





Q1,2	: 2SK812	
Q3	: 2SD1410	
IC1	: TC4001BP	
IC2	: TC4093BP	
D1,9,10,13,14	: 1S1587	
D2	: 05Z10Y	
D4~6	: UB-154	
D7	: 1S1888	
D8	: E-452	
D11,12	: 05Z15Y	
D15	: 1S516	
D16	: 1G261	