CDMA PORTABLE PCS TELEPHONE

SCH-2000

SERVICE *Manual*

CDMA PORTABLE PCS TELEPHONE

CONTENTS

1. Specification
2. Installation
3. NAM Programming
4. Circuit Description
5. Test Procedure
6. Troubleshooting
7. Exploded Views and Parts List
8. PCB Diagrams
9. Electrical Parts List
10. Block & Circuit Diagrams

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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) °æ 150 Hz
Operating Temperature	: -30 °… ° ≠+60 °…
Supply Voltage	: +3.6 V
Current Consumption (Average)	
Standby	: 180 mA (Non-slot mode)
Talk	: 480 mA (at +10 dBm)
Size and Weight	
Including Standard Battery	: 121.9(H)°ø50.8(W)°ø20.3(D), 138.9 g
Including Extended Battery	: 121.9(H)°ø50.8(W)°ø25.4(D), 158.7 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	: °æ24 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

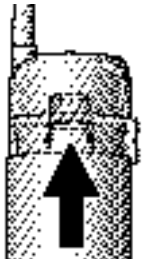
Rx Sensitivity and Dynamic Range	: -104 dBm, FER=0.5% or less
(Rate Set 1)	: -25 dBm, FER=0.5% or less
Conducted Spurious Emission	
1930 ° ≠1990 MHz	: <-81 dBm
1850 ° ≠1910 MHz	: <-61 dBm
All Other Frequencies	: <-47 dBm
Single Tone Desensitization	: lower than 1%
Rx power=-101 dBm	
Tone power=-30 dBm	
Tone offset from carrier=°æ1.25 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=°æ1.25 MHz	
Tone 2 offset from carrier=°æ2.05 MHz	

2. Installation

2-1 Installing a Battery Pack

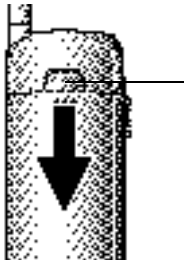
1. To attach the battery pack after charging, align it with the phone about 1cm (1/2") away from its place so that the two arrows on the phone are seen, the battery charge contacts pointing downwards.

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.



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 charger lights up red.

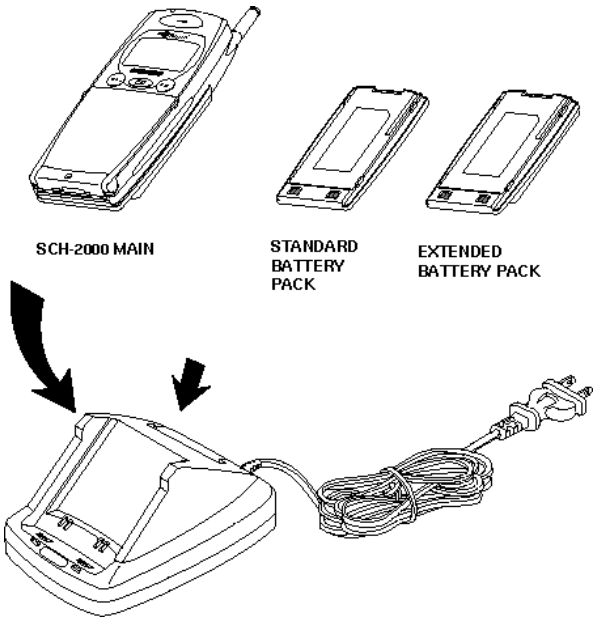


Figure 2-1 Charging The Phone and Battery

2-3 For Mobile Mount

2-3-1 Antenna

1. Choose a proper location to install the antenna.
   - ¶UThe center of the roof top provides the best performance.
   - ¶UThe edge of the rear trunk also provides a good performance. However, the antenna should be higher than the roof of the car.
   - ¶UIn 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.

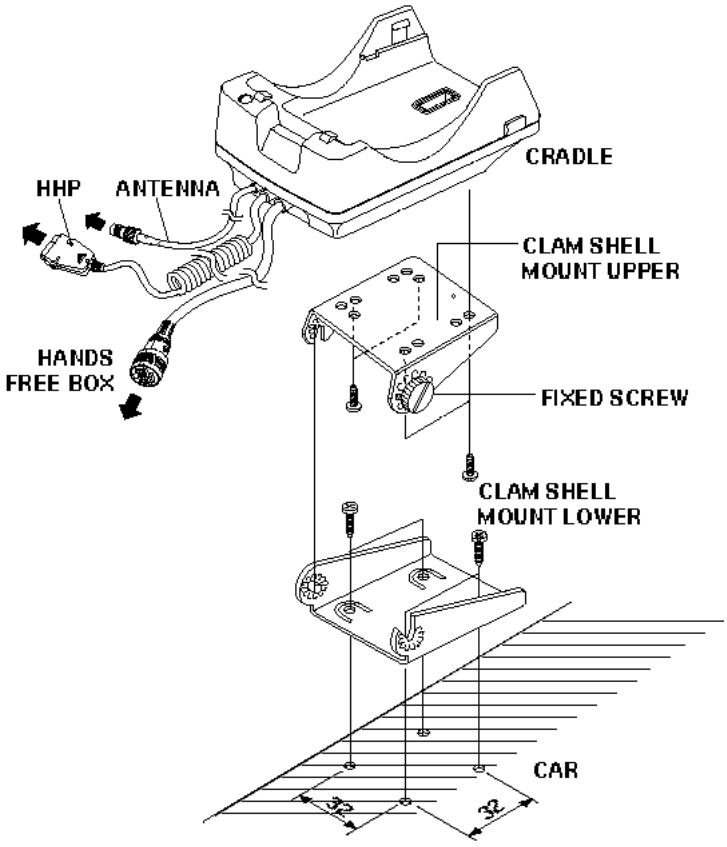


Figure 2-2 Cradle Installation

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.

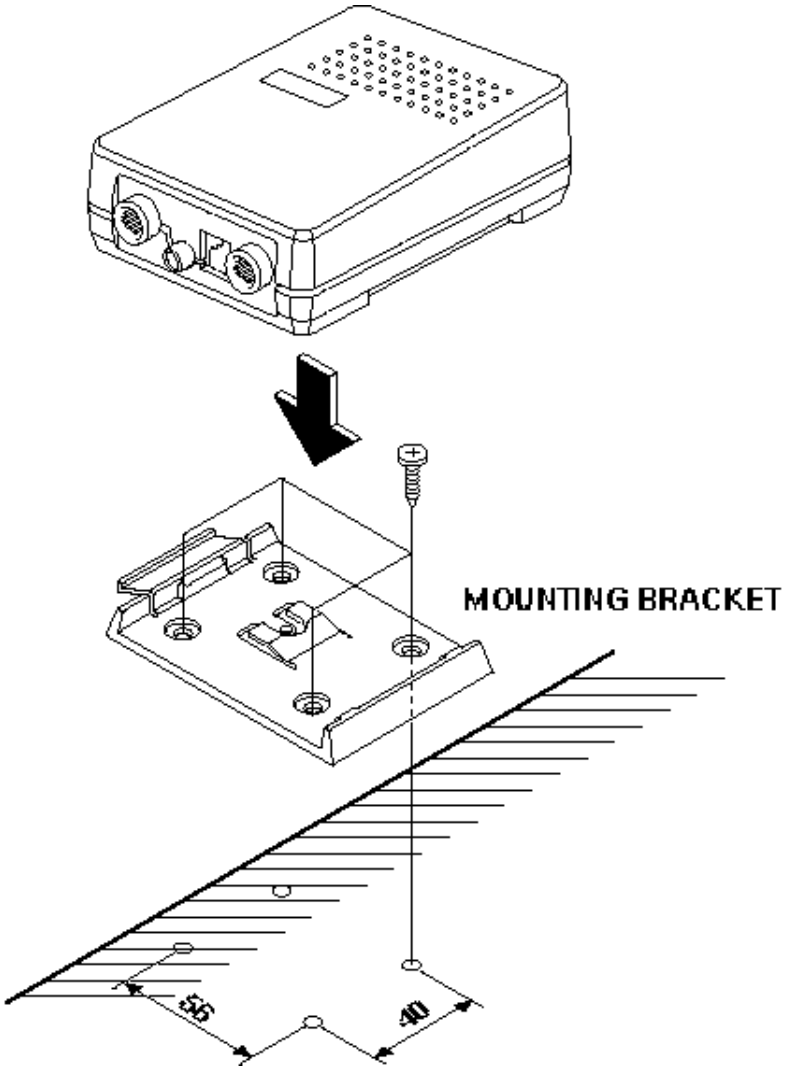


Figure 2-3 Hands-Free Box Installation

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.

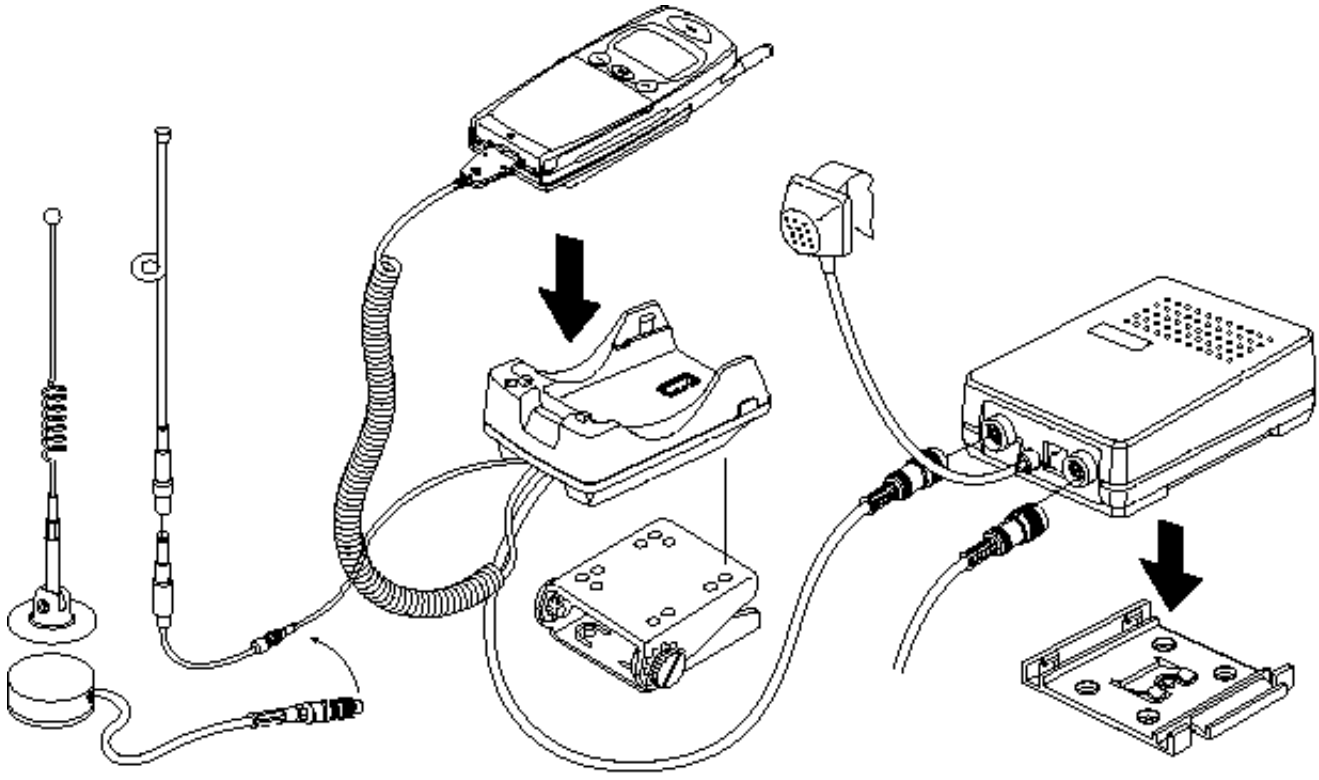


Figure 2-4 Cable Connections

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°Ë°È 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	°Ëor°È **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	 °Ëor°È **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°Ë°È 1:PCS Phone # 2:General	Volume °„	-NAM Programming Menu is displayed
SVC Menu°Ë°È 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	°Ëor°È **OK**	CDMA Home system ID, current status is displayed. -changes the status. -stores it.
CDMA fSID Yes	°Ëor°È **OK**	CDMA foreign SID, current status is displayed. -changes the status. -stores it.
CDMA fNID Yes	°Ëor°È **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 Q109(2SC4081) and make gate port Low. VBAT will be supplied to input if DC/DC converter, controlled by Q115, makes 3.6V for Idle and Talk Mode, and 3.4V for Sleep Mode.

The VBAT applied to ON_SW turns on Q110(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 Q109 even after the PWR key is released.

The power from U108 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/4 and CHIPX8 clock signals from the BBA and controls the phone. The major components are as follows:

¶UCPU : INTEL 80186 core
¶UFROM : U111,U114 (MBM29LV800T)-8MBIT FLASH ROM
¶USRAM : U112(KM68FS2000I)-2MBIT STATIC RAM
¶UEEPROM : U107(24LC128I)-128KBIT 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 (U111, U114)

One 8MBIT FROM(U111) is used to store the terminal's program. Using the down-loading program, the program can be changes even after the terminal is fully assembled. The other is used to store program for Voice memo, Voice dialing and so on.

SRAM (U112)

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

EEPROM (U107)

One 128KBIT 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 and it senses the six LEDs and backlight flip ON/OFF through reed switch.

EARPIECE

This is a phone that can make a call and receive a call by earpiece.

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 negative voltage 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 Figure 4-1.

MICROPROCESSOR INTERFACE

The interface circuitry consists of reset address bus (A0-A19), data bus (AD0-AD15), and memory controls (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) : Analog to Digital Converter(ADC) 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 8KHz by QCELP 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/ changed to LOW, all the pins except for the TXCO are disabled.

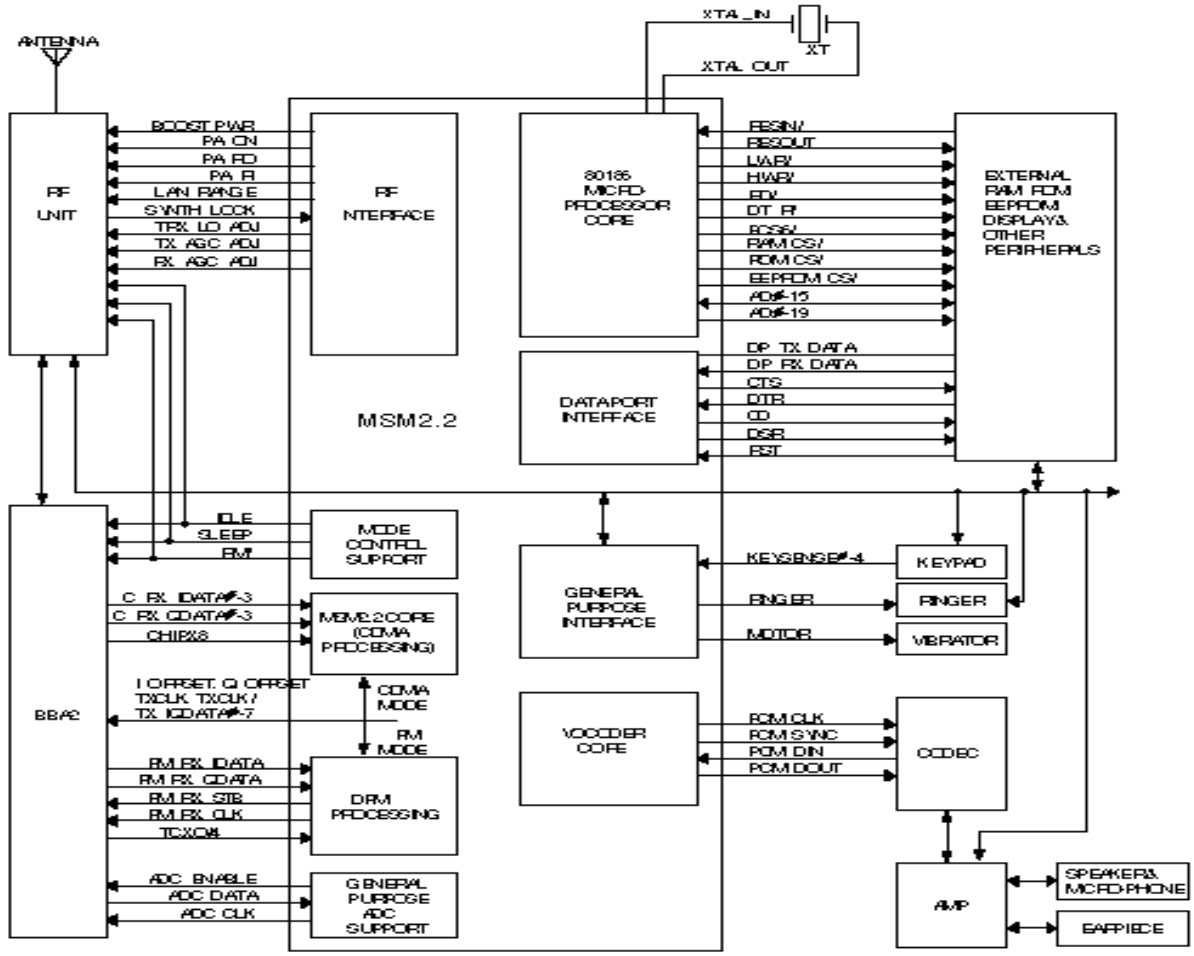


Figure 4-1 Baseband Block Diagram

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 out from the MSM is converted to audio signal by ADC 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 R220, C222, R219, and C221, 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°æ30MHz RF signal from 1750°æ30MHz first local signal. The LNA is Q303 and down converter is 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°æ30MHz) from the signal received from the mobile station. The band width 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 °æ630kHz band width. The filter also eliminates the image product generated at the mixer.

