

SAMSUNG

CDMA PORTABLE PCS TELEPHONE SCH-1900

SERVICE *Manual*

CDMA PORTABLE PCS TELEPHONE



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Samsung Electronics Co.,Ltd.
GH68-60620A
Printed in Korea.

1. Specification

1-1 General

Frequency Range	
Transmitter	: 1850 ° 1910 MHz
Receiver	: 1930 ° 1990 MHz
Channel Bandwidth	: 1.23 MHz
Channel Spacing	: 50 KHz
Number of Channels	: 1200
Duplex Separation	: 80 MHz
Type of Emission	: G7 W
Input/Output Impedance	: 50 ohms
Intermediate Frequency	
Transmitter	: 130.38 MHz
Receiver	: 210.38 MHz
Local Frequency	
Transmitter	: 1st (F _{TX} -130.38), 2nd (260.76 MHz)
Receiver	: 1st (F _{RX} -210.38), 2nd (420.76 MHz)
TCXO Frequency	: 19.68 MHz
Frequency Stability	: (F _{RX} - 80 MHz) °± 150 Hz
Operating Temperature	: -30 °... ° +60 °...
Supply Voltage	: +4.8 V
Current Consumption (Average)	
Standby	: 150 mA (Non-slot mode)
Talk	: 400 mA (at +10 dBm)
Size and Weight	
Including Standard Battery	: 114(H)°ø49.8(W)°ø10.5(D), 118.67 g
Including Extended Battery	: 114(H)°ø49.8(W)°ø20.5(D), 161.86 g

1-2 Transmitter

Waveform Quality	: 0.944 or more
Open Loop Power Control Range	
-25 dBm	: -60.5 dBm ° -41.5 dBm
-65 dBm	: -20.5 dBm ° -1.5 dBm
-104dBm	: +15.0 dBm ° +30.0 dBm
Minimum Tx Power Control	: -50 dBm below
Closed Loop Power Control Range	: °±24 dB
Maximum RF Output Power	: 200 mW (+23 dBm)
Occupied Bandwidth	: 1.23 MHz
Conducted Spurious Emissions @1.25MHz	: -42 dBc/30KHz

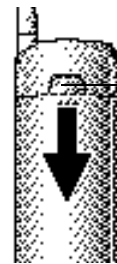
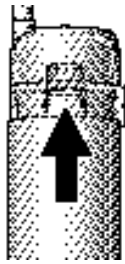
1-3 Receiver

Rx Sensitivity and Dynamic Range (Rate Set 1)	: -104 dBm, FER=0.5% or less : -25 dBm, FER=0.5% or less
Conducted Spurious Emission	
1930 ° 1990 MHz	: <-81 dBm
1850 ° 1910 MHz	: <-61 dBm
All Other Frequencies	: <-47 dBm
Single Tone Desensitization	: lower than 1%
Rx power=-101 dBm	
Tone power=-30 dBm	
Tone offset from carrier=°±1.25 MHz	
Intermodulation Spurious Response Attenuation	: lower than 1%
Rx power=-101 dBm	
Tone power 1=-43 dBm	
Tone power 2=-43 dBm	
Tone 1 offset from carrier=°±1.25 MHz	
Tone 2 offset from carrier=°±2.05 MHz	

2. Installation

2-1 Installing a Battery Pack

1. To attach the battery pack after charging, align it with the phone about 1cm (1/2") away from its place so that the two arrows on the phone are seen, the battery charge contacts pointing downwards.
2. Slide the battery pack upwards until it clicks firmly into position. The phone is now ready to be turned on.
3. To remove the battery pack, release it by pressing the button on the rear of the phone.
4. Slide the battery pack downwards about 1cm (1/2") and lift it away from the phone.



Press this button to release the battery pack

2-2 For Desk Top Use

1. Choose a proper location to install the charger for desk top use.
2. Plug the power cord of the charger into an appropriate wall socket. When the power cord is connected correctly, the lamps turn on briefly.
3. To charge the battery pack, insert the battery pack into the rear slot of the charger. The lamp marked BAT on the front panel of the charger lights up red.
4. If you do not wish to use the phone while charging the battery, insert the phone with the battery pack attached into the front slot of the charger. The lamp marked PHONE on the front panel of the charger lights up red.

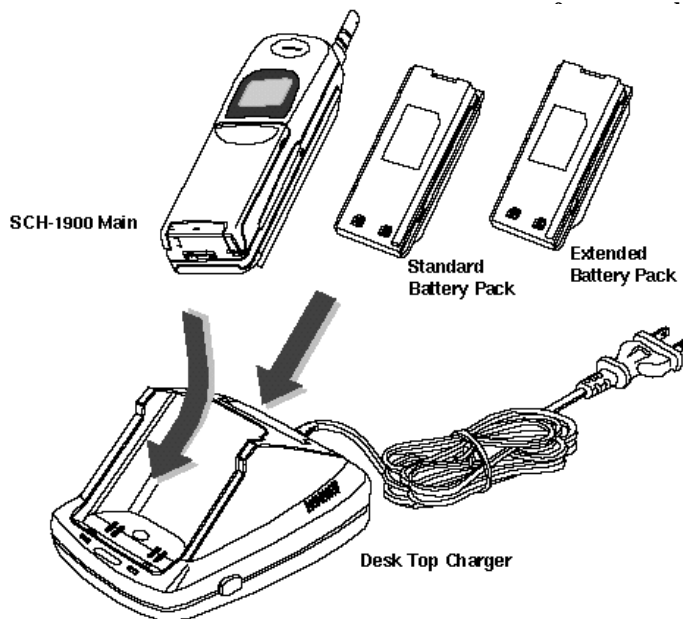


Figure 2-1 Charging The Phone and Battery

2-3 For Mobile Mount

2-3-1 Antenna

1. Choose a proper location to install the antenna.
 - ¶ The center of the roof top provides the best performance.
 - ¶ The edge of the rear trunk also provides a good performance. However, the antenna should be higher than the roof of the car.
 - ¶ In case of on-glass antenna, you should align the antenna base with the round plate to connect the cables correctly.
2. Mount the antenna vertically, connect the antenna cable.
3. Tighten the antenna nut fully.

2-3-2 Cradle

1. Choose a location where it is easy to reach and does not interfere with the driver's safe operation of the car.
2. Separate the two halves of the clamshell by removing the two large slotted screws. See the figure 2-2.
3. Drill holes and mount the lower half of the clamshell by using the screws.
4. Place the cradle onto the remaining half of the clamshell and assemble them by using the screws.
5. Reassemble the two halves of the clamshell together. Adjust the mounting angle and tighten the two slotted screws.

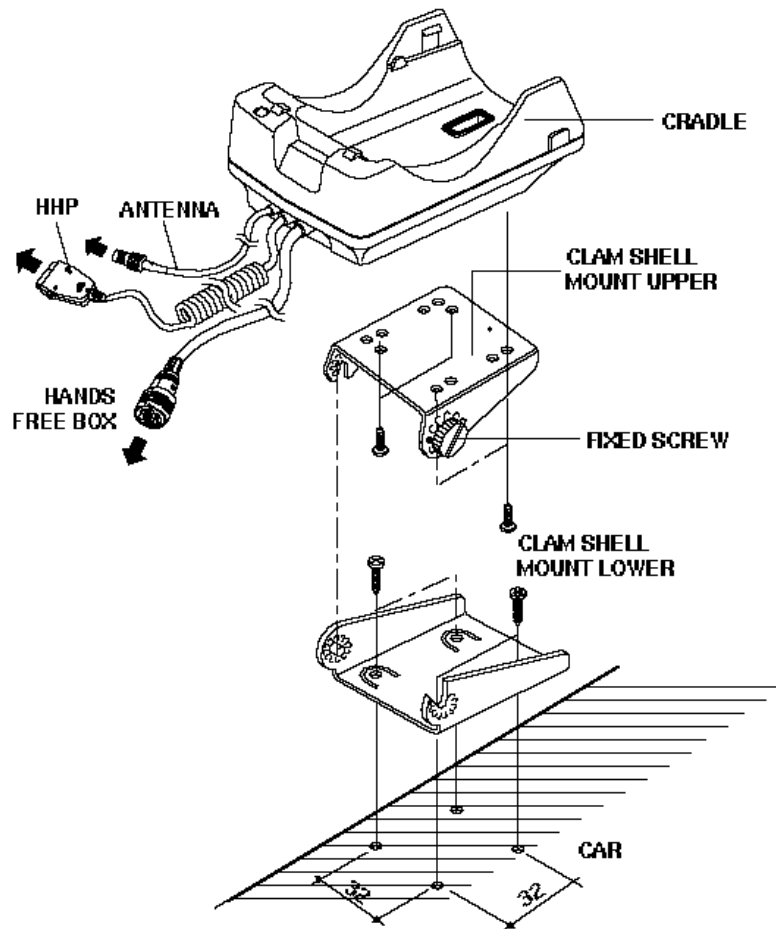


Figure 2-2 Cradle Installation

2-3-3 Hands-Free Box

1. Drill holes in a proper location for the hands-free box, attach the mounting bracket by using the screws. See the figure 2-3.
2. Install the hands-free box into the bracket.

2-3-4 Hands-Free Microphone

1. It is recommended to install the microphone where it is 30-45 cm (12-18") away from the driver. Choose the location where is least susceptible to interference caused by external noise sources, ie, adjacent windows, radio speakers, etc. Normal place is the sun visor.
2. Once the microphone has been correctly positioned, connect the microphone wire to the MIC jack on the hands-free box.

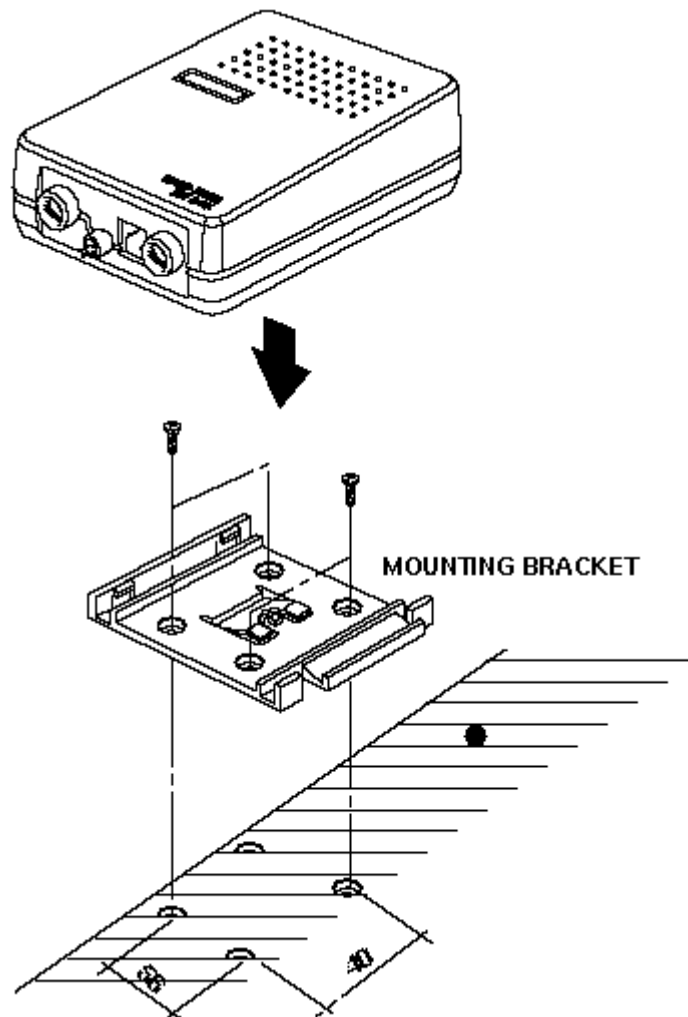


Figure 2-3 Hands-Free Box Installation

2-3-5 Cables

1. Connect the cradle and the hands-free box with the data cable. See the figure 2-4.
2. Connect the antenna cable to the **RF** jack of the cradle.
3. Connect one end of the power cable to the battery or ignition terminal. Connect the red wire to the battery (+) terminal, black wire to the vehicle chassis. Then connect the battery (-) terminal to the vehicle chassis.
4. Connect the other end of the power cable to the **PWR** jack of the hands-free box.

Notes:

- ¶ It is recommended to connect the power cable directly to the battery to avoid power noise.
- ¶ Make sure the connection between the battery terminal and the vehicle chassis is made correctly.
- ¶ Make sure the fuse having a proper capacity is used on the power cable.
- ¶ Make sure the cables do not pass over any sharp metal edge that may damage it.

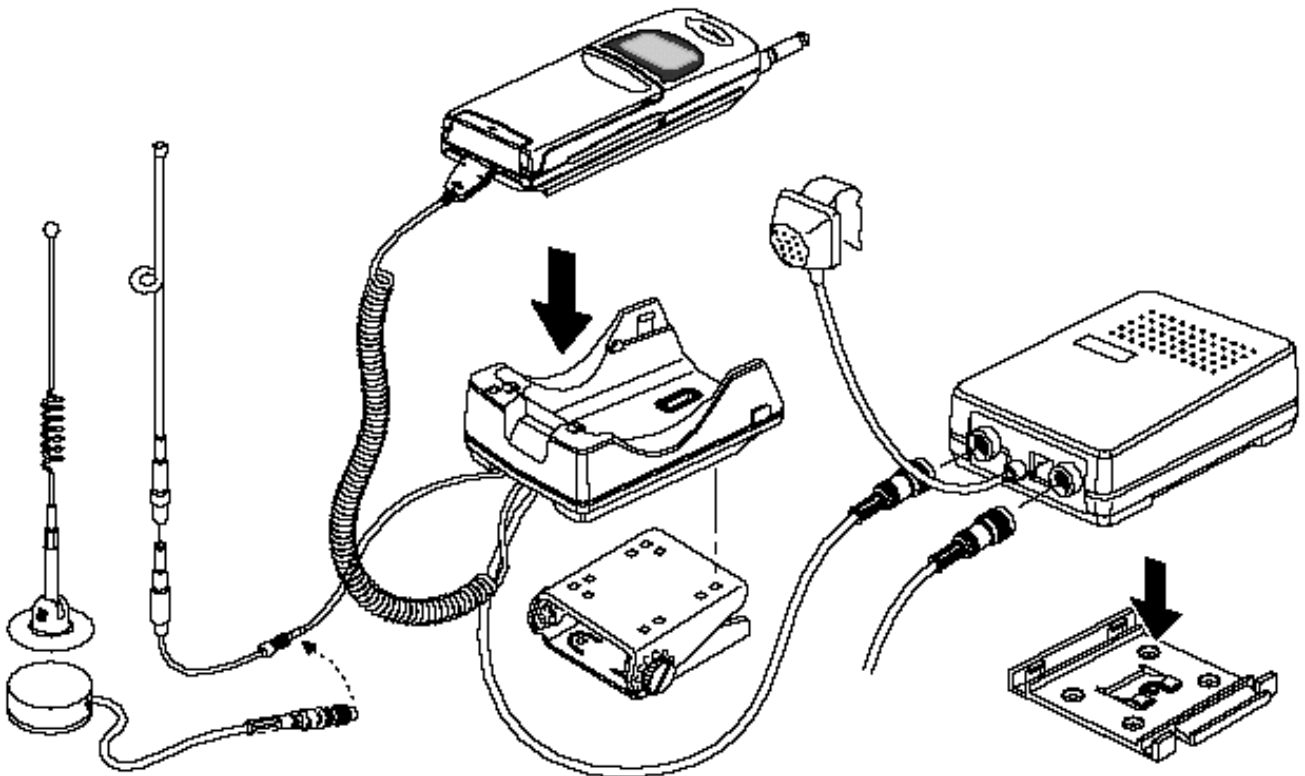


Figure 2-4 Cable Connections

3. NAM Programming

NAM features can be programmed as follows:

Notes:

- If you enter the NAM program mode, each item shows the currently stored data. Go to the next item by pressing **OK**.
- You can modify the data by entering a new data.
- If you enter a wrong digit, press **CLR** to delete the last digit. Press and hold **CLR** to delete all digits.
- To scroll items backwards or forwards, press the **VOLUME** button on the left side of the phone.

3-1 General Setup

LCD Display	Key in	Function
	MENU, 5, 0	-selects NAM programming
Enter Lock ???????	6-digit code	-Enter random 6-digit code (MSL)
SVC Menu °É°É 1:PCS Phone# 2:General	2	-choose 'GENERAL.'
ESN B0000000	Volume °,	-Electronic Serial Number of the phone is displayed
CAI version 1	Volume °,	-Common Air Interface version is displayed
VOC13K/8K SO_VOICE_13K	°Éor°É OK	-Select vocoder service option -stores it
SCM 00001010	Volume °,	-Station Class Mark displays the power class, transmission, slotted class, dual mode.
Lock Code 0000	4-digit code OK	Lock code, current status is displayed -to change, enter new code. -stores it.
Slot Mode No	°Éor°É OK	Slot mode. 'Yes' indicates the slot mode. -changes the status. -stores it.
Slot Index 2	0 - 7 OK	Slot mode index. The higher, the longer sleeping time. -to change, enter new one. -stores it.

3-2 Setting Up NAM

LCD Display	Key in	Function
SVC Menu 1:PCS Phone # 2:General	Volume	-NAM Programming Menu is displayed
SVC Menu 3:NAM	3	-choose 'Setup NAM'
IMSI_MCC 310	number OK	IMSI Mobile Country Code, current code is displayed. -to change, enter new one. -stores it.
IMSI_MNC 00	number OK	IMSI Mobile Network Code, current code is displayed. -to change, enter new one. -stores it.
CDMA ACCOLC 0	class number OK	CDMA Access Over load Class, current status is displayed. -to change, enter new one. -stores it.
CDMA HomeSID Yes	or OK	CDMA Home system ID, current status is displayed. -changes the status. -stores it.
CDMA fSID Yes	or OK	CDMA foreign SID, current status is displayed. -changes the status. -stores it.
CDMA fNID Yes	or OK	CDMA foreign NID, current status is displayed. -changes the system. -stores it.
SID 4120	number OK	first SID written in the list, current status is displayed. -to change, enter new one. -stores it.
NID 65535	number OK	first NID written in the list, current status is displayed. -to change, enter new one. -stores it.

4. Circuit Description

4-1 Logic Section

4-1-1 Power Supply

With the battery installed on the phone and by pressing the PWR key, the VBATT and ON_SW signals will be connected. This will turn on Q108(2SC4081). This in turn will be supplied to pin 6 of regulators U110 and U111, thus releasing them from the shut-down state to output regulated 3.3V. And then the pin 8 of (U110) stays High.

The VBATT applied to ON_SW turns on Q113(DTC144) and will result in the signal ON_SW_SENSE to change state from HIGH to LOW. The MSM recognizes this signal and sends out PS_HOLD(logical HIGH) to turn on Q108 even after the PWR key is released.

The power from U110 is used in the digital part of MSM and BBA. The power from U111 is used in the analog part of BBA.

4-1-2 Logic Part

The Logic part consists of internal CPU of MSM, RAM, ROM and EEPROM. The MSM receives TCXO and CHIPX8 clock signals from the BBA and controls the phone. The major components are as follows:

- ¶UCPU : INTEL 80186 core
- ¶UFROM : U112 (MBM29LV800T)-8MBIT
FLASH ROM
- ¶USRAM : U113(KM68V2000BLTI)-2MBIT
STATIC RAM
- ¶UEEPROM : U109(24LC65-1/SM)-64KBIT
SERIAL EEPROM

CPU

INTEL 80186 CMOS type 16-bit microprocessor is used and CPU controls all the circuitry. For the CPU clock, 27MHz is used.

FLASH ROM

One 8Mbit FROM is used to store the terminal's program. Using the down-loading program, the program can be changed even after the terminal is fully assembled.

SRAM

One 2Mbit SRAM is used to store the internal flag information, call processing data, and time data.

EEPROM

One 64Kbit EEPROM is used to store ESN, NAM, power level, volume level, and telephone number.

KEY-PAD

For key recognition, key matrix is setup using SCAN0-6 of STROBE signals and KEY0-2 of input ports of MSM. Six LEDs and backlight circuitry are included in the keypad for easy operation in the dark.

LCD MODULE

LCD module contains a controller which will display the information onto the LCD by 8-bit data from the MSM. It also consists a DC-DC converter to supply -3.3V for fine view angle and LCD reflector to improve the display efficiency.

4-1-3 Base Band

MOBILE SYSTEM MODEM (MSM)

The MSM equipped with the INTEL 80186 CPU core is an important component of the CDMA cellular phone. The MSM comes in a 176 pins TQFP package. The interface block diagram is shown on page4-3.

MICROPROCESSOR INTERFACE

The interface circuitry consists of reset circuit, address bus (A0-A19), data bus (AD0-AD15), and memory controls (ALE,DT-R,HWR/,LWR/,RAM_CS/,ROM_CS).

INPUT CLOCK

- °§CPU clock : 27 MHz
- °§TXCO/4 (pin34) : 4.92 MHz. This clock signal from the BBA is the reference clock for the MSM except in CDMA mode.
- °§CHIPX8 : 9.8304 MHz. The reference clock used during the CDMA mode.

BBA INTERFACE

CDMA,Data Interface

- °§TX_IQDATA0-7 (pin24-32) : TX data bus used during both CDMA.
- °§C_RX_IDATA0-3 (pins16-20) and C_RX_QDATA0-3(pins 12-15) : RX data bus used during CDMA mode.

Clock

- °§TX_CLK(pin 22), TX_CLK/(pin23) : Digital to Analog Converter(DAC) reference clock used in TX mode.
- °§CHIPX8 : ADC reference clock used in CDMA RX mode.

ADC Interface

ADC_CLK (pin3), ADC_ENABLE (pin1) and ADC_DATA (pin2) are required to control the internal ADC in the BBA.

Data Port Interface

Includes the UART. Also, supports Diagnostic Monitor (DM) and HP equipment Interface.

CODEC Interface

The MSM outputs 2.048MHz PCM_CLK (pin19) and 8KHz CODEC_SYNC (pin16,20) to the CODEC (U102). The voice PCM data from the MSM (U101)PCM_DIN (pin135) is compressed into 13KHz by PureVoice algorithm in the CDMA mode.

RF Interface

TX : TX_AGC_ADJ (pin35) port is used to control the TX power level and PA_ON (pin44) signal is used to control the power amplifier.

RX : AGC_REF (pin36) port is used to control the RX gain and TRK_LO_ADJ (pin45) is used to compensate the TCXO clock.

General Purpose I/O Register Pins

Input/output ports to control external devices.

Power Down Control

When the IDLE/signal turns LOW, only the TX sections will be disabled.If both the IDLE/ and SLEEP/ are changed to LOW, all the pins except for the TXCO are disabled.

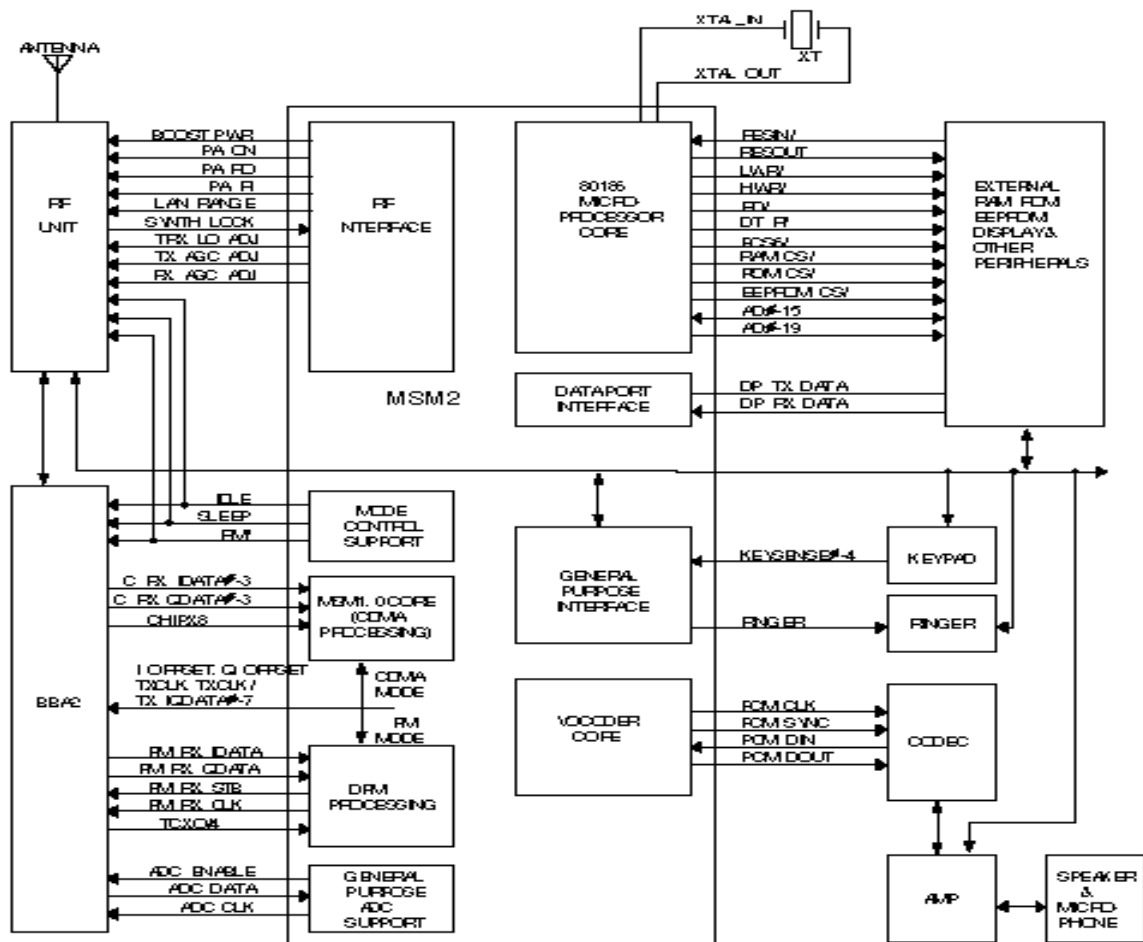


Figure 4-1 Baseband Block Diagram

4-1-4 Audio Section

TX AUDIO PATH

The voice signal output from microphone is filtered and amplified by the internal OP-AMP and is converted to PCM data by the CODEC(U102). This signal is then applied to the MSM(U101)'s internal vocoder.

RX AUDIO PATH

The PCM data from the MSM are converted to audio signal by DAC of CODEC(U102), is then amplified by the speaker amplifier(U105) to be sent to the speaker unit.

VOLUME ADJUST

Volume can be adjusted up to 8 steps for the user to obtain a proper loudness of received signal.

4-1-5 Buzzer Driving Circuitry

Buzzer generates alert tone. When the buzzer receives the timer signal from the MSM, it generates alert tone. The buzzer level is adjusted by the alert signal's period generated from the MSM timer.

4-1-6 Key Tone Generator

Ring signal (pin49) from MSM(U101) is passed through LPF consisting of R180, C119, R124, and C120, amplified at the speaker amp(U105) and come out to speaker.

4-2 Receiver Section

LOW NOISE AMPLIFIER (LNA)

The low noise amplifier featuring 1.6dB Noise Figure and 19dB gain amplifies a weak signal received from the base station to obtain the optimum signal level.

DOWN CONVERTER (MIXER)

First local signal is applied to this down converter. The down converter transfers the signal amplified at the LNA into 210.38 MHz IF signal. 210.38MHz IF signal is made by subtracting 1960°±30MHz RF signal from 1749.62°±30MHz first local signal. The LNA is Q303 and down converter is U302.

IF AMP

The IF amp (Q310) amplifies the output signal of the down converter (U302).

RF IF AUTOMATIC GAIN CONTROLLER (AGC) AMP

210.38 MHz IF signal is applied to IF AGC amp, the AGC output level is applied to BBA (Base Band Asic). The AGC amp (U303) keeps the signal at a constant level by controlling the gain. Dynamic range is 90dB, up gain +45dB, and down gain -45dB.

RF BAND PASS FILTER (BPF)

The RF BPF(F302) accepts only a specific frequency (1960°±30MHz) from the signal received from the mobile station. The bandwidth is 60MHz.

IF SAW BAND PASS FILTER FOR CDMA

IF SAW BPF (F303) is used for CDMA system having 1.23 MHz wide band and °±630kHz band width. The filter also eliminates the image product generated at the mixer.

BUFFER

Buffer (Q311) amplifies the signal from the VCO (U305) to be applied to the local input of the down converter (U302) when a phase is locked between U304 and U305.

The VCO (U305) generates the signal having 1750MHz center frequency and °±30MHz deviation with the voltage control. PLL IC(U304) controls this signal.

PHASE LOCKED LOOP (PLL)

Input reference frequency is generated at VCTCXO (U306) and the local signal is generated at VCO. PLL compares the two signals and allows the VCO controlled by voltage to generate the desired signal with pre-programmed counter.

VOLTAGE CONTROLLED TEMPERATURE COMPENSATED CRYSTAL OSCILLATOR

It provides 19.68MHz reference frequency to PLL (U304) and BBA (U401). A correct frequency tuning is made by the voltage control.

DUPLEXER

Duplexer (F301) controls to transmit through the antenna only the signals within acceptable Tx frequency range (1880°±30MHz) and to receive through the antenna only the signals within acceptable Rx frequency range (1960°±30MHz). It also matches LNA(Q303) input in receiving part and PA output in transmitter part with the antenna.

4-3 Transmitter Section

POWER AMP MMIC

Power Amp MMIC (U407) amplifies signal to be sent out to the base station through the antenna.

DRIVER AMP

The driver amp (Q413) allows the input signal to the power amp MMIC(U407) to be within a specified level.

UP CONVERTER (MIXER)

The up-converter (U405) receives the first local signal to generate $1880 \pm 30\text{MHz}$ from the signal controlled by TX AGC amp (U404). $1880 \pm 30\text{MHz}$ signal comes out of the mixer output by adding 130.38MHz IF signal to $1749.62 \pm 30\text{MHz}$ first local signal. The driver amp's reference number is Q413 and up converter's reference number is U405.

IF AUTOMATIC GAIN CONTROLLER AMP

The signal output from BBA (Base Band ASIC) should be a constant level. The TX IF AGC amp (U404) controls power to keep the signal at a desired level. Dynamic range is 85 dB, up gain +40dB, and down gain -45dB.

POWER SUPPLY REGULATOR

The power supply regulator (U414) generates the regulated power.

ANTENNA

ANT1 allows signals to send and to receive to from the base station.

RF BAND PASS FILTER (BPF)

The RF BPFS (F402, F403) accept only a specific frequency ($1880 \pm 30\text{MHz}$) to send it out to power amp MMIC. The bandwidth is 60MHz.

POWER SUPPLY SWITCHING

Power supply switching (Q412) turns on TX POWER when the phone is in traffic mode and supplies power to the circuits.

ISOLATOR

Isolator (I401) is used to reduce a reflected signal to protect the power amp MMIC from being damaged.

POWER SUPPLY REGULATOR

The power supply regulator (U413,U414) supplies a regulated power to each part of transmitter. U413 supplies 4.8V to Tx driver (Q413) and Power Amp MMIC (U407). U414 supplies 4.2V to the others.

4-4 Hands-Free Kit

Hands-free board is largely composed of car adapter circuit and Hands-free circuit.

4-4-1 Car Adapter Circuit

POWER SUPPLY

Input power switching circuit : This circuit includes Short protection circuit, and Power switching control circuit. It supplies power for HHP and hands-free kit.

+13.5V switching circuit (Q801, 802) : This circuit switches power for power amplifier using MPU mute signal.

HHP power circuit : This circuit is Switching regulator. Input voltage is +13.6v, output voltage is +5.8v.

Vcc regulator (U704) : This circuit regulates Vcc (+5V).

CHARGER CIRCUIT

This circuit charges battery pack by detecting the temperature of battery, the slope of temperature, the slope of the voltage of battery, and charging time, etc.

During charging, the charger LED turn on red. When charging is completed, the charger LED turns on green.

Battery Type	Capacity	Charge Current	Charge Voltage
Standard	850mAH	300mA	6.2V
Extended	1500mAH	600mA	6.7V

Voltage detection circuit : Charging circuit is designed to stop charging when the voltage of battery is dropped.

The voltage of battery is entered to A/D converter located in U703 #2.

Temperature detection circuit : The temperature of battery is measured by missing NTC thermistor. NTC themistor has a characteristics of Log-scale. It obtains a linear characteristics by the parallel connection of resistors.

4-4-2 Hands-free Circuit

POWER SUPPLY (U704,U808)

+5V is regulated by U704 for hands-free circuit, and -5V is regulated by U808.

TX PATH

The audio signal from external mic(JP705) flows into U802 pin #11. U802 includes Amplifier and Control circuit for hands-free operatin. U801A amplifies input signal. Output signal is transmitted to HHP.

RX PATH

Input audio signal cancels noise by difference amplifier (U801c). U802 performs hands-free action. The RX audio signal is input (U805). The speaker drive amp (U804) amplifies the Rx audio signal and the output of U804 goes out of speaker.

4-5 Desk-Top Rapid Charger

4-5-1 SMPS

1ST SWITCHING CIRCUIT

The AC current from AC plug transfers to a high-voltage DC through BD1, C2, and C3. TNR1 is AC surge protector, and F1 is fuse to protect circuit from overcurrent. The line filter composed of LF1 and C1 is used to protect from line noise and switching noise.

The transferred DC voltage is switched by T1. 2nd switching voltage is flattened into AC through D20 and C22, and filtered through L20 and C30.

The voltage is regulated through shunt regulator U5, R28, R29.

2ND SWITCHING

The regulated voltage through 1st switching circuit performs 2nd switching. Step-down regulator is composed of Q20, U2, D22, L21, and C25. Q20 performs high-speed switching according to the output signal from U2. L21 stores energy when the switching transistor turns on. D22 is a fly-wheel diode and transfers the stored energy when Q20 turns off.

Voltage mode PWM IC U2 controls duty cycle between the switching on and off of Q20. C30 and R34 are parameter to determine the switching frequency of U2.

4-5-2 Constant Current Circuit

U2 (TL494) has two error-amps. VREF (+5V) is supplied to INV terminal (pin 15) of amp 1 and N.INV terminal (pin 16) is connected to ground. It causes the amp 1 output to be zero. In amp 2, the reference voltage 2.0V is supplied to INV terminal (pin 15) through R37 and R38, and the voltage obtained in proportion to constant current is supplied N.INV terminal (pin 16). The constant current circuit also includes the shunt resistor R40, and Q21 and U7.

FAST CHARGING (MASTER MODE)

The fast charging formula is shown below.

$$I_{CHG} = \frac{R39}{R40 \times (R43 + RR)} \times V_{REF} \text{ (mA)}$$

<RR=330Ω, VREF=2.0 V>

For standard battery, RR is set with 680 ohm, and for slim battery, 1 kohm is used.

SLOW (SLAVE MODE) AND TRICKLE CHARGING

If batteries are installed both on front and rear port of the desktop charger, the one installed in advance performs fast charging while the other installed later performs slow charging. In slave mode, Q23 turns off. In trickle charging mode, Q24 turns off. The slow charging formula is shown below.

$$I_{CHG} = \frac{R39}{R40 \times (R42)} \times V_{REF} \text{ (mA)}$$

<VREF=2.0 V>

4-5-3 Master and Slave Mode

Status \ Signal	MPU(11) CUR_CTRL	MPU(4) CHG_A	MPU(3) CHG_B	MPU(13) FRNT_GRN	MPU(9) REAR_GRN
Fastcharging on front port	HIGH	LOW	HIGH	LOW	LOW
Fastcharging on rear port	LOW	HIGH	LOW	LOW	LOW
Front port master charging Rear port slave charging	HIGH	LOW	LOW	LOW	HIGH
Rear port master charging Front port slave charging	LOW	LOW	LOW	HIGH	LOW
Fast charging on front port Trickle charging on rear port	HIGH	LOW	LOW	LOW	HIGH
Fast charging on rear port Trickle charging on front port	LOW	LOW	LOW	HIGH	LOW
Trickle charging on both front and rear ports	HIGH	LOW	LOW	HIGH	HIGH

4-5-4 Watch Dog and Reset Circuit

MPU U1 Reset pin is active in low state. U4 is used as A/D reference voltage for MPU and whole charging system, so the circuitry composed of Q30-Q32 and D30 detects the voltage. In normal state, Q31 turns on so U4 pin 3 becomes low. It causes MPU Reset to be high. If an excessive impulsive voltage is supplied to U4, Q30 turns on, and U4 pin 3 becomes high. It causes MPU to be reset.

4-5-5 Timer

Timer is used to protect the battery from being overcharged. The timer is set at initial routine. If fast charge is not completed until maximum time value, fast charge is stopped by the timer and it moves to automatic trickle charge routing. This is the final step to protect battery from excessive charging and damage. There are four timers available, and the default timer is 140 minutes.

Time (minute)	Time-1 (RX1)	Time-2 (RX2)
140	VCC	VCC
210	GND	VCC
280	VCC	GND
350	GND	GND

4-5-6 Temperature Detection

The battery temperature and ambient temperature can seriously damage Ni-MH battery, so the temperature is constantly detected by MPU. The ambient temperature is detected by MPU pin 19 through R54, TH1, and R56. The battery temperature is detected by R45, R46, and NTC, and measured as A/D value by MPU pin 20.

4-5-7 Charging Voltage Detection

The charging voltage of the battery is detected by R47 and R48, and measured as A/D value by MPU pin 18. The parameters, $-βEV$, $0 βEV$, and V_{max} , used for checking charge level are also measured by MPU.

4-5-8 Discharging Circuit

Discharging is available on the rear port only. When MPU pin 14 acknowledges that the discharging button is pressed, MPU pin 2 starts discharging. Discharging is initiated immediately when the button is pressed for over than 0.7 seconds within 30 seconds after battery installed. If the voltage reaches 1 V/cell by discharge, discharging stops, then fast charging starts automatically.

4-6 Cigarette Lighter Adapter

4-6-1 Functional Specification

SUMMARY

This standard describes on the specifications of CLA(Cigarette Lighter Adaptor) for the SCH-1000 of SAMSUNG.

CLA AS ADAPTOR AND CHARGER

Adaptor

directly supplies power in order to operate cellular phone independent of the battery pack.

Charger

for the NiMH battery pack

ELECTRICAL SPECIFICATION

Input Voltage : 11V to 16.5V DC
(normal voltage : 13.5V DC)

Output Current

- HHP POWER : supplies 100mA if cellular phone mode is in stand_by state and 300mA to 600mA in carrier_on state.
- Battery Charge Current : 390mA +/- 10%
(carrier_off) 10βA°æ10βA°(carrier_on, full_charge)

Output Voltage (when 2K·y is loaded to the battery charge terminal)

- Battery Charge Terminal : 5.8°æ0.5V
- HHP POWER Terminal : 5.8V(+/- 0.3V)

Ripple & Noise : 50mVp-p

Normal Fuse Capacity : 250V, 2A

Charge Time : 3Hrs. at 850mAh6Hrs. at 1500mAh

ENVIRONMENTAL SPECIFICATION

Temperature

- Operating Temperature : 0° ... to 50° ...
- Storage Temperature : -20° ... to 85° ...

Humidity

- Operating Humidity : 5% to 90%
- Storage Humidity : 5% to 95%

FUNCTIONS OF CLA

Protection Circuit

Protection Circuit is the circuit against the electrical stress which is occurred at unexpected conditions of the source power of CLA unit such as reverse voltage or over-current.

Detection of cellular phone

If cellular phone is connected to CLA, the CLA lamp is on to display whether charge will be done normally or not.

Detect Carrier-On

In the case of Carrier-On, CLA detects the resistance of the Cellular Phone and reduces the charge current.

Detect Full-Charge

If the temperature of the battery pack is higher than the temperature outside of the cellular phone, CLA detects the battery fully charged and the state will be converted to the Trickle Charge.

CLA CURL CABLE CONNECTION



PIN NO(CLC)	Description	PIN NO(HHP)
#1	HHP Power	12 or 13
#2	BATT	16
#3	Thermistor	15
#4	C/F	3
#5	GND	2 or 4 or 6

4-6-2 Schematic Description

DC-DC CONTROLLER

KA7500B(U1) is DC-DC Controller. It reads the voltage difference between E1I+ Port and E1I- Port and controls time to turn on Q1. E2I+ and E2I- turn on Q1 in the same way. U1 also supplies +5V of Reference Voltage(Vref).

STATIC CURRENT

E1I- Port of U1 detects about 1.25V until Full-Charge and controls the TURN ON time of Q1 in order to detect 1.25V at E1I+ Port. To make the E1I+ Port detect 1.25V continuously, 0.19V of voltage reduction will be generated on R4. At the equation of $V=I \cdot R$, the current of R4 is around 390mA and it will be the charge current.

BATTERY CHARGE CURRENT CUTTING BY RELATIVE TEMPERATURE

Although every battery sample applied to the SCH-1000 has almost the same battery temperature at Full-Charge, it varies according to the relative temperature. So the battery temperature at Full-Charge may be different according to the temperature around the cellular phone.

If Full-Charge occurs at 25°..., the voltage of U3C to which the battery thermistor is connected is around 2.11V and the voltage of the parallel resistance of Th1 and R18 is about 2.11V. PIN 8 of U3C will be HIGH and turn on Q3 if the temperature is up. This generates the voltage detected at E1I- of U1 around 0.1V and the charge current reduces to 40mA. If Full-Charge occurs at high temperature and low temperature, the battery temperature varies and the voltage decline of Th1 and R18 relatively varies. So the battery Full-Charge condition will be fulfilled.

PREVENT CHARGE CIRCUIT IN THE CASE OF MOBILE PHONE CARRIER-ON

In the case of Mobile Phone carrier-on, the voltage loaded on PIN-13 of U3D is lower than that of PIN-12. So PIN-14 outputs HIGH and Q3 is TURN ON again. It results to the Prevent Charge.

LED-DRIVING CIRCUIT

When battery is inserted to CLC, the voltage loaded to PIN-2 of U3A is lower than that of PIN-3 and PIN-1 outputs HIGH. This TURN ON Q7 and drives LED.

4-7 Travel Charger

4-7-1 Input Filter and Regulator

The AC input converts to a high-voltage DC through overcurrent protector F1 and F2, surge protector VA1, noise eliminator CO1 and LF1, and regulator D1 and C3.

4-7-2 Switching Controller and Transformer

DC voltage is biased to the gate of Q1 through R3-R7, resulting Q1 to be on. When the current is supplied to the primary winding of T1, the gate voltage of Q1 is increased.

The voltage detected by R2 is biased to the base of Q2 through R10 and C7. It turns Q2 on. The gate voltage of Q1 is reduced so that Q1 turns off. The flyback current transfers to the secondary winding.

4-7-3 Feedback

The transferred current is rectified and flattened by D20, C21 and C22. If there is no battery installed or Q2 turns off, the current is biased to U21 through R26 and R27, then applied to OP1 according to the value set through R27-R29. It controls the bias voltage of Q2 base. It causes the output voltage to be 8.0V.

4-7-4 Battery Charging

Without battery installed, Q24 turns on. It turns LED off. The output status of U23 and U24 are as follows:

	OUT-A	OUT-B	Q21	Q20
U23	L	L		
U24	L	L	OFF	OFF

With battery installed, and when the output voltage of U23A pin 3 is smaller than pin 2, the output status of U23 and U24 are as follows. Q24 turns off, the LED is lit in red.

	OUT-A	OUT-B	Q21	Q20
U23	L	L		
U24	H	H	OFF	OFF

When the battery voltage of pin 3 of U23A is greater than pin 2, Q21 turns off, the output of U23A becomes low, the output status of U23 and U24 are as follows:

	OUT-A	OUT-A	Q21	Q20
U23	H	H		
U24	H	H	ON	ON

When Q20 and Q21 turn on, the battery is charged.

The output voltage detected by R21 is increased until the output voltages of U22A pin 6 and pin 5 are the same level. When the output voltage of pin 5 becomes greater than that of pin 6, U22 becomes high, resulting U21 reference voltage to be high. When the OP1 current increases, Q2 turns on, Q1 turns off, and the output voltage is reduced.

The battery voltage is detected by U23B pin 5. U23B compares the voltage with reference voltage in pin 6, and remains low status until the voltage reaches the reference voltage. It causes U24A to be remained high.

When the battery is being charged, U23B becomes high and the output voltage of U24A pin 2 returns to the reference.

When the battery is fully charged, the battery temperature is increased. After detecting the temperature, if the U24A pin 2 is greater than pin 3, the output status of U23 and U24 are as follows:

	OUT-A	OUT-B	Q21	Q20
U23	L	H		
U24	L	H	OFF	OFF

When charging is completed, 20mA trickle current flows through R24, R25, and D21. Q24 turns on, and red LD1 turns off. Latch circuit operates so that U24A remains in low and trickle current is supplied to the battery. The latch is released when AC power turns off or the battery is removed from the main body.

5. Test Procedure

5-1 List of Equipment

DC Power Supply

Test Jig

Test Cable

CDMA Mobile Station Test Set

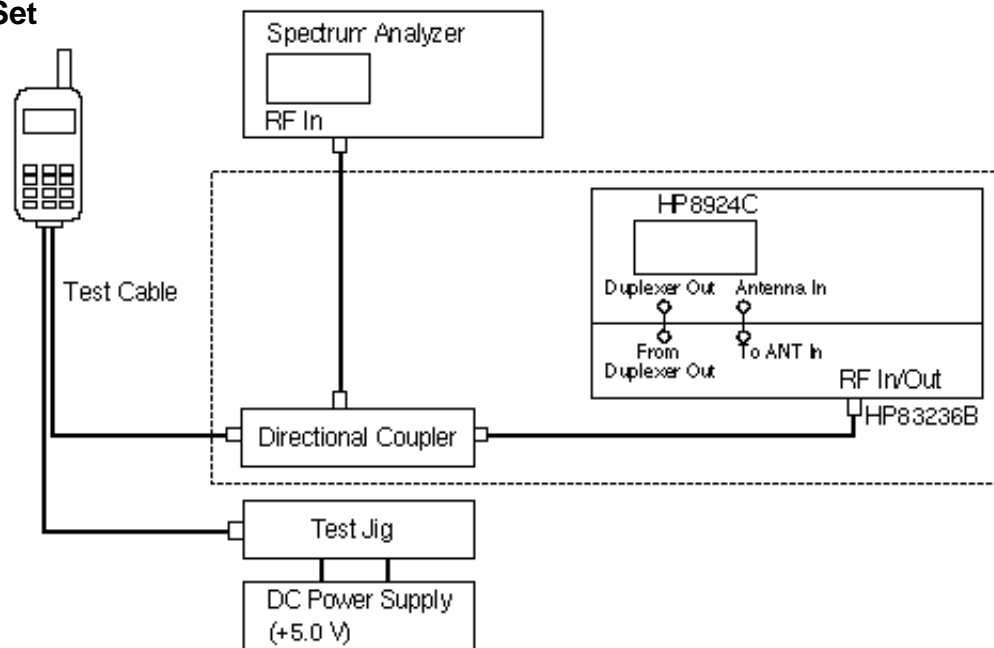
HP8924C, HP83236B, CMD-80, etc

Spectrum Analyzer (include CDMA test mode)

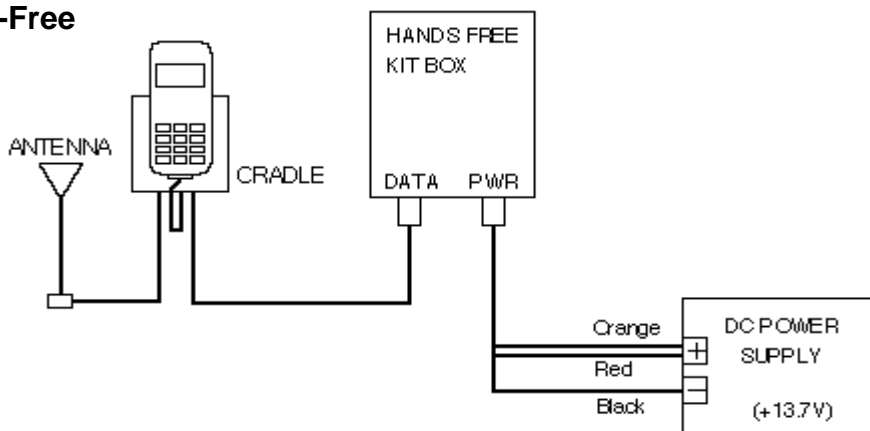
HP8596E

5-2 Configuration of Test

5-2-1 Hand Set



5-2-2 Hand-Free



5-3 Test Procedure

5-3-1 Change to Test Mode

1. To change the phone from Normal Mode to test Mode, You should enter the following keys.
" 4 7 * 8 6 9 # 1 2 3 5 "
2. The command " 0 1"(Suspend) is entered to start test.
3. To finish the Test Mode, You should enter the command "0 2".

5-3-2 Channel Selection and Tx Power Output level Control

1. You should change the phone from Normal Mode to Test mode
2. The command " 0 1"(Suspend) is entered to start test.

3. You should enter the following keys.
" 0 9, 0 5 2 5, #, 0 7, 3 4, 7 1, 4 7 5, #"

¶If you enter the command "0 9", You can select the channel
ex) 0 9 X X X X (means channel number)

¶The command "0 7" means Carrier On (Carrier Off : 0 8)

¶If you enter the command "3 4", You can spread the carrier.

¶If you enter the command "7 1", You can control the power output level. Following under-bar means AGC code. And you can control the power output level using Volume Up/Down Keys.
ex) 7 1 X X X

4. After enter the command "7 4" and control the Tx Power Output Level to be 0.0dBm using Volume Up/Down keys, press "STO" key to store Data in EEPROM.

5-4 Test Command Table

Command No. (OP, AB, RB)	Test Command	Description
01(1F, 0, 0)	T_SUSPEND_I	Terminate the normal mode, enter to the test mode.
02(3F, 0, 0)	T_RESTART_I	Terminate the test mode, enter to the normal mode.
03(FD, 0, 0)	T_SAVE_VAL_I	Save value in EEPROM. (Only for Auto test)
04(1D, 0, 1)	T_GET_MODE_I	Get mode. (CDMA or FM)
05(1C, 1, 0)	T_SET_MODE_I	Set mode to CDMA or FM. (Only for Auto test)
06(1E, 0, 0)	T_WRITE_NV_I	Write an EEPROM item. (one of the NV items)
07(81, 0, 0)	T_CARRIERON_I	Turn the carrier on.
08(82, 0, 0)	T_CARRIEROFF_I	Turn the carrier off.
09(83, 4, 0)	T_LOADSYN_I	Set the synthesizer to the channel specified by ch_data.
10(84, 1, 0)	T_PWRLEVEL_I	Set the RF power attenuation to the specified value.
11(85, 0, 0)	T_RXMUTE_I	Mute the receive-audio signal.
12(86, 0, 0)	T_RXUNMUTE_I	Unmute the receive-audio signal.
13(87, 0, 0)	T_TXMUTE_I	Mute the transmit-audio signal.
14(88, 0, 0)	T_TXUNMUTE_I	Unmute the transmit-audio signal.
16(8F, 0, 0)	T_STON_I	Turn on ST.
17(90, 0, 0)	T_STOFF_I	Turn off ST.
22(91,96,96)	T_SNDNAM_I	Display and send NAM information.
23(95, 3, 4)	T_SNDVERSION_I	Display and return S/W version.
24(9F, 7, 8)	T_SNDESN_I	Display and return ESN.
25(92, 0, 0)	T_BACKLIGHT_ON_I	Turn on the backlight.
26(93, 0, 0)	T_BACKLIGHT_OFF_I	Turn off the backlight.
27(96, 0, 0)	T_LAMP_ON_I	Turn on the LAMP.
28(97, 0, 0)	T_LAMP_OFF_I	Turn off the LAMP.
29(9A, 0, 0)	T_REBUILD_I	Rebuild EEPROM.
30(9D,15, 0)	T_PLINE_I	Display and return production date.
32(A0, 1, 0)	T_SATON_I	Turn on SAT.
33(A1, 0, 0)	T_SATOFF_I	Turn off SAT.
34(A2, 0, 0)	T_CDATA_I	Continuously send TX control data.
35(A3, 0, 0)	T_VOLUME_UP_I	Increase value of the last command. (Only for autotest)
36(A4, 0, 0)	T_VOLUME_DOWN_I	Decrease value of the last command. (Only for autotest)
42(AA, 1, 0)	T_DTMFON_I	Activate dtmf generator with keycode.
43(AB, 0, 0)	T_DTMFOFF_I	Deactivate DTMF generator.
44(B0, 0, 0)	T_COMPANDORON_I	Turn on compandor.
45(B1, 0, 0)	T_COMPANDOROFF_I	Turn off compandor.
50(B6, 4, 0)	T_H_LIST_I	History Channel.
57(BC, 0, 0)	T_MIC_ON_I	Mic path on.
58(BD, 0, 0)	T_MIC_OFF_I	Mic path off.
59(BE, 0, 0)	T_ALLPATH_I	Set RX Path, TX Path Unmute to Earpiece.
67(C6, 3, 6)	T_READ_BATT_I	Reads Low-Battery in the standby, talk.

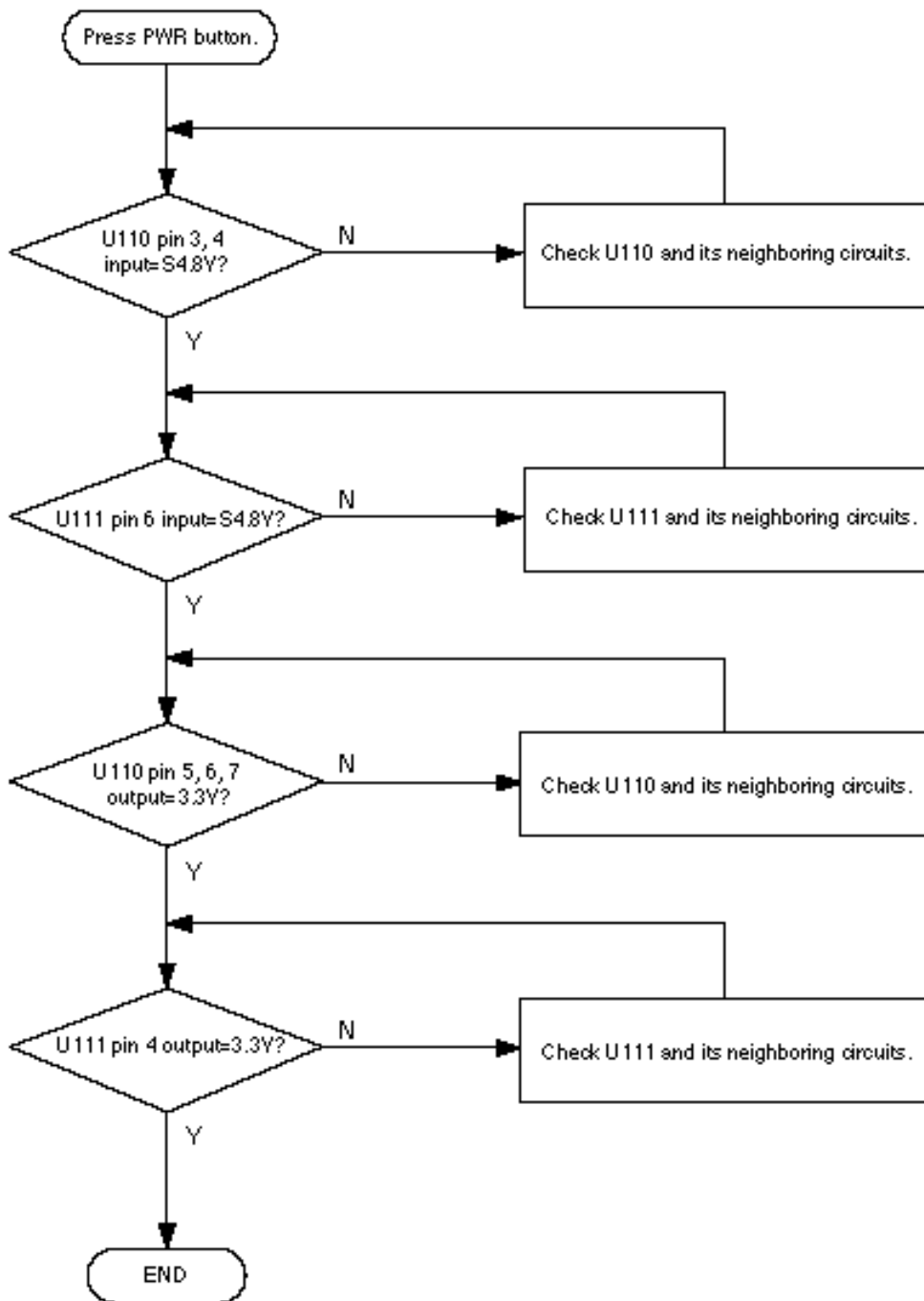
Command No. (OP, AB, RB)	Signal. Name	Description
68(C8, 0, 3)	T_VBATT1_I	Set the low battery position in the standby.
69(C9, 0, 3)	T_VBATT2_I	Set the low battery position in the talking.
70(CA, 3, 0)	T_WRITE_BATT_I	Write low battery level value to NVM.
71(D1, 3, 0)	T_CDMA_TXADJ_I	Change PDM TX AGC in CDMA.
72(D2, 3, 0)	T_FM_TXADJ_I	Change PDM TX AGC in FM.
73(D3, 1, 0)	T_SET_PA_R_I	Set PA R1, R0 in CDMA.
74(D4, 3, 0)	T_TXADJ_0DBM_I	Set TX AGC ADJ for 0dBm power.
75(D5, 0, 3)	T_READ_RSSI_I	Read a RSSI.
76(D6, 3, 0)	T_WRITE_RSSI_I	Writes RSSI.
77(D7, 0, 3)	T_READ_TEMP_I	Read Temp.
79(D9, 1, 0)	T_BUZZER_ON_I	Buzzer On at DTMF 0 key.
80(DA, 0, 0)	T_BUZZER_OFF_I	Buzzer off.
81(E3, 0, 0)	T_VOC_PCMLPON_I	Play a PCM LOOP BACK.
82(E4, 0, 0)	T_VOC_PCMLPOFF_I	Play off a PCM LOOP BACK.
84(E6, 3, 0)	T_CD_MAX_LIMIT_I	CDMA MAX limit.
85(E7, 0, 0)	T_SPEAKER_ON_I	Turn on the speaker path.
86(E8, 0, 0)	T_SPEAKER_OFF_I	Turn off the speaker path.
87(E9, 0, 0)	T_FM_LOOP-TEST_I	Play a PCM FM loopback.
88(EA, 3, 0)	T_TRK_ADK_I	TRK LOCAL ADJUST.
89(EB, 3, 0)	T_CD_TRK_ADJ_I	CDMA TRK LOCAL ADJUST.
90(F0, 3, 0)	T_CDMA_LOW_CH_HIPWR_I	Setting the volume for LOW CH highpwr. (+18dBm)
91(F1, 3, 0)	T_CDMA_LOWMID_CH_HIPWR_I	Setting the volume for LOWMID CH highpwr. (+18dBm)
92(F2, 3, 0)	T_CDMA_MIDDLE_CH_HIPWR_I	Setting the volume for MIDDLE CH highpwr. (+18dBm)
93(F3, 3, 0)	T_CDMA_LOW_CH_LOPWR_I	Setting the volume for LOW CH lowpwr. (-41dBm)
94(F4, 3, 0)	T_CDMA_LOWMID_CH_LOPWR_I	Setting the volume for LOWMID CH lowpwr. (-41dBm)
95(F5, 3, 0)	T_CDMA_MIDDLE_CH_LOPWR_I	Setting the volume for MIDDLE CH lowpwr. (-41dBm)
96(F6, 3, 0)	T_CDMA_HIGHMID_CH_LOPWR_I	Setting the volume for HIGHMID CH lowpwr. (-41dBm)
97(F7, 3, 0)	T_CDMA_HIGH_CH_LOPWR_I	Setting the volume for HIGH CH lowpwr. (-41dBm)
98(F8, 3, 0)	T_CDMA_HIGHMID_CH_HIPWR_I	Setting the volume for HIGHMID CH highpwr. (+18dBm)
99(F9, 3, 0)	T_CDMA_HIGH_CH_HIPWR_I	Setting the volume for HIGH CH highpwr. (+18dBm)

¹⁵ OP: Operation Command Number
 AB: Input Argument Byte Number
 RB: Return Byte Number

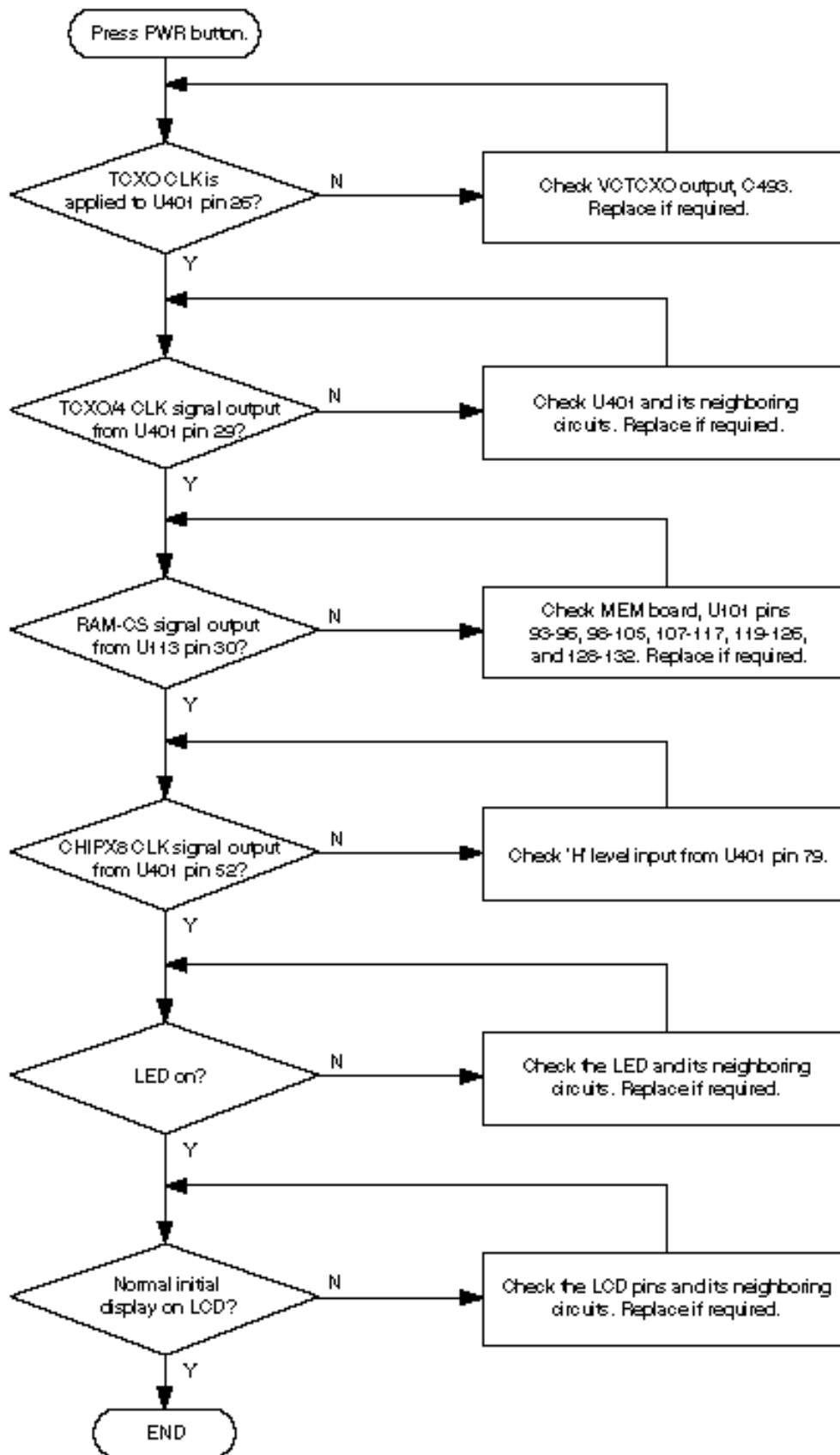
6. Troubleshooting

6-1 Logic Section

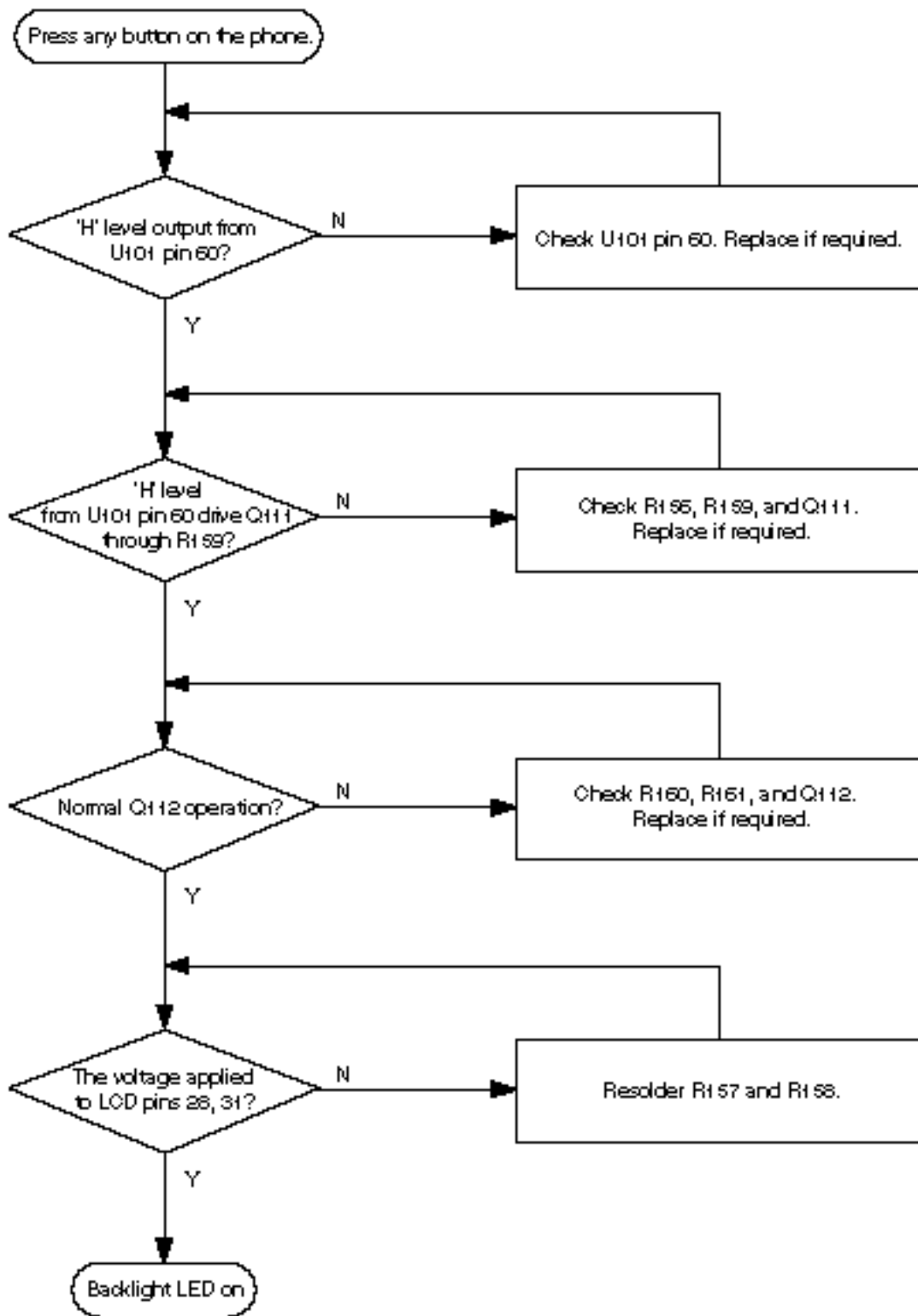
6-1-1 No Power



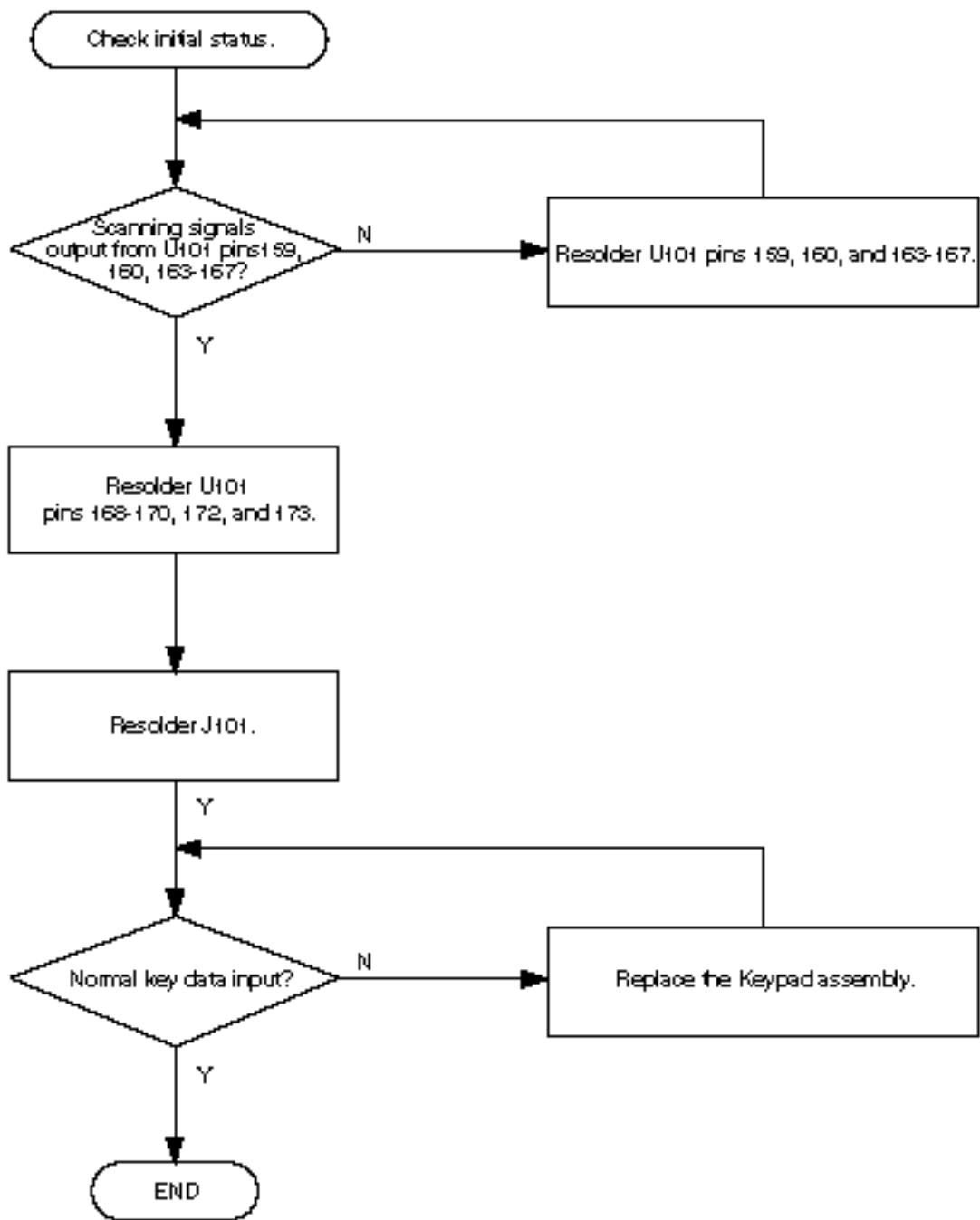
6-1-2 Abnormal Initial Operation (Normal +3.3V voltage source)