BUFFER

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

VOLTAGE CONTROLLED OSCILLATOR

The VCO (U305) generates the signal having 1750MHz center frequency and °æ30MHz 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 signal is generated at VCO. PLL compares the two signals and generate the desired signal with a pre-programmed counter which controls voltage.

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°æ30MHz) and to receive through the antenna only the signals within acceptable Rx frequency range (1960°æ30MHz). It also matches LNA(Q303) input in receiving part and PA output in transmitter part with the antenna.

4-3 Transmitter Section

POWER AMP MODULE

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

DRIVER AMP

The driver amp (Q413) allows the signal input to the Power Amp Module (U407) to be within a specified level.

UP CONVERTER (MIXER)

The up-converter (U405) receives the first local signal to generate 1880°æ30MHz from the signal controlled by TX AGC amp (U404). 1880°æ30MHz signal comes out from the mixer output by adding 130MHz IF signal to 1750°æ30MHz 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 out to BBA (Base Band Asic) should be a constant level. The TX IF AGC amp (U404) controls power to keep the signal at a constant level. Dynamic range is 85 dB, up gain +40dB, and down gain -45dB.

ANTENNA

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

RF BAND PASS FILTER (BPF)

The RF BPF (F402) accept only a specific frequency (1880°æ30MHz) to send it out to power amp MMIC. The band width 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) supply a regulated power to each part of transmitter. U413 supplies 3.6V to Tx driver (Q413) and Power Amp Module (U407). U414 supplies 3.3V 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 (Q902, Q903) is power switching control circuit. It supply power for hands-free kit.

8V regulator (U806) : This circuit supplied power for audio amplifier (+8V).

Vcc regulator (U807) : This circuit regulate 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, charging time, etc.
During charging time turns on red LED. Charging is completed, turn on green LED.

Battery Type	Capacity	Charge Time	Charge Current
Standard	1000mAH	about 3h ° 30M	OA ~ 900mA
Extended	1600mAH	about 5h ° 30M	OA ~ 900mA

Voltage detection circuit : Charging circuit is designed to stop charging when the charging circuit is decrease.
The voltage of battery is entered to A / D converter located in U701 #4. (B / VTG)

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

4-4-2 Hands-free Circuit

POWER SUPPLY (U808)

U808 regulated -5V.

TX PATH

The audio signal from external Mic(J701) flows into U802 #11. U802 include amplifier and Control circuit for hands-free operating. U801A amplified input signal. Output signal transmit to HHP.

RX PATH

Input audio signal canceled noise by difference amplifier (U801c). U802 process hands-free action. The RX audio signal is input (U805). The speaker drive amp (U804) amplify the Rx audio signal and the output of U804 is go out of speaker.

4-5 Desk-Top Rapid Charger

4-5-1 Description

This specification describes requirements of DTC55 desktop charger. DTC55 is designed as desk-top rapid charger for Li-ion battery for SAMSUNG PCS Cellular phone SCH2000.

This charger include AC/DC adapter circuitry in its own board. This characteristic offers operating with direct indoor AC input without additional AC/DC adapter unit.

Integrated AC/DC adapter circuitry adopts switching mode power supply to keep lightness of whole charger.

And it has two battery slot, the front one is intended for cellular phone with battery and rear one is for another battery only. Two bi-color LED include charging status of each battery slot.

Charging current is automatically controlled by programmed microprocessor inside of charger, to proper to each type of battery.

4-5-2 Electrical Characteristic

AC IN PUT

- AC input voltage : 110/220Vac
- AC input voltage : 85Vac ~ 264Vac
- AC input frequency : 60Hz
- AC input ON/OFF cycle : MIN 5 sec

OUT PUT

- Battery Charging Method : CC-CV mode
- Battery Charging Current Range under CC mode
  - -Front slot : 800mA ~ 870mA
  - -Rear slot : 400mA ~ 450mA
- Battery Charging Voltage Range under CC mode
  - -Front slot voltage setting (V/F : 5.1K)
  - 4.1 ~ 4.05 VDC with 110Vac input and 180mA load current.
  - - CV mode 4.05V ~ 4.15V
  - - Voltage range (4.05V ~ 4.15V), is to be tested with 180mA ~ 600mA load range for Front slot.
  - - Rear slot voltage (V/F : 5.1K)
  - - CV mode 4.0V ~ 4.15V at 150mA load
- Ripple & Noise
  - - Ripple & Noise Limit : 60mVp_p MAX
  - - Test Condition
  - - Front : At output contact with 20MHz bandwidth using resistive load 650mA and nominal input.
- Efficiency
  - - 55% MIN
  - - Efficiency is to be tested with 650mA and 150mA resisted load and 110Vac input.

LED INDICATION

¶UAC plug in : red and green orange at 0.5 sec intervals
¶USlot Identification
- Front slot : LED " PHONE"
- Rear slot : LED "BATT"

¶UCharging Status
- Constant Red : Rapid charging
- Constant Green : Rapid charging is terminated.
- Constant Orange : Under or Over Temperature
- Flashing Orange
  *If charging is started with any battery of open cell, equivalent LED should be flashing Orange.
  *If a battery of open cell is loaded on rear slot whole front slot is charging, the other good battery.
  LED for front slot - Constant RED
  LED fro rear slot - flashing Orange
  *If a battery of open cell is loaded on front slot while rear slot charging, the other good battery.
  LED for front slot - flashing Orange
  LED for rear slot - constant RED
- Off : battery unloaded

4-5-3 General Characteristics

TEMPERATURE

¶UCharging Temperature Range : 0 to 45 ℃
¶UStorage Temperature Range : -20 to 85 ℃

SAFETY REQUIREMENTS

¶USafety Approval
- Approval No. : UL and CUL, FCC Class B
- Approval No. should be appeared in label design.

PRIMARY - SECONDARY ISOLATION

¶UWithstanding Voltage : 3K Vdc for 1 sec
¶UCut-off Current : 10mA

BURN -IN

¶UAll power supply shall be subjected to the burn - in process
- Temperature : 35 ℃ ° 5 ℃
- Load condition : 600mA and 150mA
- Input Voltage : nominal 110Vac

4-5-4 Schematic Description

BATTERY RECOGNITION CIRCUIT : HIC

¶UBattery identity detection determined to voltage through R4, R6, R11, R12.
¶UBattery internal between C/F and GND.

CURRENT DETECTION CIRCUIT : R5, R6, R11, R12, HIC

¶UBattery charging current is changed voltage detection.
¶UThis voltage inputted u-COM to 16 times amplified through HIC.

VOLTAGE DETECTION CIRCUIT : HIC

u-COM A/D through HIC pin 12, 13 detected voltage.

BATTERY TEMPERATURE DETECTION CIRCUIT : HIC, TH1

Battery temperature detection determined temperature by use of thermistor resistor variation of TH1 by HIC.

CURRENT LIMIT CIRCUIT : HIC

When soft-change, current detection circuit limited current flow to battery, reference voltage more than detected current, detected current and HIC internal reference voltage.

4-6 Cigarette Lighter Adapter

4-6-1 Description

This specification describes requirements of CHG55 cigarette lighter adapter. CHG55 is designed as an charger for Li-ion battery for SAMSUNG PCS Phone SCH-2000.

4-6-2 Electrical Characteristic

- Input Voltage : 11~ 30V DC (Normal voltage : 13.7V DC)
- Output Voltage : 4.1 ° ±0.02V DC9 (Maximum)
- Output Current :
  - Output Current : 0 ~ 740 mA
  - Current limited in this unit should be kept 740 ° ±40mA
- Ripple Noise : 0.1 Vp_p (under 600mA load)
- Fuse Capacity : 250V, 2A
- Charging time :
  - Standard battery : 4 hours ° ±30 minutes
  - Extended battery : 5 hours ° ±30 minutes

4-6-3 Function

PROTECTION CIRCUIT

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

DETECTION OF MOBILE PHONE

If mobile phone is connected to CLA, the CLA lamp is on to display whether CLA is operating or not.

AUTO POWER ON

When a phone is connected to CLA, the power of the phone will be on automatically.

DUAL LED

This CLA has dual LED.
Green : When battery is fully charged. (over 80%)
Red : When CLA is on charging battery.

4-6-4 Schematic Description

POWER SUPPLY

This circuit supplies HHP & battery with power received from Cigar Lighter jack of automobile.

POWER CIRCUIT OF CHARGE FOR HHP POWER & BATTERY

This Switching Regulator produces needed power for charging HHP power & battery, supplied U1, D1, D2, C1, C2, L1, R11 from Cigar Lighter jack of automobile.

CONFIRMING CIRCUIT OF EXISTING BATTERY OR NOT

U3A reads separated voltage between resistance battery C/F and R20, controls no. 5 pin of U1 through reference voltage and comparator then decides to produce Vcc or not.

CHARGE CURRENT CONTROL CIRCUIT

U2A, U4, Q1 and side circuit detects R4's flowing current, control no. 5 pin of u1 then charge current and charge voltage.

LED ACTIVATING CIRCUIT

LED activating circuit compares to voltage difference between R4 source and D4 PROP, controls Q3, Q4 through U2B comparator for Q6 and side circuit, then activates LED.

AUTO POWER ON CIRCUIT

Q7, Q8 and side circuit makes power on the circuit allowed Vcc power to no. 9 HHP pin (power on) by turned on Q7, following up the producing Vcc.

CONNECTION OF CLC, CURL, AND CABLE

PIN NO.(CLA)	DESCRIPTION	PIN NO.(PHONE)
#1	HP-PWR	9
#2	V-BAT	14/15/16
#3	V/F	N.C
#4	C/F	3
#5	GND	2/4/6

4-7 Travel Charger

4-7-1 Description

- This specification describes requirements of TC55 travel charger. TC55 is designed as a wall-mount type rapid charger for Li-ion battery (1CELL) for SAMSUNG PCS phone SCH-2000.
- This charger includes AC/DC adapter circuitry in its own board. This characteristic offers operating with direct indoor AC input without additional AC/DC adapter unit. And it is connected by DC power cord to a phone with battery.
- Integrated AC/DC adapter circuity adopts switching mode power supply to keep lightness of whole charger.
- Own bi-color LED indicates charging status of battery.
- Charge current is automatically controlled by programmed microprocessor inside of charger.

4-7-2 Electrical Characteristic

AC INPUT

- AC input voltage : 110/220 Vac
- AC input voltage range : 85Vac ~ 264 Vac
- AC input frequency : 60Hz
- Ac input power : 10W

OUTPUT

- Battery Charging Voltage : 4.1/4.2 V
- Battery Charging Voltage Range under C-V mode : 4.1/4.2 (-0.2/+0.1V)
- Battery Charging Current : 0 to 700 mA
- Battery Charging Current Range under C-C mode : 700mA ° æ0 mA
- Efficiency : 55% min
- Ripple & Noise : 60mVp_p max (test condition : At output contact with 20MHz bandwidth using resistive load 650mA)

SAFETY REQUIREMENTS

Primary-Secondary Isolation
- Withstanding Voltage : 3000Vac min for 1 second
- Cut-put current : 10mA
- Isolation Resistance : 8 Mohm

LED INDICATION

AC PLUG IN : yellow for 1 second
Charging status
- Red : Charging
- Green : Charging termination
- OFF : Battery unloaded
- Yellow blinking : Error mode
- Yellow : Under or over temperature

ENVIRONMENTAL SPECIFICATION

Unit Operating Temperature Range : 1 to 45 ℃Δ
Storage Temperature : -20 to 85 ℃Δ

4-7-3 Schematic Description

MICOM CONTROLLER : U4

¶UU4 is include u-COM to controlled whole charging system and include following internal circuit.
- General input / output
- A/D converter
- Reset delay circuit (power on delay)
- Timer

¶UIt is carried following functions
- Battery recognition
- Charging termination condition detection
- Output short detection and output protection
- Temperature detection

BATTERY RECOGNITION CIRCUIT : U4

¶UBattery identity detection determined to voltage detection
¶UBattery internal between ID & GND

CURRENT DETECTION CIRCUIT : R14, R15, R16, U4

¶UBattery charging current is changed voltage through R14, R15, R16
¶UThis voltage inputted u-COM to 16times amplified through U4

VOLTAGE DETECTION CIRCUIT : U4

¶Uu-COM A / D through U4 pin 15 detected voltage

BATTERY TEMPERATURE DETECTION CIRCUIT : U4

¶UBattery temperature detection determined temperature by use of thermistor resistor variation of battery by U4

CURRENT LIMIT CIRCUIT : U4

¶UWhen soft-change, current detection circuit limited current flow to battery, reference voltage more than detected current, detected current and U4 internal reference voltage.

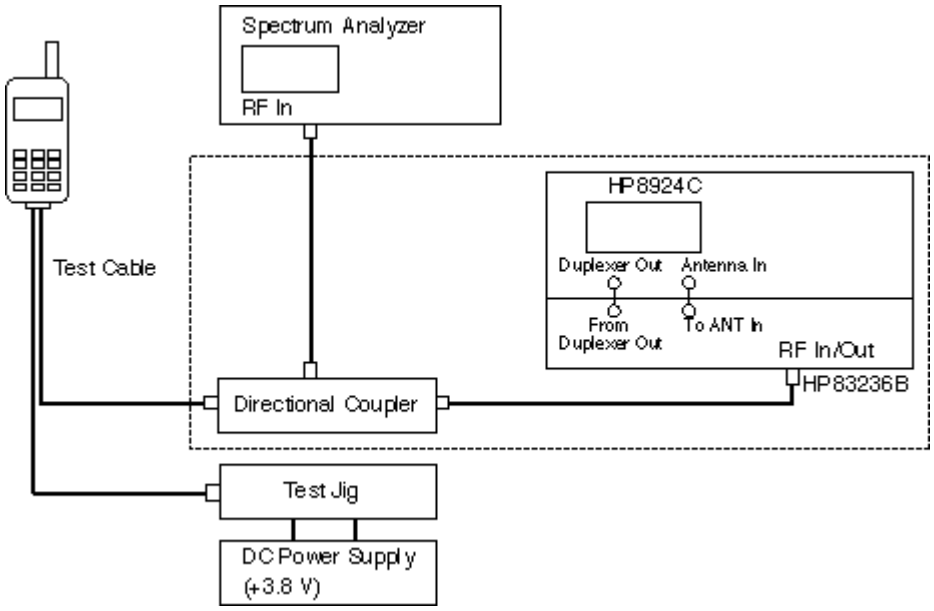
5. Test Procedure

5-1 List of Equipment

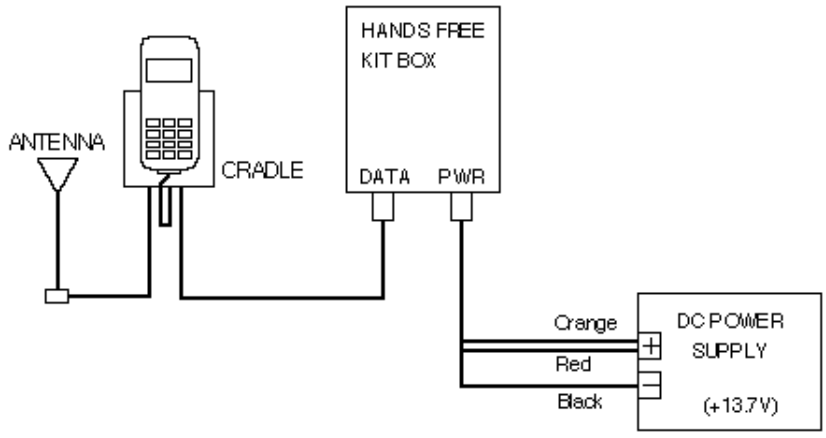
¶UDC Power Supply
¶UTest Jig
¶UTest Cable
¶UCDMA Mobile Station Test Set HP8924C, HP83236B, CMD-80, etc
¶USpectrum Analyzer (include CDMA test mode) HP8596E

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, #"

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

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

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

   ¶U 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.
46(B2, 0, 0)	T_VIBRATOR_ON_I	activate a vibrator
47(B3, 0, 0)	T_VIBRATOR_OFF_I	inactivate a vibrator
48(B4, 0, 4)	T_BATT_TYPE_I	Battery Type
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.