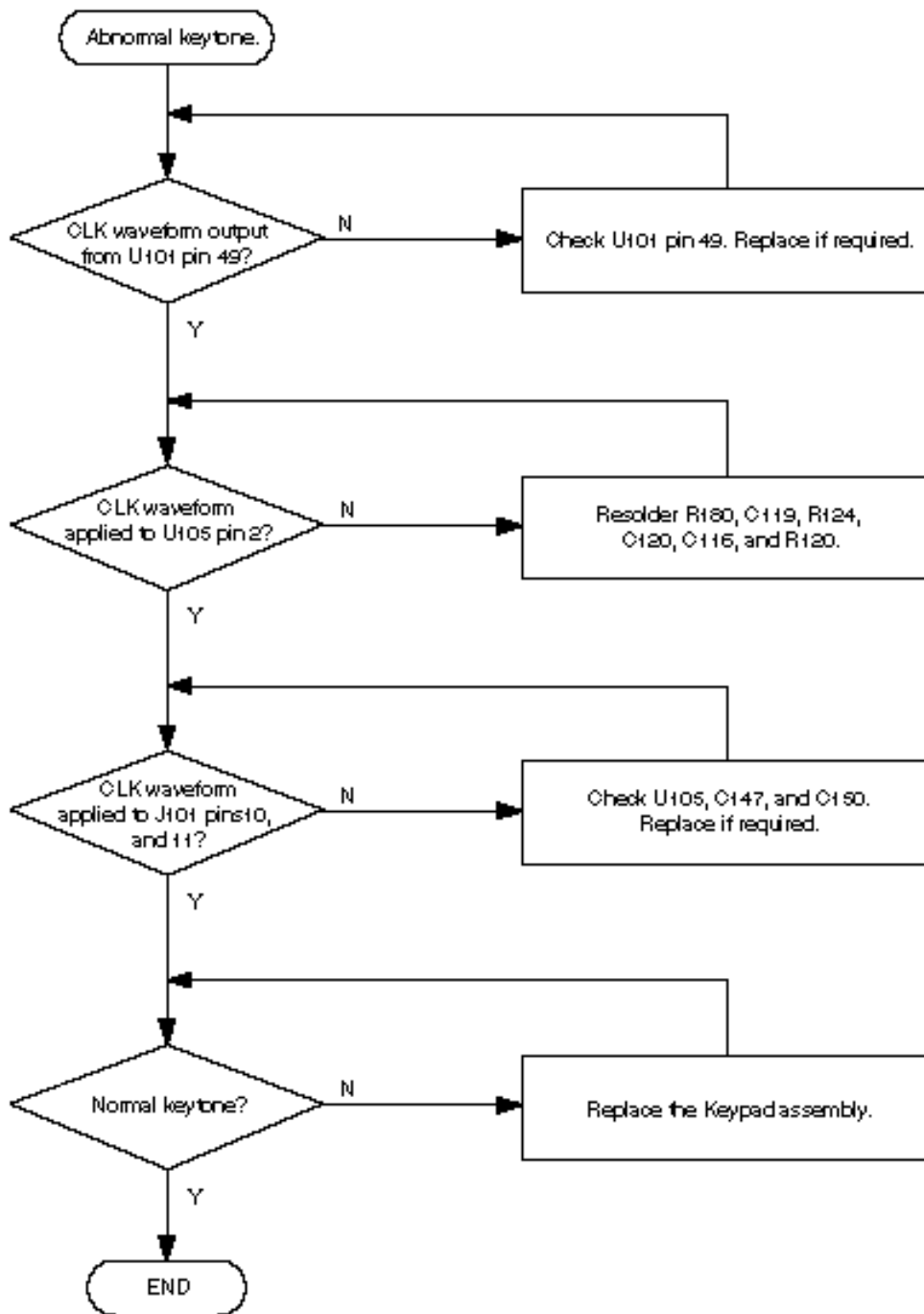
6-1-3 Abnormal Backlight Operation



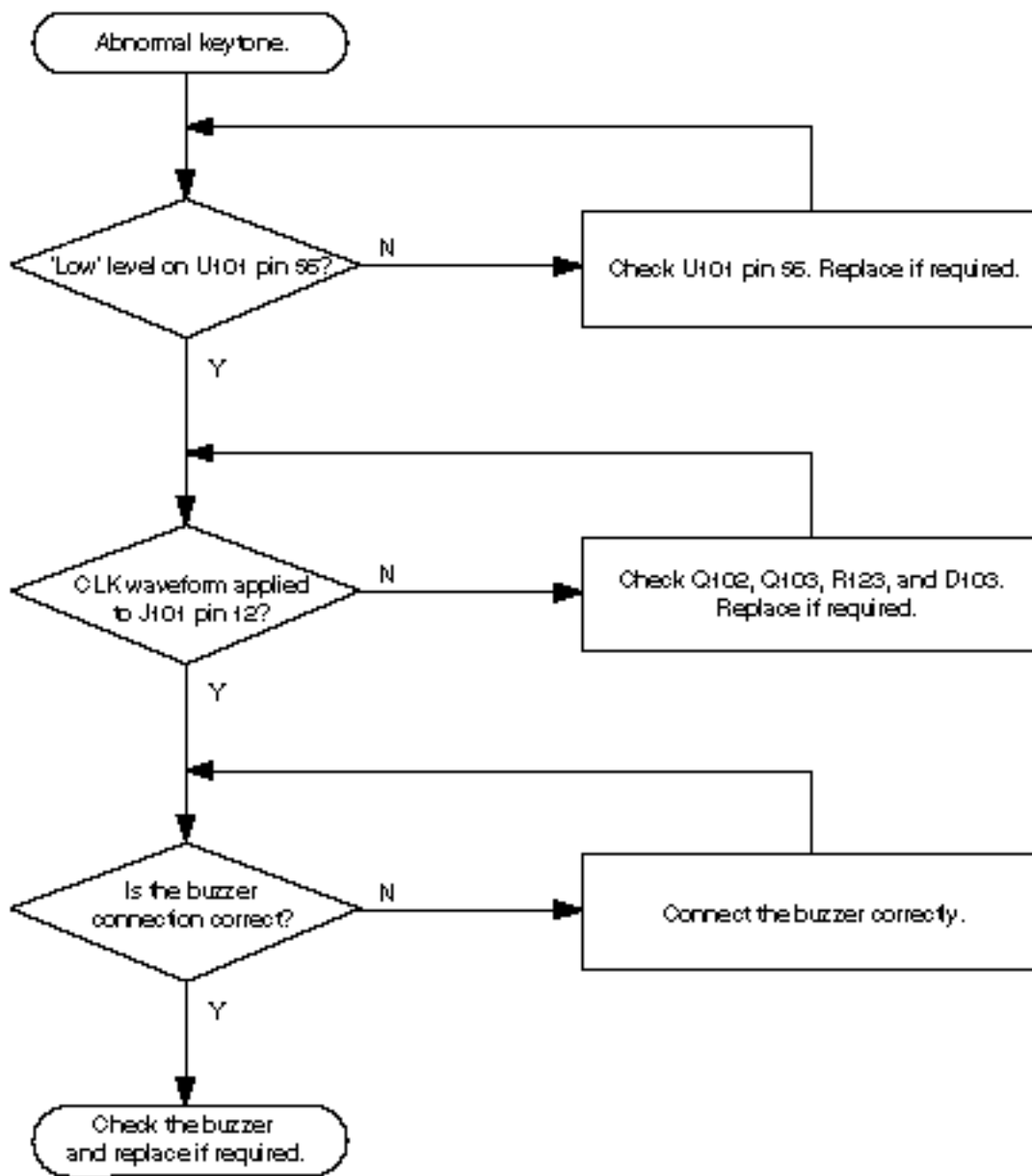
6-1-4 Abnormal Key Data Input



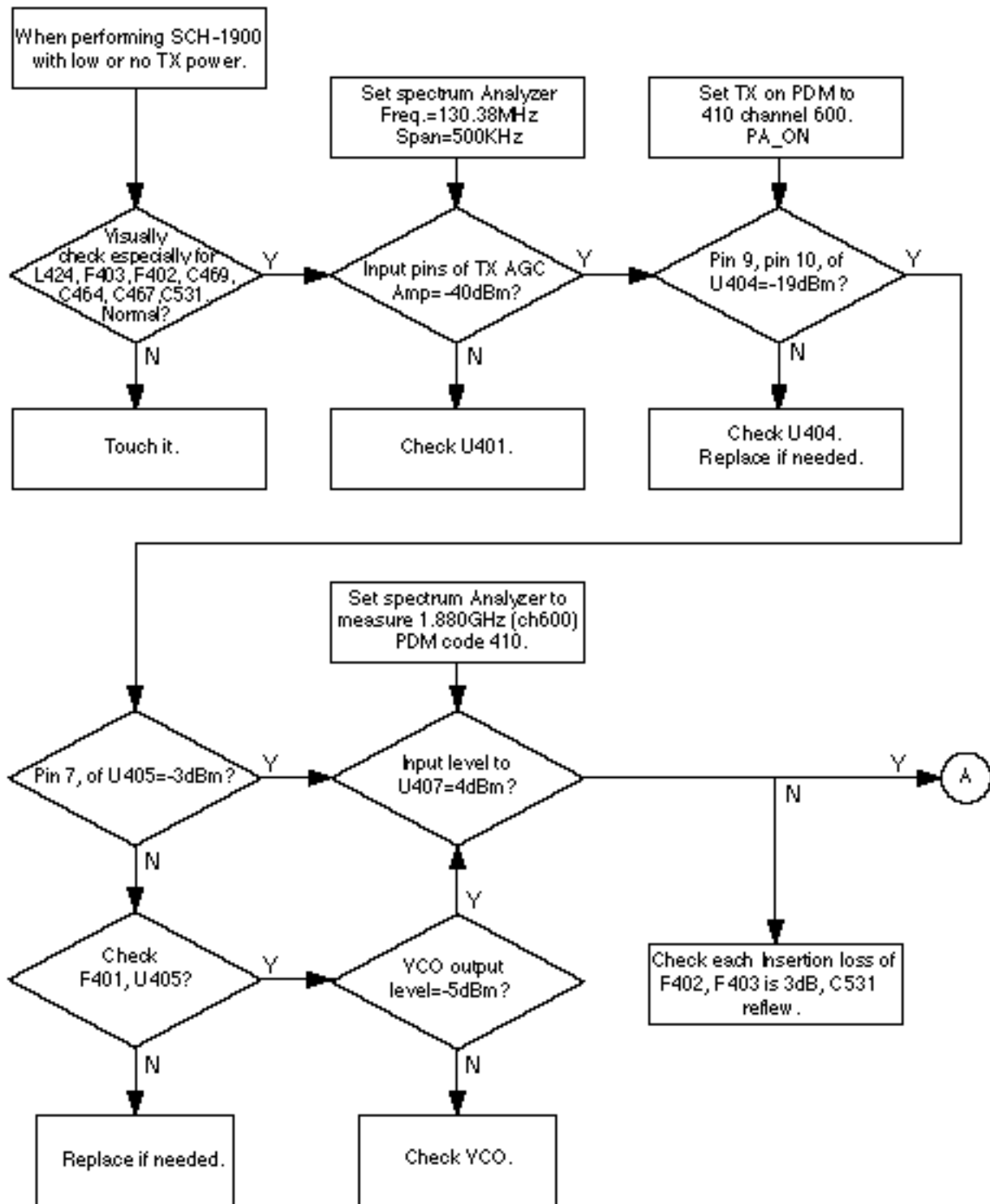
6-1-5 Abnormal Keytone

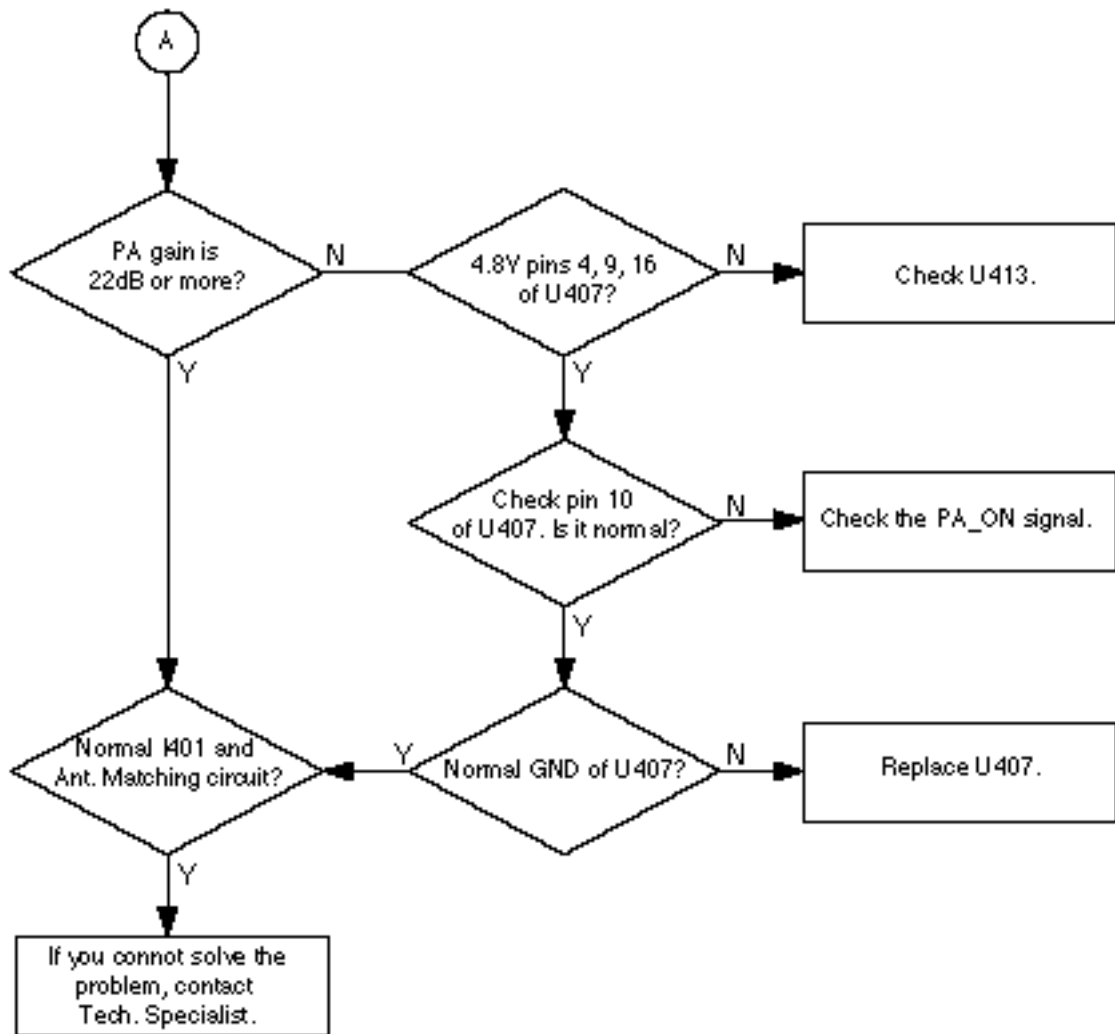


6-1-6 Abnormal Alert Tone

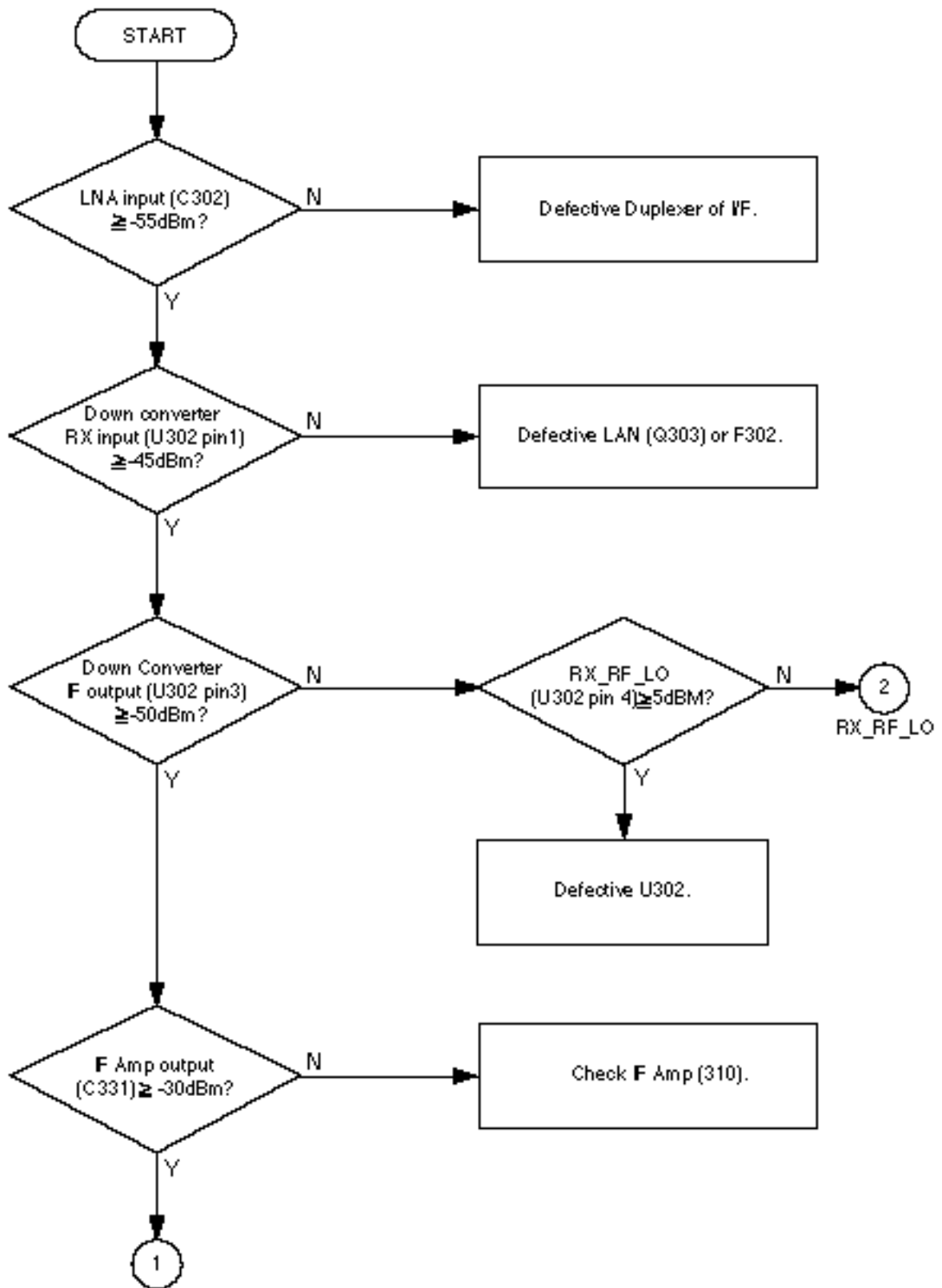


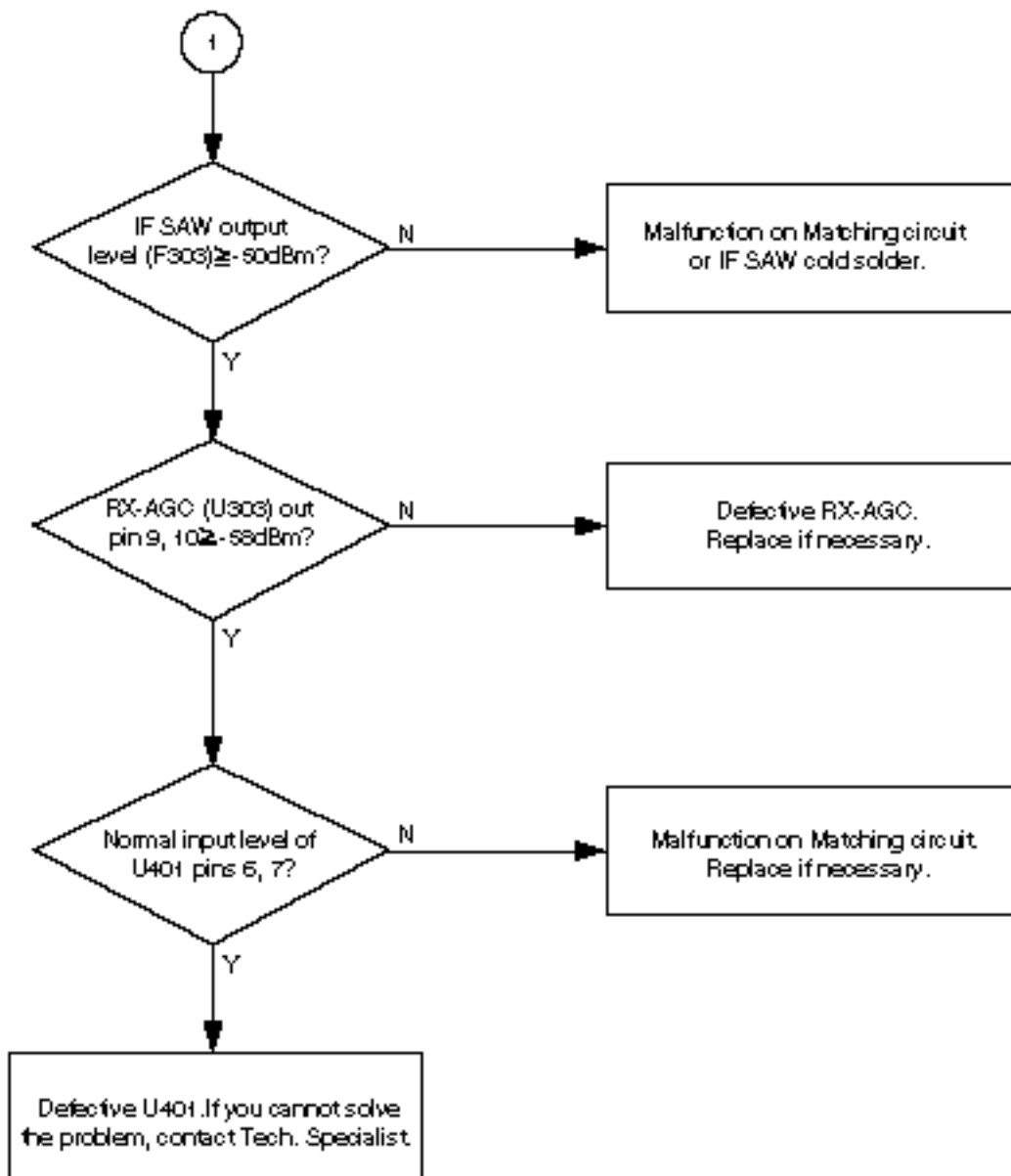
6-2 Transmitter Section

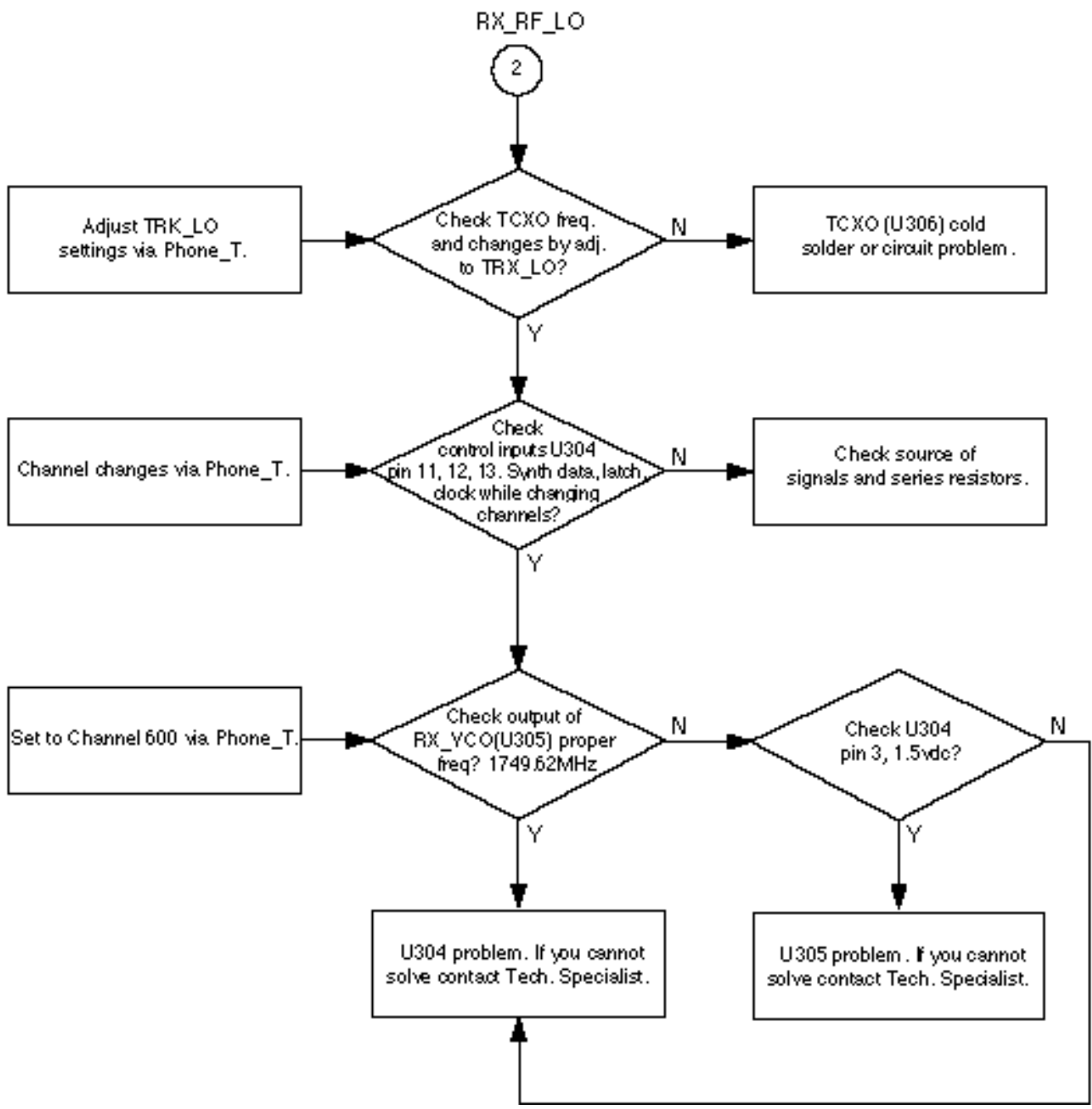




6-3 Receiver Section

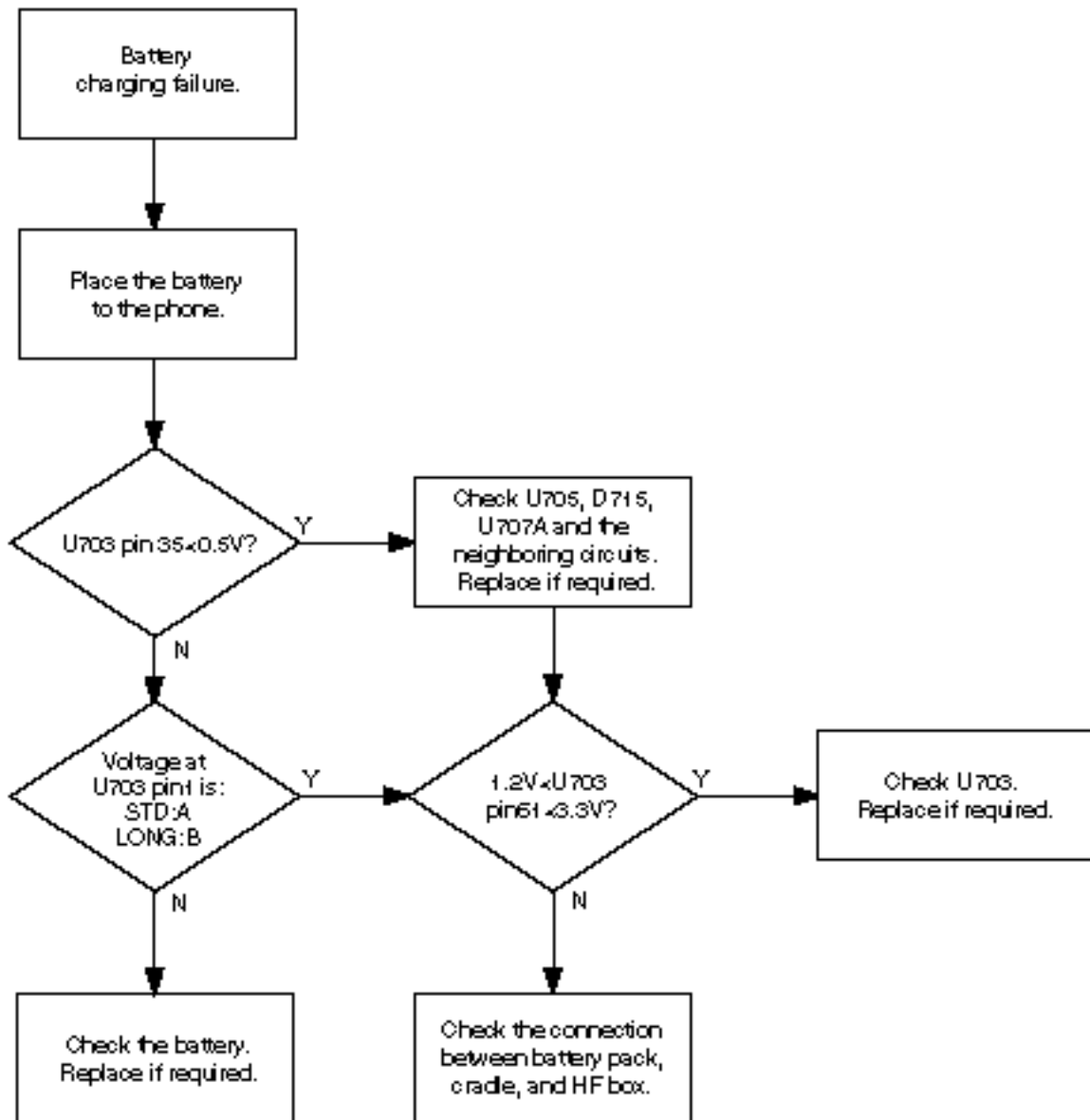






6-4 Hands-Free Car Kit

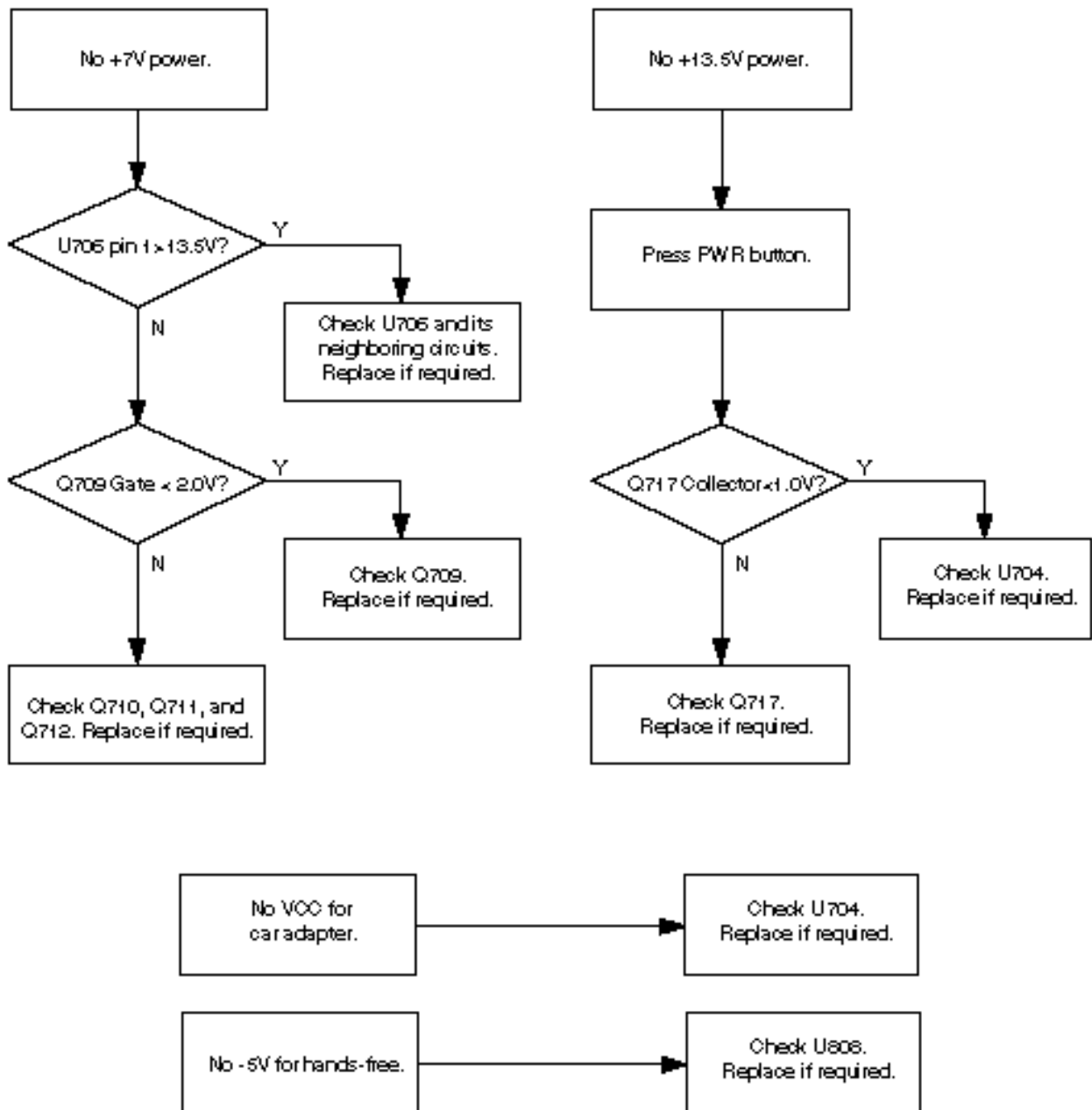
6-4-1 Abnormal Battery Charging



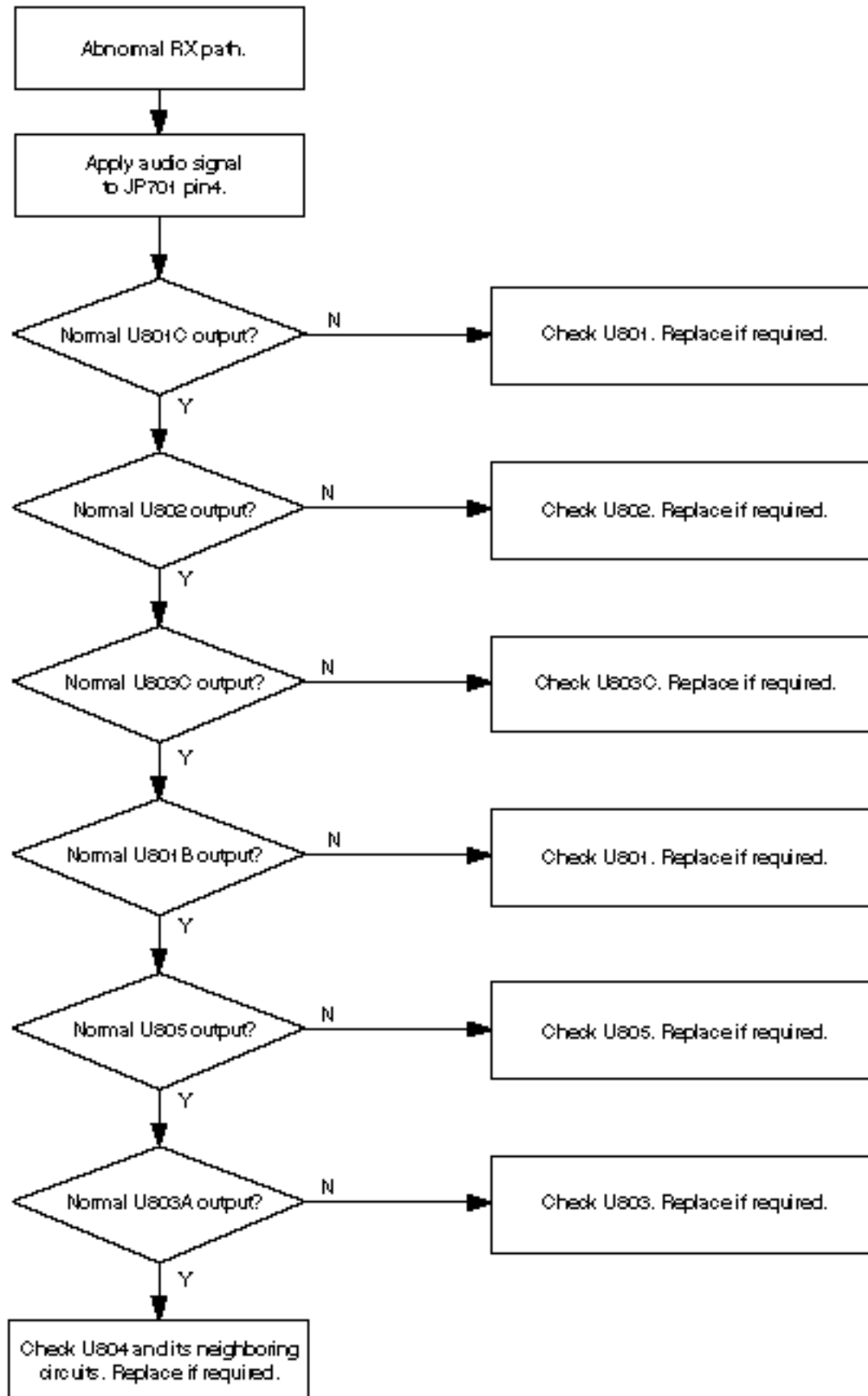
A: 2.47V \leq V at U703 pin 1 < 2.98V

B: 1.53V \leq V at U703 pin 1 < 2.47V

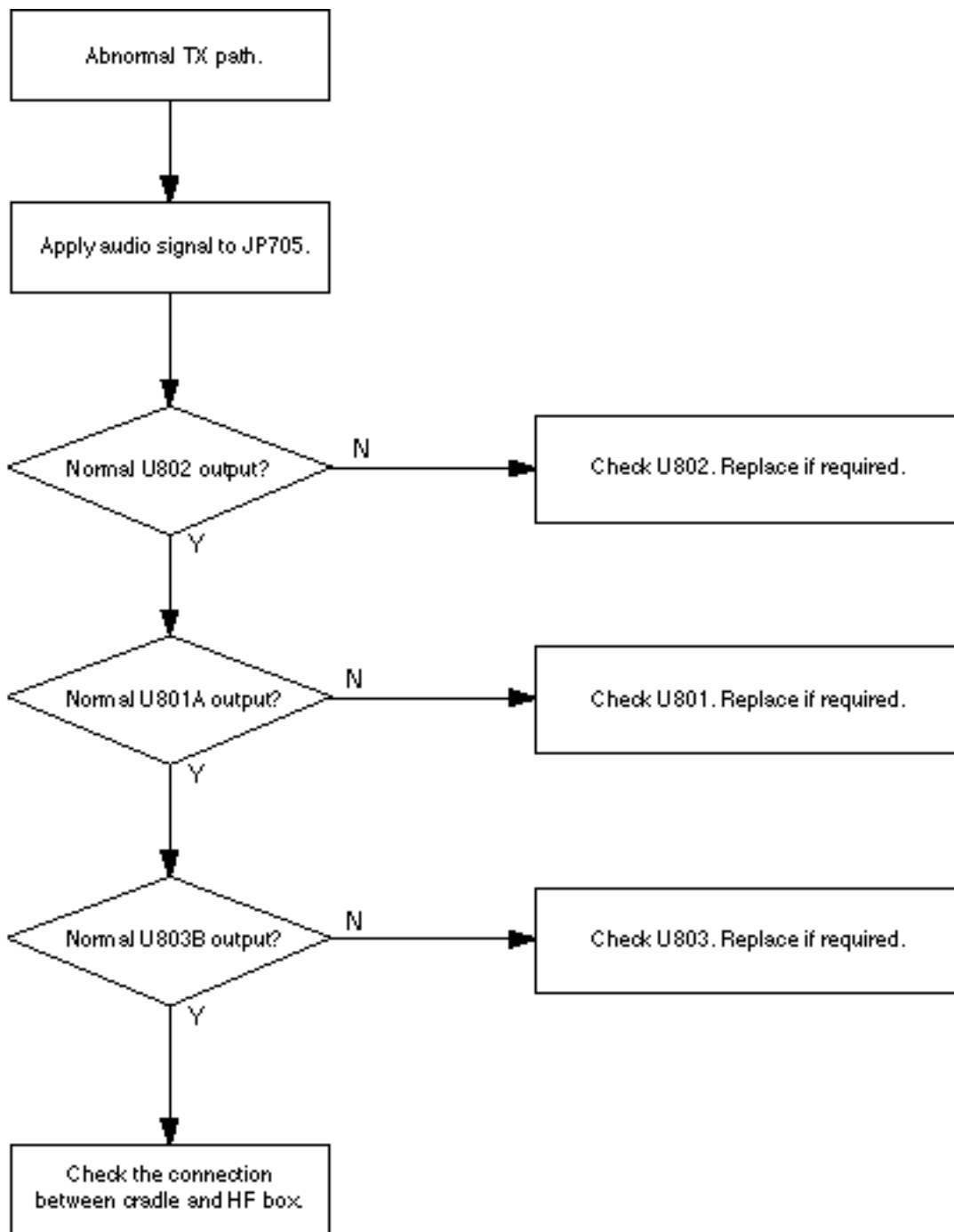
6-4-2 No Power (HHP PWR +5.8V, +13.5V) Supply