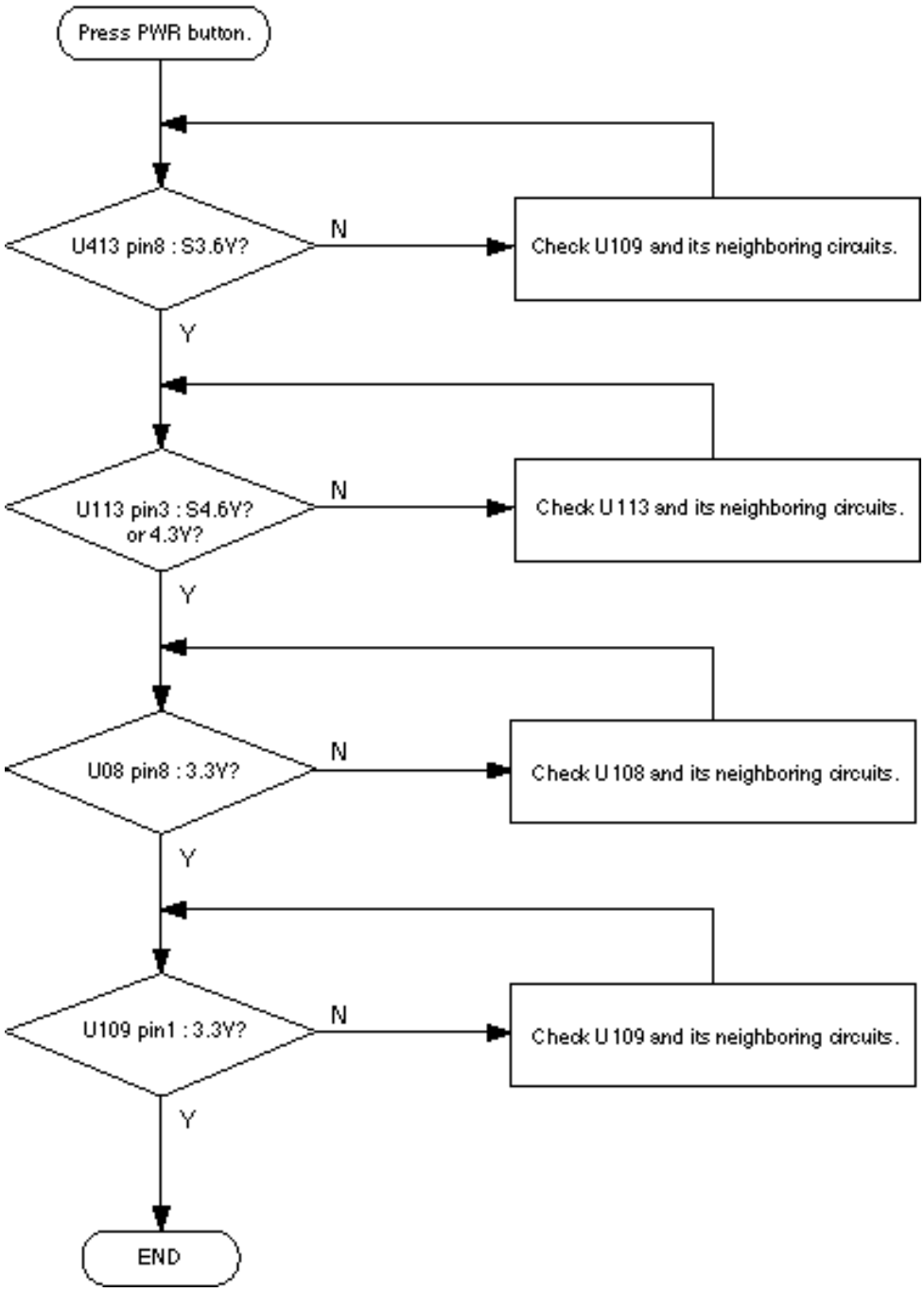
Command No. (OP, AB, RB)	Signal. Name	Description
68(C8, 0, 3)	T_VBATT1_I	Set the low battery position in the standby.
69(C9, 0, 3)	T_VBATT2_I	Set the low battery position in the talking.
70(CA, 3, 0)	T_WRITE_BATT_I	Write low battery level value to NVM.
71(D1, 3, 0)	T_CDMA_TXADJ_I	Change PDM TX AGC in 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)

¶S OP: Operation Command Number
AB: Input Argument Byte Number
RB: Return Byte Number

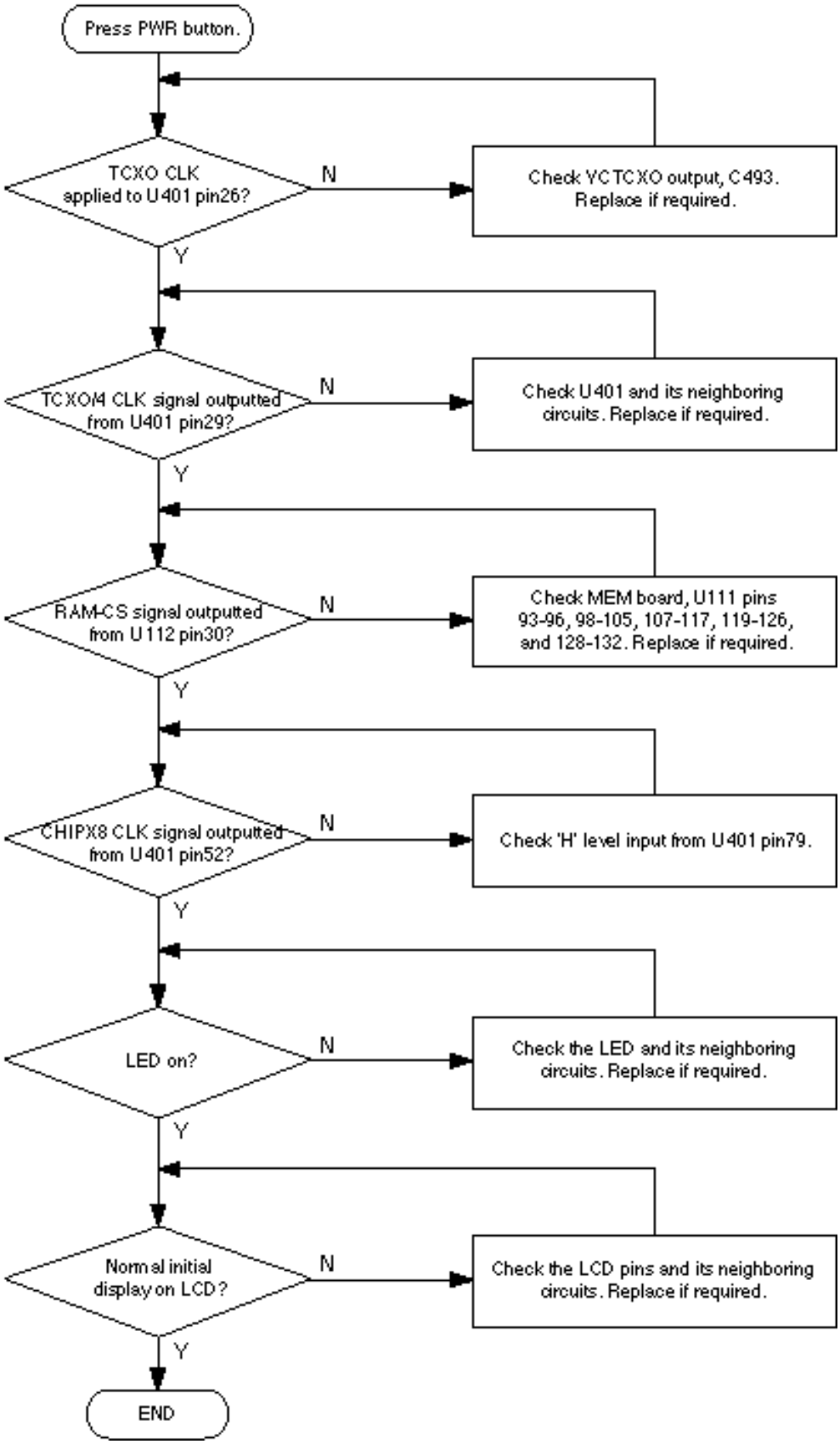
6. Troubleshooting

6-1 Logic Section

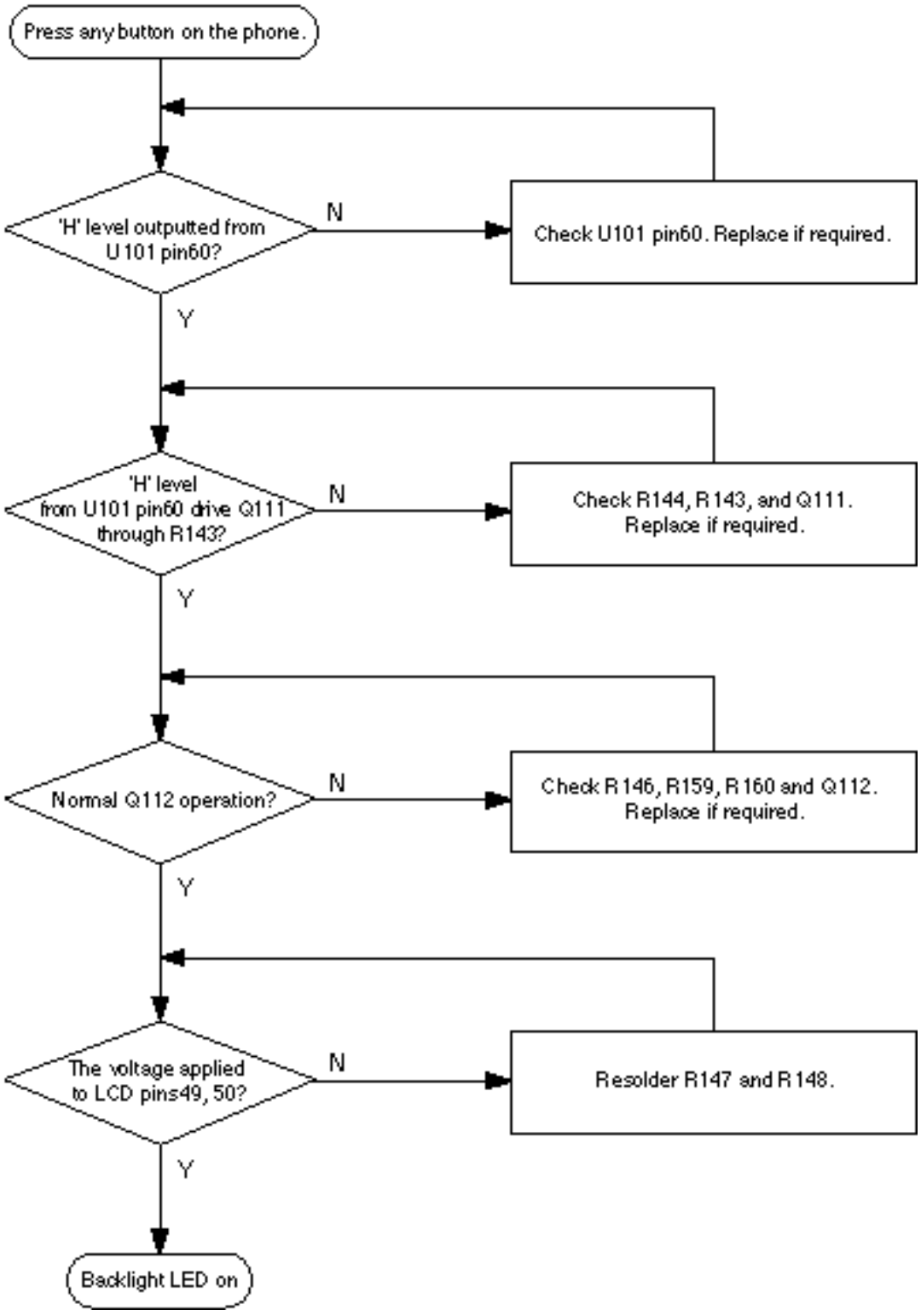
6-1-1 No Power



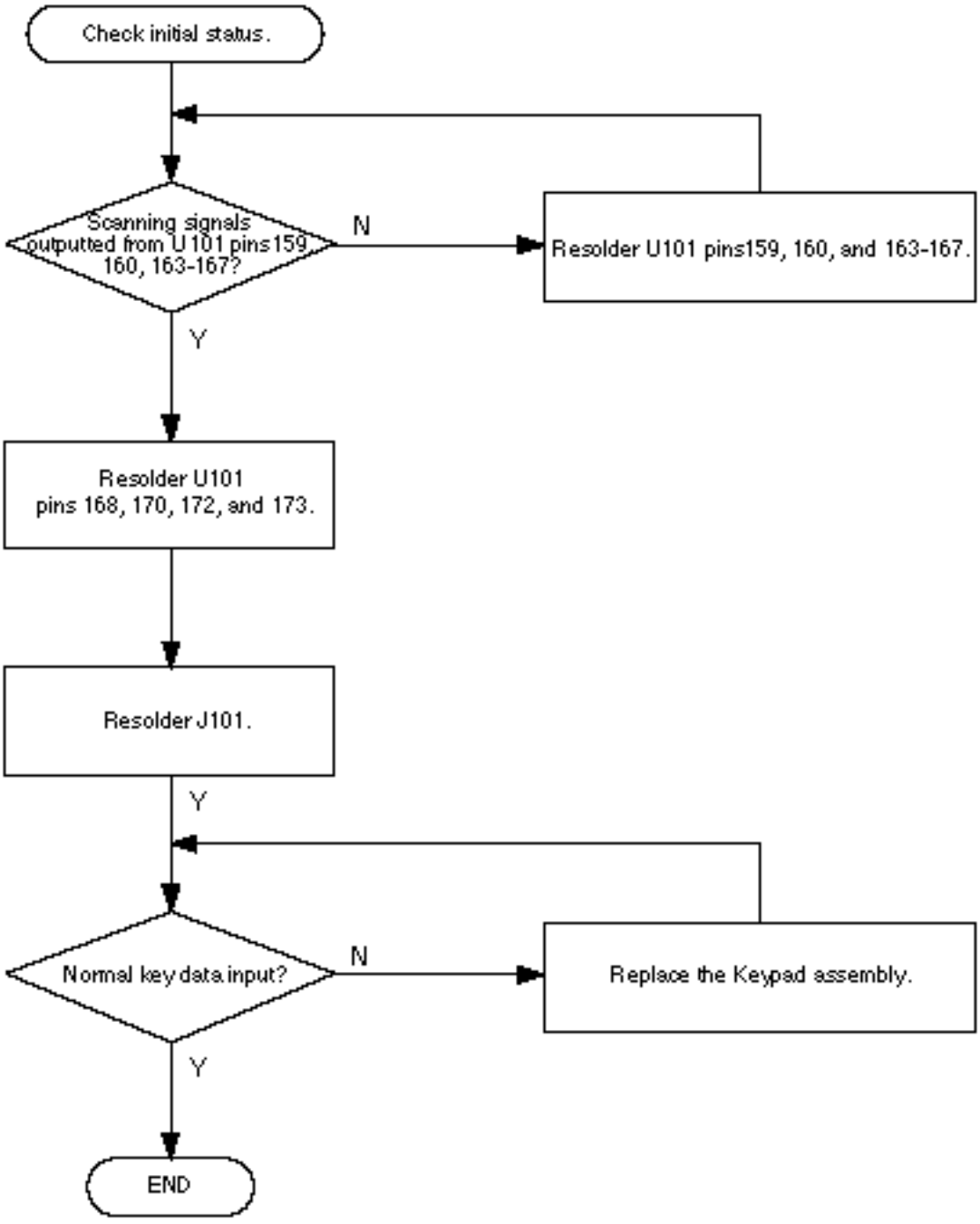
6-1-2 Abnormal Initial Operation (Normal +3.3 voltage source)



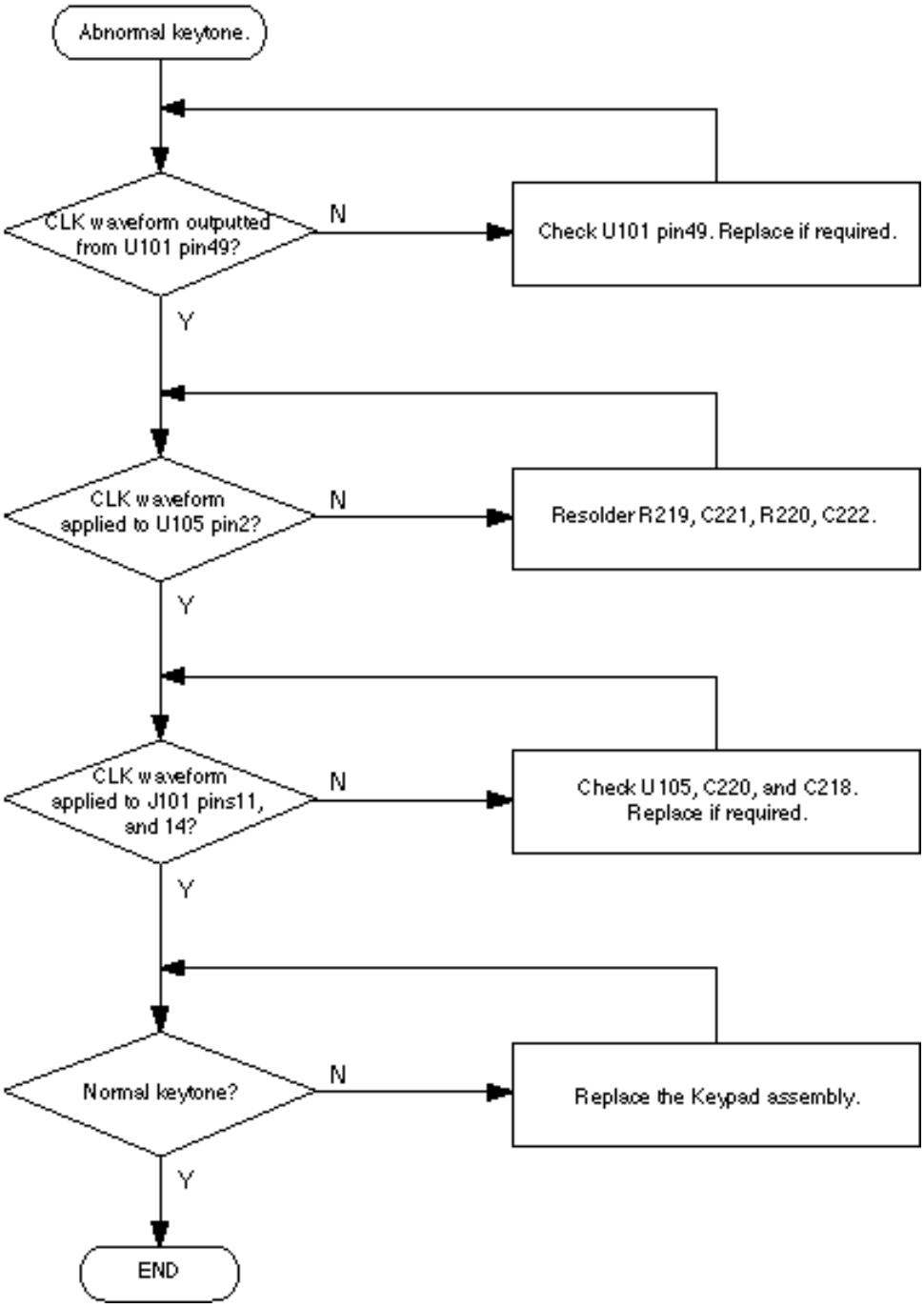
6-1-3 Abnormal Backlight Operation



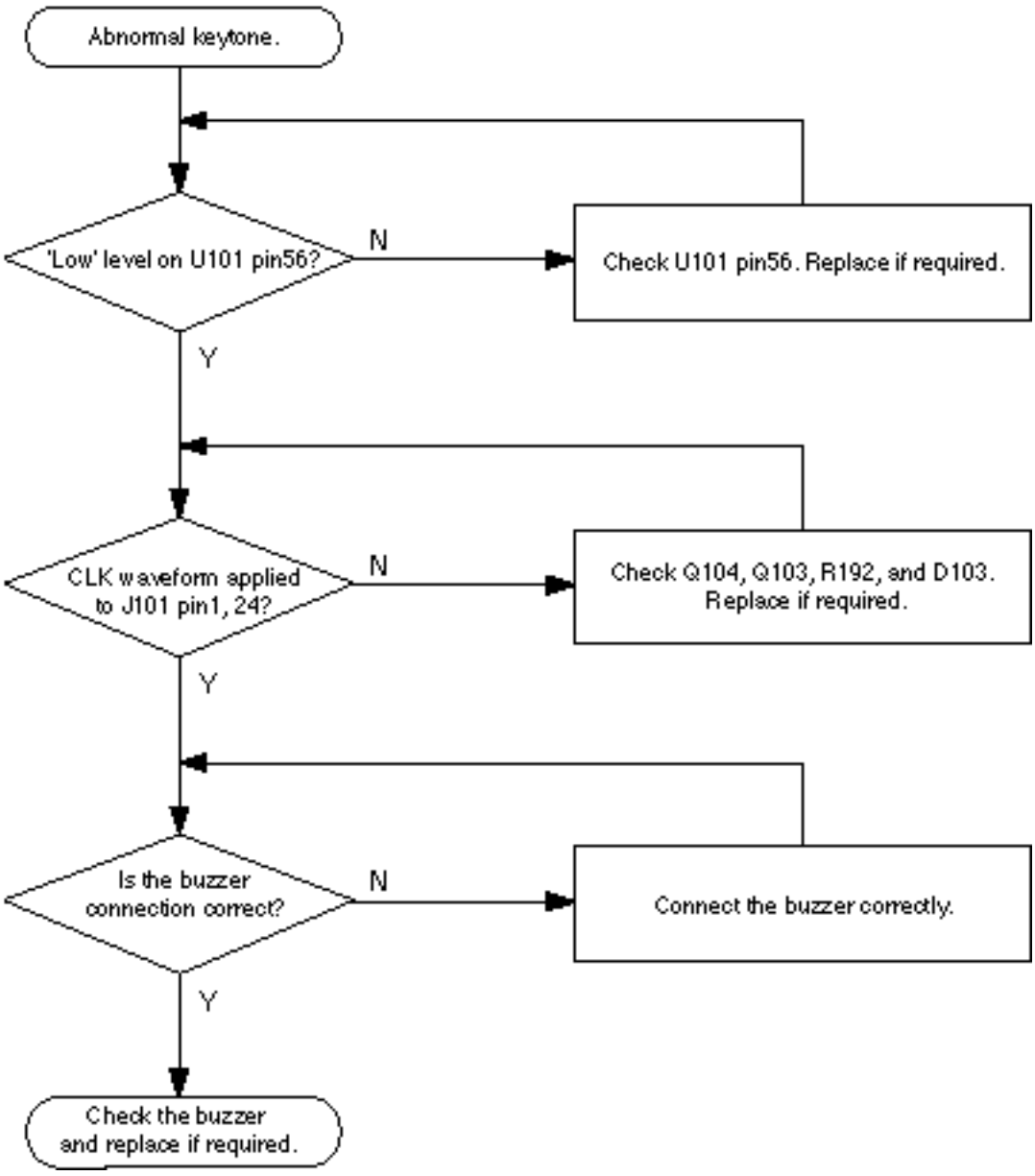
6-1-4 Abnormal Key Data Input



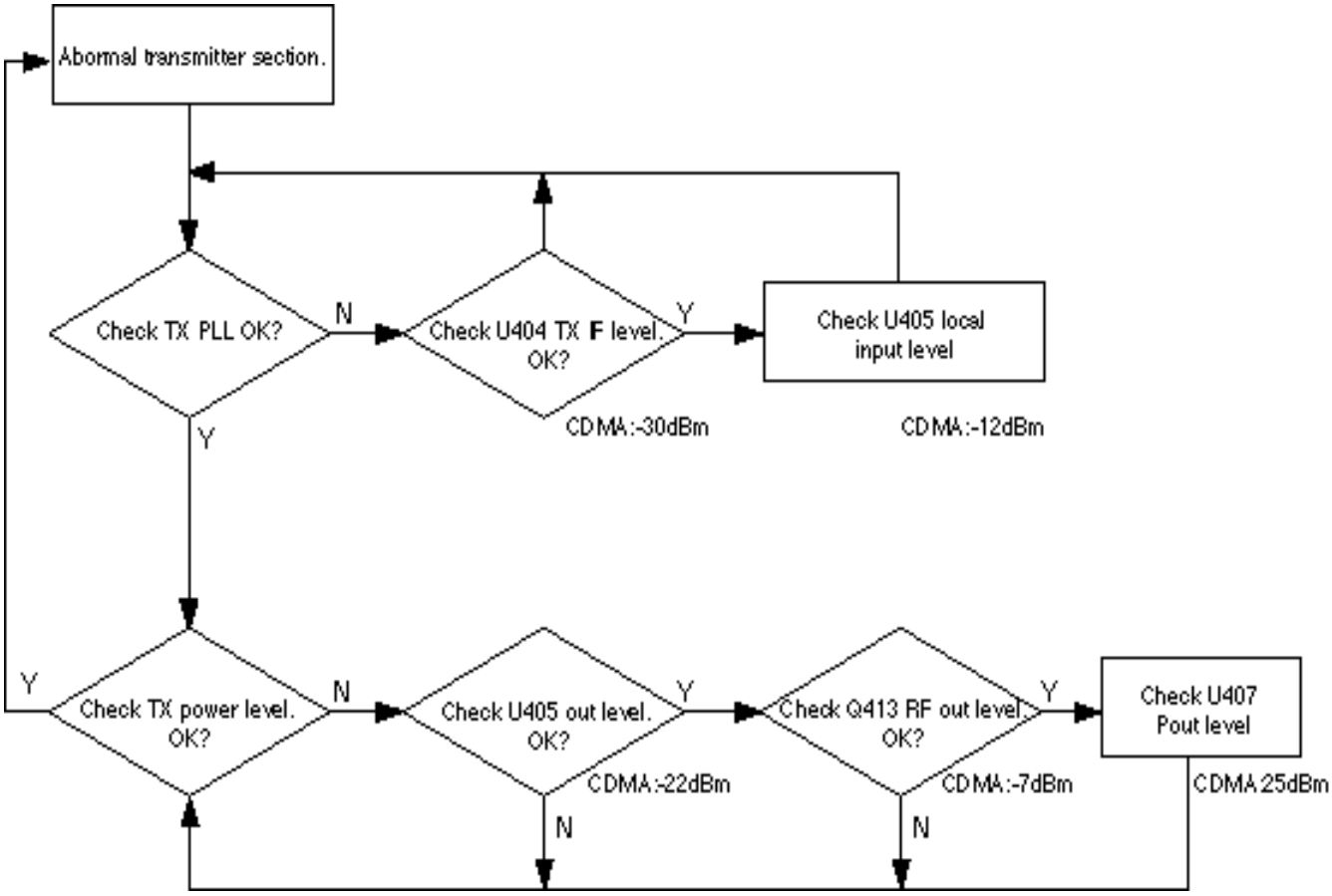
6-1-5 Abnormal Keytone



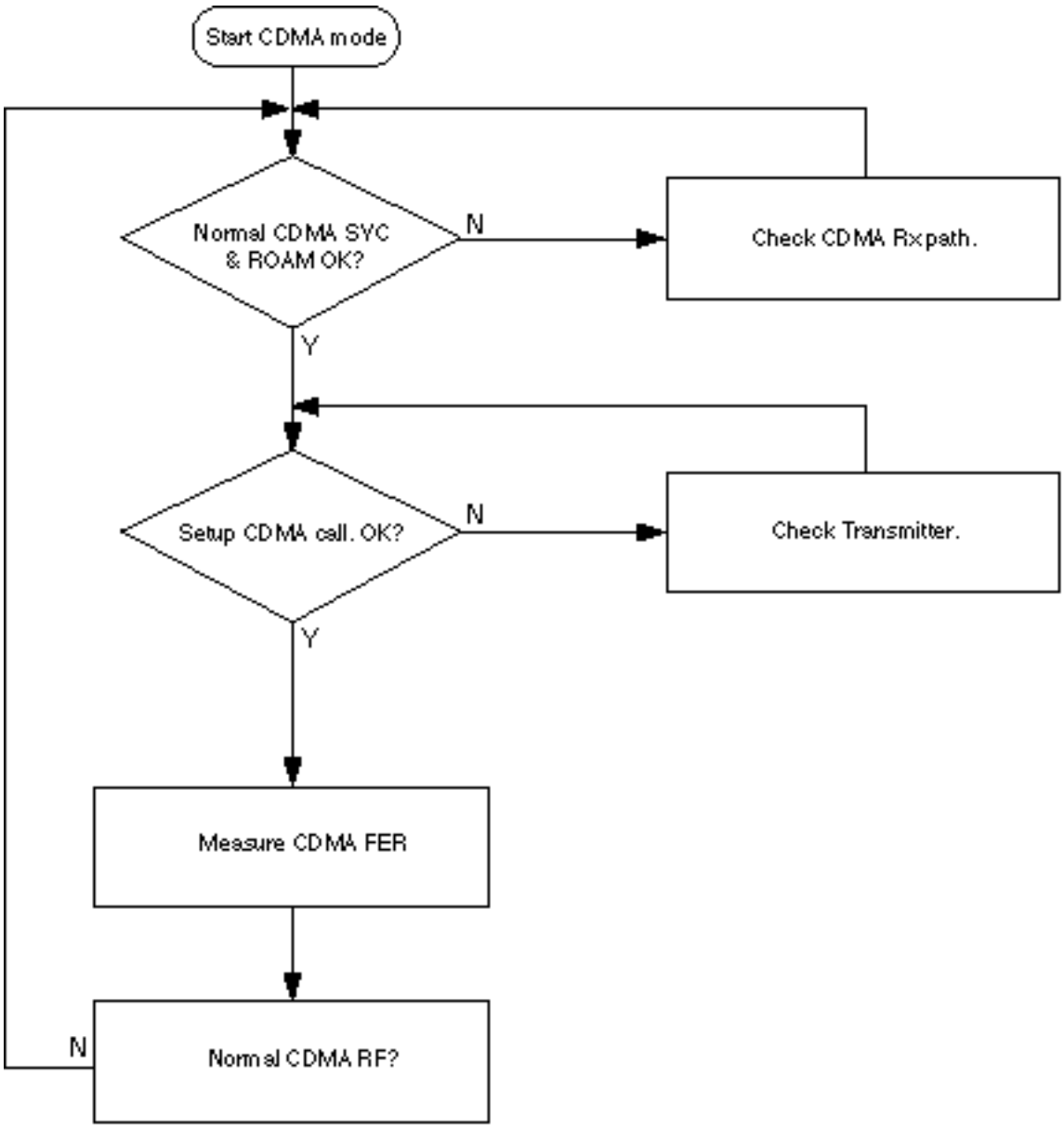
6-1-6 Abnormal Alert Tone



6-2 Transmitter Section

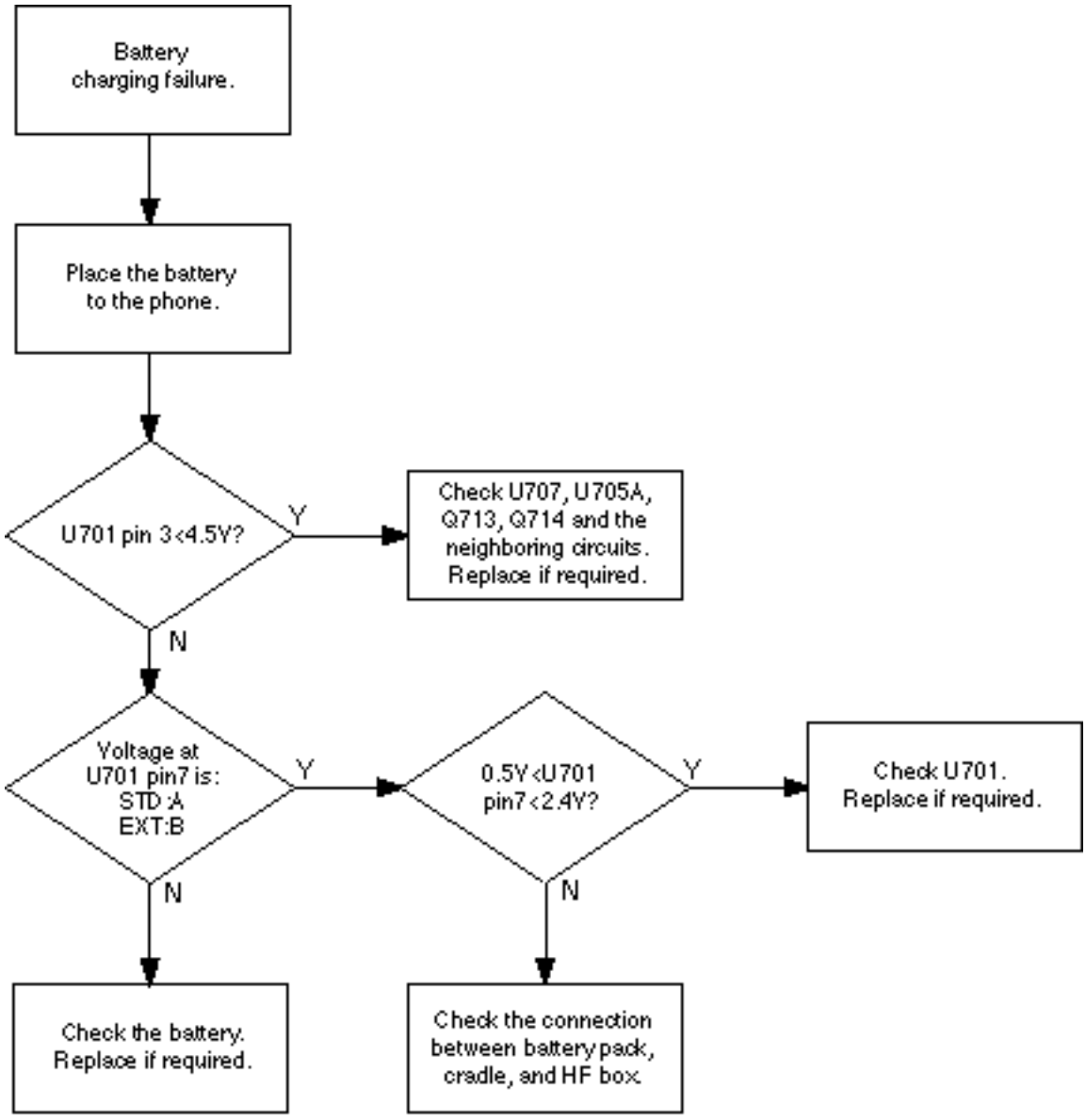


6-3 Receiver Section



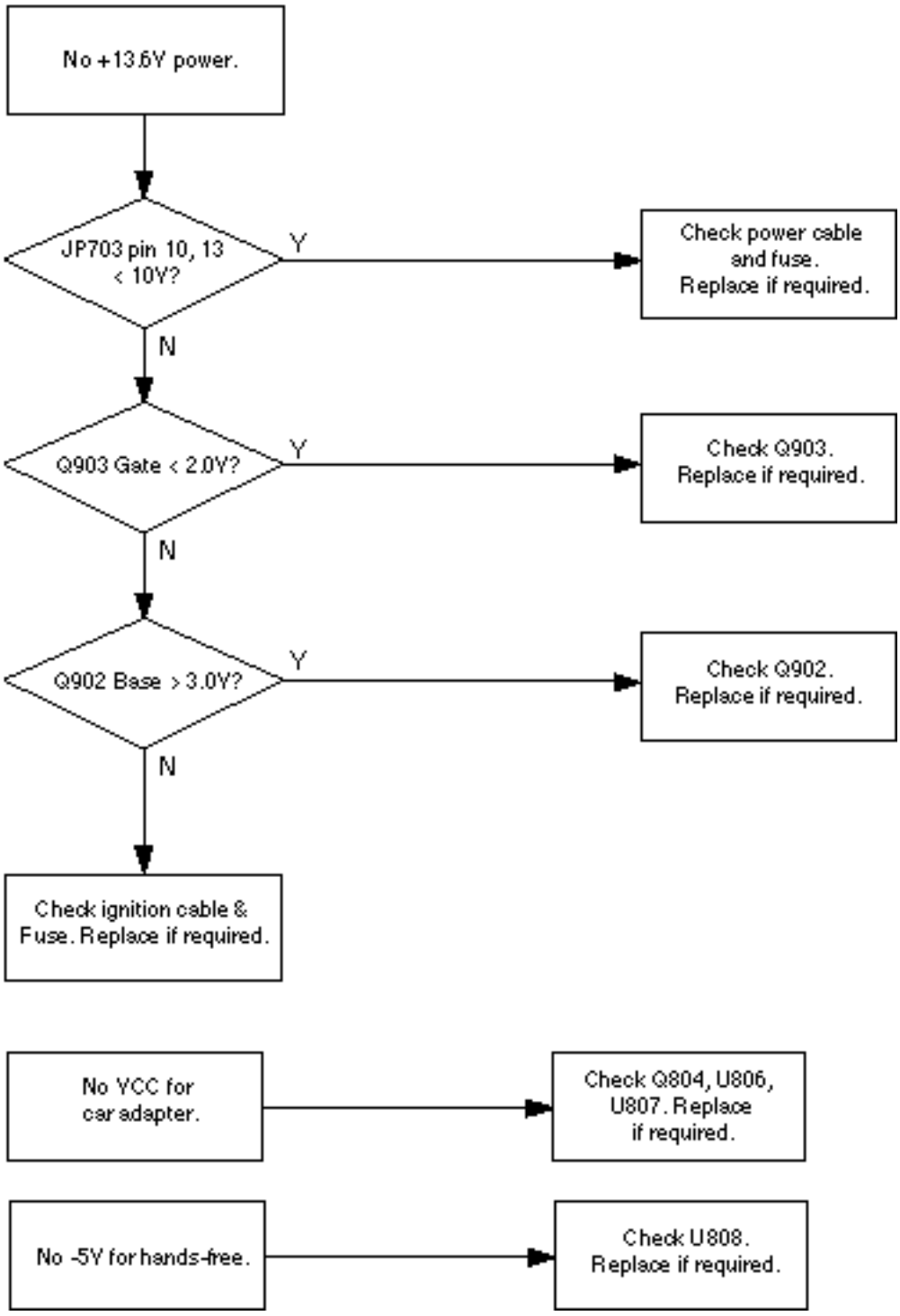
6-4 Hands-Free Kit

6-4-1 Abnormal Battery Charging

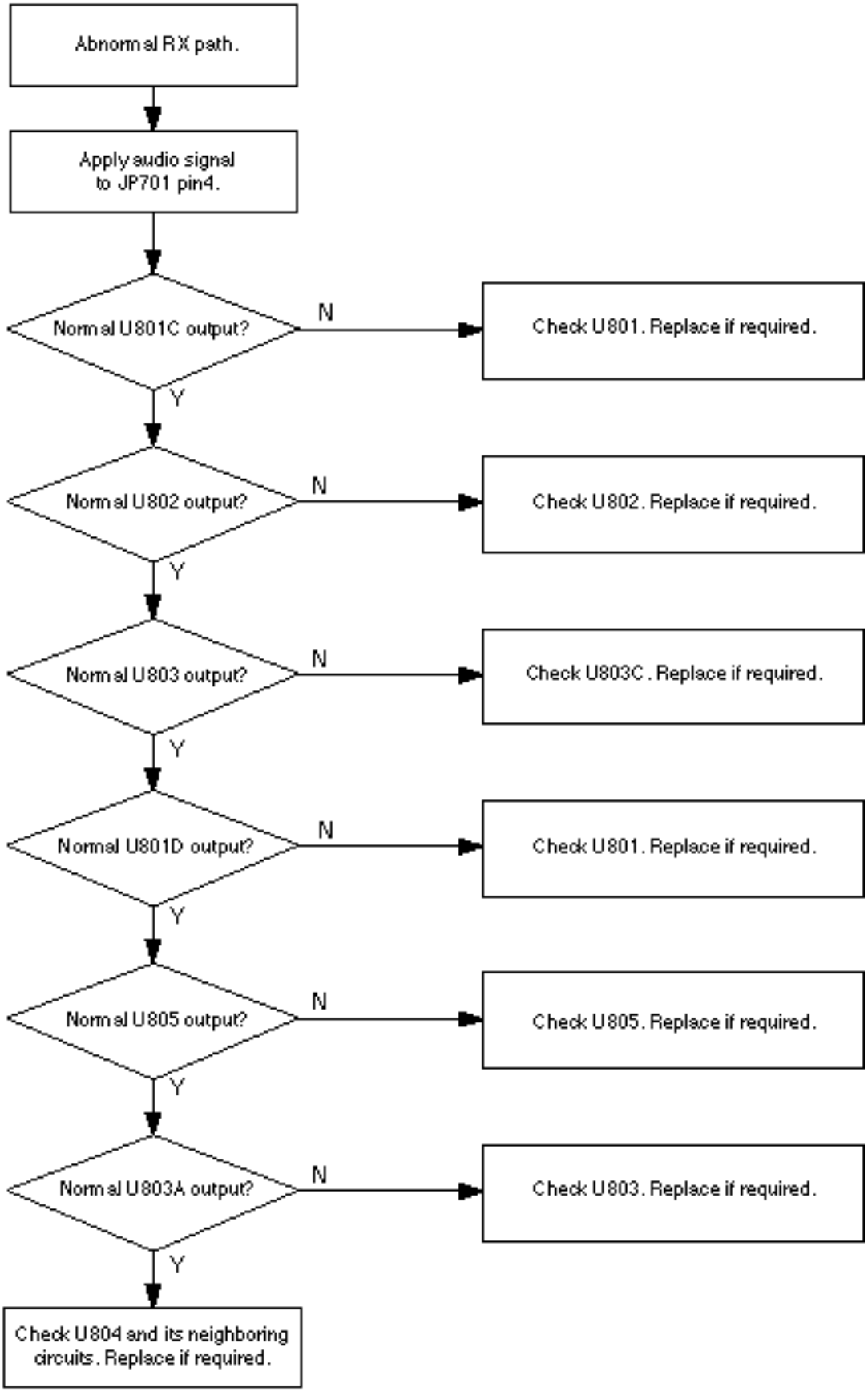