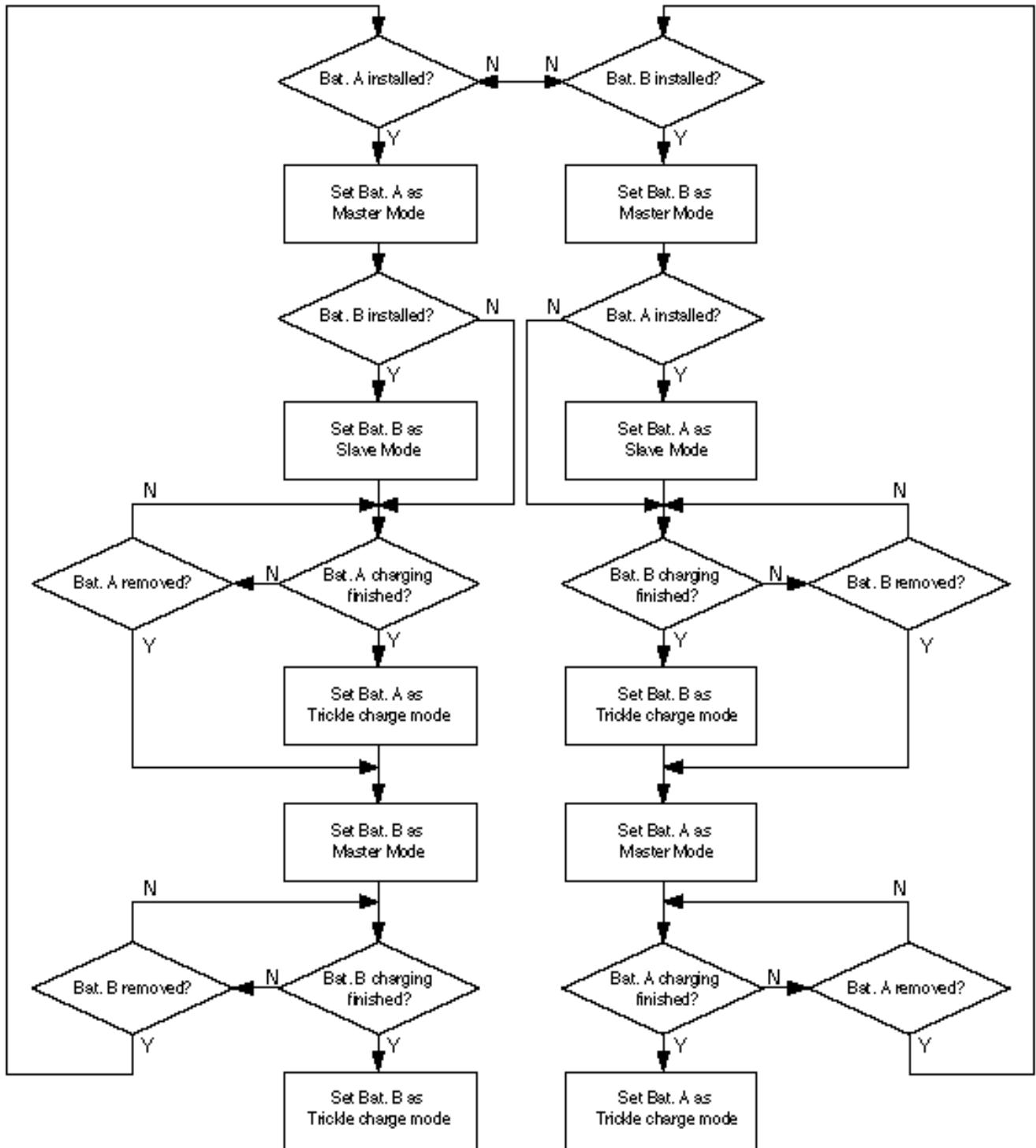
6-4-3 Hands-Free RX Path



6-4-4 Hands-Free TX Path

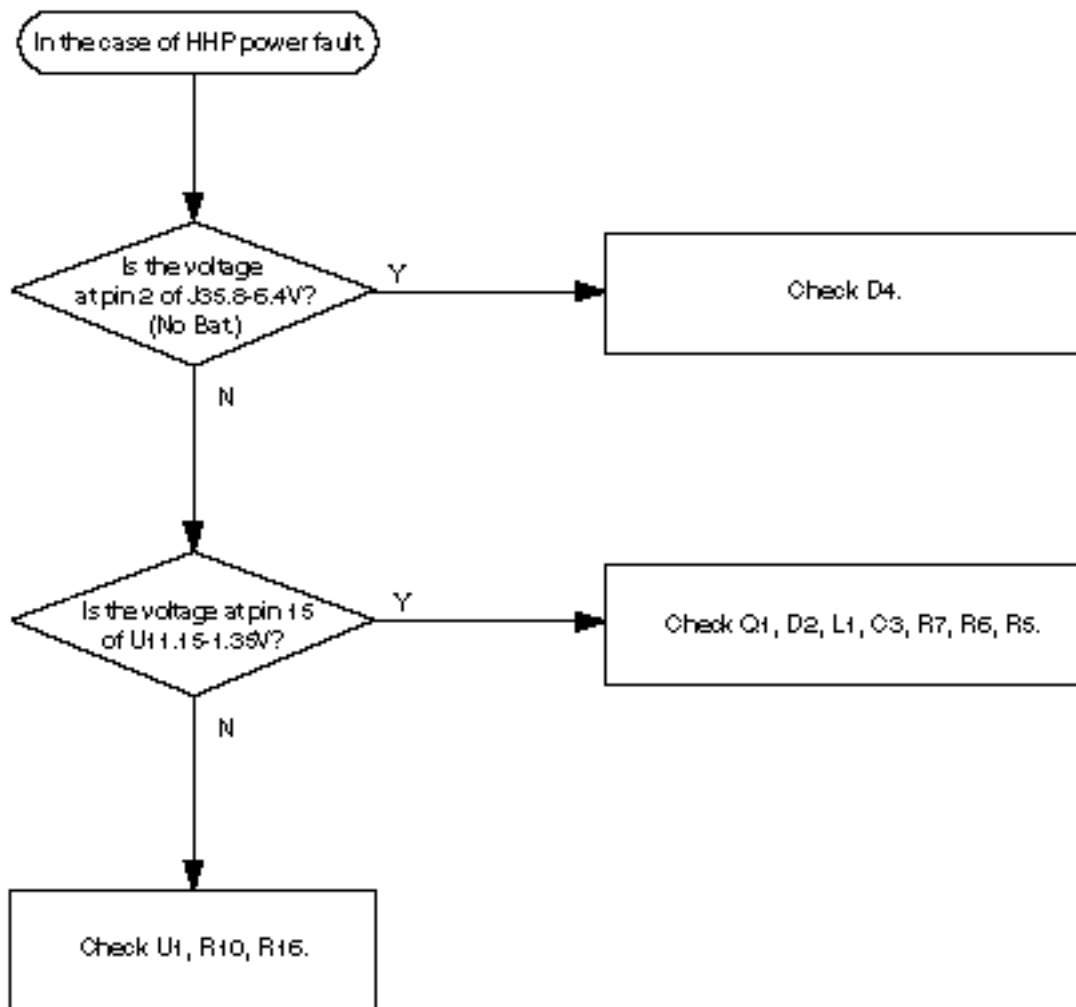


6-5 Desk-Top Rapid Charger

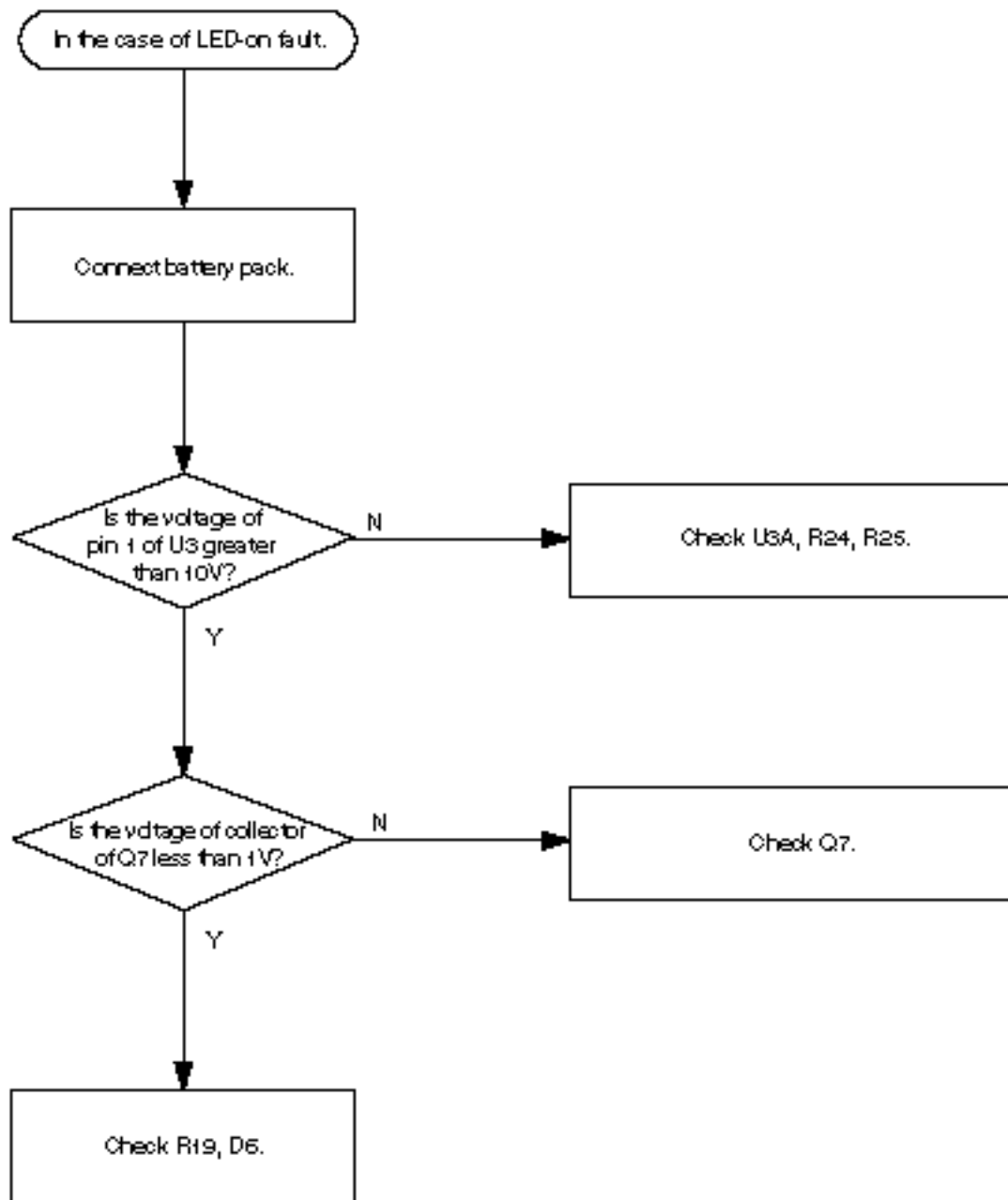


6-6 Cigarette Lighter Adapter

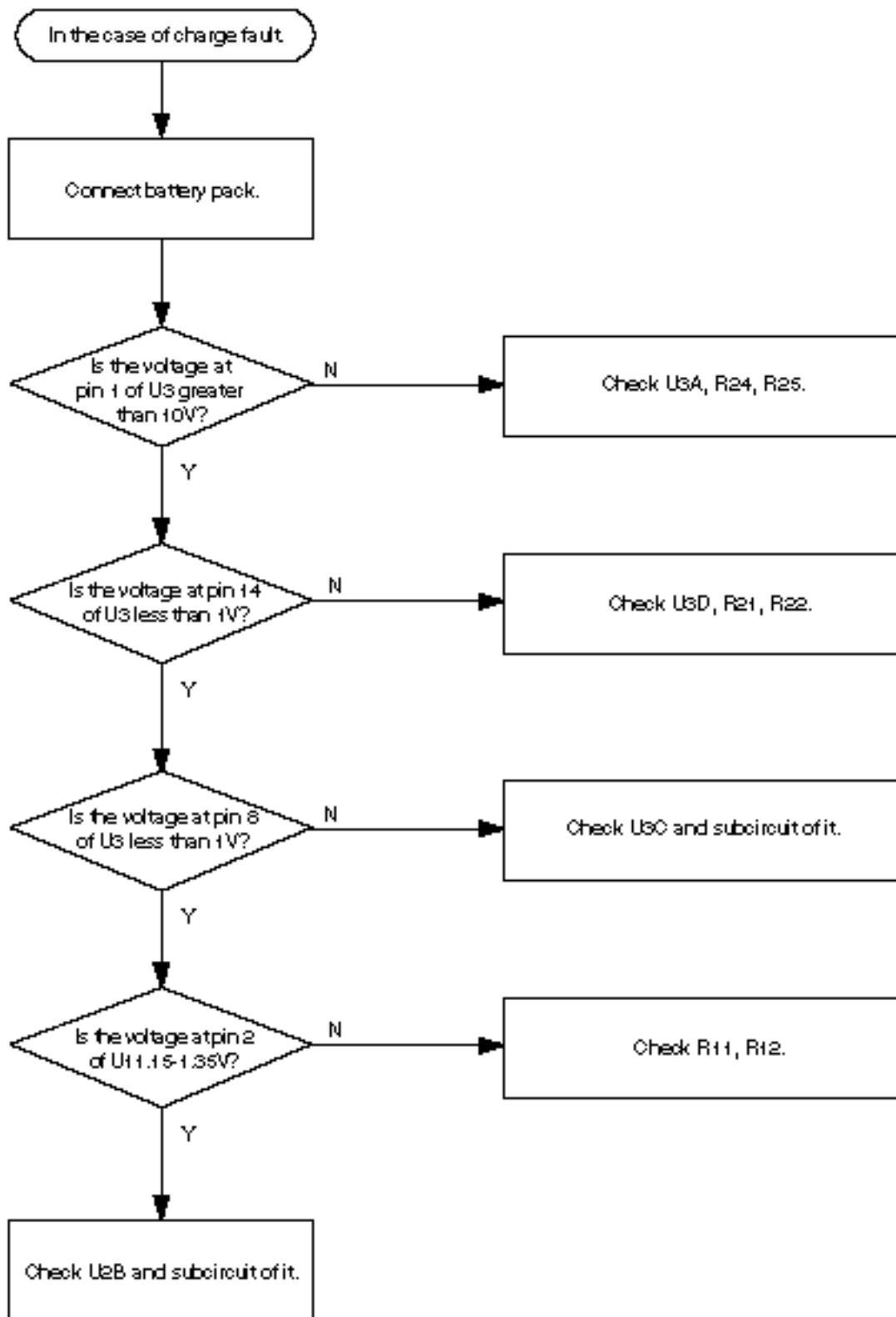
6-6-1 Power Fault



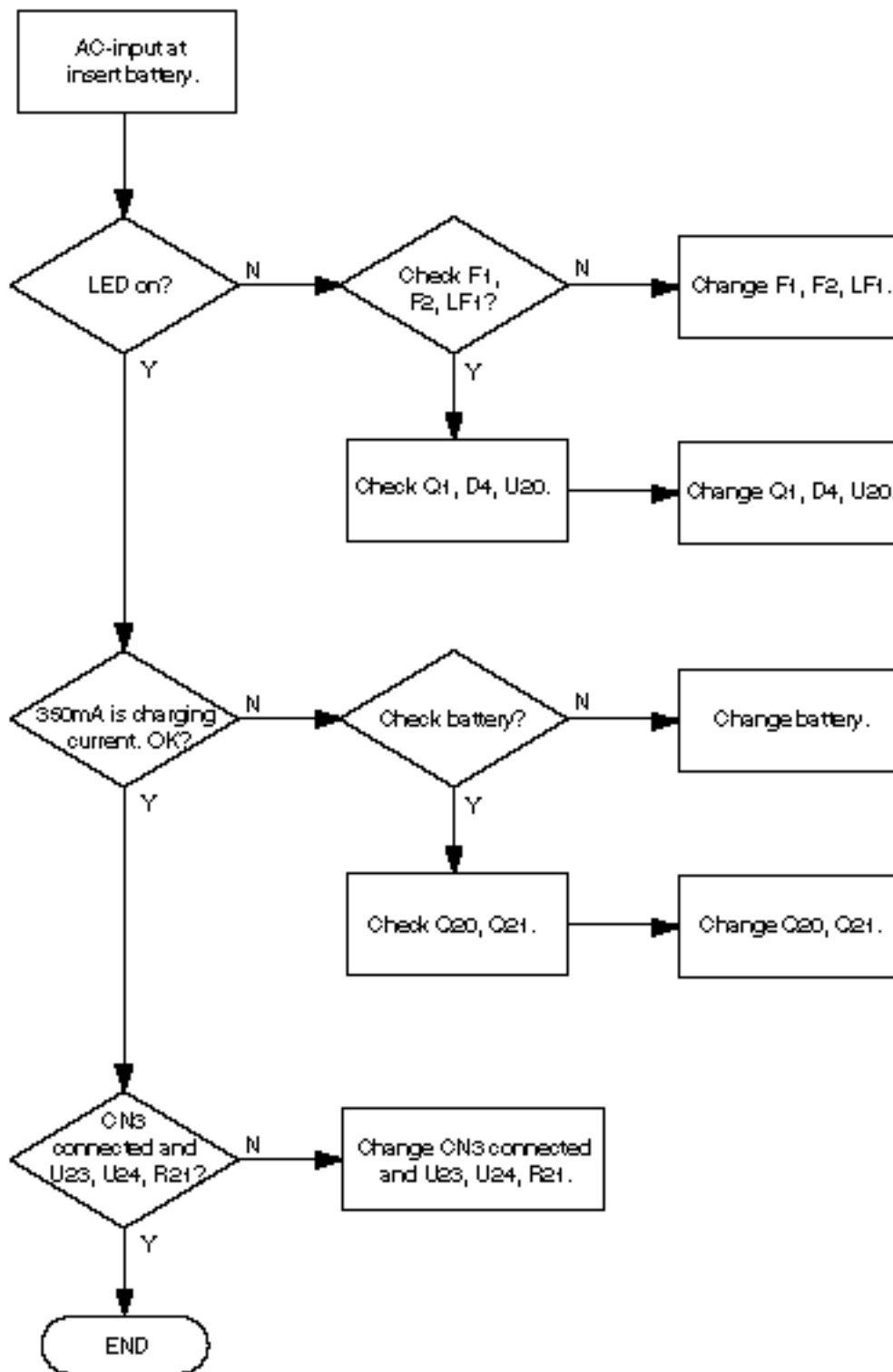
6-6-2 LED-On Fault



6-6-3 Charge Fault



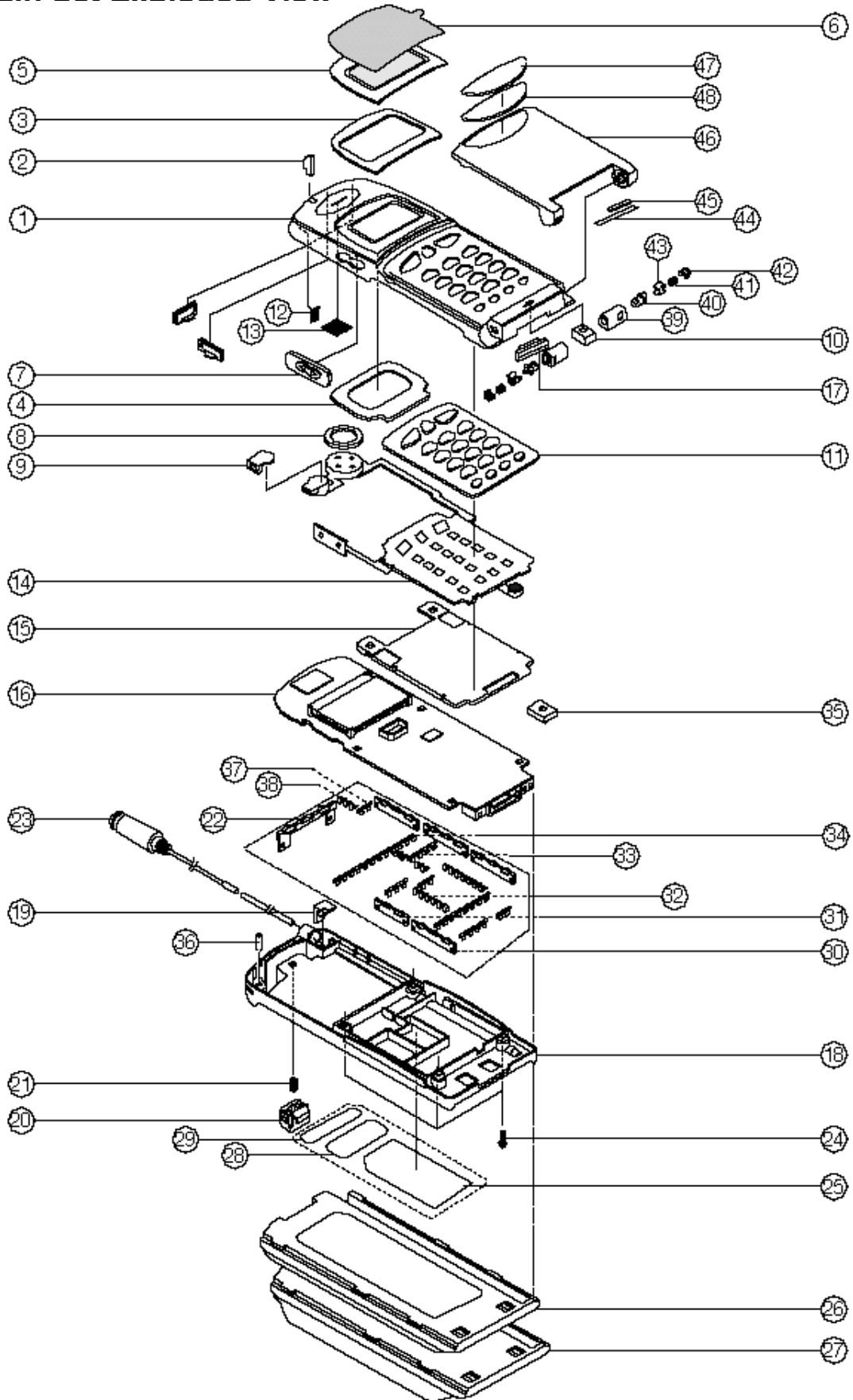
6-7 Travel Charger



7. Exploded View and its Parts List

- 7-1 Main Set Exploded View**
- 7-2 Main Set Parts List**
- 7-3 Hands-Free Kit Exploded View**
- 7-4 Hands-Free Kit Parts List**
- 7-5 Hands-Free Kit Cradle Exploded View**
- 7-6 Hands-Free Kit Cradle Parts List**
- 7-7 Desk-Top Rapid Charger Exploded View**
- 7-8 Desk-Top Rapid Charger Parts List**
- 7-9 Cigarette Lighter Adapter**
- 7-10 Travel Charger**
- 7-11 Main Set Packing Layout**
- 7-12 Main Set Packing Parts List**
- 7-13 Hands-Free Kit Packing Layout**
- 7-14 Hands-Free Kit Packing Parts List**

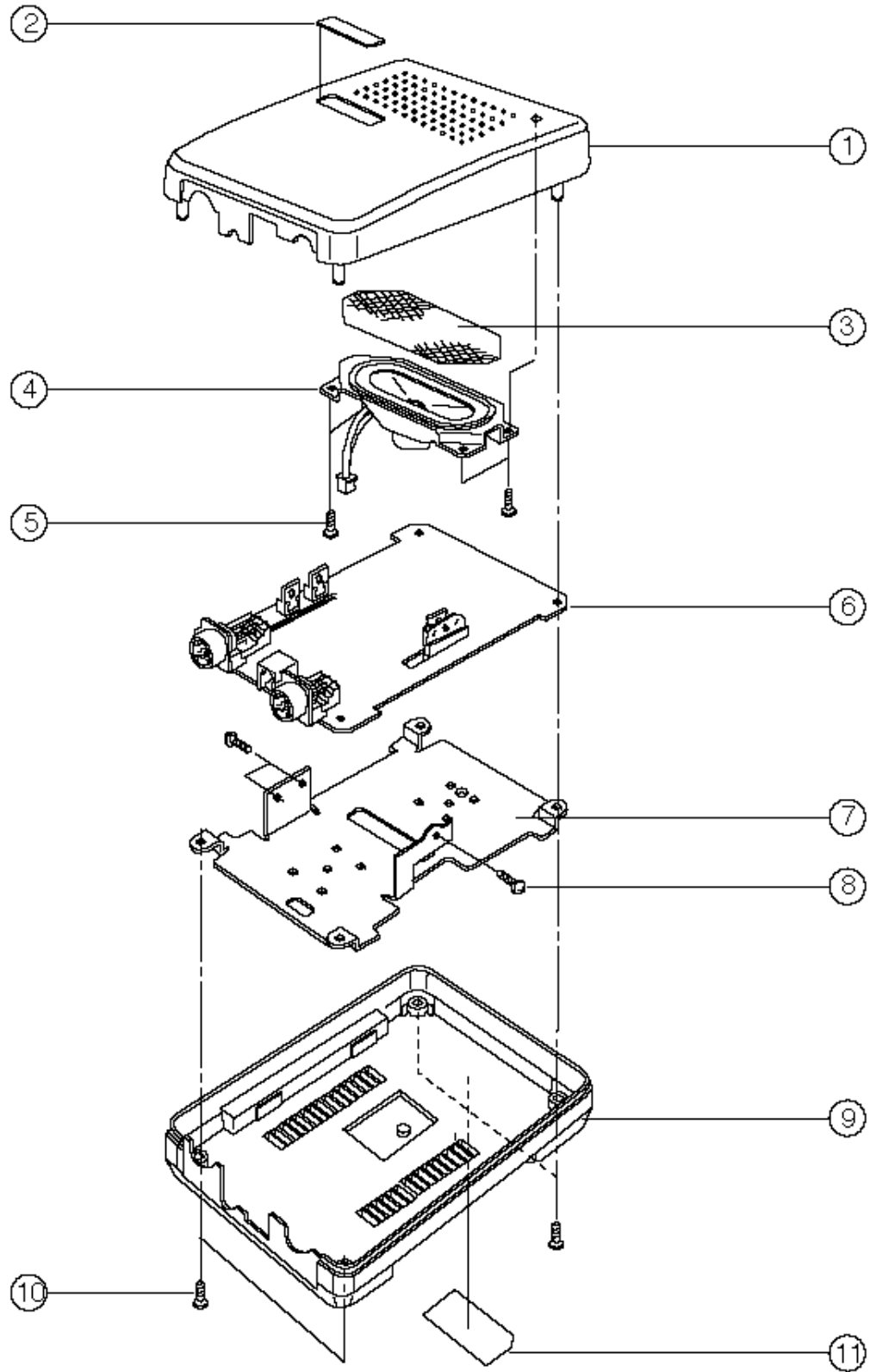
7-1 Main Set Exploded View



7-2 Main Set Parts List

NO	DESCRIPTION	SEC. CODE	Q'TY	REMARK
1	FRONT-COVER	GH72-41229A	1	
2	CAP-LED	GH72-41208A	1	
3	TAPE-WINDOW	GH74-10591A	1	
4	SPONGE-LCD	GH74-10590A	1	
5	WINDOW-LCD	GH72-20006A	1	
6	TAPE WINDOW-BOHO	GH74-40107A	1	
7	KNOB-VOLUME	GH64-10010A	1	
8	SPEAKER-TAPE	GH74-10546A	1	
9	HOLDER BUZZER	GH73-40612A	1	
10	HOLDER MIC	GH73-40536A	1	
11	KEY-PAD	GH73-40613A	1	
12	BUZZER COVER	GH72-10503A	1	
13	SPEAKER COVER	GH72-10528A	1	
14	KEY PBA ASSY	GH59-10015A	1	
15	SHIELD COVER R/F	GH72-41231A	1	
16	PBA MAIN	GH92-01030A	1	
17	COVER-CONNECTOR	GH73-40577A	1	
18	REAR COVER	GH72-41232A	1	
19	CONTACT BRACKET	GH71-10572A	1	
20	LOCKER MAIN	GH64-30021A	1	
21	SPRING LOCKER	GH70-10516A	1	
22	STRIP FINGER	GH71-10551A	1	
23	ANTENNA	GH42-10509A	1	
24	SCREW	6001-000101	4	
25	LABEL ID MAIN	GH68-30901C	1	
26	STD. BATT. PACK	GH43-10056A	1	
27	EXT. BATT. PACK	GH43-10055A	1	
28	BAR CODE ESN	GH68-30936A	1	
29	LABEL (R) BAR CODE	JF68-30572A	1	
30	STRIP-FINGER (L)	GH71-10548A	4	
31	STRIP-FINGER (M)	GH71-10549A	1	
32	SHIELD STRIP (D)	GH71-10643A	2	
33	SHIELD STRIP (C)	GH71-10641A	3	
34	SHIELD STRIP	GH71-10644A	1	
35	SPONGE-MIC	GH74-10526A	1	
36	HANGER-PIN	GH71-10632A	1	
37	SHIELD STRIP (A)	GH71-10639A	6	
38	SHIELD STRIP (B)	GH71-10640A	3	
39	HINGE-HOUSING	GH72-41227A	2	
40	SHAFT-HINGE	GH72-40725A	2	
41	SPRING-HINGE	GH70-10524A	2	
42	HOUSING-CAP	GH72-40727A	2	
43	CAM-HINGE	GH61-80001A	2	
44	LABEL (R)-FLIP	GH68-30985A	1	
45	MAGNETIC	937 312008AA	1	
46	FLIP COVER	GH72-41230A	1	
47	FLIP DUMMY	GH72-20007A	1	
48	TAPE FLIP	GH74-10592A	1	

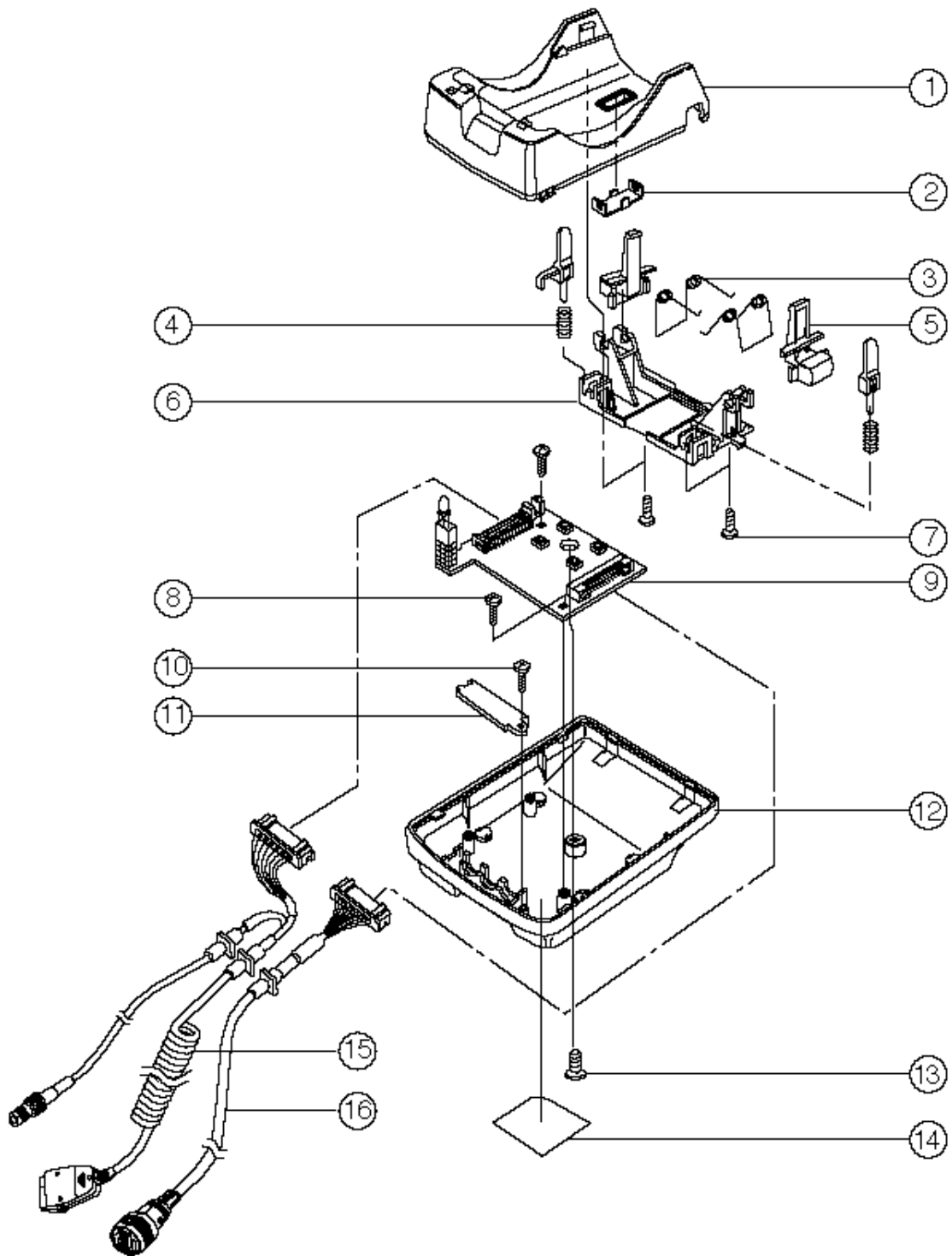
7-3 Hands-Free Kit Exploded View



7-4 Hands-Free Kit Parts List

NO	DESCRIPTION	SEC. CODE	Q'TY	REMARK
1	H/F UPPER HOUSING	GH72-41045A	1	
2	LABEL (R)-LOGO H/F	GH68-30933A	1	
3	H/F FELT-SPEAKER	GH74-10521A	1	
4	AUDIO-SPEAKER	3001-000186	1	
5	SCREW	6003-000115	4	
6	H/F PBA		1	
7	HEATSINK-H/F	GH71-10559A	1	
8	SCREW	6003-000106	3	
9	H/F LOWER HOUSING	GH72-40626A	1	
10	SCREW	6003-000161	4	
11	LABEL (R)-ID H/F	GH68-30932A	1	

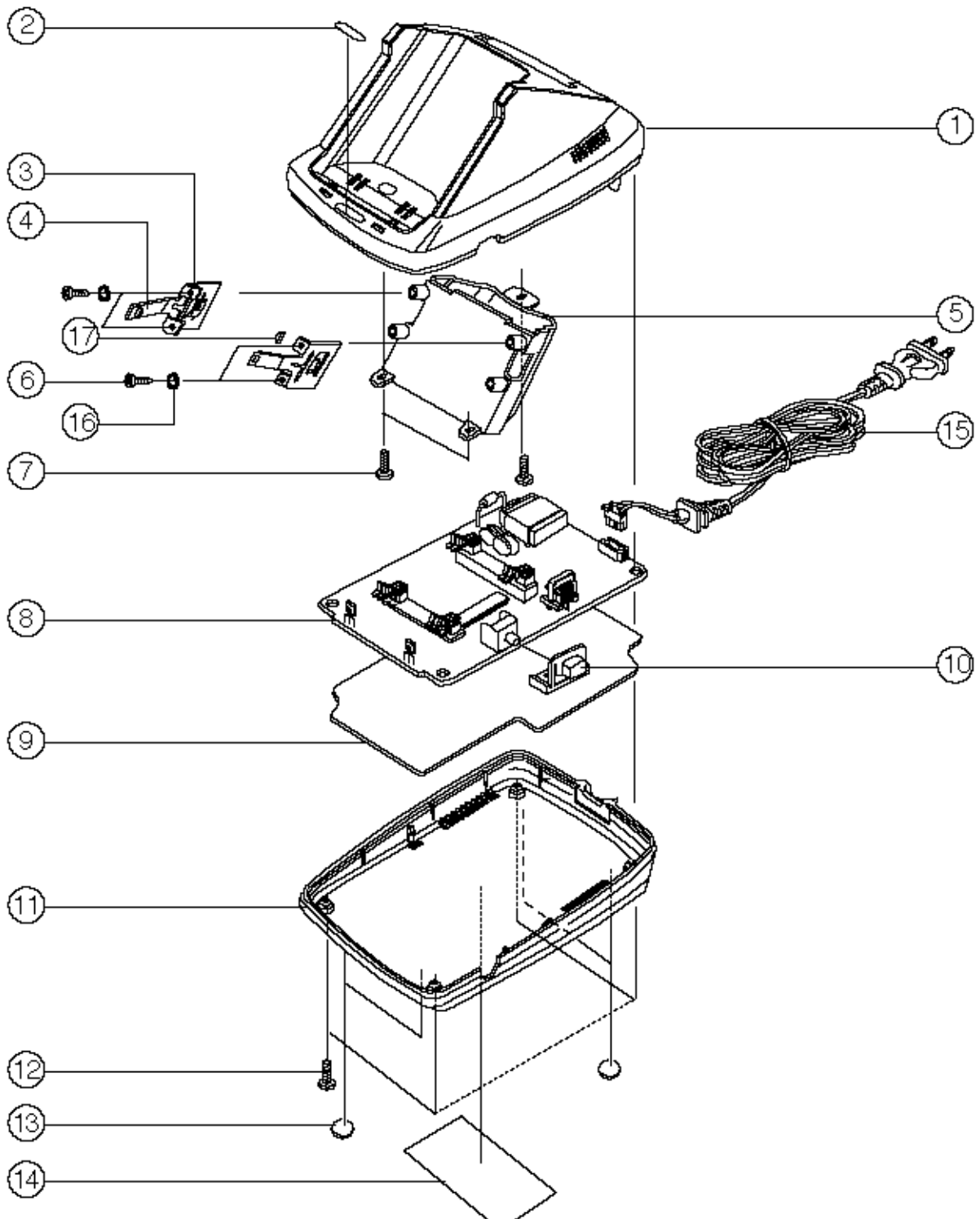
7-5 Hands-Free Kit Cradle Exploded View



7-6 Hands-Free Kit Cradle Parts List

NO	DESCRIPTION	SEC. CODE	Q'TY	REMARK
1	UPPER HOUSING-C/D	GH72-40014A	1	
2	SOCKET PLATE-C/D	GH70-10526A	1	
3	TORSION SPRING-C/D	GH70-40002A	2	
4	EJECTOR SPRING-C/D	GH70-10520A	2	
5	LOCKER-C/D	GH72-40013A	2	
6	FRAME-C/D	GH72-40011A	1	
7	SCREW, TAPTITE, B, BH, M2.6, L6	6003-000107	4	
8	SCREW, TAPTITE, BH, M2.6, L6	6003-000107	2	
9	CRADLE-PBA		1	
10	SCREW, TAPPING, BH, M2, L6	6002-000342	4	
11	HOLDER-C/D	GH72-40622A	1	
12	LOWER HOUSING-C/D	GH72-40010A	1	
13	SCREW, MACHINE, BH, M3, L8	6001-000556	1	
14	LABEL (R)-ID C/D	GH68-30931A	1	
15	CURL CORD		1	
16	CRADLE DATA CABLE		1	

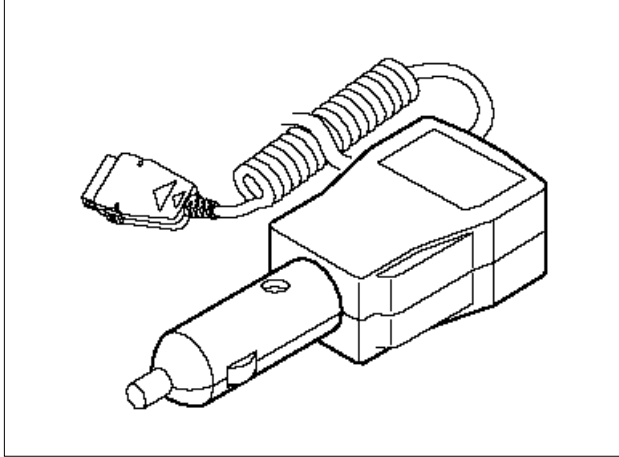
7-7 Desk-Top Rapid Charger Exploded View



7-8 Desk-Top Rapid Charger Parts List

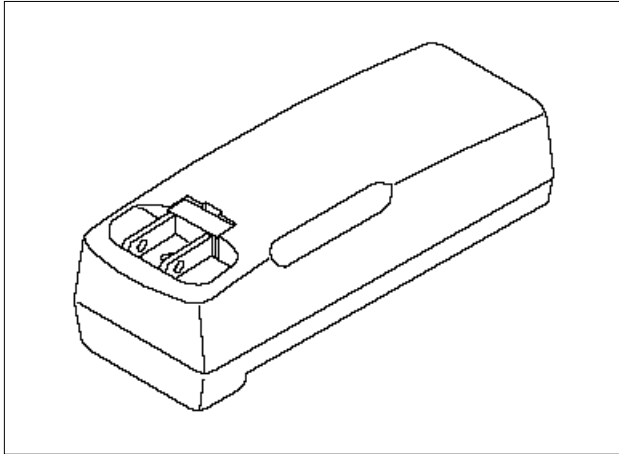
NO	DESCRIPTION	SEC. CODE	Q'TY	REMARK
1	CASE TOP		1	
2	LABEL-LOGO DTC		1	
3	HOOK PLATE (L)		1	
4	HOOK PLATE (B)		2	
5	HOUSING BATT		1	
6	TAPPING SCREW		4	
7	TAPPING SCREW		3	
8	MAIN PBA		1	
9	INSULATION PAPER		1	
10	KNOB		1	
11	CASE BOTTOM		1	
12	TAPPING SCREW		4	
13	FOOT RUBBER		4	
14	LABEL-DTC		1	
15	AC POWER CORD ASSY		1	
16	WASHER		4	
17	HOOK (A)		2	

7-9 Cigarette Lighter Adapter



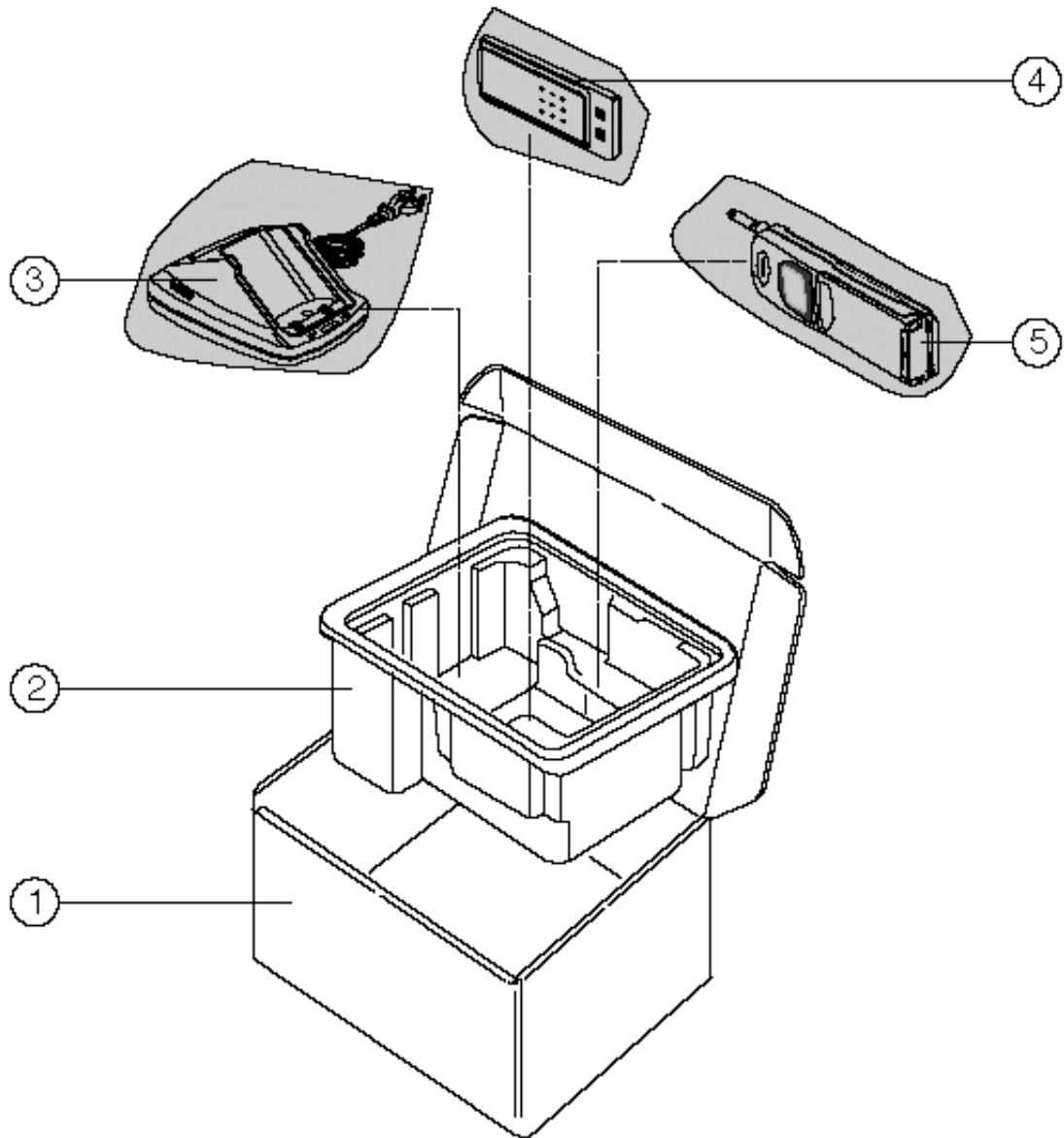
CIGARETTE LIGHTER ADAPTER ASS'Y :
GH44-40012A

7-10 Travel Charger



TRAVEL CHARGER ASS'Y : GH44-40011A

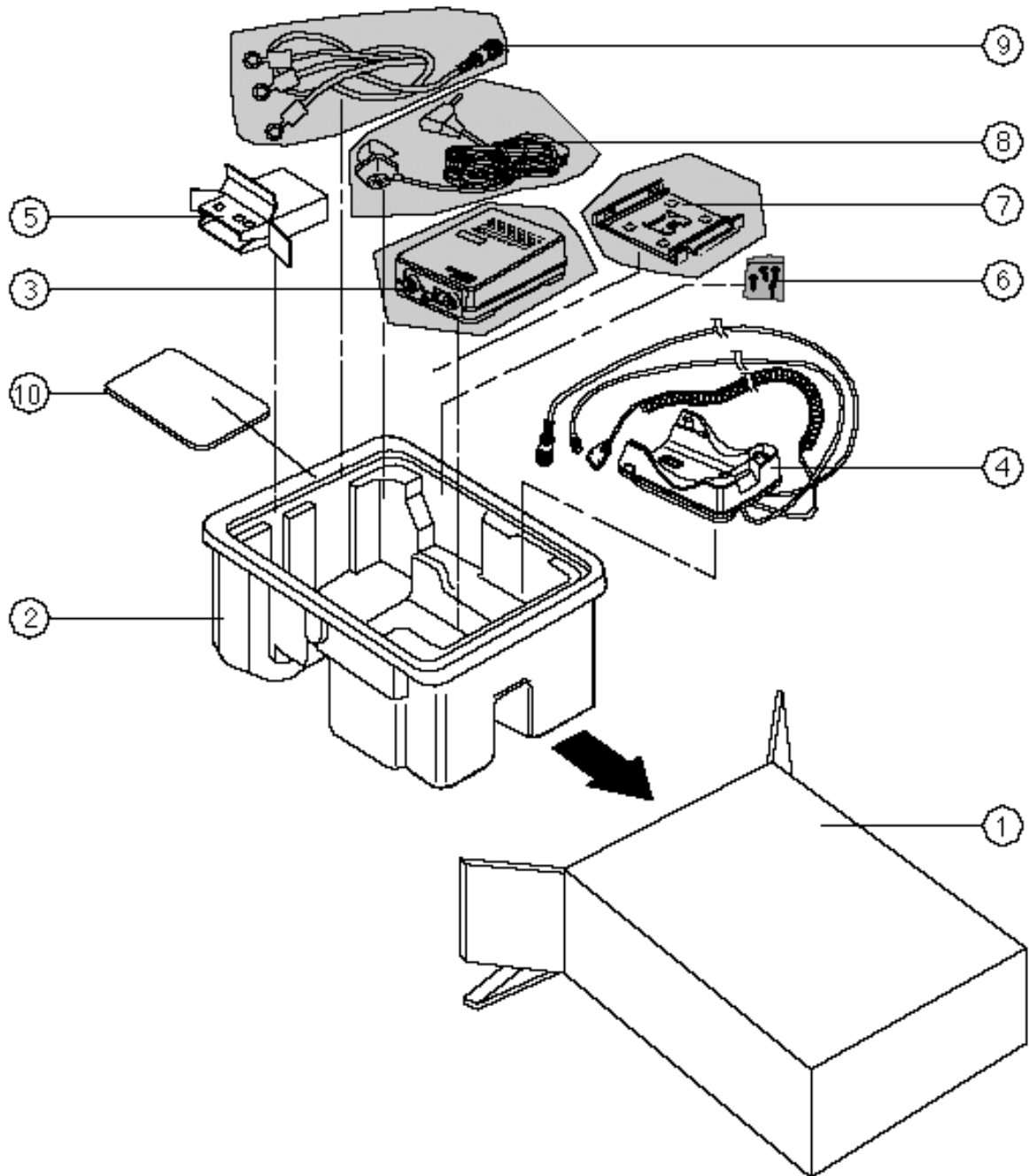
7-11 Main Set Packing Layout



7-12 Main Set Packing Parts List

NO	DESCRIPTION	SEC. CODE	Q'TY	REMARK
1	GIFT BOX MAIN	GH69-10884A	1	
2	CUSHION CASE-MAIN	GH69-20558A	1	
3	DESK TOP CHARGER	GH90-00611A	1	
4	STD BATT. PACK	GH43-10048A	1	
5	MAIN SET		1	

7-13 Hands-Free Kit Packing Layout



7-14 Hands-Free Kit Packing Parts List

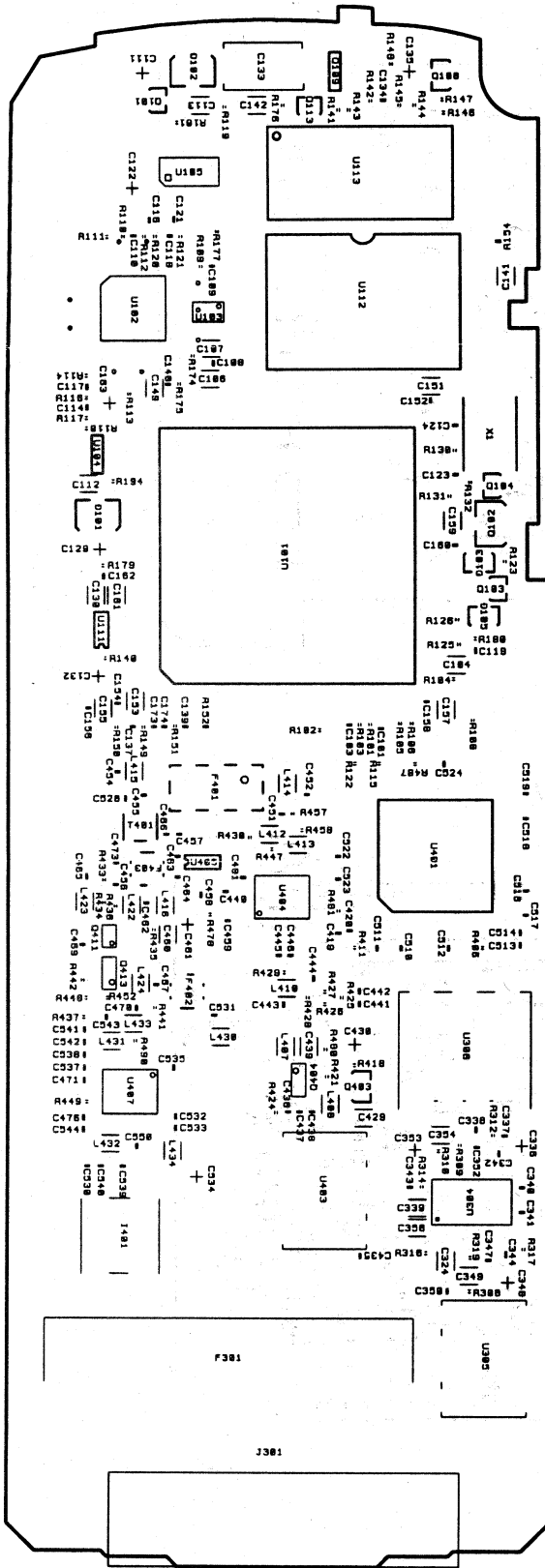
NO	DESCRIPTION	SEC. CODE	Q'TY	REMARK
1	GIFT BOX-H/F	GH69-11069A	1	
2	CUSHION CASE-H/K	GH69-20622A	1	
3	H/F BOX		1	
4	CRADLE		1	
5	CLAM SHELL MOUNT	GH75-10550A	1	
6	SUA INSTALL SCREW	GH75-10552A	1	
7	MTG BRACKET-H/F	GH72-40628A	1	
8	H/F MIC ASS'Y	GH96-000736A	1	
9	PWR-CABLE	GH39-10503A	1	
10	MANUAL			

MEMO

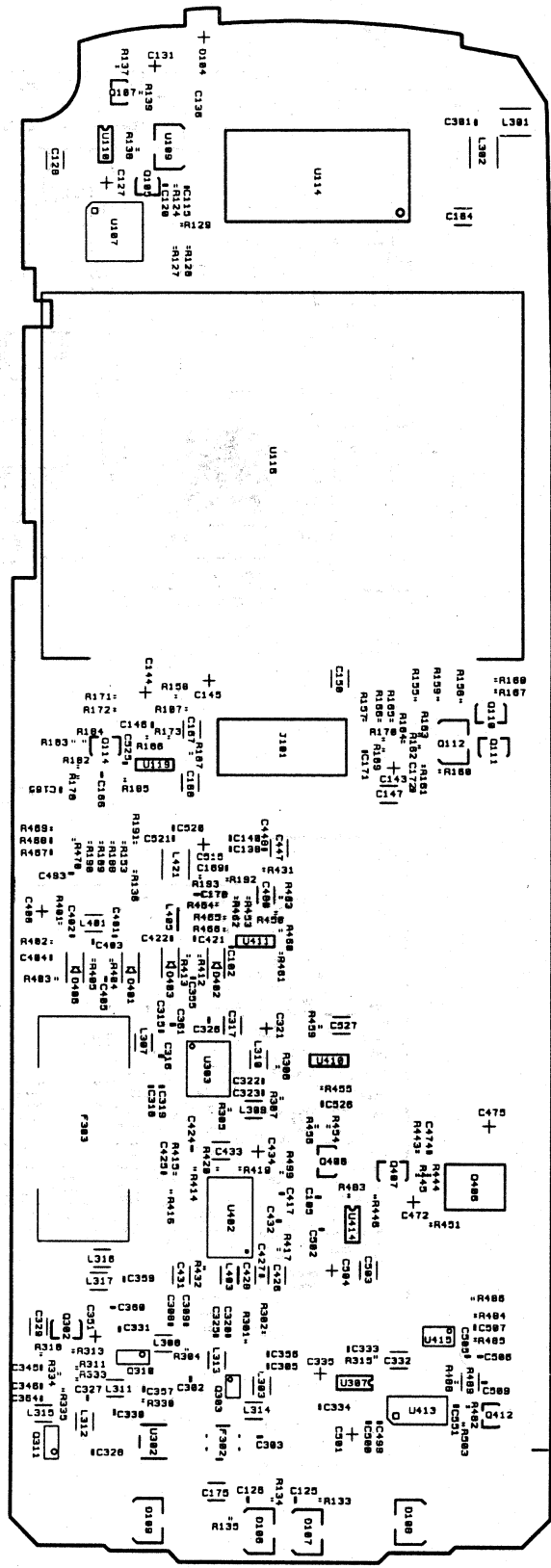
8. PCB Diagrams

8-1 Main

Top View

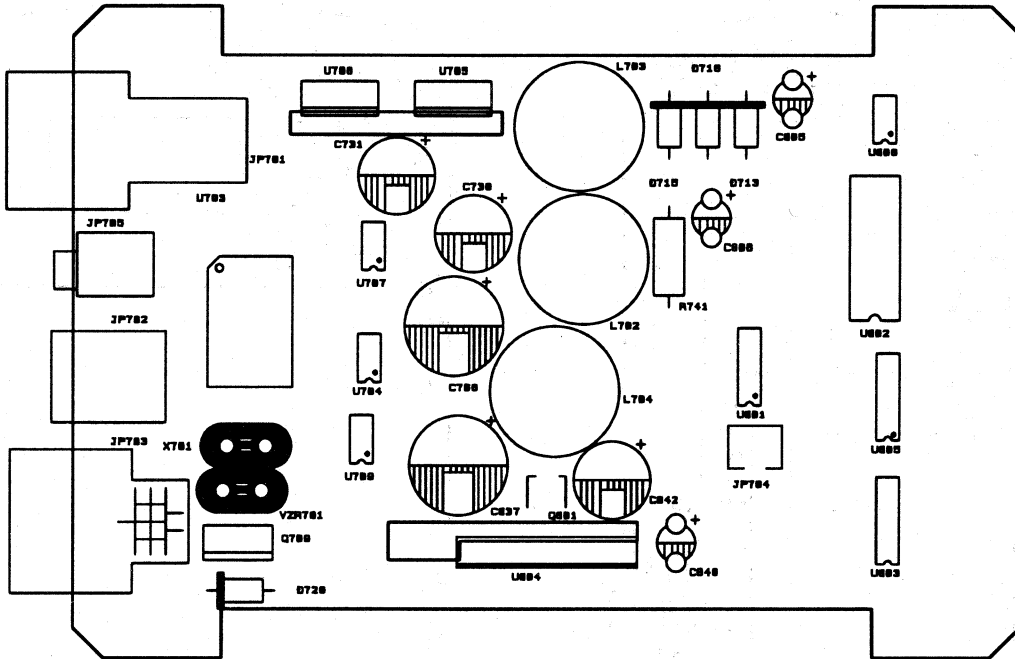


Bottom View

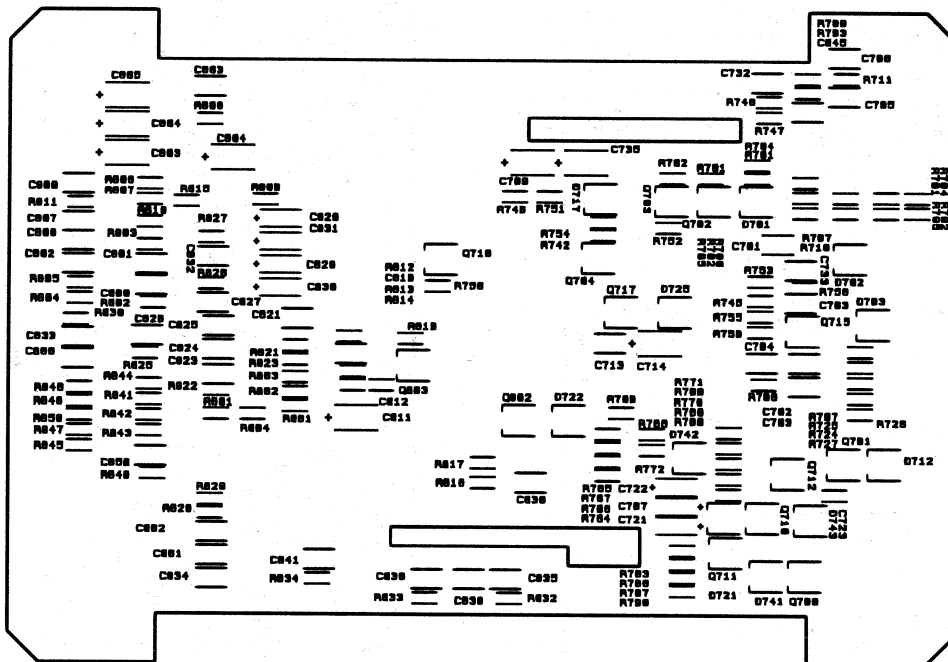


8-2 Hands-Free Car Kit

Top View

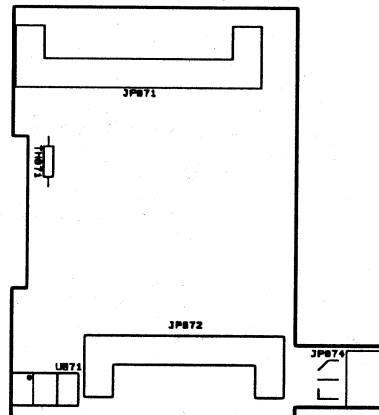


Bottom View

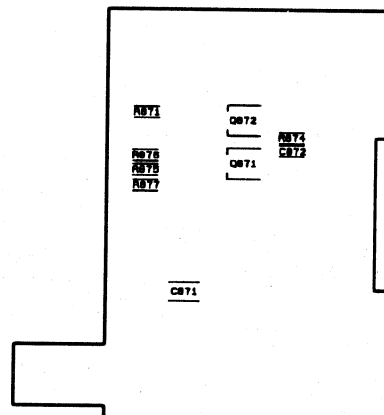


8-3 Cradle

Top View

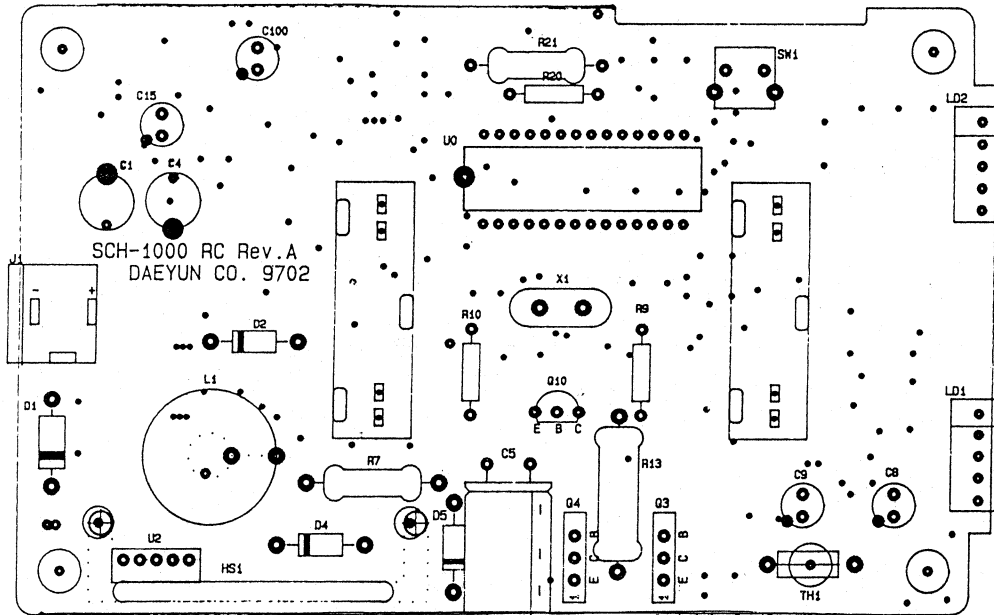


Bottom View

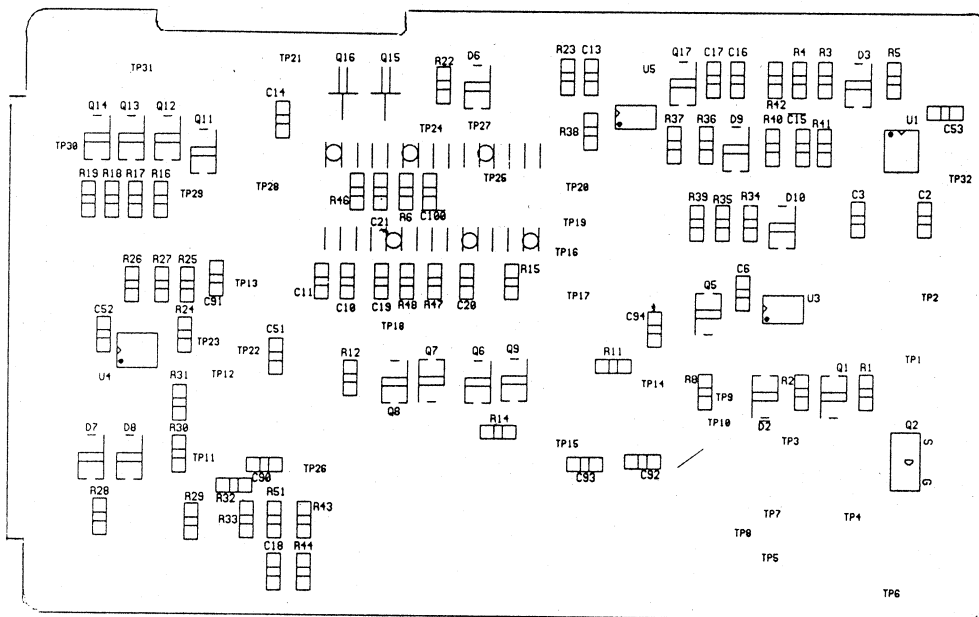


8-4 Desk-Top Rapid Charger

Top View



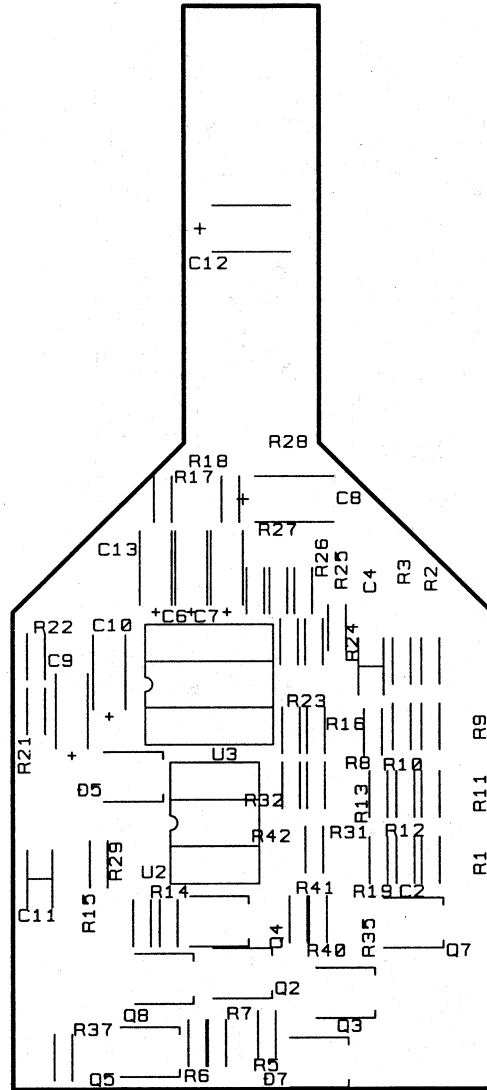
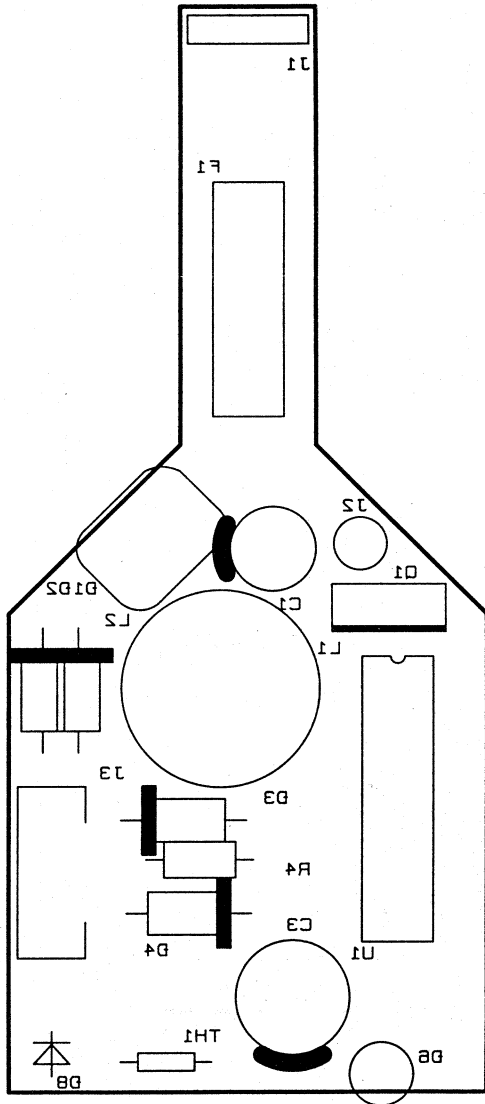
Bottom View



8-5 Cigarette Lighter Adapter

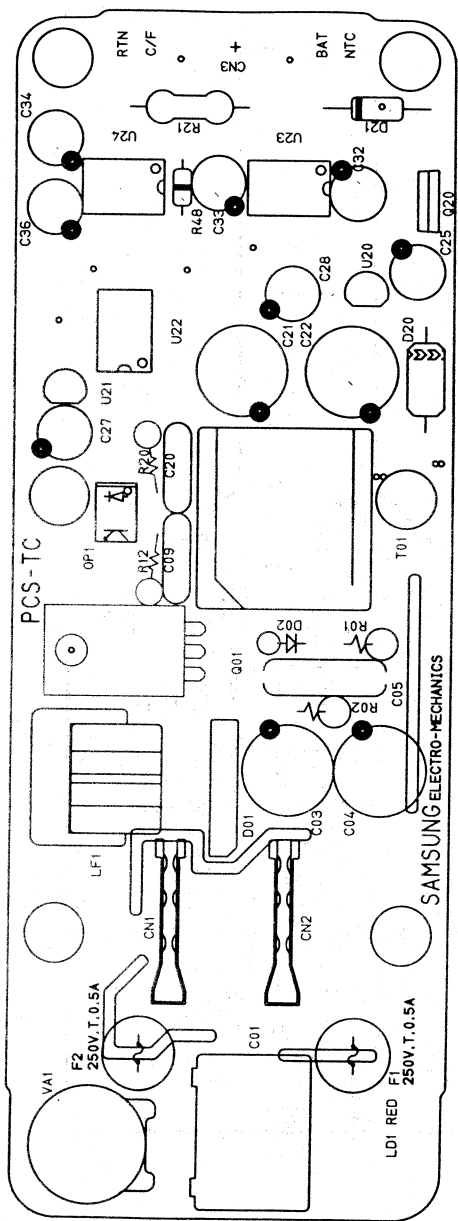
Top View

Bottom View

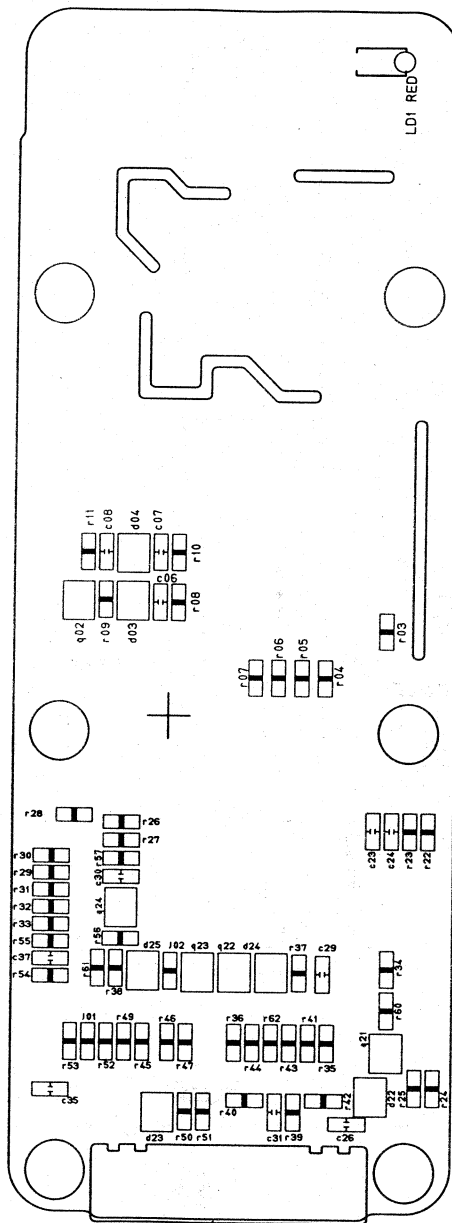


8-6 Travel Charger

Top View



Bottom View



9. Electrical Parts List

9-1 Handset

NO	DESCRIPTION	SEC. CODE	REMARK
- Capacitors -			
C101	Ceramic, Chip, 47nF	2203-001432	
C102	Ceramic, Chip, 33nF	2203-001416	
C104	Ceramic, Chip, 100nF	2203-000189	
C105	Ceramic, Chip, 1nF	2203-000438	
C106, C107	Ceramic, Chip, 100nF	2203-000189	
C108, C109	Ceramic, Chip, 680F	2203-001124	
C110	Ceramic, Chip, 8.2nF	2203-001210	
C111	Tantalum, Chip, 1uF	2404-000151	
C112, C113	Ceramic, Chip, 100nF	2203-000189	
C114	Ceramic, Chip, 1nF	2203-000438	
C115	Ceramic, Chip, 5.6nF	2203-001033	
C116	Ceramic, Chip, 10nF	2203-000254	
C117	Ceramic, Chip, 47nF	2203-001432	
C118	Ceramic, Chip, 390pF	2203-000836	
C119	Ceramic, Chip, 100nF	2203-000189	
C120	Ceramic, Chip, 22nF	2203-001283	
C121	Ceramic, Chip, 2.2nF	2203-000489	
C122	Tantalum, Chip, 2.2uF	2404-000175	
C123, C124	Ceramic, Chip, 5pF	2203-001437	
C125, C126	Ceramic, Chip, 470pF	2203-000940	
C127	Tantalum, Chip, 10uF	2404-000139	
C129	Tantalum, Chip, 10uF	2404-000139	
C130	Ceramic, Chip, 100nF	2203-000189	
C131	Tantalum, Chip, 1uF	2404-000151	
C133	Tantalum, Chip, 100uF	2404-001003	
C134	Ceramic, Chip, 1nF	2203-000438	
C137-C140	Ceramic, Chip, 8.2nF	2203-001210	
C141, C142	Ceramic, Chip, 100nF	2203-000189	
C143-C145	Tantalum, Chip, 4.7uF	2404-000232	
C146	Ceramic, Chip, 10nF	2203-000254	
C147	Ceramic, Chip, 100nF	2203-000189	
C148	Ceramic, Chip, 10nF	2203-000254	
C149-C151	Ceramic, Chip, 100nF	2203-000189	