A (STD): 0.5V °¬ V at U701 pin 7 < 1.5V
B (EXT): 1.6V °¬ V at U701 pin 7 < 2.4V

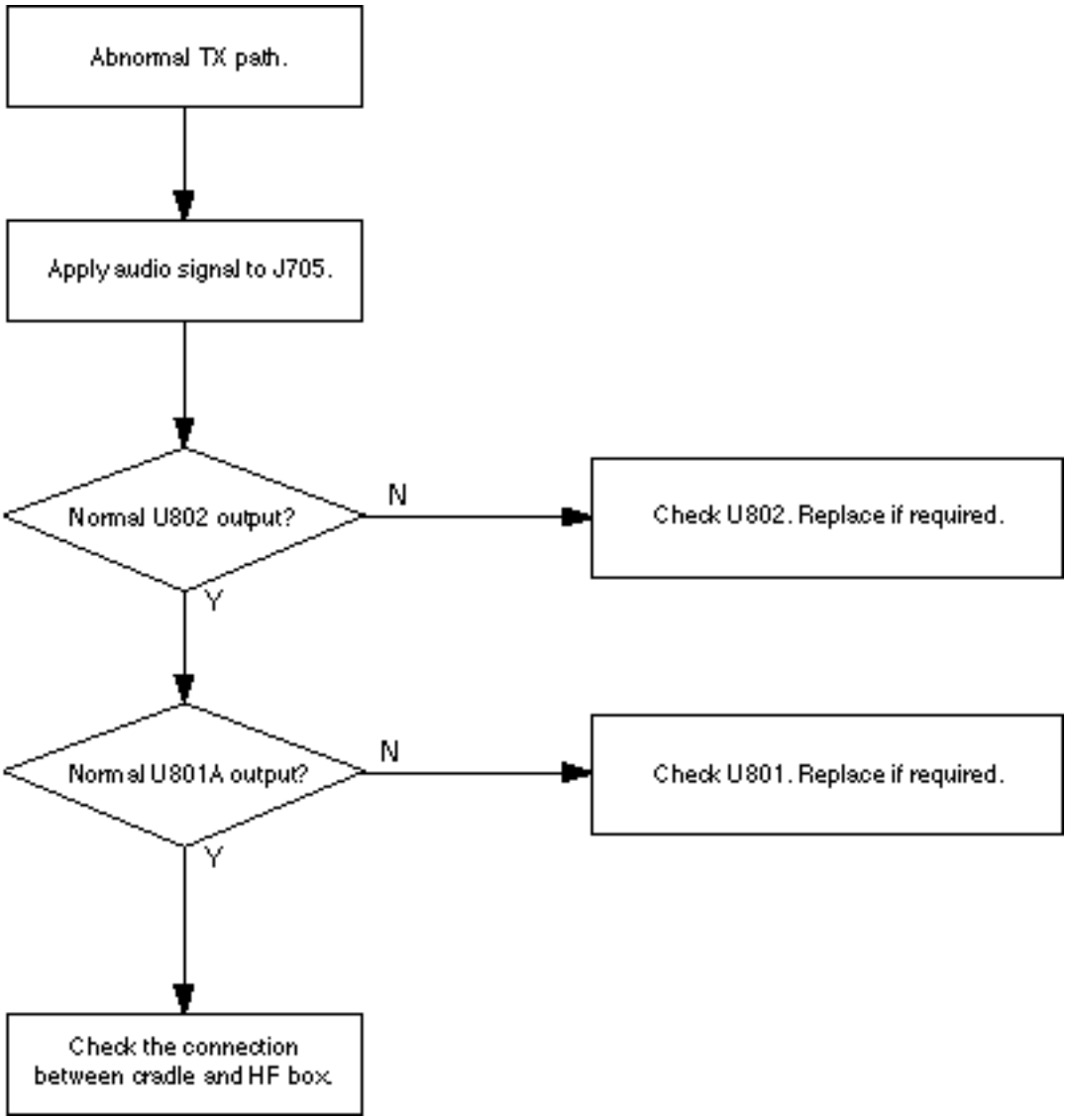
6-4-2 No Power


No +13.6Y power.
JP703 pin 10, 13 < 10Y?
Y
Check power cable and fuse. Replace if required.
N
Q903 Gate < 2.0Y?
Y
Check Q903. Replace if required.
N
Q902 Base > 3.0Y?
Y
Check Q902. Replace if required.
N
Check ignition cable & Fuse. Replace if required.
No VCC for car adapter.
Check Q804, U806, U807. Replace if required.
No -5Y for hands-free.
Check U808. Replace if required.