NO	DESCRIPTION	SEC. CODE	REMARK
C152	Ceramic, Chip, 10nF	2203-000254	
C153	Ceramic, Chip, 100nF	2203-000189	
C154	Ceramic, Chip, 10nF	2203-000254	
C155	Ceramic, Chip, 100nF	2203-000189	
C156	Ceramic, Chip, 10nF	2203-000254	
C157	Ceramic, Chip, 100nF	2203-000189	
C158	Ceramic, Chip, 10nF	2203-000254	
C159	Ceramic, Chip, 100nF	2203-000189	
C160	Ceramic, Chip, 10nF	2203-000254	
C161	Ceramic, Chip, 100nF	2203-000189	
C162	Ceramic, Chip, 10nF	2203-000254	
C163	Tantalum, Chip, 1uF	2404-000151	
C302	Ceramic, Chip, 18pF	2203-000425	
C303	Ceramic, Chip, 30pF	2203-001412	
C304	Ceramic, Chip, 1nF	2203-000440	
C305	Ceramic, Chip, 2.7nF	2203-000530	
C308	Ceramic, Chip, 1nF	2203-000438	
C309	Ceramic, Chip, 10nF	2203-000254	
C315	Ceramic, Chip, 47pF	2203-000995	
C316	Ceramic, Chip, 10nF	2203-000254	
C317	Ceramic, Chip, 100nF	2203-000189	
C318, C319	Ceramic, Chip, 10nF	2203-000254	
C320	Ceramic, Chip, 2.7nF	2203-000530	
C321	Tantalum, Chip, 4.7uF	2404-000232	
C322, C323	Ceramic, Chip, 1nF	2203-000438	
C324	Ceramic, Chip, 100nF	2203-000189	
C325	Ceramic, Chip, 2.7nF	2203-000530	
C326	Ceramic, Chip, 47nF	2203-001432	
C327	Ceramic, Chip, 1nF	2203-000438	
C328	Ceramic, Chip, 22pF	2203-000628	
C329	Ceramic, Chip, 100nF	2203-000189	
C330	Ceramic, Chip, 680pF	2203-001124	
C331	Ceramic, Chip, 4pF	2203-001017	
C332	Ceramic, Chip, 100nF	2203-000189	
C333, C334	Ceramic, Chip, 10nF	2203-000254	
C335, C336	Tantalum, Chip, 10uF	2404-000139	
C337, C338	Ceramic, Chip, 10nF	2203-000254	
C339	Ceramic, Chip, 100nF	2203-000189	

NO	DESCRIPTION	SEC. CODE	REMARK
C340-C342	Ceramic, Chip, 100pF	2203-000233	
C343	Ceramic, Chip, 10nF	2203-000254	
C344	Ceramic, Chip, 100pF	2203-000233	
C345	Ceramic, Chip, 10pF	2203-000278	
C346	Ceramic, Chip, 1nF	2203-000438	
C347	Ceramic, Chip, 100pF	2203-000233	
C348	Tantalum, Chip, 1.5uF	2404-000274	
C349	Ceramic, Chip, 100nF	2203-000189	
C350	Ceramic, Chip, 2.2nF	2203-000489	
C351	Tantalum, Chip, 10uF	2404-000139	
C352	Ceramic, Chip, 100pF	2203-000233	
C353	Tantalum, Chip, 1.5uF	2404-000274	
C354	Ceramic, Chip, 100nF	2203-000189	
C356	Ceramic, Chip, 2.7nF	2203-000530	
C357	Ceramic, Chip, 10nF	2203-000254	
C358	Ceramic, Chip, 100nF	2203-000189	
C359	Ceramic, Chip, 27pF	2203-000679	
C360	Ceramic, Chip, 10nF	2203-000254	
C361	Ceramic, Chip, 15pF	2203-000386	
C362	Ceramic, Chip, 10pF	2203-000278	
C364	Ceramic, Chip, 1pF	2203-000466	
C401, C402	Ceramic, Chip, 100pF	2203-000233	
C403	Ceramic, Chip, 6pF	2203-001180	
C404	Ceramic, Chip, 47nF	2203-001432	
C405	Ceramic, Chip, 1nF	2203-000438	
C406	Tantalum, Chip, 2.2uF	2404-000167	
C420	Ceramic, Chip, 100pF	2203-000233	
C421, C422	Ceramic, Chip, 33pF	2203-000812	
C423	Ceramic, Chip, 3pF	2203-000870	
C437	Ceramic, Chip, 10pF	2203-000278	
C439-C442	Ceramic, Chip, 1nF	2203-000438	
C445, C446	Ceramic, Chip, 10pF	2203-000278	
C447	Ceramic, Chip, 100nF	2203-000189	
C448	Ceramic, Chip, 1nF	2203-000438	
C451, C452	Ceramic, Chip, 1nF	2203-000438	
C457	Ceramic, Chip, 1nF	2203-000438	
C464	Ceramic, Chip, 1nF	2203-000438	
C467	Ceramic, Chip, 1nF	2203-000466	

NO	DESCRIPTION	SEC. CODE	REMARK
C469	Ceramic, Chip, 15pF	2203-000386	
C470	Ceramic, Chip, 1nF	2203-000438	
C471	Ceramic, Chip, 100pF	2203-000233	
C472	Ceramic, Chip, 100nF	2203-000189	
C473	Ceramic, Chip, 1nF	2203-000438	
C474	Ceramic, Chip, 10nF	2203-000254	
C475	Tantalum, Chip, 4.7uF	2404-000232	
C476	Ceramic, Chip, 220pF	2203-000585	
C477	Ceramic, Chip, 1nF	2203-000438	
C480	Ceramic, Chip, 100nF	2203-000189	
C481	Ceramic, Chip, 220pF	2203-000585	
C491	Ceramic, Chip, 1nF	2203-000466	
C492	Ceramic, Chip, 1nF	2203-000438	
C493	Ceramic, Chip, 100pF	2203-000233	
C499, C500	Ceramic, Chip, 10nF	2203-000254	
C501	Tantalum, Chip, 10uF	2404-000139	
C502	Ceramic, Chip, 10nF	2203-000254	
C503	Ceramic, Chip, 100nF	2203-000189	
C504	Tantalum, Chip, 10uF	2404-000139	
C505	Ceramic, Chip, 100pF	2203-000233	
C506	Ceramic, Chip, 10nF	2203-000254	
C507, C508	Ceramic, Chip, 100nF	2203-000189	
C509	Ceramic, Chip, 100pF	2203-000233	
C510	Ceramic, Chip, 10nF	2203-000254	
C511	Ceramic, Chip, 1nF	2203-000438	
C512, C513	Ceramic, Chip, 10nF	2203-000254	
C514	Ceramic, Chip, 1nF	2203-000438	
C515	Tantalum, Chip, 10uF	2404-000139	
C516	Ceramic, Chip, 10nF	2203-000254	
C517	Ceramic, Chip, 1nF	2203-000438	
C518	Ceramic, Chip, 10nF	2203-000254	
C519	Ceramic, Chip, 1nF	2203-000438	
C520	Ceramic, Chip, 10nF	2203-000254	
C521	Ceramic, Chip, 1nF	2203-000438	
C522	Ceramic, Chip, 10nF	2203-000254	
C523	Ceramic, Chip, 1nF	2203-000438	
C524	Ceramic, Chip, 10nF	2203-000254	

NO	DESCRIPTION	SEC. CODE	REMARK
C525	Ceramic, Chip, 1nF	2203-000438	
C526	Ceramic, Chip, 47nF	2203-001432	
C527	Ceramic, Chip, 100nF	2203-000189	
C530	Ceramic, Chip, 1nF	2203-000438	
C531	Ceramic, Chip, 10pF	2203-000278	
C532	Ceramic, Chip, 220pF	2203-000585	
C533	Ceramic, Chip, 100nF	2203-000189	
C534	Tantalum, Chip, 4.7uF	2404-000232	
C535	Ceramic, Chip, 33nF	2203-001416	
C537	Ceramic, Chip, 33nF	2203-001416	
C538	Ceramic, Chip, 15pF	2203-000386	
C541	Ceramic, Chip, 10pF	2203-000278	
C542	Ceramic, Chip, 220pF	2203-000585	
C543	Ceramic, Chip, 9pF	2203-001283	
C544	Ceramic, Chip, 33nF	2203-001416	
C550	Ceramic, Chip, 2pF	2203-000696	
C551	Ceramic, Chip, 10nF	2203-000254	
- Diodes -			
D101, D102	Diode, Array, KDS226	0407-000122	
D103	Diode, Array, DAN202U	0407-000115	
D105	Diode, Array, DAN202U	0407-000115	
D106, D107	Diode, Array, KDS226	0407-000122	
D401 ~ D403	Diode, Varactor, ISV229	0405-000107	
D406	Diode, Varactor, ISV229	0405-000107	
- Filters -			
F301	Filter-Duplexer, 1960MHz	2904-001037	
F302	Filter-SAW, 1960MHz	2904-001021	
F303	Filter-SAW, 210.38MHz	2904-001071	
F401	Filter-SAW, 1880MHz	2904-001020	
F402, F403	Filter-BPF, SCH-1000D	GH29-30502A	
- Connectors -			
J101	Connector, Socket	3710-001117	
J301	Connector, Socket	3710-0010221	

NO	DESCRIPTION	SEC. CODE	REMARK
- Coils -			
L303	Inductor, SMD, 100nH	2703-001172	
L307, L308	Inductor, SMD, 100nH	2703-001172	
L309, L310	Inductor, SMD, 2.7uH	2703-000301	
L311	Inductor, SMD, 47nH	2703-001259	
L312	Inductor, SMD, 8.2nH	2703-001167	
L313	Inductor, SMD, 2.2nH	2703-001205	
L314	Inductor, SMD, 4.7nH	2703-001165	
L315	Inductor, SMD, 2.2nH	2703-001205	
L316	Inductor, SMD, 12nH	2703-001173	
L317	Inductor, SMD, 56nH	2703-001175	
L401	Inductor, SMD, 27nH	2703-000304	
L405	Inductor, SMD, 15nH	2703-000302	
L407	Inductor, SMD, 1.2nH	2703-001204	
L412, L413	Inductor, SMD, 2.7nH	2703-000301	
L414	Inductor, SMD, 1nH	2703-000300	
L421	Inductor, SMD, 750nH	2703-000273	
L423	Inductor, SMD, 180nH	2703-000144	
L424, L425	Inductor, SMD, 3.3nH	2703-001258	
L431	Inductor, SMD, 4.7nH	2703-001165	
L432-L436	Inductor, SMD, 47nH	2703-001259	
- Transistors -			
Q101	Digital, RN2104	0504-000172	
Q102	Small Signal:MMBT2222A	0501-000457	
Q103	Digital, RN2104	0504-000172	
Q104, Q105	Digital, RN1102	0504-000167	
Q107	Digital, RN1104	0504-000168	
Q108	Small Signal:2SC4081	0501-000218	
Q110	Small Signal:2SA1576	0501-000162	
Q111	Small Signal:2SC4081	0501-000218	
Q112	Small Signal:MMBT2222A	0501-000457	
Q113	Digital, RN1104	0504-000168	
Q302	Small Signal:2SC4081	0501-000218	
Q303	Small Signal:BFP405	0501-002037	
Q310, Q311	Small Signal:AT-32011	0501-002060	

NO	DESCRIPTION	SEC. CODE	REMARK
Q404	Small Signal:AT-32011	0501-002060	
Q406	Small Signal:MMBT2907A	0501-000462	
Q407	Small Signal:2SC4081	0501-000218	
Q408	Small Signal:2SA1576	0501-000162	
Q412	Digital, RN1102	0504-000167	
Q413	Small Signal:AT-32011	0501-002060	
	- Resistors -		
R101	Chip, 470ohm, 5%	2007-000932	
R102	Chip, 10Kohm, 5%	2007-000148	
R103	Chip, 0ohm, 5%	2007-000171	
R104	Chip, 47Kohm, 5%	2007-000157	
R105	Chip, 22Kohm, 5%	2007-000153	
R106	Chip, 470ohm, 5%	2007-000932	
R107	Chip, 22Kohm, 5%	2007-000153	
R108	Chip, 47Kohm, 5%	2007-000157	
R109	Chip, 58Kohm, 5%	2007-000160	
R110	Chip, 47Kohm, 5%	2007-000157	
R111	Chip, 4.7Kohm, 5%	2007-000143	
R112	Chip, 75Kohm, 5%	2007-007021	
R113	Chip, 1Kohm, 5%	2007-000140	
R114	Chip, 10Kohm, 5%	2007-000148	
R116	Chip, 150Kohm, 5%	2007-000164	
R117	Chip, 100Kohm, 5%	2007-000162	
R118	Chip, 150Kohm, 5%	2007-000164	
R119	Chip, 30Kohm, 5%	2007-000156	
R120	Chip, 82Kohm, 5%	2007-000161	
R121	Chip, 91Kohm, 5%	2007-001244	
R123	Chip, 1Kohm, 5%	2007-000140	
R124	Chip, 4.7Kohm, 5%	2007-000143	
R125	Chip, 39Kohm, 5%	2007-000831	
R126	Chip, 3.3Kohm, 5%	2007-001325	
R127	Chip, 1Kohm, 5%	2007-000140	
R128	Chip, 15Kohm, 5%	2007-000151	
R130	Chip, 1Mohm, 5%	2007-000170	
R132	Chip, 150ohm, 5%	2007-001306	
R133,R134	Chip, 470ohm, 5%	2007-000932	

NO	DESCRIPTION	SEC. CODE	REMARK
R137	Chip, 120ohm, 5%	2007-001305	
R138	Chip, 10Kohm, 5%	2007-000148	
R140	Chip, 150Kohm, 5%	2007-000164	
R141, R142	Chip, 100Kohm, 5%	2007-000162	
R143	Chip, 4.7Kohm, 5%	2007-000143	
R144, R145	Chip, 100Kohm, 5%	2007-000162	
R146	Chip, 2.2Kohm, 5%	2007-000141	
R147, R148	Chip, 100Kohm, 5%	2007-000162	
R149-R152	Chip, 20Kohm, 5%	2007-000152	
R154	Chip, 10Kohm, 5%	2007-000148	
R155	Chip, 91Kohm, 5%	2007-001244	
R156	Chip, 1Kohm, 5%	2007-000140	
R157, R158	Chip, 68ohm, 5%	2007-001301	
R159	Chip, 22Kohm, 5%	2007-000153	
R160	Chip, 3.3Kohm, 5%	2007-001325	
R161	Chip, 10ohm, 5%	2007-000172	
R162, R163	Chip, 10Kohm, 5%	2007-000148	
R164, R165	Chip, 0ohm, 5%	2007-000171	
R165, R166	Chip, 10Kohm, 5%	2007-000148	
R167	Chip, 4.7Kohm, 5%	2007-000143	
R168	Chip, 39Kohm, 5%	2007-000831	
R169	Chip, 10Kohm, 5%	2007-000148	
R170	Chip, 3.9Kohm, 5%	2007-007001	
R171, R172	Chip, 100ohm, 5%	2007-000138	
R173	Chip, 100Kohm, 5%	2007-000162	
R174	Chip, 2Kohm, 5%	2007-000137	
R175	Chip, 10Kohm, 5%	2007-000148	
R176	Chip, 100Kohm, 5%	2007-000162	
R179	Chip, 4.7Kohm, 5%	2007-000143	
R180	Chip, 1.2Kohm, 5%	2007-001319	
R181	Chip, 3.9Kohm, 5%	2007-007001	
R184	Chip, 0ohm, 5%	2007-000171	
R194	Chip, 4.7Kohm, 5%	2007-000143	
R196	Chip, 10Kohm, 5%	2007-000148	
R197	Chip, 270Kohm, 5%	2007-000636	
R199	Chip, 0ohm, 5%	2007-000171	
R301	Chip, 24Kohm, 5%	2007-000154	

NO	DESCRIPTION	SEC. CODE	REMARK
R304	Chip, 110ohm, 5%	2007-000322	
R302	Chip, 100ohm, 5%	2007-000138	
R305	Chip, 56ohm, 5%	2007-002970	
R306, R307	Chip, 0ohm, 5%	2007-000171	
R308	Chip, 3.9Kohm, 5%	2007-007001	
R309	Chip, 0ohm, 5%	2007-000171	
R310	Chip, 470ohm, 5%	2007-000932	
R311	Chip, 110ohm, 5%	2007-000322	
R312	Chip, 100ohm, 5%	2007-000138	
R313	Chip, 1Kohm, 5%	2007-000140	
R314	Chip, 390ohm, 5%	2007-007095	
R315	Chip, 47Kohm, 5%	2007-000157	
R316	Chip, 100ohm, 5%	2007-000138	
R317	Chip, 1Kohm, 5%	2007-000140	
R318	Chip, 100ohm, 5%	2007-000138	
R319	Chip, 1.2Kohm, 5%	2007-001319	
R330	Chip, 56Kohm, 5%	2007-000159	
R333, R334	Chip, 8.2Kohm, 5%	2007-000147	
R335	Chip, 15Kohm, 5%	2007-000151	
R336	Chip, 0ohm, 5%	2007-000151	
R401	Chip, 10Kohm, 5%	2007-000171	
R402	Chip, 1.8Kohm, 5%	2007-001320	
R403-R405	Chip, 10Kohm, 5%	2007-000148	
R406	Chip, 39Kohm, 5%	2007-000831	
R411	Chip, 100ohm, 5%	2007-000138	
R412, R413	Chip, 10Kohm, 5%	2007-000148	
R415	Chip, 0ohm, 5%	2007-000070	
R421	Chip, 10Kohm, 5%	2007-000148	
R422	Chip, 0ohm, 5%	2007-000070	
R425	Chip, 560ohm, 5%	2007-002797	
R426, R427	Chip, 5.6Kohm, 5%	2007-000982	
R428	Chip, 1.2Kohm, 5%	2007-001319	
R430	Chip, 39ohm, 5%	2007-001295	
R431	Chip, 30ohm, 5%	2007-001291	
R433	Chip, 470ohm, 5%	2007-000932	
R434-R436	Chip, 10ohm, 5%	2007-000172	
R441	Chip, 100ohm, 5%	2007-000138	

NO	DESCRIPTION	SEC. CODE	REMARK
R443	Chip, 22Kohm, 5%	2007-000153	
R444	Chip, 8.2Kohm, 5%	2007-000147	
R445	Chip, 12Kohm, 5%	2007-000149	
R446	Chip, 1Kohm, 5%	2007-000140	
R447	Chip, 470ohm, 5%	2007-000932	
R449	Chip, 180ohm, 5%	2007-001307	
R450	Chip, 4.7Kohm, 5%	2007-000143	
R451	Chip, 24ohm, 5%	2007-000618	
R452	Chip, 12Kohm, 5%	2007-000149	
R453	Chip, 10ohm, 5%	2007-000172	
R455	Chip, 4.7Kohm, 5%	2007-000143	
R456	Chip, 12Kohm, 5%	2007-000149	
R457	Chip, 39ohm, 5%	2007-001295	
R458	Chip, 470ohm, 5%	2007-000932	
R459	Chip, 47Kohm, 5%	2007-000157	
R460	Chip, 1Kohm, 5%	2007-000140	
R461	Chip, 100Kohm, 5%	2007-000162	
R462	Chip, 9.1Kohm, 5%	2007-007013	
R463	Chip, 10Kohm, 5%	2007-000148	
R464	Chip, 3.3Kohm, 5%	2007-001325	
R465	Chip, 39Kohm, 5%	2007-000831	
R466	Chip, 1Kohm, 5%	2007-000140	
R467-R470	Chip, 0ohm, 5%	2007-000171	
R480	Chip, 820ohm, 5%	2007-001316	
R481	Chip, 100ohm, 5%	2007-000138	
R482	Chip, 56Kohm, 5%	2007-000159	
R483	Chip, 100Kohm, 5%	2007-000162	
R485	Chip, 100ohm, 5%	2007-000138	
R486	Chip, 2.7Kohm, 5%	2007-000142	
R488	Chip, 15Kohm, 1%	2007-007132	
R489	Chip, 12Kohm, 1%	2007-007309	
R499	Chip, 1.2Kohm, 5%	2007-001319	
R503	Chip, 1.2Kohm, 5%	2007-001319	

NO	DESCRIPTION	SEC. CODE	REMARK
- IC's -			
U101	IC, Data COMM., GEN.	1205-001196	
U102	IC, ASP, TLV320AC361PT	1204-001106	
U103	IC, TTL, 4W53	0803-003010	
U104	IC, OP Amp, 7101	1201-001006	
U105	IC, Audio Amp, 860	1201-000103	
U109	IC, EEPROM 24LC65	1103-000171	
U110	IC, Voltage Regulator	1203-001335	
U111	IC, Voltage Regulator	1203-000384	
U112	IC, Flash Memory	1107-001033	
U113	IC, SRAM, 68V2000	1106-001130	
U118, U119	IC, CMOS Logic, 7S04	0801-000885	
U303	IC, AGC Amp, 5500	1201-001075	
U304	IC, PLL Synthesiser	1209-001064	
U307	IC, Switch Regulator	1203-001201	
U401	IC, Data COMM., GEN.	1205-001203	
U404	IC, AGC Amp, 5505	1201-001076	
U405	IC, Mixer, MRFIC1813	1205-001267	
U407	IC, Power Amp, 21007	1201-001077	
U410, U411	IC, OP Amp, 7101	1201-001006	
U414	IC, Switch Regulator	1203-001201	
U415	IC, TTL, 4W53	0803-003010	
- Miscellaneous -			
D104	LED, Chip, RED	0601-000355	
I401	Freq Isolator, 800M-20GHz	4709-001022	
TH401	Thermistor-NTC, 10Kohm	1404-001040	
U302	Freq, Mixer, DC-400MHz	4709-001029	
U305	Oscillator, VCO	2806-001022	
U306	Oscillator, VCTCXO	2809-001205	
U413	FET-Slicon, SI9933DY	0505-000329	
X1	Resonator Ceramic, 27MHz	2802-001048	

9-2 Hands-free Car Kit

9-2-1 SCH-1900 HFK

NO	DESCRIPTION	SEC. CODE	REMARK
- Capacitors -			
C701, C702	Chip, 0.1U	2203-000204	
C703, C704	Chip, 3P	2203-000874	
C705, C706	0.01U	2203-000260	
C713	Chip, 0.1U	2203-000204	
C714	Tantalum, 10U, 10V	2404-000120	
C721, C722	Tantalum, 2.2U, 35V	2404-000292	
C723	0.01U	2203-000260	
C730, C731	1000U, 16V	2401-000039	
C732	Chip, 0.1U	2203-000204	
C733	Chip, 1000P	2203-000440	
C735	Tantalum, 10U, 10V	2404-000120	
C763	Chip, 0.1U	2203-000204	
C767	Tantalum, 2.2U, 35V	2404-000292	
C768	1000U, 25V	2401-000164	
C769	Tantalum, 10U, 10V	2404-000120	
C800-C802	Chip, 0.1U	2203-000204	
C803	Tantalum, 4.7U, 10V	2404-000234	
C804	Tantalum, 22U, 6.3V	2404-000304	
C805, C806	47U, 16V	2401-001509	
C807, C808	Chip, 0.1U	2203-000204	
C809	Chip, 330P	2203-000778	
C810	Chip, 0.1U	2203-000204	
C811	Tantalum, 10U, 10V	2404-000120	
C812	0.01U	2203-000260	
C821	Chip, 0.1U	2203-000204	
C824	Chip, 0.1U	2203-000204	
C825	Chip, 4700P	2203-000891	
C826, C827	Chip, 0.1U	2203-000204	
C828	Tantalum, 2.2U, 35V	2404-000292	
C829, C830	Tantalum, 0.47, 35V	2404-000272	
C831	Tantalum, 2.2U, 35V	2404-000292	
C832	Chip, 0.1U	2203-000204	

NO	DESCRIPTION	SEC. CODE	REMARK
C833, C834	0.01U	2203-000260	
C835, C836	Chip, 0.1U	2203-000204	
C837	470U, 25V	2401-001781	
C838	Chip, 0.1U	2203-000204	
C839	0.01U	2203-000260	
C840	100U, 16V	2401-000042	
C841	Chip, 0.1U	2203-000204	
C842	1000U, 16V	2401-000135	
C845	Chip, 0.1U	2203-000204	
C856	Chip, 0.1U	2203-000204	
C861-C863	Chip, 0.1U	2203-000204	
C864, C865	Tantalum, 10U, 10V	2404-000120	
C866	Chip, 0.1U	2203-000204	
- Diodes -			
D701, D702	Diode, 1SS226	0407-000122	
D713	Diode, 1N5818	0402-000164	
D715, D716	Diode, 1N5818	0402-000164	
D717	Diode, 1SS226	0407-000122	
D720	Diode, 1N4004	0402-000345	
D721	Diode, 1SS184	0407-000123	
D722	Diode, MMBZ5234BL	0403-000283	
D725	Diode, MMBZ5234BL	0403-000283	
D741-D743	Diode, 1SS184	0407-000123	
- Connectors -			
JP701	Connector, RP13A-12RC-20PB	3706-000121	
JP702	Connector, 623PCB6-B	3722-000574	
JP703	Connector, RP13A-12RC-13PB	3706-000122	
JP704	Connector, 2P-S2T2	3711-000443	
JP705	Connector, HSJ1045-01-010	3722-001149	
- Coil -			
L702-L704	Coil, HP-012Z	GH27-40001A	

NO	DESCRIPTION	SEC. CODE	REMARK
- Transistors -			
Q701-Q703	KSR1104	0504-000129	
Q704	MMBT2907A	0501-000462	
Q708	KSR2102	0504-000154	
Q709	IRF9540	0505-000340	
Q710-Q712	KSR1104	0504-000129	
Q715	KSR1104	0504-000129	
Q717, Q718	KSR1104	0504-000129	
Q801	Chip, 2SA1213	0501-000158	
Q802, Q803	KSR1104	0504-000129	
- Resistors -			
R701	Chip, 10K	2007-000090	
R702	Chip, 43K	2007-000913	
R704, R705	Chip, 100K	2007-000102	
R706, R707	Chip, 10K	2007-000090	
R708	Chip, Inductor, 1M	2007-000109	
R709	Chip, 4.7K	2007-000871	
R710	Chip, 10K	2007-000090	
R711	Chip, 12K	2007-000354	
R741	Metal, 0.5	2003-000113	
R742	Chip, 1K	2007-000078	
R745	Chip, 6.2K	2007-001056	
R746	Chip, 12K	2007-000354	
R747	Chip, 22K	2007-000094	
R748	Chip, 5.6K	2007-000086	
R750	Chip, 6.2K	2007-001056	
R751, R752	Chip, 18K	2007-000458	
R753	Chip, 12K	2007-000354	
R754	Chip, 22K	2007-000094	
R755	Chip, 100K	2007-000102	
R756	Chip, 22K	2007-000094	
R758	Chip, 10K	2007-000090	
R763	Chip, Inductor, 1M	2007-000109	
R764	Chip, 10K	2007-000090	
R765	Chip, Inductor, 1M	2007-000109	
R766	Chip, 12K	2007-000354	

NO	DESCRIPTION	SEC. CODE	REMARK
R767	Chip, 22K	2007-000094	
R768, R769	Chip, Inductor, 1M	2007-000109	
R770	Chip, 10K	2007-000090	
R771	Chip, 100K	2007-000102	
R772	Chip, 100K	2007-000102	
R781, R782	Chip, 22K	2007-000094	
R787	Chip, 100K	2007-000102	
R788	Chip, 10K	2007-000090	
R789	Chip, Inductor, 1M	2007-000109	
R790	Chip, 10K	2007-000090	
R791	Chip, 4.7K	2007-000871	
R792	Chip, 1K	2007-000078	
R793	Chip, 120K	2007-000103	
R794-R797	Chip, 10K	2007-000090	
R799	Chip, 43K	2007-000913	
R801, R802	Chip, 330K	2007-000133	
R803	Chip, 5.1K	2007-000965	
R804	Chip, 56K	2007-000098	
R805	Chip, 10K	2007-000090	
R806	Chip, 120K	2007-000103	
R807	Chip, 10K	2007-000090	
R808, R809	Chip, 100K	2007-000102	
R810	Chip, 5.1K	2007-000965	
R811	Chip, 220K	2007-000106	
R812	Chip, 47K	2007-000097	
R813	Chip, 1K	2007-000078	
R814	Chip, 2.2K	2007-000124	
R815	Chip, 330K	2007-000133	
R816	Chip, 10K	2007-000090	
R817	Chip, 2.2K	2007-000124	
R818	Chip, 100K	2007-000102	
R821-R823	Chip, 330K	2007-000133	
R825	Chip, 56K	2007-000098	
R826, R827	Chip, 5.1K	2007-000965	
R828	Chip, 22K	2007-000094	
R829	Chip, 47K	2007-000097	

NO	DESCRIPTION	SEC. CODE	REMARK
R830	Chip, 10K	2007-000090	
R832	Chip, 330K	2007-000133	
R833	Chip, 120K	2007-000103	
R834	Chip, 3.3	2007-000695	
R842	Chip, 180K	2007-000132	
R843	Chip, 120K	2007-000103	
R844	Chip, 82K	2007-000101	
R845	Chip, 56K	2007-000098	
R846	Chip, 33K	2007-000134	
R847	Chip, 15K	2007-000092	
R848	Chip, 5.1K	2007-000965	
R849	Chip, 100K	2007-000102	
R850	Chip, 22K	2007-000094	
R861-R863	Chip, 330K	2007-000133	
R864	Chip, 100	2007-000074	
- IC's -			
U703	IC, TMP91P640-10	0903-000123	
U704	IC, LP2951ACM	1203-000148	
U705, U706	IC, LM2576	1203-000185	
U707, U709	IC, LM2904D	1201-000181	
U801	IC, LM2902D	1201-000239	
U802	IC, MC34118DW	1204-000282	
U803	IC, MC14053BD	1001-000171	
U804	IC, TDA1010	1201-000386	
U805	IC, MC14051BD	1201-000121	
U808	IC, ICL7660	1203-000269	
- Miscellaneous -			
VZR701	VZR, ENB330D-10B	1405-000136	
X701	X-Tal, 4.9152MHz	2801-003292	

9-2-2 SCH-1900 Cradle

NO	DESCRIPTION	SEC. CODE	REMARK
- Capacitors -			
C871	GRM40X7R104K25PT	2203-000204	
C872	GRM39COG221J50PT	2203-000592	
- Diode -			
D873	SLV-1529SAM5207-(B)	0604-000353	
- Connectors -			
JP871	Connector, Gils-15P-S2L2-EF	3711-000425	
JP872	Connector, Gils-12P-S2L2-EF	3711-002036	
JP874	Connector, ESQ-103-44-T-D	3711-002036	
- Transistor -			
Q871, Q872	Digital, KAR1104	0504-000129	
- Resistors -			
R871	MCRO3EZHZ221T	3711-002036	
R874	MCRO3GEZH123T	2007-000354	
R875, R876	MCRO3EZHZ331T	3711-002036	
R877	MCRO3EZHZ102T	3711-002036	
- Miscellaneous -			
TH871	NTH300XQ103E01	0604-000118	
U871	SG-215	0604-000166	

9-2-3 Cable & Accessories

NO	DESCRIPTION	SEC. CODE	REMARK
	Antenna, Gold	GH96-00733A	
	Microphone	GH96-00736	
	Cable, Power	GH39-10501A	
	Curly Cord	GH39-60506A	
	Cable, Data, 15Pin	GH81-10504A	
	Speaker, 3W	3001-000186	
	Antenna, Onglass	3001-000186	

9-3 Desk-Top Rapid Charger

NO	DESCRIPTION	SEC. CODE	REMARK
- Capacitors -			
C1	MP, 250VAC 104-X		
C2	EL, 400V, 22 β fi		
C3	CE, 1KV, 222		
C4	CE, 1KV, 22pF		
C5	Chip, 0805, 474Z		
C6	EL, 10V, 100 β fi		
C7	Chip, 0805, 104K		
C8	Chip, 0805, 474Z		
C12	CHIP, 0805, 474Z		
C13, C14	CHIP, 0805, 102J		
C22	EL, 25V, 470 β fi		
C23	EL, 16V, 680 β fi		
C24	CHIP, 0805, 104K		
C25	EL, 25V, 330 β fi		
C26A, C26B	MP, 250VAC 332-Y		
C27A, C27B	MP, 250VAC 332-Y		
C28A, C28B	Chip, 0805, 474Z		
C30	Chip, 0805, 102J		
C31-C37	Chip, 0805, 104K		
C40	Chip, 0805, 104K		
C41	EL, 16V, 1 β fi		
C42	EL, 10V, 100 β fi		
C43	Chip, 0805, 104K		
C44	EL, 16V, 4.7 β fi		
C45-C47	Chip, 0805, 104K		
C50	EL, 25V, 330 β fi		
C51	Chip, 0805, 102J		
C52-C57	Chip, 0805, 104K		
C90-C92	Chip, 0805, 104K		

NO	DESCRIPTION	SEC. CODE	REMARK
- Diodes -			
BD1	Bridge, 600V 1A		
D1	DO-41, TVS 600W, 160V		
D2	DO-41, FRD, 1KV, 1A		
D3	SOT-23		
D20	SBD, 60V, 3A		
D21	SOT-23		
D22	SBD, 40V, 1A		
D23	SBD, 40V, 2A		
D24-D26	SOT-23, 80V, 100mA		
D30	SOT-23		
D31	SOT-23, 80V, 100mA		
D40	SBD, 40V, 1A		
D41	SOT-23		
D42	SBD, 40V, 2A		
D43-D45	SOT-23, 80V, 100mA		
D80, D81	SOT-23		
- Transistors -			
Q3	NPN, SOT-23 50V, 100mA		
Q20	P-CH, SO-8P, Dual -30V, -3.5A, 85mV		
Q21	PNP, SOT-23 -60V, -60mA		
Q22	NPN, SOT-23 50V, 100mA		
Q23, Q24	PNP, SOT-23 -50V, -100mA		
Q30	PNP, SOT-23 -60V, -60mA		
Q31, Q32	NPN, SOT-23 50V, 100mA		
Q33, Q34	PNP, SOT-23 -60V, -60mA		
Q36, Q37	PNP, SOT-23 -50V, -100mA		
Q38	NPN, SOT-23 50V, 100mA		
Q39	NPN, TO-92 40V, 500mA, DARLINGTON		
- Resistors -			
R1	Chip, 0805, 1.8kΩ J		
R5	Chip, 0805, 330kΩ J		
R24, R25	Chip, 0805, 47kΩ J		
R26	Chip, 0805, 100kΩ J		
R28	Chip, 0805, 5.6kΩ J		

NO	DESCRIPTION	SEC. CODE	REMARK
R29	Chip, 0805, 1.5 Ω J		
R30	1/4W 1 Ω , 5%		
R32	1/4W 1 Ω , 5%		
R34	Chip, 0805, 33 Ω J		
R35	Chip, 0805, 47 Ω J		
R36	Chip, 0805, 1 Ω J		
R37	Chip, 0805, 3 Ω F		
R38	Chip, 0805, 2 Ω F		
R39	Chip, 0805, 91 Ω F		
R40	1W 0.22 Ω , 1%		
R41	Chip, 0805, 2.2 Ω J		
R42	Chip, 0805, 4.7 Ω F		
R43	Chip, 0805, 470 Ω F		
R44	Chip, 0805, 220 Ω J		
R45	Chip, 0805, 4.7 Ω F		
R46	Chip, 0805, 18 Ω F		
R47	Chip, 0805, 33 Ω F		
R48	Chip, 0805, 22 Ω F		
R50-R53	Chip, 0805, 560 Ω J		
R54	Chip, 0805, 4.7 Ω F		
R55	Chip, 0805, 220 Ω J		
R56	Chip, 0805, 18 Ω F		
R57	Chip, 0805, 1.2 Ω F		
R58	Chip, 0805, 4.7 Ω F		
R60-R62	Chip, 0805, 2.2 Ω J		
R63	Chip, 0805, 10 Ω J		
R65	Chip, 0805, 10 Ω J		
R66	2W 15 Ω , 5%		
R67	Chip, 0805, 1.5 Ω F		
R68	Chip, 0805, 2.2 Ω J		
R69	Chip, 0805, 100 Ω J		
R70, R72	1/4W 1 Ω , 5%		
R74	Chip, 0805, 33 Ω J		
R75	Chip, 0805, 47 Ω J		