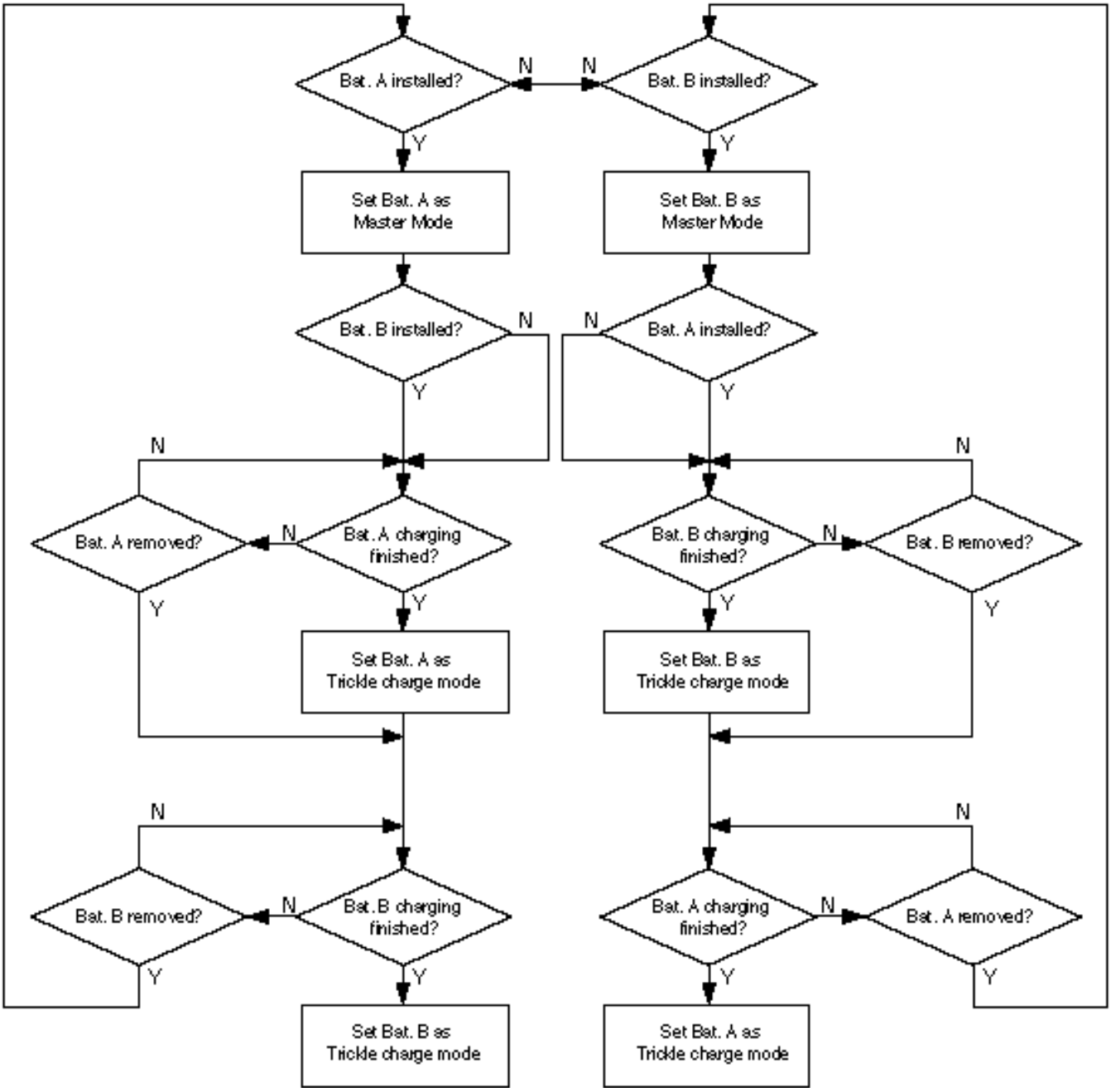
6-4-3 Hands-Free RX Path



6-4-4 Hands-Free TX Path

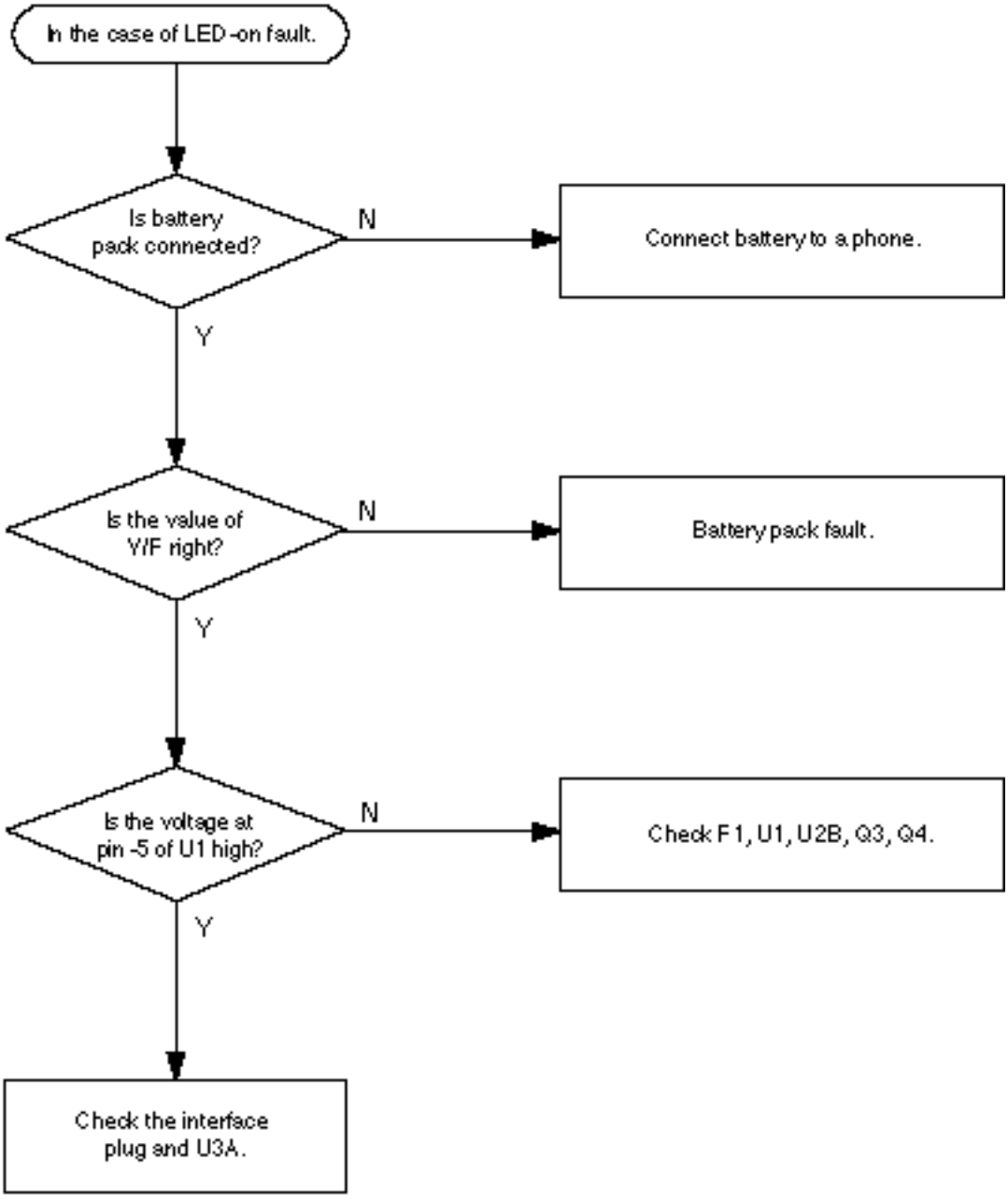


6-5 Desk-Top Rapid Charger

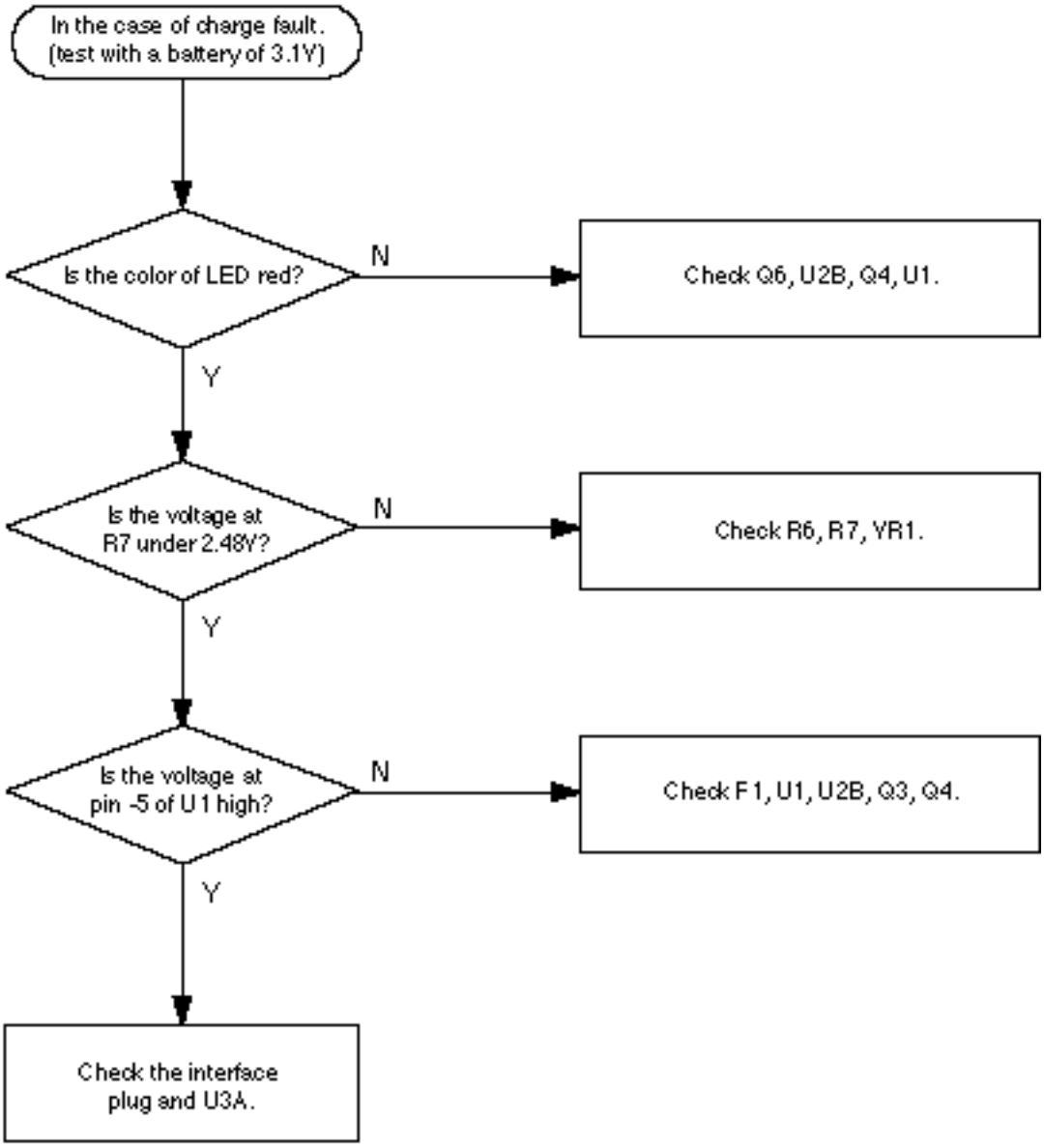


6-6 Cigarette Lighter Adapter

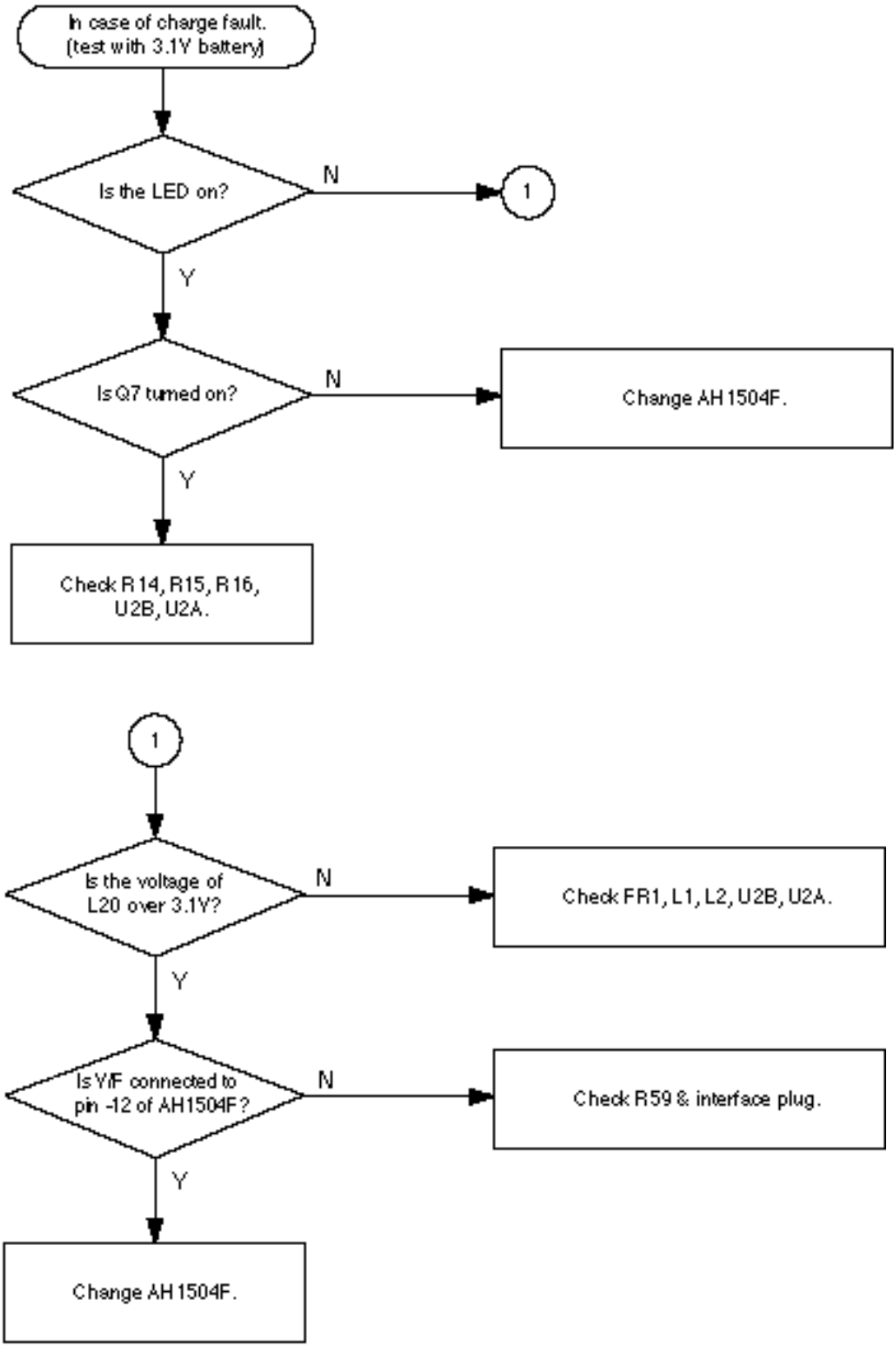
6-6-1 LED-ON Fault



6-6-2 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

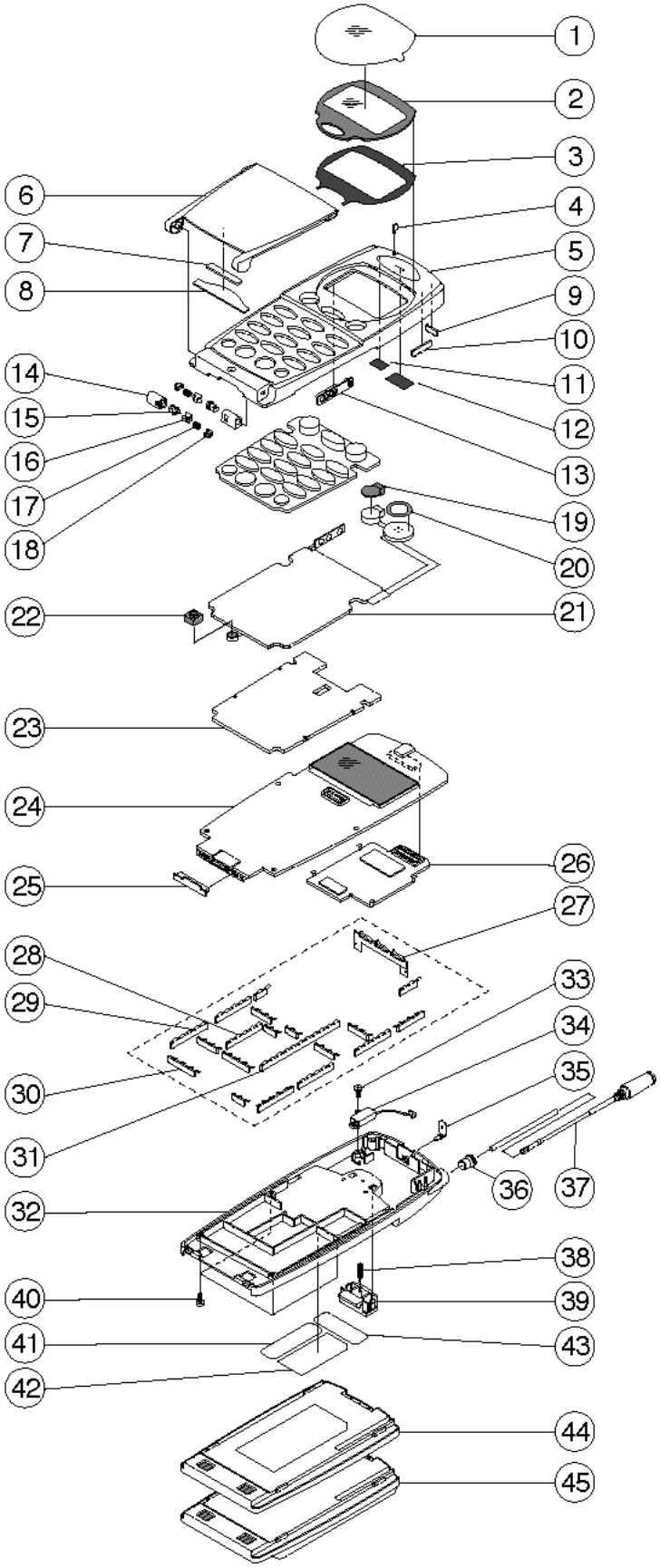
7-11 Main Set Packing Layout

7-12 Main Set Packing Parts List

7-13 Hands-Free Kit Packing Layout

7-14 Hands-Free Kit Packing Parts List

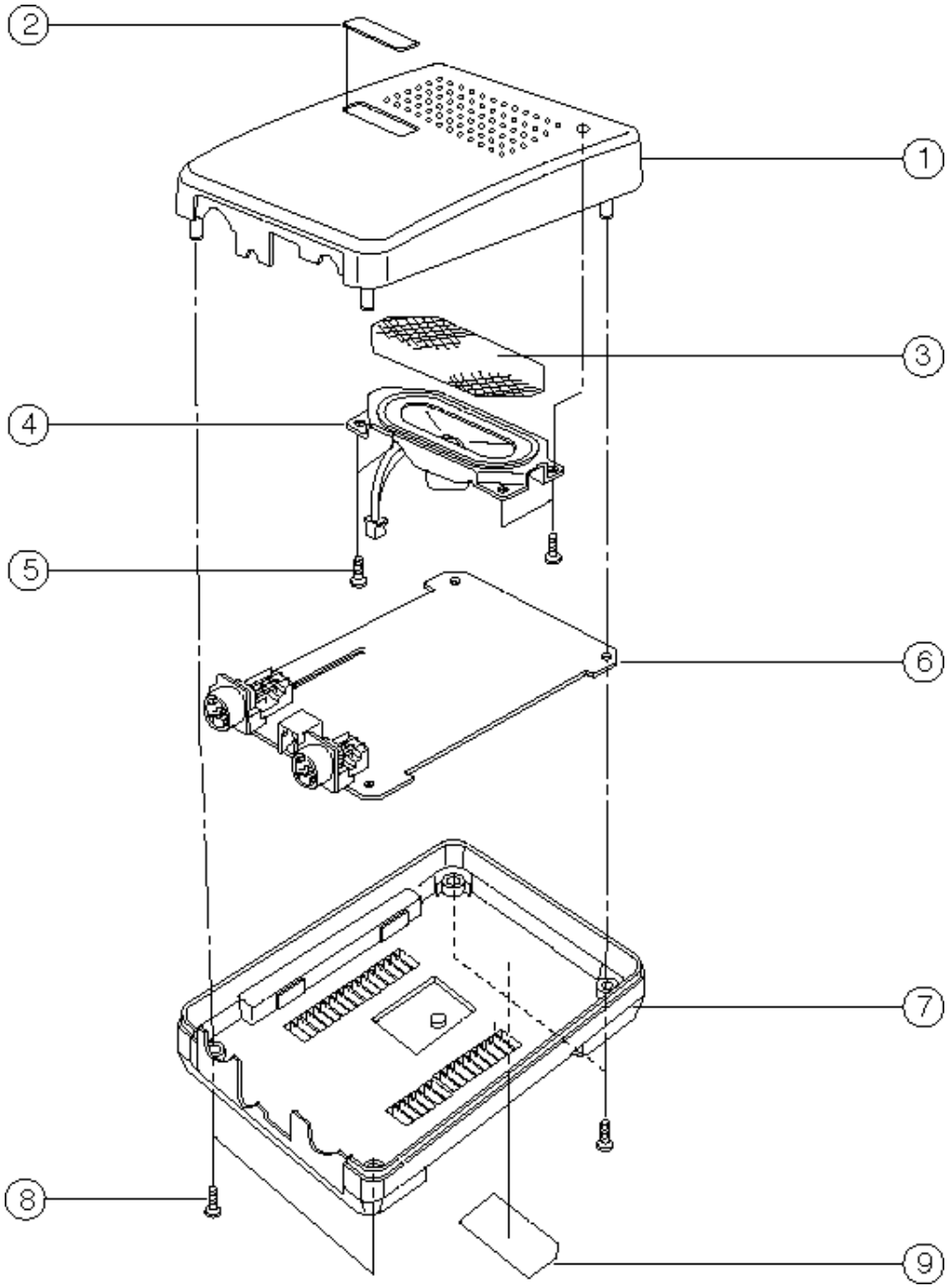
7-1 Main Set Exploded View



7-2 Main Set Parts List

NO	DESCRIPTION	SEC. CODE	Q'TY	REMARK
1	TAPE WINDOW-BOHO	GH72-10001A	1	
2	WINDOW-LCD	GH72-20008A	1	
3	TAPE-WINDOW	GH74-10650A	1	
4	CAP-LED	GH72-41424A	1	
5	FRONT-COVER	GH72-41426A	1	
6	FLIP COVER	GH72-41427A	1	
7	MAGNETIC	937 312008AA	1	
8	LABEL (R)-FLIP	GH68-31044A	1	
9	SHIELD STRIP (A)	GH71-10639A	6	
10	SHIELD STRIP (B)	GH71-10640A	5	
11	BUZZER-COVER	GH72-10503A	1	
12	SPEAKER-COVER	GH72-10528A	1	
13	KNOB-VOLUME	GH73-40670A	1	
14	HINGE-HOUSING	GH72-41293A	1	
15	SHAFT-HINGE	GH72-41554A	2	
16	CAM-HINGE	GH72-41055A	2	
17	SPRING-HINGE	GH70-10608A	2	
18	HOUSING-CAP	GH72-41056A	2	
19	HOLDER BUZZER	GH73-40666A	1	
20	SPEAKER-TAPE	GH74-10571A	1	
21	KEY PBA ASSY	GH59-10075A	1	
22	HOLDER MIC	GH73-40667A	1	
23	SHIELD COVER	GH72-41423A	1	
24	MAIN PCB	GH41-10626A	1	
25	COVER-CONNECTOR	GH73-40636A	1	
26	MEMORY PCB	GH41-10627A	1	
27	STRIP FINGER	GH71-10551A	1	
28	SHIELD STRIP (D)	GH71-10643A	1	
29	SHIELD STRIP (F)	GH71-10673A	5	
30	SHIELD STRIP (C)	GH71-10641A	3	
31	SHIELD STRIP	GH71-10644A	1	
32	REAR COVER	GH72-41425A	1	
33	TAPTITE	6003-000366	1	
34	VIBRATOR	GH31-10003A	1	
35	EARPHONE COVER	GH72-41493A	1	
36	ANT-BUSHING	GH71-40003A	1	
37	ANTENNA	GH42-10520A	1	
38	SPRING LOCKER	GH70-10516A	1	
39	LOCKER-MAIN	GH72-41492A	1	
40	SCREW	6001-001046	4	
41	LABEL (R) BAR CODE	GH68-30963A	1	
42	LABEL MAIN	GH68-31069A	1	
43	BAR CODE ESN	GH68-30936A	1	
44	STD. BATT. PACK	GH43-10111A	1	
45	EXT. BATT. PACK	GH43-10112A	1	

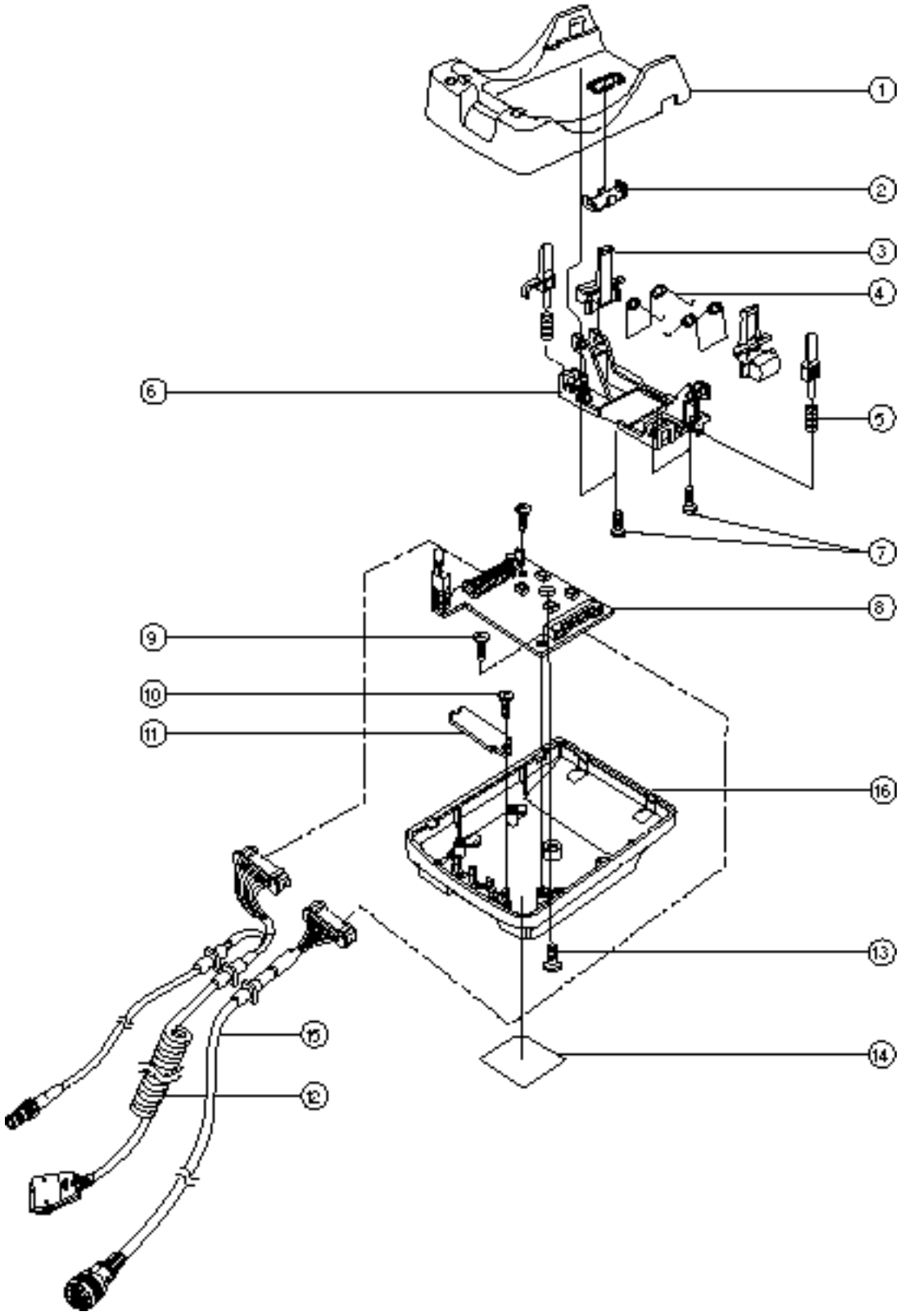
7-3 Hands-Free Kit Exploded View



7-4 Hands-Free Kit Parts List

NO	DESCRIPTION	SEC. CODE	Q'TY	REMARK
1	H/F UPPER HOUSING		1	
2	LABEL (R)-LOGO H/F		1	
3	H/F FELT-SPEAKER		1	
4	AUDIO-SPEAKER		1	
5	SCREW		4	
6	H/F PBA		1	
7	H/F LOWER HOUSING		1	
8	SCREW		4	
9	LABEL (R)-ID H/F		1	

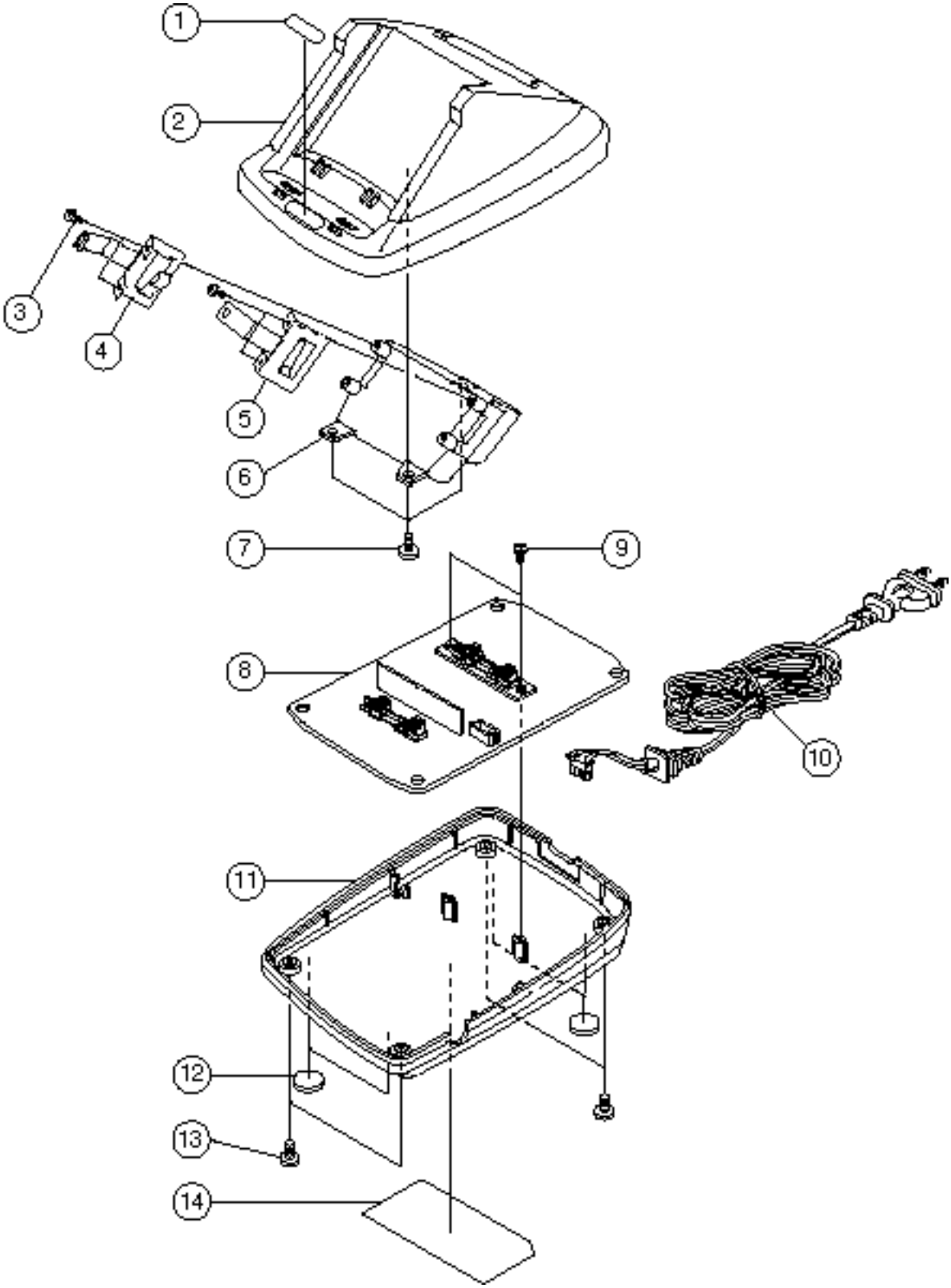
7-5 Hands-Free Kit Cradle Exploded View



7-6 Hands-Free Kit Cradle Parts List

NO	DESCRIPTION	SEC. CODE	Q'TY	REMARK
1	UPPER HOUSING-C/D		1	
2	SOCKET PLATE-C/D		1	
3	LOCKER-C/D		2	
4	TORSION SPRING-C/D		2	
5	EJECTOR SPRING-C/D		2	
6	FRAME-C/D		1	
7	SCREW, TAPTITE, B, BH, M2.6, L6		4	
8	CLADLE-PBA		1	
9	SCREW, TAPTITE, BH, M2.6, L6		2	
10	SCREW, TAPTITE, BH, M2, L6		4	
11	HOLDER-C/D		1	
12	CURL CORD		1	
13	SCREW, MACHINE, BH, M3, L8		1	
14	LABEL (R)-ID C/D		1	
15	CRADLE DATA CABLE		1	
16	LOWER HOUSING-C/D		1	