NO	DESCRIPTION	SEC. CODE	REMARK
R76	Chip, 0805, 1B \square J		
R77	Chip, 0805, 3B \surd F		
R78	Chip, 0805, 2B \surd F		
R79	Chip, 0805, 6.8B \surd F		
R80	Chip, 0805, 91B \ddot{Y} F		
R81	1W 0.22B \ddot{Y} , 1%		
R82	Chip, 0805, 470B \ddot{Y} F		
R83	Chip, 0805, 2.2B \surd J		
R84	Chip, 0805, 220B \ddot{Y} J		
R85	Chip, 0805, 4.7B \surd F		
R86	Chip, 0805, 18B \surd F		
R87	Chip, 0805, 33B \surd F		
R88	Chip, 0805, 22B \surd F		
R90	Chip, 0805, 5.1B \ddot{Y} J		
R91	Chip, 0805, 10B \surd J		
R92	Chip, 0805, 1B \surd J		
R93	Chip, 0805, 47B \surd J		
R94	Chip, 0805, 1B \square J		
R95	Chip, 0805, 150B \surd J		
R96	Chip, 0805, 100B \surd J		
R101, R102	1/4W 4.7B \square ,		
R103, R104	Chip, 0805, 22B \ddot{Y} J		
RX1, RX2	Chip, 0805, 10B \surd J		
- IC's -			
U1	20-DIP, MPU		
U2, U3	SO-16P, P.W.M		
U4	SO-8P, Low-Drop Voltage REG'		
U5	TO-92, Shunt REG'		
U6	SO-16P, Analog S/W		
U7	SO-8P, Dual OP-AMP		
U0	TO-220, 10~20W off Line PWM S/W		

NO	DESCRIPTION	SEC. CODE	REMARK
- Miscellaneous -			
FB1 F1 LD1, LD2 LF1 L20 L21, L22 PCB PC1 SW1 TH1 TNR1 T1 X1	6mm W/LEAD 250V 1A, 4.5•x15mm 2-Color C-Mode 0.15-140TS N-Mode 0.5-17.5TS, 7uH N-Mode 220uH 70x112.5x1.2t 35V 50mA Photo Coupler Switch, KPT1105S Switch, KNOB Conn. Wafer 3-PIN 10K/25° ... 300V, 3KA Surge Absorber EPC19 TYPE 4MHz, 0.5% Case, Top Case, Bottom Battery, Housing Contact, Ass'y Hook, Ass'y, Right Hook, Ass'y, Left Label Bumpon 10 Gate Label Insulation Sheet Screw, BHT+ 2°ø3°ø5 Screw, BHT+ 2°ø2.6°ø6 Screw, BHT+ 2°ø2.6°ø12 AC Cord		

9-4 Cigarette Lighter Adapter

NO	DESCRIPTION	SEC. CODE	REMARK
- Capacitors -			
C1	Electrolytic, 100u, 25V, CESSL1E101M0611AB		
C2	Chip, 1000P, CL10B102KBNCA		
C3	Electrolytic, 200u, 16V, CESSL1C221M0812AB		
C4	Chip, 0.1u, CL21B104KNER		
C6, C7	Tantalum, Chip, 4.7u, 6.3V, TCSCS0J475MAAR		
C9, C10	Tantalum, Chip, 4.7u, 6.3V, TCSCS0J475MAAR		
C11	Chip, 0.1u, CL21B104KNER		
C12	Tantalum, Chip, 4.7u, 16V, TCSCS1C476MBAR		
C13	Tantalum, Chip, 4.7u, 6.3V, TCSCS0J475MAAR		
- Diodes -			
D1	Diode, 1N4004		
D2	Diode, Zener, 1N5818		
D3	Diode, 1N4004		
D4	Diode, Zener, 1N5818		
D5	Diode, Chip, SDS2838		
D6	LED (Green), SM3511		
D7	Diode, Chip, SDS2838		
D8	Diode, Zener, 1N5818		
- Filter -			
F1, F2	Fuse, 250V, 2A, 41MS		
- Connectors -			
J3	Connector, 5pin, GIL-S-5P-S2T2-EF		
- Coil -			
L1	Coil, RF210		
L2	Coil, AS59-8003		
- Transistors -			
Q1	KSB1151-Y		
Q2	Chip, KST2907A		
Q3-Q5	Chip, KSR1104		
Q7, Q8	Chip, KSR1104		

NO	DESCRIPTION	SEC. CODE	REMARK
- Resistors -			
R1	Chip, 47K, RC1608J473CS		
R2, R3	Chip, 1.8K, RC1608J182CS		
R4	0.5, 5%, 1/4W, CR1/4W, 0.5, J, TB		
R5	Chip, 51K, RC1608J513CS		
R6	Chip, 150K, RC1608J154CS		
R7	Chip, 200K, RC1608J204CS		
R8	Chip, 47K, RC1608J473CS		
R9	Chip, 1M, RC1608J105CS		
R10, R11	Chip, 39K, RC1608J393CS		
R12	Chip, 13K, RC1608J133CS		
R13	Chip, 330, RC1608J331CS		
R14	Chip, 3.3K, RC1608J332CS		
R15	Chip, 510, RC1608J511CS		
R16	Chip, 13K, RC1608J133CS		
R17	Chip, 4.3K, RC1608F432CS		
R18	Chip, 15K, RC1608F153CS		
R19	Chip, 1K, RC1608J331CS		
R21	Chip, 270, RC1608J271CS		
R22, R23	Chip, 1K, RC1608J102CS		
R24	Chip, 100K, RC1608J104CS		
R25	Chip, 200K, RC1608J204CS		
R26	Chip, 4.7K, RC1608F472CS		
R27	Chip, 12K, RC1608F123CS		
R28	Chip, 47K, RC1608F473CS		
R29	Chip, 100K, RC1608J104CS		
R31	Chip, 62K, RC1608F623CS		
R32	Chip, 150K, RC1608F154CS		
R35	Chip, 1.3M, RC1608F135CS		
R37	Chip, 2.7M, RC1608F275CS		
R40	Chip, 100K, RC1608J104CS		
R41	Chip, 1.1M, RC1608F115CS		
R42	Chip, 2M, RC1608F205CS		

NO	DESCRIPTION	SEC. CODE	REMARK
- IC's -			
U1	IC, 16pin, KA7500B		
U2	IC, OP Amp, 8pin, KA2904D/T		
U3	IC, OP Amp, 14pin, KA2902D/T		
- Miscellaneous -			
TH1	Thimster, TH310H36GBNI Curl, Ass'y, 5pin GND, Harness Upper, Housing Lower, Housing Fuse, Cover Fuse, Holder Fuse, Plate Outer, Spring Power, Contact Spring, CLC Label, CLC Taptite, Screw Poly, Box Carton, Box Corrugated, PAD		

9-5 Travel Charger

NO	DESCRIPTION	SEC. CODE
- Capacitors -		
C1	X-CAP, 100nF, 250V, KNB15300-104 X-CAP, 100nF, 250V, PCX2-335M-104	2305-000139 2301-001092
C3	Cap-Elec. 10uF, 250V, 85°, 10°ø16mm, CESSL2E100M Cap-Elec. 10uF, 250V, 85°, 10°ø16mm, SHL2EVB100M	2401-000430 2401-000430
C5	Cap-Film, 15nF, 20%, 630V (400, 15.5°ø4.5°ø9.5m Cap-Film, 15nF, 20%, 630V (400, 15.5°ø4.5°ø9.5m	2305-000199 2305-000499
C6, C7	Cap-Chip. 2012, 104-K, X7R, CL21B104KB(A)NC Cap-Chip. 2012, 104-K, X7R, MCH215(2)C104KK	2203-000206 2203-000206
C8	Cap-Chip. 2012, 221-J, NPO, CL21C221JBNC Cap-Chip. 2012, 221-J, NPO, CL21C221JBNC	2203-000590 2203-000595
C9, C20	Y-CAP, 2.2nF, 20%, 250V, HCYE2G222MAAT	2201-001004
C21, C22	Cap-Elec. 270uF, 16V, 105°, 10°ø12.5, CESTL1C271M Cap-Elec. 270uF, 16V, 105°, 10°ø12.5, SXE16VB270M	2401-003161 2401-003161
C23, C24	Cap-Chip. 2012, 221-J, CL21C221JBNC Cap-Chip. 2012, 221-J, CL21C221JBNC	2203-000590 2203-000595
C25	Cap-Elec. 10uF, 25V, 85°, 5°ø5, CESSM1E100M Cap-Elec. 10uF, 25V, 85°, 5°ø5, SRE25VB100M	2401-002353 2401-002568
C26	Cap-Chip. 2012, 104-K, X7R, CL21B104KB(A)NC Cap-Chip. 2012, 104-K, X7R, MCH215(2)C104KK	2203-000206 2203-000206
C27	Cap-Elec. 1uF, 50V, 85°, 4°ø7, CESSM1H1ROM Cap-Elec. 1uF, 50V, 85°, 4°ø7, SRA1HVB010M	2401-000596 2401-000593
C28	Cap-Elec. 100uF, 16V, 85°, 6.3°ø7, CESSM1C101M Cap-Elec. 100uF, 16V, 85°, 6.3°ø7, SRAICV101M	2401-000250 2401-000250
C29, C30	Cap-Chip. 2012, 104-K, X7R, CL21B104KB(A)NC Cap-Chip. 2012, 104-K, X7R, MCH215(2)C104KK	2203-000206 2203-000206
C31	Cap-Chip. 2012, 474-K, Z5U, CL21F474ZB(A)NC Cap-Chip. 2012, 474-K, Z5U, MCH212(5)F474ZK	2203-000922 2203-000922
C32	Cap-Elec. 3.3uF, 50V, 85°, 4°ø7, CESSM1H3R3M Cap-Elec. 3.3uF, 50V, 85°, 4°ø7, SRA1HVB3R3M	2401-001020 2401-001018
C33	Cap-Elec. 4.7uF, 50V, 85°, 5°ø7, CESSM1H4R7M Cap-Elec. 4.7uF, 50V, 85°, 5°ø7, SRA1HVB4R7M	2401-003167 2401-001276
C34	Cap-Elec. 3.3uF, 50V, 85°, 4°ø7, CESSM1H3R3M Cap-Elec. 3.3uF, 50V, 85°, 4°ø7, SRA1HVB3R3M	2401-001020 2401-001018
C35	Cap-Chip. 2012, 104-K, X7R, CL21B104KB(A)NC Cap-Chip. 2012, 104-K, X7R, MCH215(2)C104KK	2203-000206 2203-000206
C36	Cap-Elec. 10uF, 25V, 85°, 5°ø5, CESSM1E100M Cap-Elec. 10uF, 25V, 85°, 5°ø5, SRE25VB100M	2401-002353 2401-002568
C37	Cap-Chip. 2012, 474-K, Z5U, CL21F474ZB(A)NC Cap-Chip. 2012, 474-K, Z5U, MCH212(5)F474ZK	2203-000922 2203-000922

NO	DESCRIPTION	SEC. CODE
- Diodes -		
D1	Diode, Bridge, 600V, 1A, SOP-4, S1NB60	0402-001088
D2	Diode, FR, 1000V, 1A, BYV38	0402-000495
	Diode, FR, 1000V, 1A, UF4007	0402-000012
D3	Diode, Ultra, High, Speed, SOT-23, 85V, 100mA, 0.92V, KDS181 (A3)	60222-00181KA
	Diode, Ultra, High, Speed, SOT-23, 85V, 100mA, 0.92V, DAP202K (P)	0407-000116
D4	Diode, Zener, 18V-Y, Z02W18V	0403-000742
D20, D21	Diode, Schottky, 40V, 1A, 1N5819	0402-000358
	Diode, Schottky, 40V, 1A, 11DQ04	0402-000124
D22-D27	Diode, Ultra, High, Speed, SOT-23, 85V, 100mA, 0.92V, KDS181 (A3)	60222-00181KA
	Diode, Ultra, High, Speed, SOT-23, 85V, 100mA, 0.92V, DAP202K (P)	0407-000116
- Filter -		
F1, F2	Fuse, 250VAC, 500mA, MST0034.6612	3601-001035
	Fuse, 250VAC, 500mA, MRT500	3601-001035
- LED -		
LD1	LED, RED/GRN Dual, 5°ø2, AL-225RGW	0601-001107
	LED, RED/GRN Dual, 5°ø2, SMW-0523M	0601-001107
	LED, RED/GRN Dual, 5°ø2, SAM5280	0601-001107
- Transistors -		
Q1	FET-MOS (N), TO-220, 500V, 8A, IRF840	0505-000135
Q2	TR-NPN, SOT-23, 60V, 600mA, KST2222ATF (1P)	0501-000457
	TR-NPN, SOT-23, 60V, 600mA, MMST2222A	
	TR-NPN, SOT-23, 60V, 600mA, KTN2222AS	
Q20	FET-MOS (P), I-PAK, 50V, 3A, 2SJ132	0505-001105
	FET-MOS (P), I-PAK, 50V, 3A, IRFU9120	0505-001022
Q21	TR-NPN, SOT-23, 50V, 100mA (Bias Resistor), DTC144EKA (26)	0504-000186
	TR-NPN, SOT-23, 50V, 100mA (Bias Resistor), KSR1104 (R04)	0504-000129
	TR-NPN, SOT-23, 50V, 100mA (Bias Resistor), KRC104S	
Q22, Q23	TR-PNP, SOT-23, 60V, 600mA (Bias Resistor), DTA114EKA	0504-000001
	TR-PNP, SOT-23, 60V, 600mA (Bias Resistor), KSR2102	0504-000154
	TR-PNP, SOT-23, 60V, 600mA (Bias Resistor), KRC102S	
Q24, Q25	TR-NPN, SOT-23, 60V, 600mA, KST2222ATF (1P)	0501-000457
	TR-NPN, SOT-23, 60V, 600mA, MMST2222A	
	TR-NPN, SOT-23, 60V, 600mA, KTN2222AS	

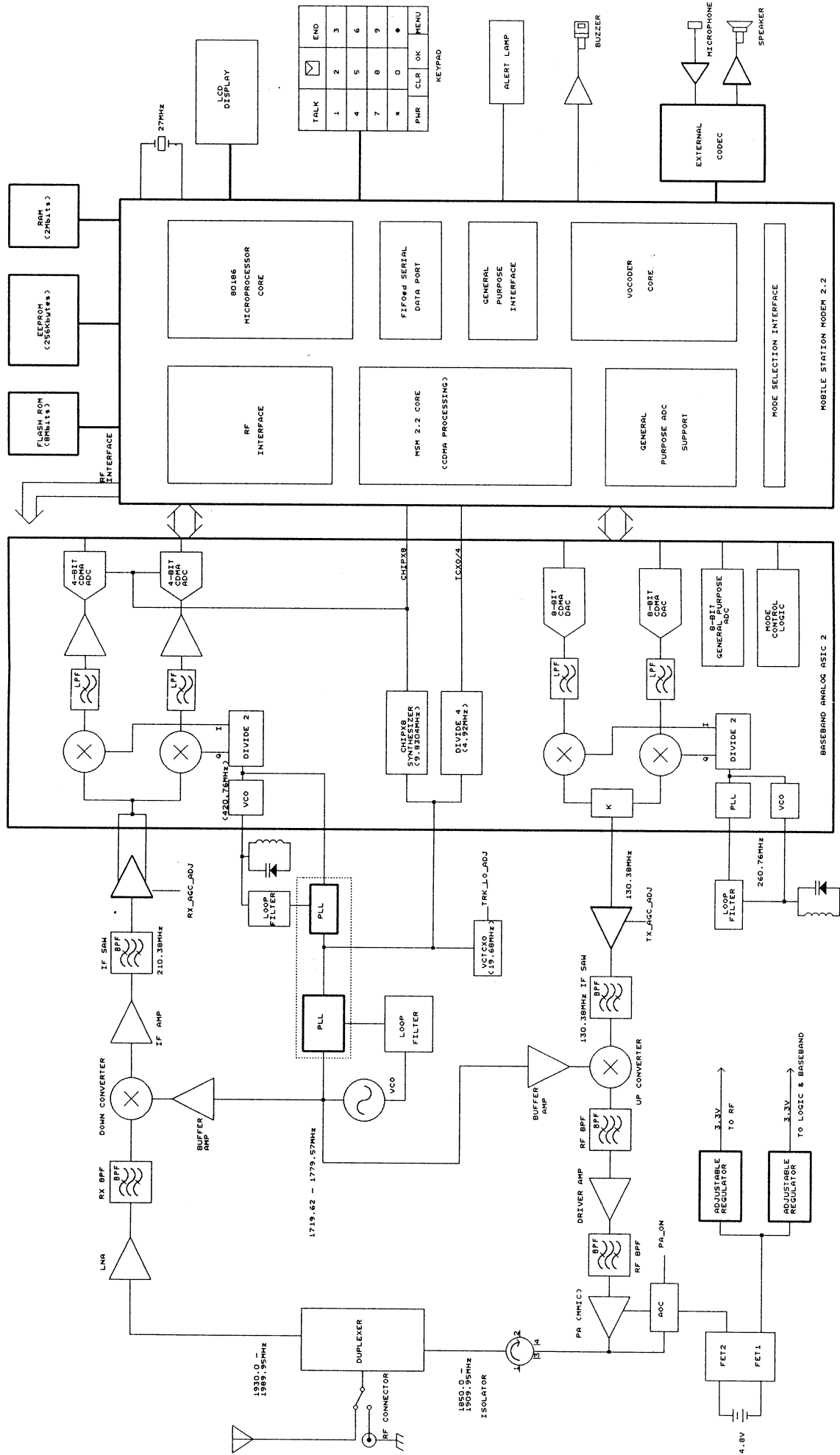
NO	DESCRIPTION	SEC. CODE
	- Resistors -	
R1	R-Metal Oxide, 1W, 470K, 5%, MOR-1, 470K, J	2003-001064
R2	R-Chip, 1/2W, 0.499BŸ, 1%, SR73H2ETDO.499F	2007-007410
R3-R7	R-Chip, 2012, 39KBŸ, 1%, RC2012F3902CS	2007-000827
	R-Chip, 2012, 39KBŸ, 1%, MCR10EZHUF3902	
R8, R9	R-Chip, 2012, 300BŸ, 5%, RC2012J301CS	2007-000728
R10	R-Chip, 2012, 1KBŸ, 1%, RC2012F1001CS	2007-000465
R12	R-Surage, 1/2W, 4.7M, 5%, RCR50+T524.7MJ	2009-001039
R20	R-Surage, 1/2W, 4.7M, 5%, RCR50+T524.7MJ	2009-001039
R21	R-Wire Wound, 1/2W, 0.5BŸ, 1%, ARW1/2N, 0.5, F, TP	2005-001007
R22, R23	R-Chip, 2012, 20BŸ, 5%, RC2012J200CS	2007-000551
R24, R25	R-Chip, 2012, 200BŸ, 5%, RC2012J201CS	2007-000026
R26	R-Chip, 2012, 300BŸ, 5%, RC2012J301CS	2007-000728
R27	R-Chip, 2012, 15KBŸ, 1%, RC2012F1502CS	2007-000406
R28	R-Chip, 2012, 9.1KBŸ, 5%, RC2012J912CS	2007-001224
	R-Chip, 2012, 9.1KBŸ, 5%, MCR10EZHJU912	
R29	R-Chip, 2012, 20KBŸ, 5%, RC2012J203CS	2007-000546
R30	R-Chip, 2012, 30KBŸ, 1%, RC2012F3002CS	2007-000735
R31	R-Chip, 2012, 1KBŸ, 1%, RC2012F1001CS	2007-000465
R32	R-Chip, 2012, 430BŸ, 1%, RC2012F431CS	2007-000902
R33	R-Chip, 2012, 10KBŸ, 1%, RC2012F1002CS	2007-000297
R34	R-Chip, 2012, 20KBŸ, 5%, RC2012J203CS	2007-000546
R35, R36	R-Chip, 2012, 10KBŸ, 1%, RC2012F1002CS	2007-000297
R37	R-Chip, 2012, 1KBŸ, 1%, RC2012F1001CS	2007-000465
R38	R-Chip, 2012, 10KBŸ, 1%, RC2012F1002CS	2007-000297
R39, R40	R-Chip, 2012, 1MBŸ, 1%, RC2012F1004CS	2007-000474
R41	R-Chip, 2012, 33KBŸ, 1% RC2012F3302CS	2007-000771
R42	R-Chip, 2012, 30KBŸ, 1%, RC2012F3002CS	2007-000735
R43	R-Chip, 2012, 33KBŸ, 1% RC2012F3302CS	2007-000771
R44	R-Chip, 2012, 39KBŸ, 1%, RC2012F3902CS	2007-000827
	R-Chip, 2012, 39KBŸ, 1%, MCR10EZHUF3902	
R45	R-Chip, 2012, 4.7KBŸ, 1%, RC2012F4701CS	2007-000868
R46	R-Chip, 2012, 150BŸ, 1% RC2012F1500CS	2007-000398
R47	R-Chip, 2012, 11KBŸ, 1%, RC2012F1102CS	2007-000327
R48	R-NTC (Thermistor), 10KBŸ, 25° ..., TH310H37GBNI	1404-000215
	R-NTC (Thermistor), 10KBŸ, 25° ..., TH310H37GBNI	1404-001014

NO	DESCRIPTION	SEC. CODE
R49	R-Chip, 2012, 4.7K β Y, 1%, RC2012F4701CS	2007-000868
R50	R-Chip, 2012, 000 β Y, 5%, RC2012J000CS	2007-000029
R51	R-Chip, 2012, 12K β Y, 1%, RC2012F1202CS	2007-000352
R52	R-Chip, 2012, 4.7K β Y, 1%, RC2012F4701CS	2007-000868
R53	R-Chip, 2012, 10K β Y, 1%, RC2012F1002CS	2007-000297
R54	R-Chip, 2012, 1.5K β Y, 1%, RC2012F1501CS	2007-000238
R55	R-Chip, 2012, 10K β Y, 1%, RC2012F1002CS	2007-000297
R56	R-Chip, 2012, 5.6K β Y, 5%, RC2012J562CS	2007-000981
R57, R58	R-Chip, 2012, 470 β Y, 5%, RC2012J471CS	2007-000931
R59	R-Chip, 2012, 10K β Y, 1%, RC2012F1002CS	2007-000297
R60	R-Chip, 2012, 2K β Y, 5%, RC2012J202CS	2007-000671
R61	R-Chip, 2012, 1.5K β Y, 1%, RC2012F1501CS	2007-000238
R62	R-Chip, 2012, 000 β Y, 5%, RC2012J000CS	2007-000029
R64	R-Chip, 2012, 39K β Y, 1%, RC2012F3902CS	2007-000827
	R-Chip, 2012, 39K β Y, 1%, MCR10EZHUF3902	
- IC's -		
U20	IC, Regulator, 5V, 100mA, TO-92, LE50CZ	1203-001224
	IC, Regulator, 5V, 100mA, TO-92, LP2950CZ-5.0	
U21	IC, Linear, 35V, 100mA, TO-92, KA431Z	1203-000187
U22	IC, OP Amp, 28V, 0.15uA, Dual, DIP-8P, KA358A	1201-000530
	IC, OP Amp, 28V, 0.15uA, Dual, DIP-8P, LM358A	
U23, U24	IC, COMP., 36V, 1mA, Dual, DIP-8P, KA393A	1202-001006
	IC, COMP., 36V, 1mA, Dual, DIP-8P, LM393A	
- Miscellaneous -		
J1, J2	R-Chip, 2012, 000 β Y, 5%, RC2012J000CS	2007-000029
LF1	Line Filter, TC-002, UU1014V, 22mH (Min), LF1	ML29-00023K
OP1	Photo-Coupler, 130-260%, 200mW, DIP-4, ST, PC817B	0604-000191
	Photo-Coupler, 130-260%, 200mW, DIP-4, ST, TLP621GR	0604-000191
T01	Trans, TC-001	ML26-00261S

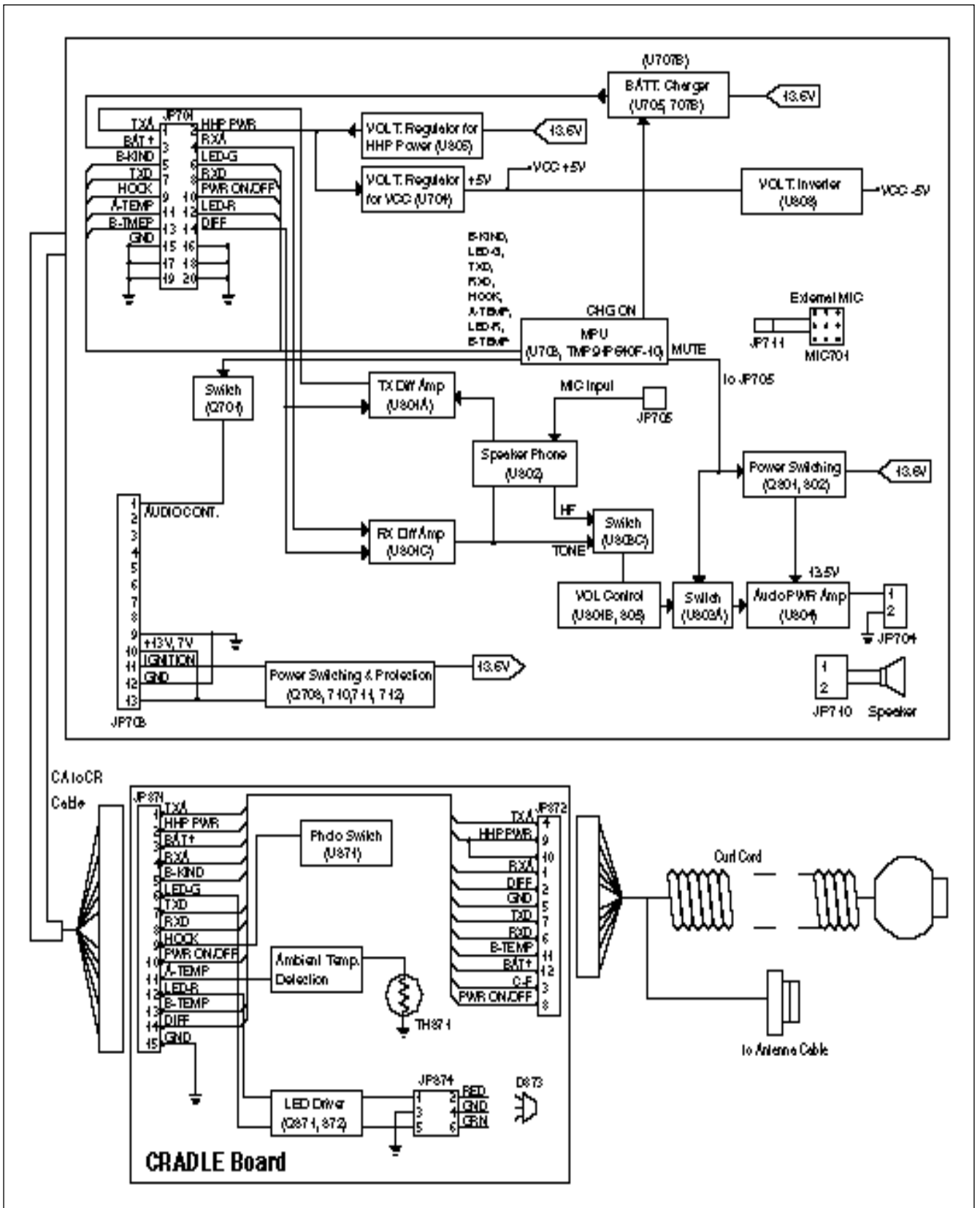
NO	DESCRIPTION	SEC. CODE
VA1	Varistor, 198-242V, 3500A, 15°∅18mm, TP, D6221ZOV141RA07 Varistor, 198-242V, 3500A, 15°∅18mm, TP, D6221ZOV151RA07 Label, 30°∅70mm, CTC-1900 Terminal-Bat, 5.5°∅30mm, 4, AGTC-04 Terminal-Input, 4°∅18°∅12mm, 3 Case Ass'y-Top, Cover, Gate, Label, Plug, Ass'y, 1900-TC-C Case Ass'y-Bottom, Bottom, Gate, Label, Ass'y, 1900-TC-B PCB, FR-4, 1.2t, 1oz, 46.5°∅132, 1900-TC Screw-TAP, PH+, 2.6°∅10, BLK Packing-Box, SW (A), 518°∅341°∅260 Packing-NIL-PAD, SW (A), 513°∅336 Packing-C/P-A, SW (A), 513°∅78 Packing-C/P-B, SW (A), 336°∅78 Packing-C/P-B, SW (A), 609°∅336 Adhesive, Sealant, DC739, 40RTV Adhesive, Sealant, DC739, 40RTV	1405-000196 1405-000194 ML68-00278U 3711-003551 ML71-00291E ML72-00239V ML72-00239W ML41-00224W 6002-001014 ML69-0007A ML69-00028A ML69-00099E ML69-00099F ML69-00099D 0201-001029 0201-000303

10. Block & Circuit Diagrams

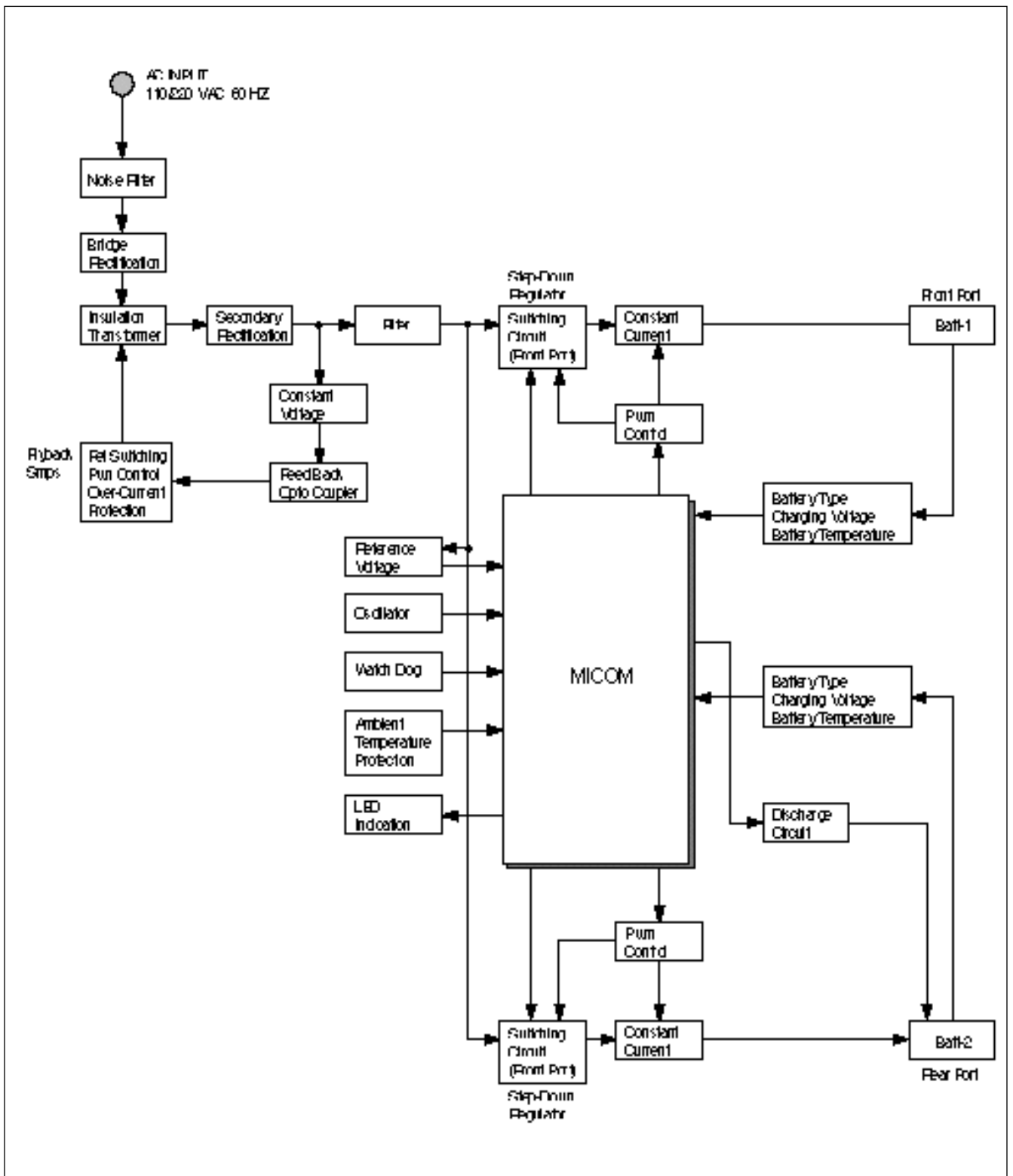
10-1 Main Block Diagram



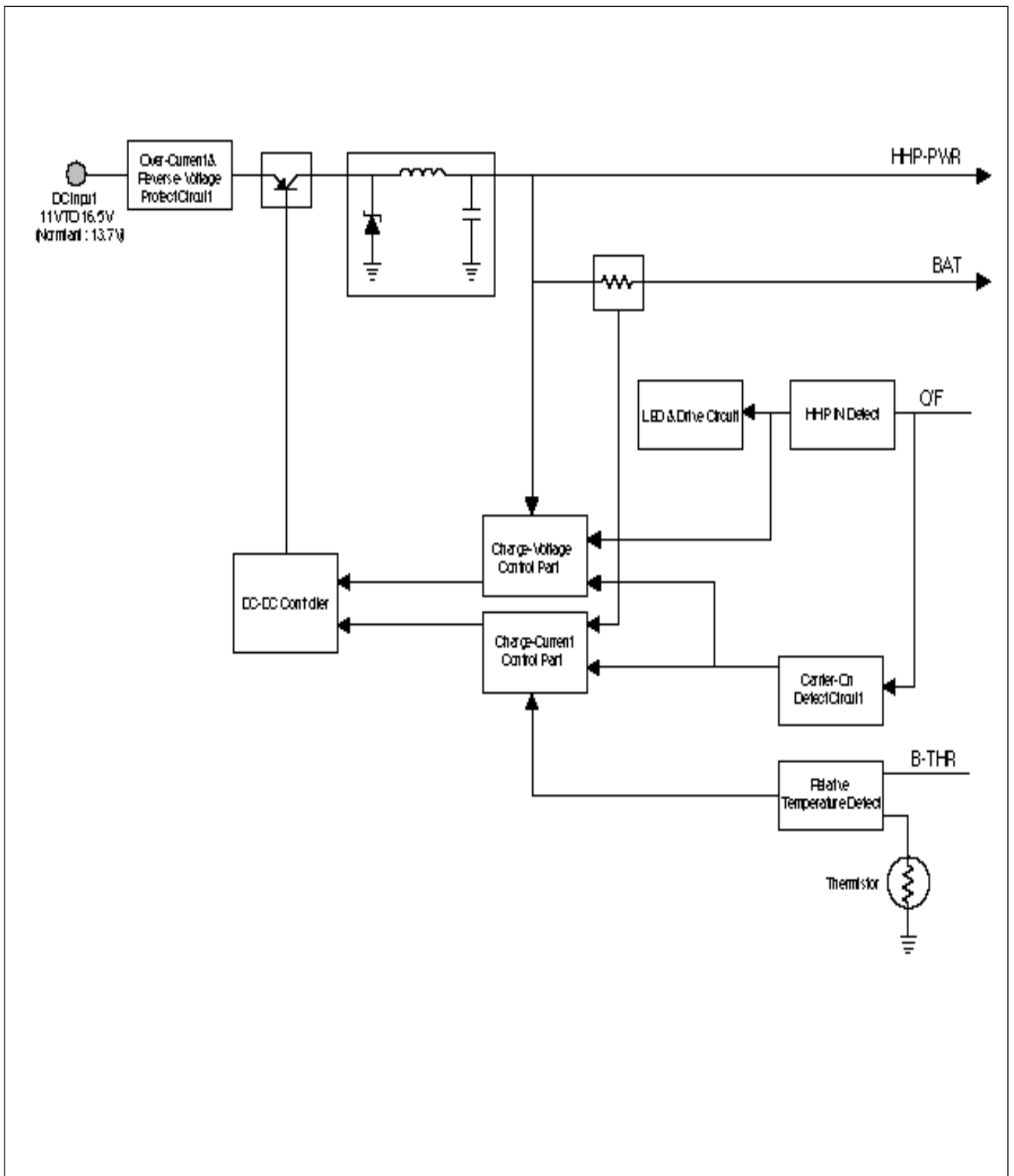
10-2 Hands-Free Kit Block Diagram



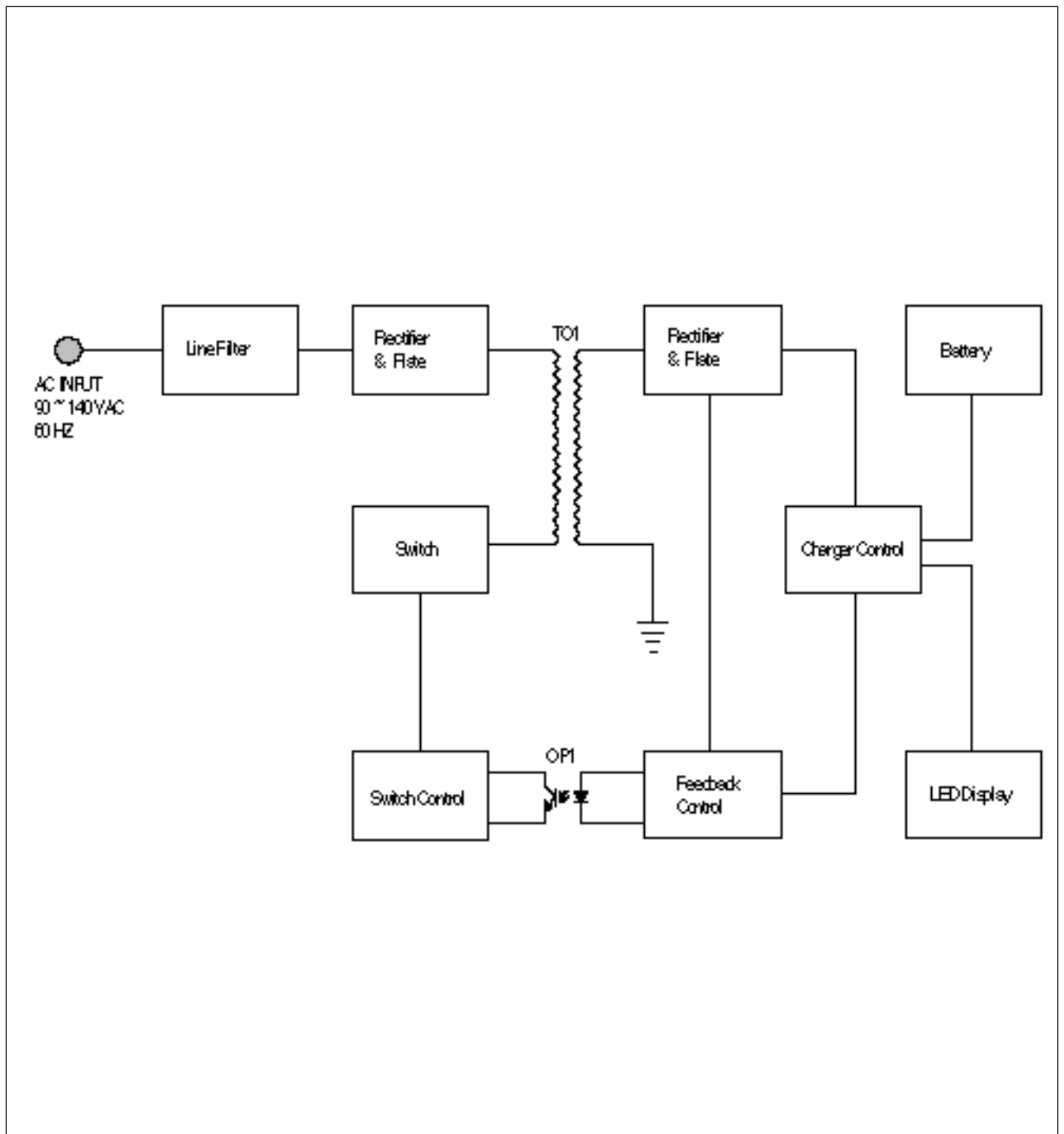
10-3 Desk-Top Rapid Charger Block Diagram

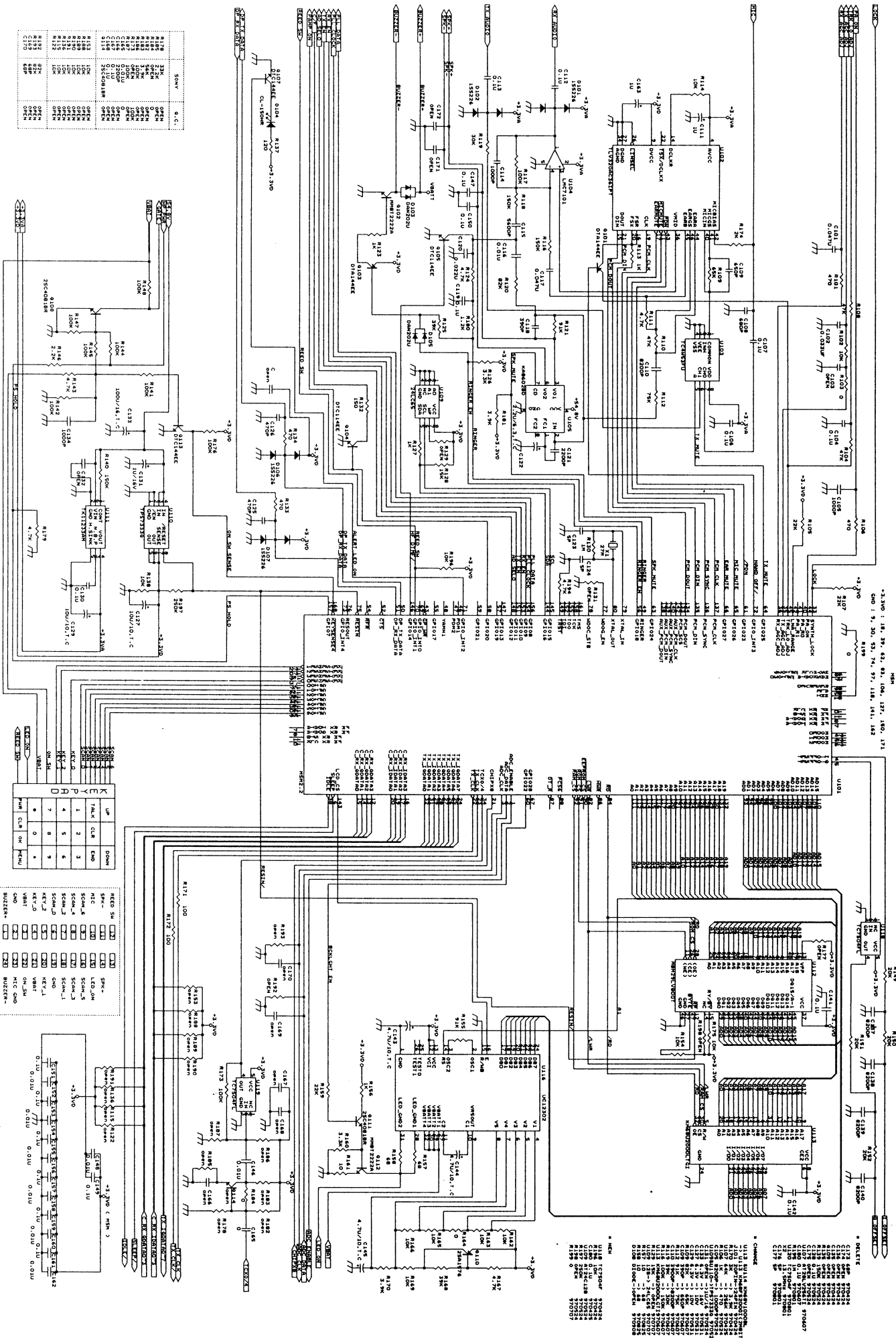


10-4 Cigarette Lighter Adapter Block Diagram



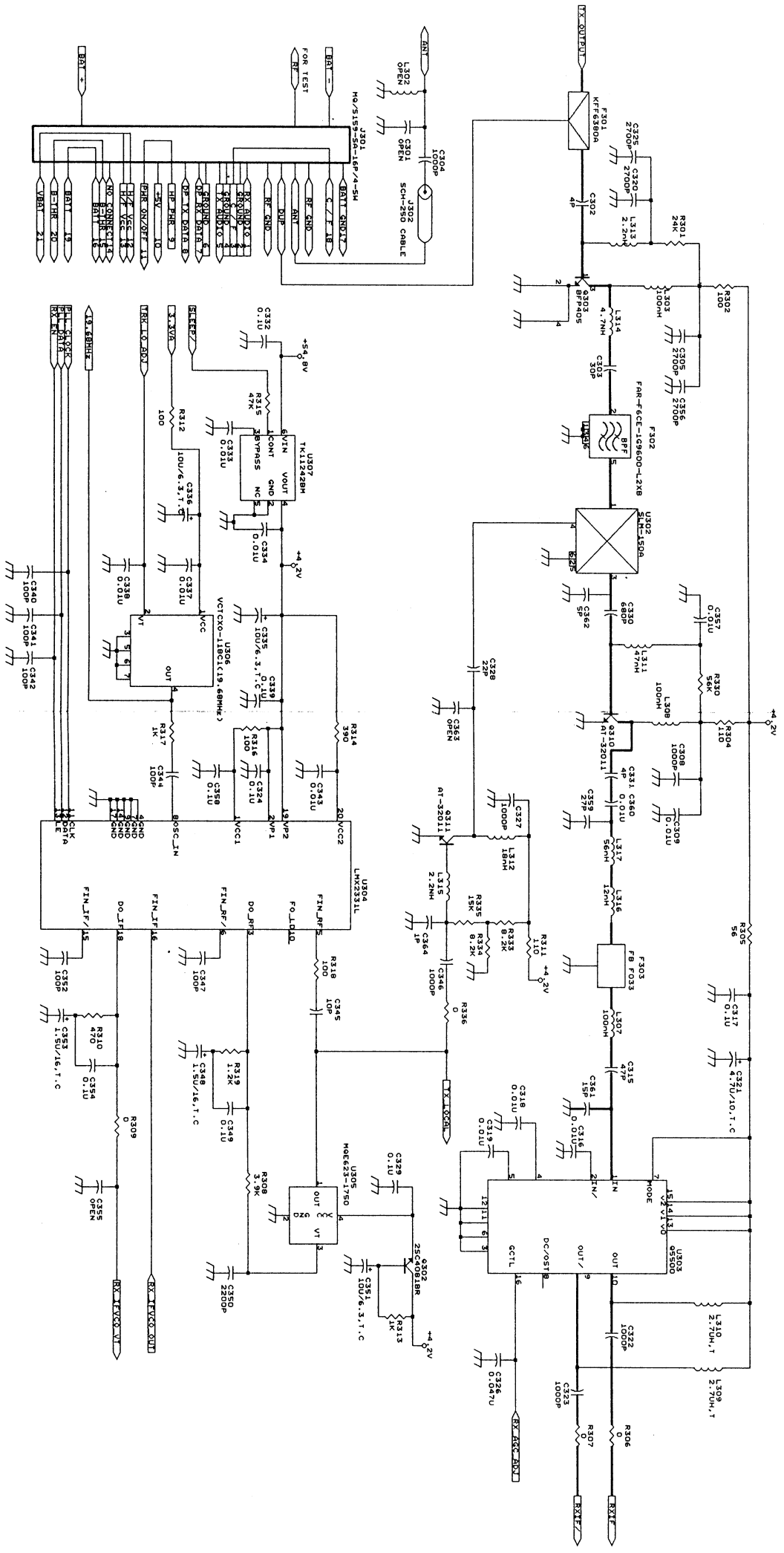
10-5 Travel Charger Block Diagram



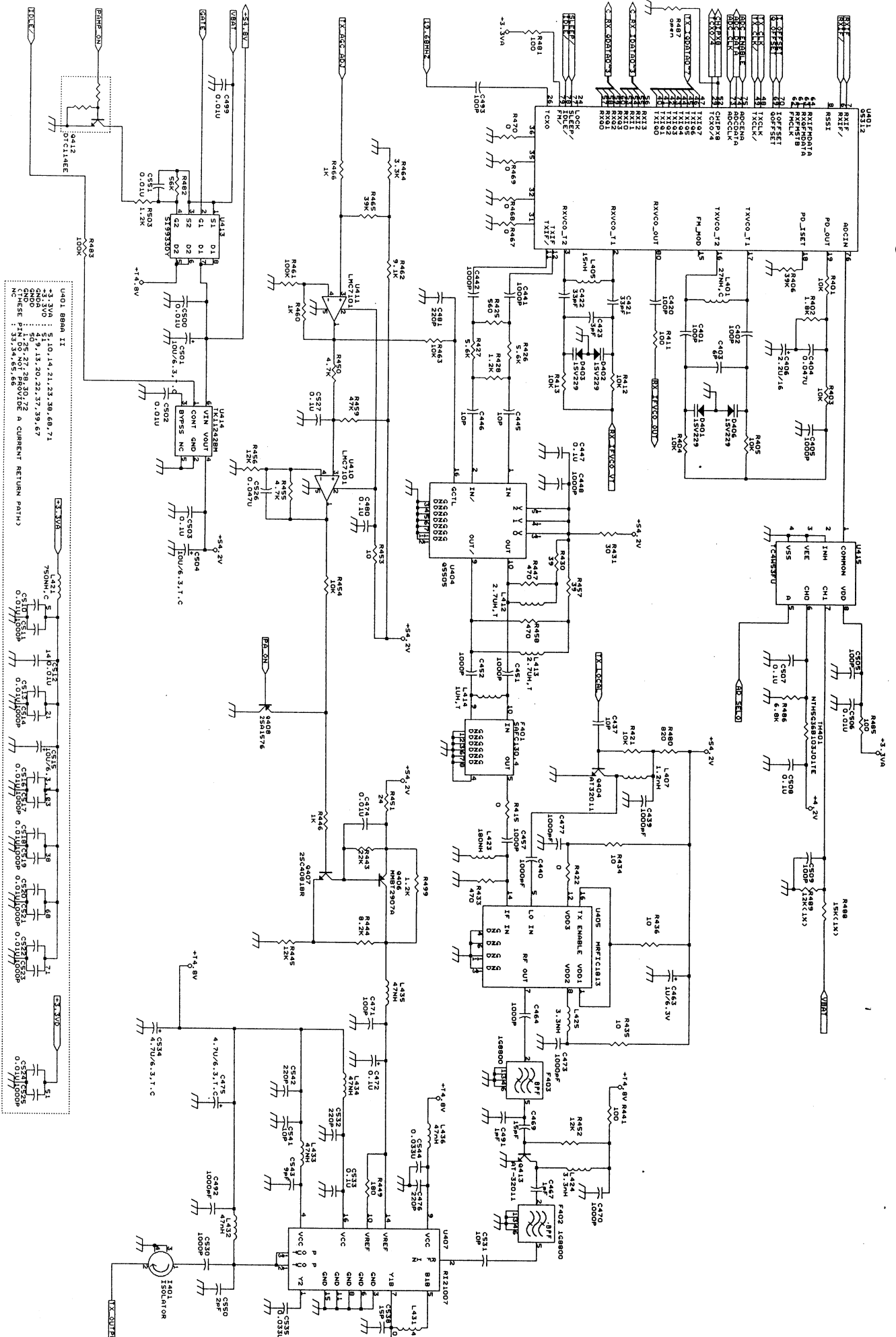


74100: 18, 29, 43, 85, 104, 137, 180, 171
74104: 51, 52, 53, 74, 75, 118, 141, 142

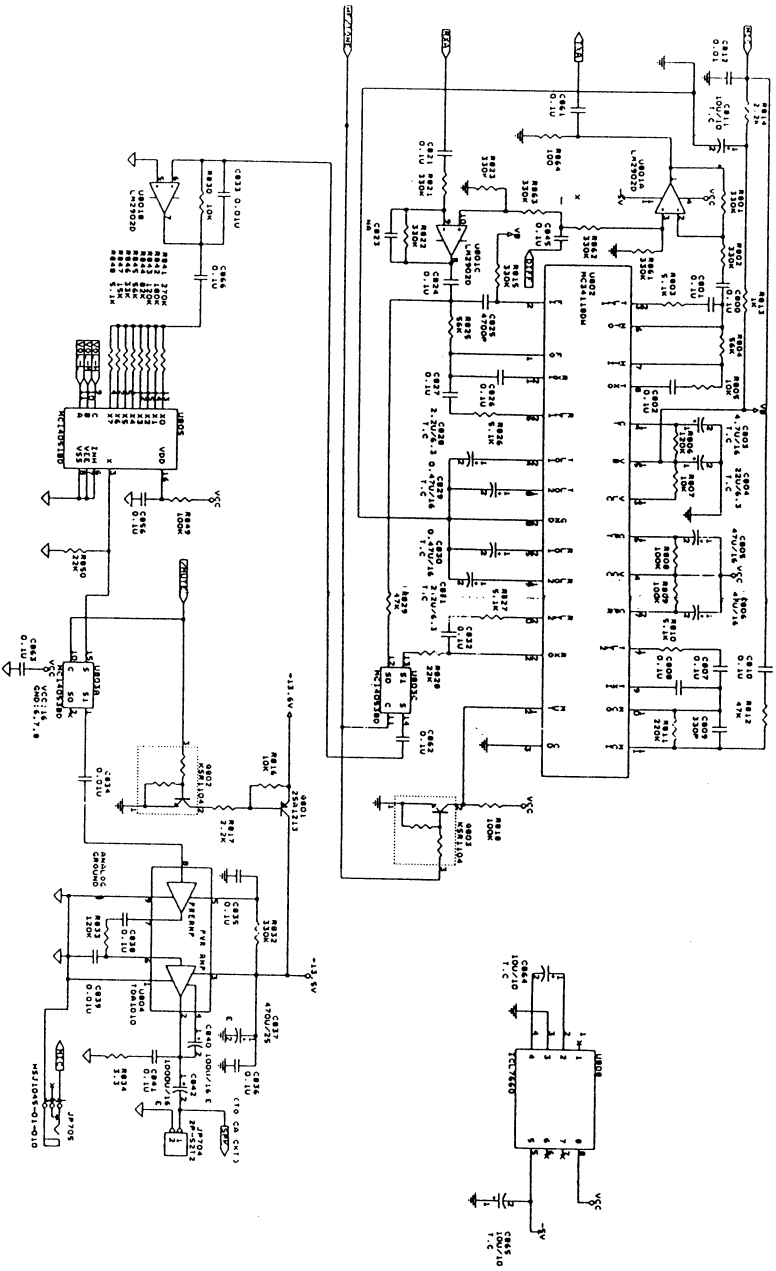
U11A 74104 106
U11B 74104 107
U11C 74104 108
U11D 74104 109
U11E 74104 110
U11F 74104 111
U11G 74104 112
U11H 74104 113
U11I 74104 114
U11J 74104 115
U11K 74104 116
U11L 74104 117
U11M 74104 118
U11N 74104 119
U11O 74104 120
U11P 74104 121
U11Q 74104 122
U11R 74104 123
U11S 74104 124
U11T 74104 125
U11U 74104 126
U11V 74104 127
U11W 74104 128
U11X 74104 129
U11Y 74104 130
U11Z 74104 131
U12A 74104 132
U12B 74104 133
U12C 74104 134
U12D 74104 135
U12E 74104 136
U12F 74104 137
U12G 74104 138
U12H 74104 139
U12I 74104 140
U12J 74104 141
U12K 74104 142
U12L 74104 143
U12M 74104 144
U12N 74104 145
U12O 74104 146
U12P 74104 147
U12Q 74104 148
U12R 74104 149
U12S 74104 150
U12T 74104 151
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U12V 74104 153
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U12Y 74104 156
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U13C 74104 160
U13D 74104 161
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U13F 74104 163
U13G 74104 164
U13H 74104 165
U13I 74104 166
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U14G 74104 190
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U14P 74104 199
U14Q 74104 200
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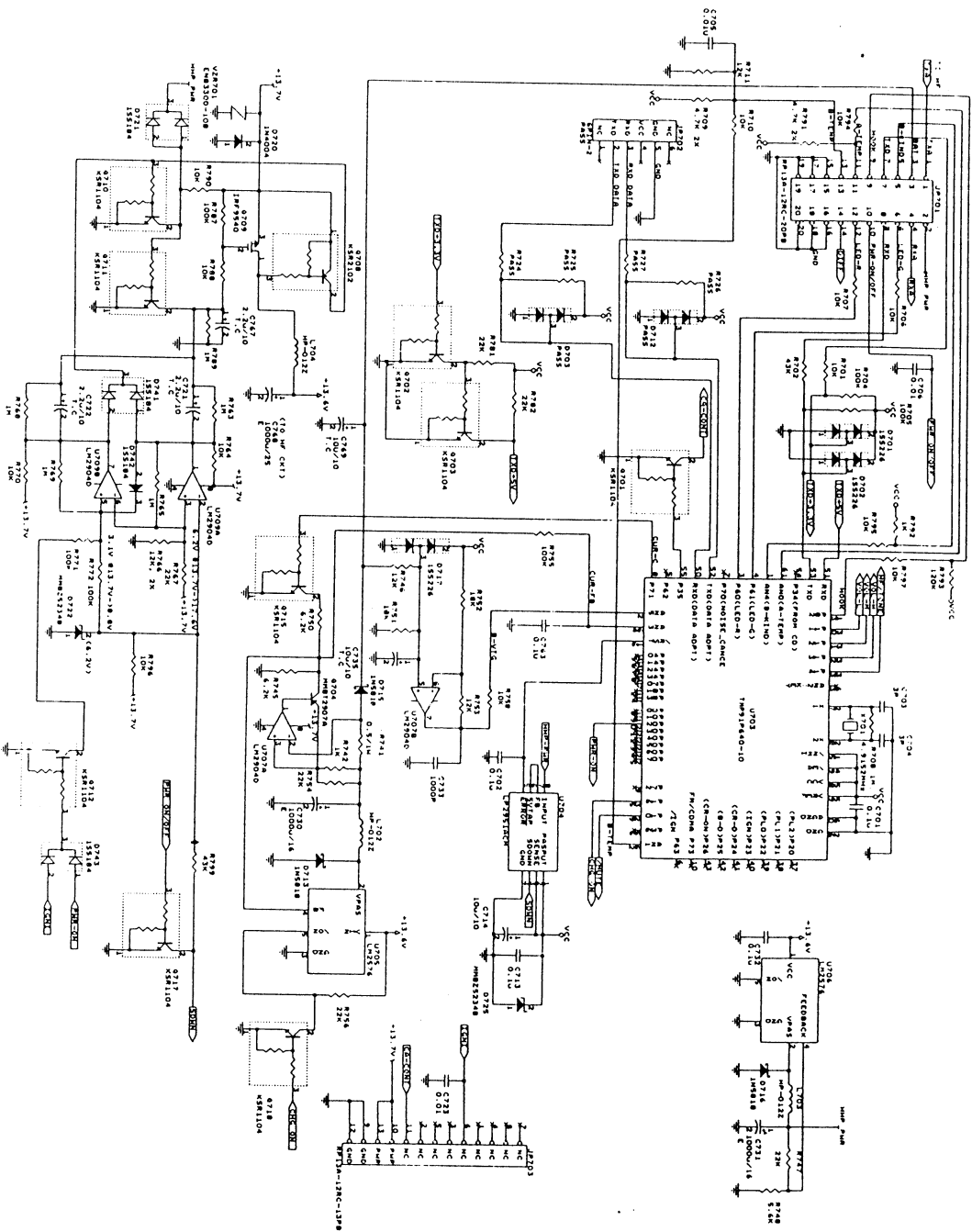


10-8 Transmitter Circuit Diagram

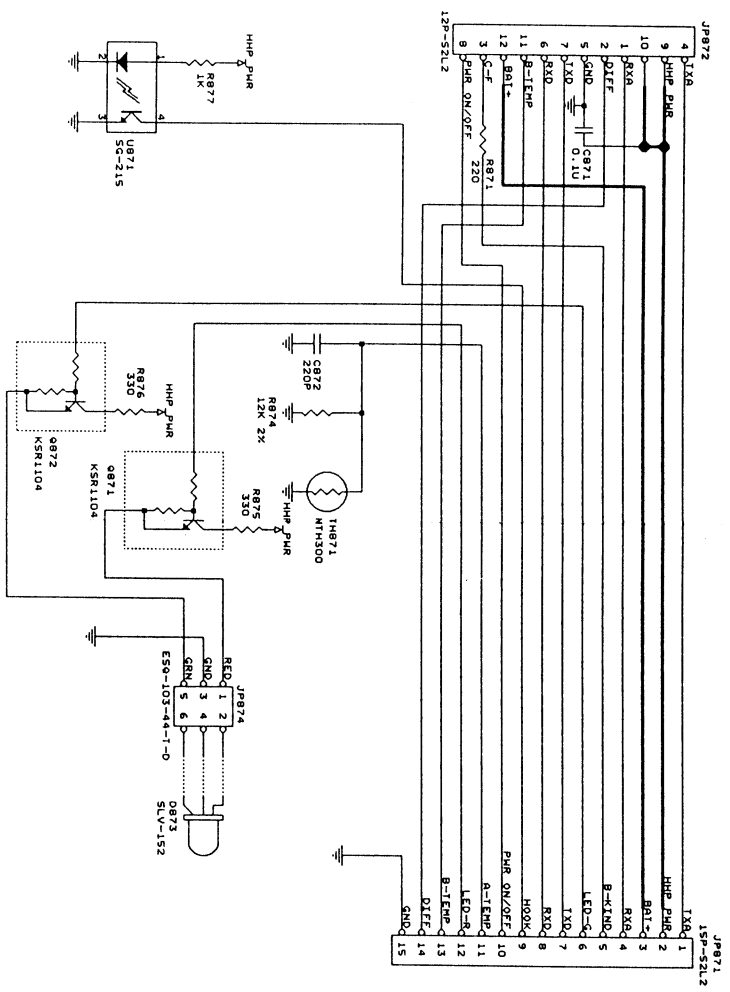


10-9 Hands-Free Circuit Diagram

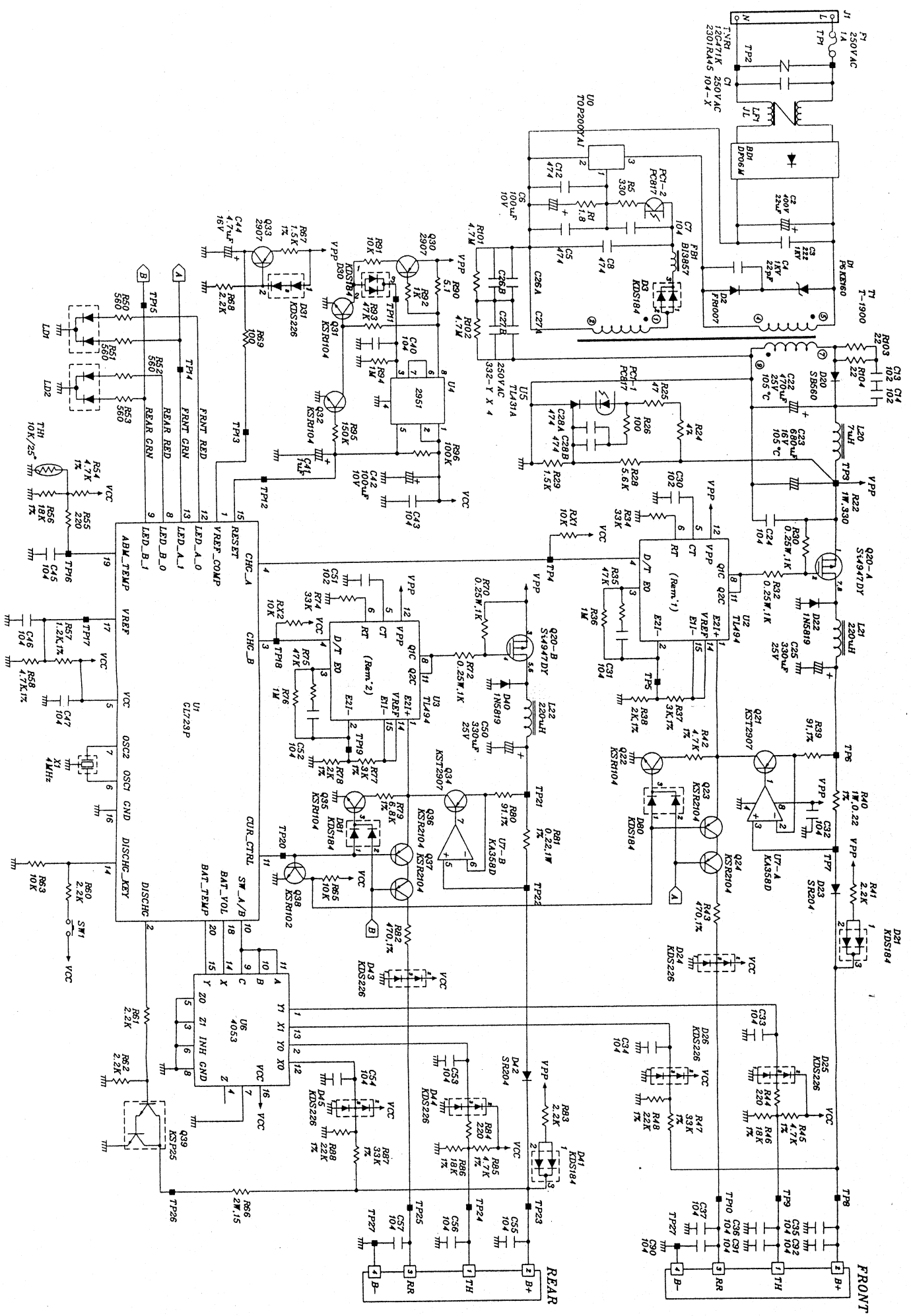




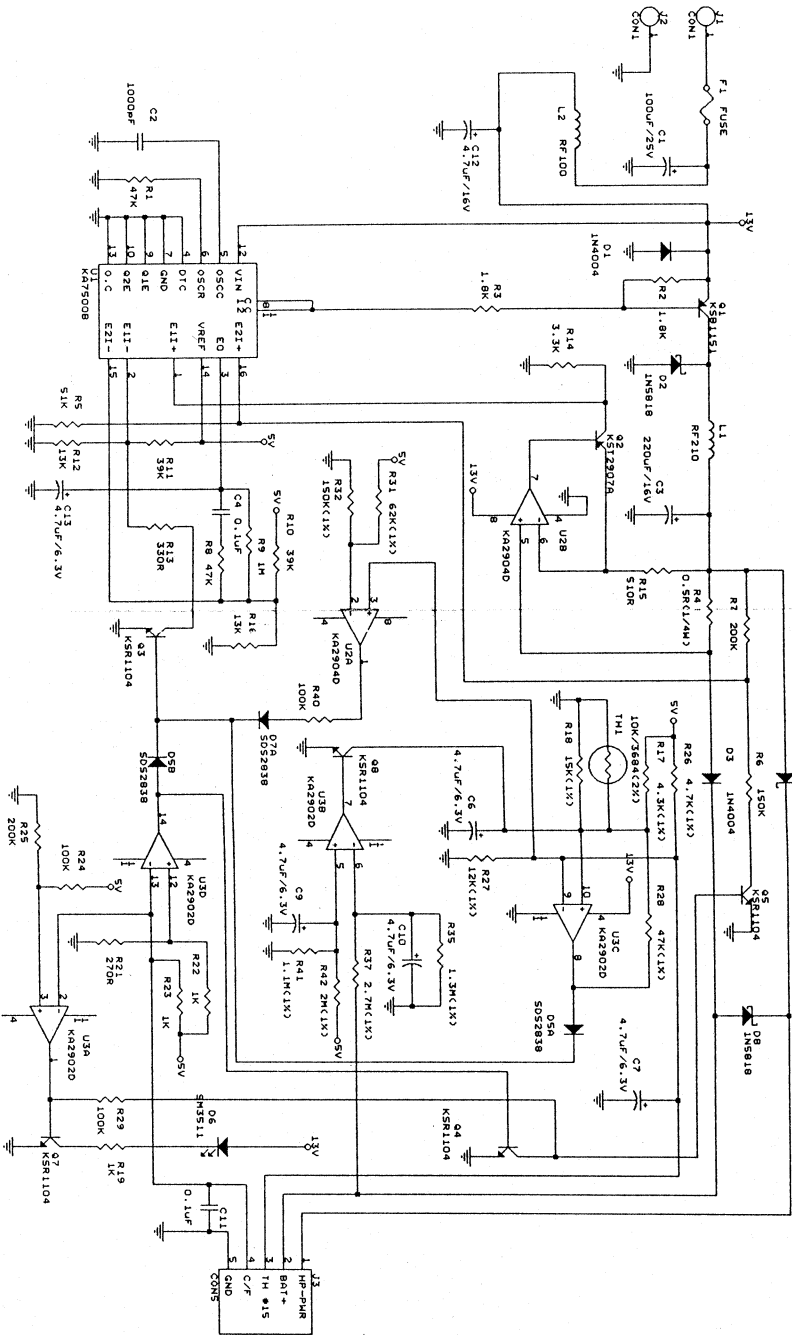
10-11 Cradle Circuit Diagram



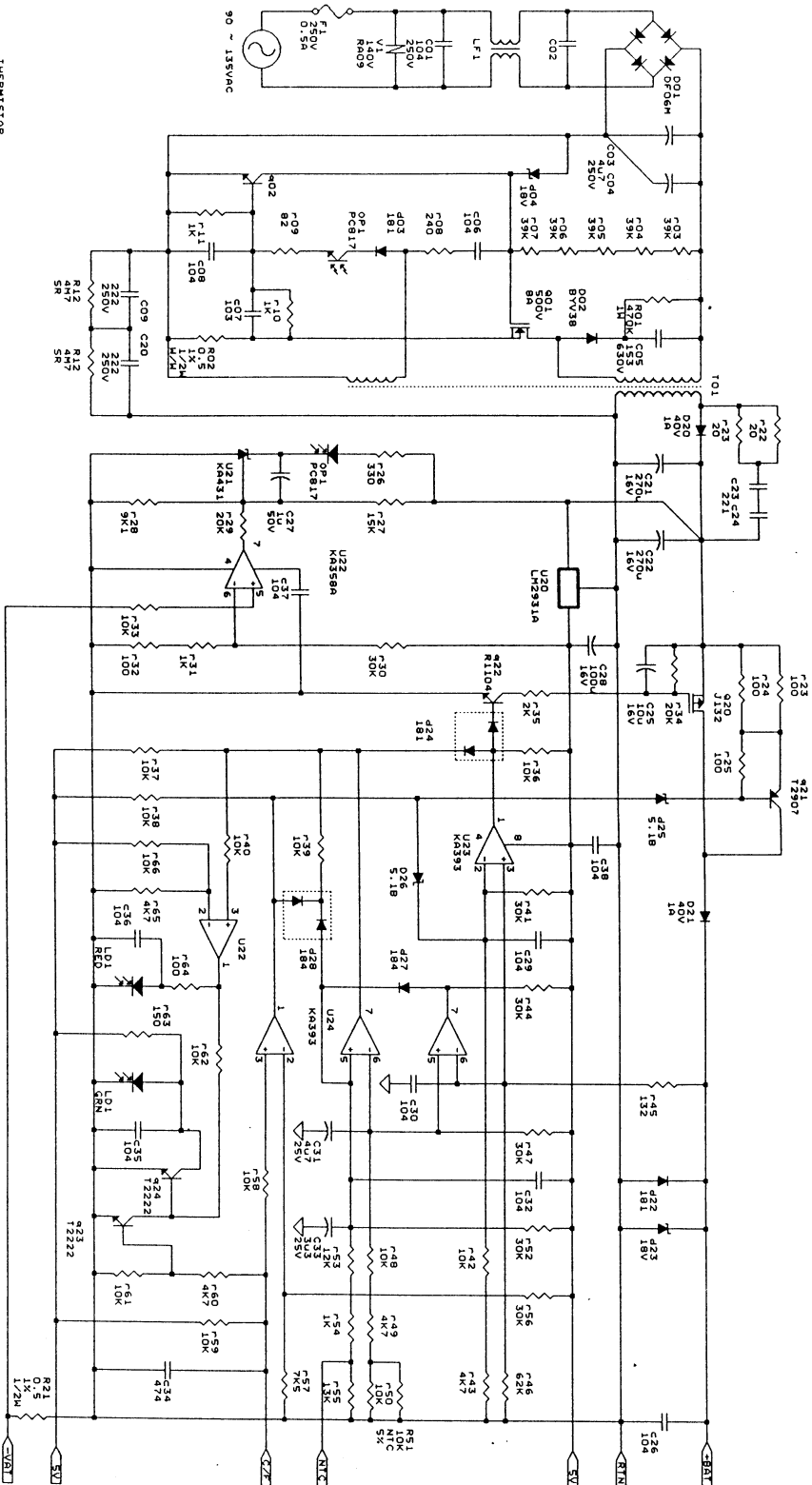
10-12 Desk-Top Rapid Charger Circuit Diagram



10-13 Cigarette Lighter Adapter Circuit Diagram



10-14 Travel Charger Circuit Diagram



THERMISTOR

- 0°C ----> 32K
 - 10°C ----> 20K
 - 20°C ----> 12K
 - 25°C ----> 10K
 - 30°C ----> 9K
 - 40°C ----> 5K1
 - 50°C ----> 3K5
- BAT CHARGER VOLTAGE**
AT CHARGING CURRENT 0.5C
- 0°C ----> 6.4V
 - 25°C ----> 6.15V
 - 40°C ----> 6.0V

NOTE : Unless Otherwise Specified Resistor are in OHM,1/10W.