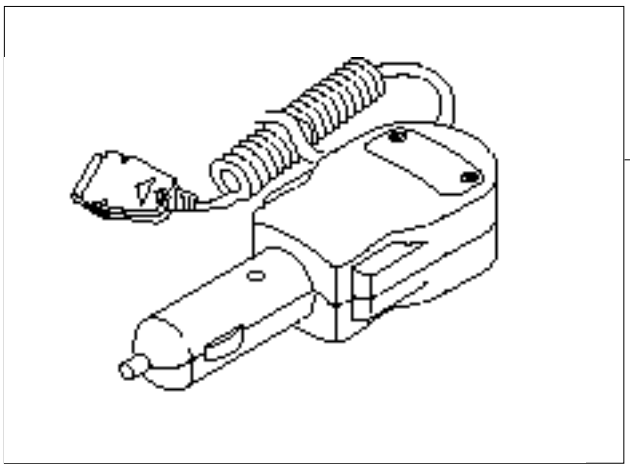
7-7 Desk-Top Rapid Charger Exploded View



7-8 Desk-Top Rapid Charger Parts List

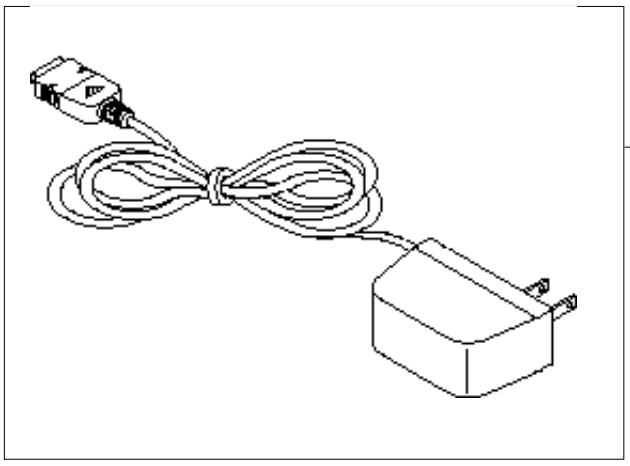
NO	DESCRIPTION	SEC. CODE	Q'TY	REMARK
1	LABEL-LOGO DTC		1	
2	CASE TOP		1	
3	TAPPING SCREW		4	
4	HOOK PLATE (L)		1	
5	HOOK PLATE (R)		1	
6	HOUSING BATT		1	
7	TAPPING SCREW		1	
8	MAIN PBA		3	
9	TAPPING SCREW		1	
10	AC POWER CORD ASSY		2	
11	CASE BOTTOM		1	
12	FOOT RUBBER		1	
13	TAPPING SCREW		4	
14	LABEL-DTC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

7-9 Cigarette Lighter Adapter



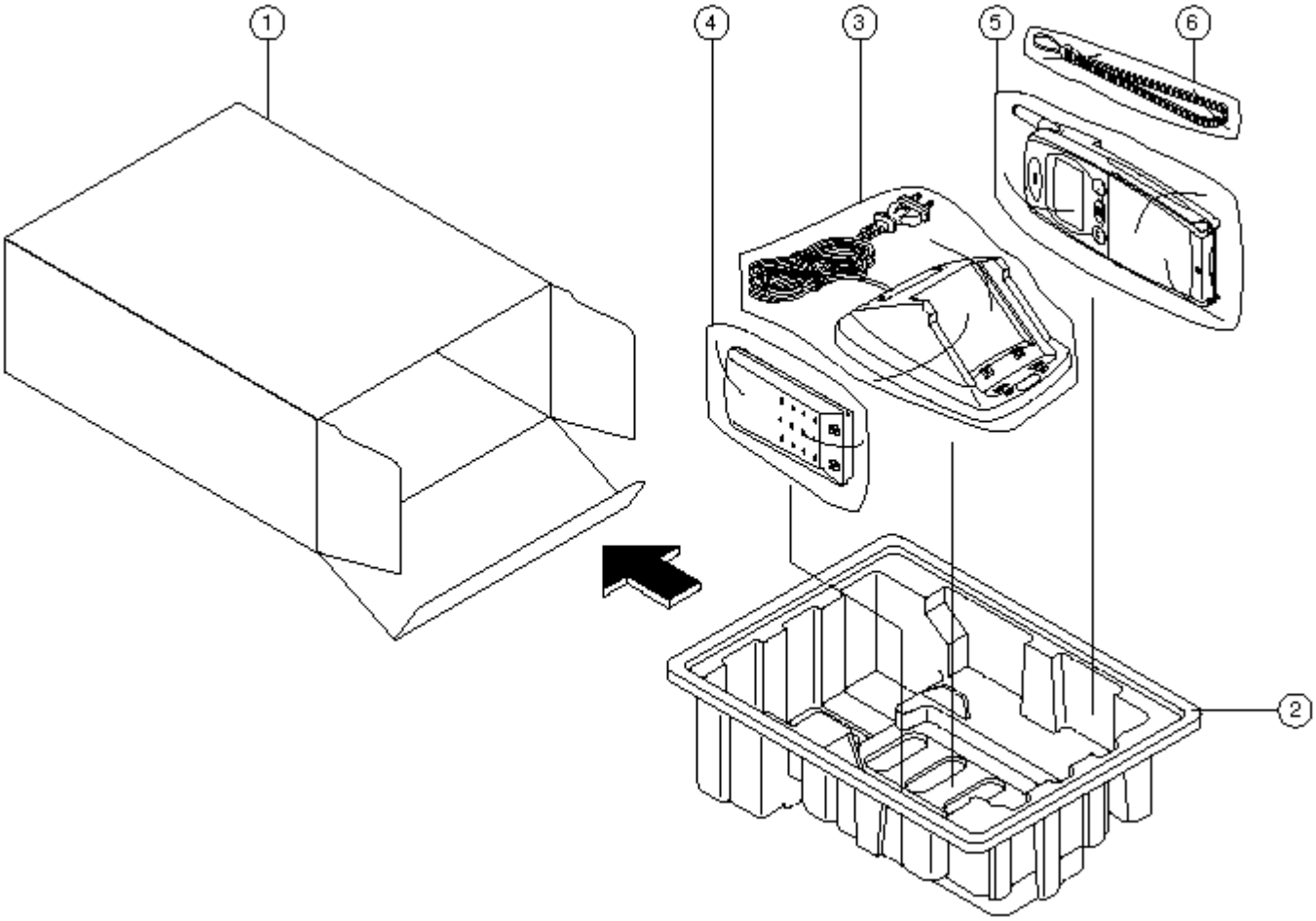
CIGARETTE LIGHTER ADAPTER ASS'Y : GH44-40071A

7-10 Travel Charger



TRAVEL CHARGER ASS'Y : GH44-40070A

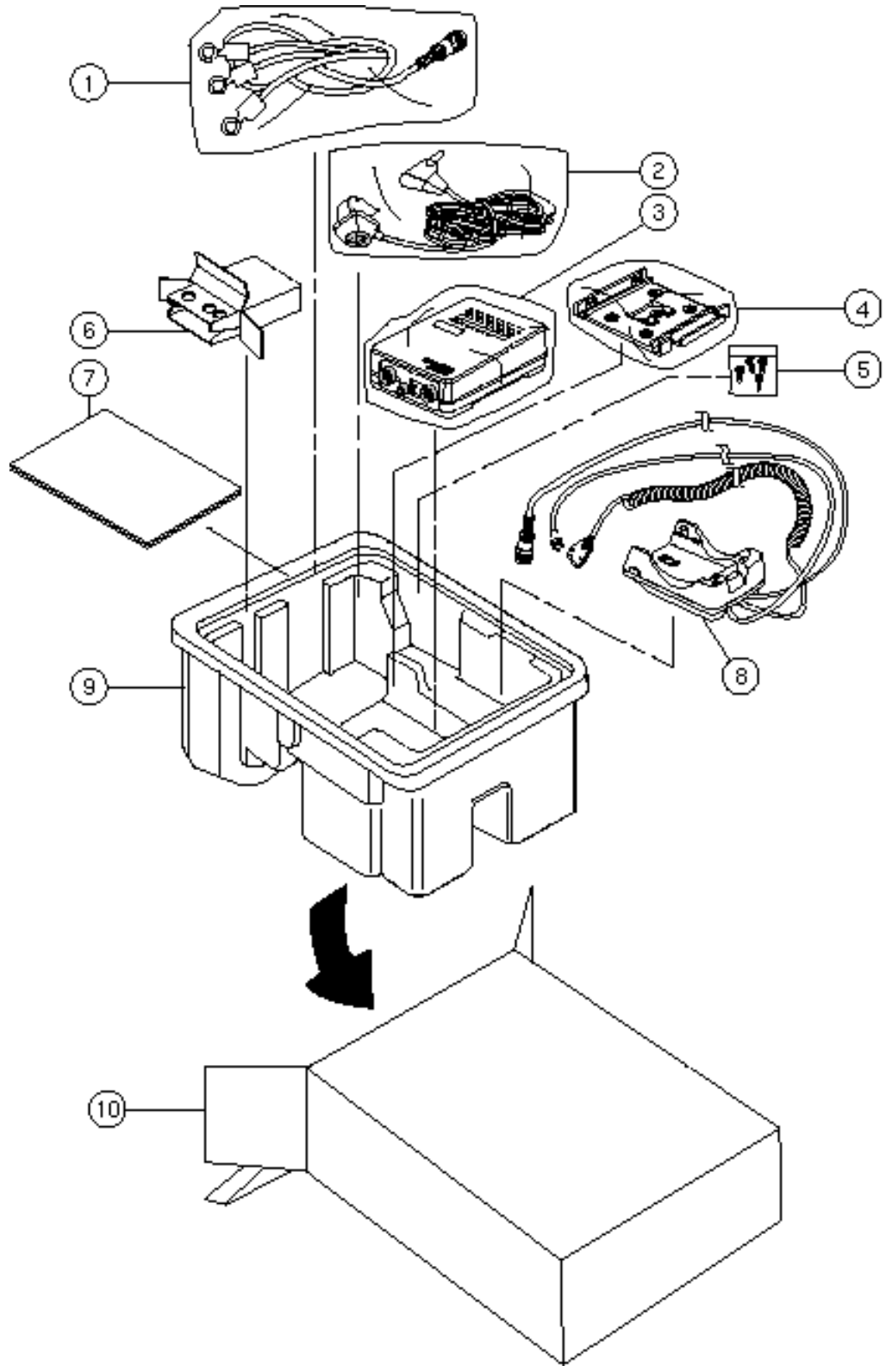
7-11 Main Set Packing Layout



7-12 Main Set Packing Parts List

NO	DESCRIPTION	SEC. CODE	Q'TY	REMARK
1	GIFT BOX MAIN	GH69-11132A	1	
2	CUSHION CASE-MAIN	GH69-20664A	1	
3	DESK TOP CHARGER	GH44-40069A	1	
4	STD BATT. PACK	GH43-10111A	1	
5	MAIN SET		1	
6	HAND STRAP	GH72-41051A	1	

7-13 Hands-Free Kit Packing Layout



7-14 Hands-Free Kit Packing Parts List

NO	DESCRIPTION	SEC. CODE	Q'TY	REMARK
1	PWR-CABLE		1	
2	H/F MIC ASS'Y		1	
3	H/F BOX		1	
4	MTG BRACKET-H/F		1	
5	SUA INSTALL SCREW		1	
6	CLAM SHELL MOUNT		1	
7	MANUAL		1	
8	CRADLE		1	
9	CUSHION CASE-H/K		1	
10	GIFT BOX-H/F		1	

MEMO

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	TANTALIUM,CHIP,1uF	2404-000151	
C107,C108	CERAMIC,CHIP,470pF	2203-000941	
C109	TANTALIUM,CHIP,100uF	2404-000112	
C110	TANTALIUM,CHIP,10uF	2404-001020	
C111	CERAMIC,CHIP,1nF	2203-000438	
C112	TANTALIUM,CHIP,330uF	2404-001027	
C114,C115	TANTALIUM,CHIP,1uF	2404-000151	
C117	TANTALIUM,CHIP,10uF	2404-001020	
C118-C121	CERAMIC,CHIP,8.2nF	2203-001210	
C126-C128	TANTALIUM,CHIP,2.2uF	2404-000167	
C135	CERAMIC,CHIP,10nF	2203-000254	
C138,C139	CERAMIC,CHIP,5pF	2203-001437	
C148	CERAMIC,CHIP,10nF	2203-000254	
C149	CERAMIC,CHIP,100nF	2203-000189	
C150	CERAMIC,CHIP,10nF	2203-000254	
C151	CERAMIC,CHIP,100nF	2203-000189	
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	CERAMIC,CHIP,100nF	2203-000189	
C164	CERAMIC,CHIP,100pF	2203-000234	
C165	CERAMIC,CHIP,470pF	2203-000941	

NO	DESCRIPTION	SEC. CODE	REMARK
C166-C168	CERAMIC,CHIP,100pF	2203-000234	
C169	CERAMIC,CHIP,100pF	2203-000189	
C171-C176	CERAMIC,CHIP,100nF	2203-000189	
C201,C202	TANTALIUM,CHIP,1uF	2404-000151	
C203,C204	CERAMIC,CHIP,680pF	2203-001124	
C205,C206	CERAMIC,CHIP,100nF	2203-000189	
C207	CERAMIC,CHIP,18nF	2203-000415	
C209	TANTALIUM,CHIP,1uF	2404-000151	
C211	CERAMIC,CHIP,5.6nF	2203-001033	
C212	CERAMIC,CHIP,10nF	2203-000254	
C213	CERAMIC,CHIP,100nF	2203-000189	
C214	CERAMIC,CHIP,1.2nF	2203-002687	
C215	CERAMIC,CHIP,2.2nF	2203-000439	
C216	TANTALIUM,CHIP,2.2uF	2404-000167	
C217	CERAMIC,CHIP,100nF	2203-000189	
C218	TANTALIUM,CHIP,33uF	2404-000309	
C219	CERAMIC,CHIP,100nF	2203-000189	
C221	CERAMIC,CHIP,22nF	2203-000604	
C222	CERAMIC,CHIP,100nF	2203-000189	
C229	CERAMIC,CHIP,15pF	2203-000386	
C302	CERAMIC,CHIP,6pF	2203-001178	
C303	CERAMIC,CHIP,15pF	2203-000386	
C304	CERAMIC,CHIP,1pF	2203-000469	
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	CERAMIC,CHIP,10nF	2203-000254	
C319	CERAMIC,CHIP,100pF	2203-000234	
C320	CERAMIC,CHIP,2.7nF	2203-000530	
C321	TANTALIUM,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	

NO	DESCRIPTION	SEC. CODE	REMARK
C328	CERAMIC,CHIP,22pF	2203-000628	
C329	CERAMIC,CHIP,100nF	2203-000189	
C331	CERAMIC,CHIP,5pF	2203-001437	
C332	CERAMIC,CHIP,100nF	2203-000189	
C334	CERAMIC,CHIP,10nF	2203-000254	
C335,C336	TANTALIUM,CHIP,10uF	2404-001020	
C337,C338	CERAMIC,CHIP,10nF	2203-000254	
C339	CERAMIC,CHIP,100nF	2203-000189	
C340-C342	CERAMIC,CHIP,100pF	2203-000234	
C343	CERAMIC,CHIP,10nF	2203-000254	
C344	CERAMIC,CHIP,100pF	2203-000234	
C345	CERAMIC,CHIP,10pF	2203-000278	
C346	CERAMIC,CHIP,1nF	2203-000438	
C347	CERAMIC,CHIP,100pF	2203-000234	
C348	TANTALIUM,CHIP,1.5uF	2404-000274	
C349	CERAMIC,CHIP,100nF	2203-000189	
C350	CERAMIC,CHIP,2.2nF	2203-000439	
C351	TANTALIUM,CHIP,10uF	2404-001020	
C352	CERAMIC,CHIP,100pF	2203-000234	
C353	TANTALIUM,CHIP,1.5uF	2404-000274	
C354	CERAMIC,CHIP,100nF	2203-000189	
C355	CERAMIC,CHIP,2.2nF	2203-000439	
C356	CERAMIC,CHIP,2.7nF	2203-000530	
C357	CERAMIC,CHIP,10nF	2203-000254	
C358	CERAMIC,CHIP,100nF	2203-000189	
C359	CERAMIC,CHIP,33pF	2203-000812	
C360	TANTALIUM,CHIP,10uF	2404-001020	
C361	CERAMIC,CHIP,15pF	2203-000386	
C362	CERAMIC,CHIP,10pF	2203-000278	
C363	CERAMIC,CHIP,10nF	2203-000254	
C364	CERAMIC,CHIP,1pF	2203-000466	
C365	CERAMIC,CHIP,1nF	2203-000438	
C367	CERAMIC,CHIP,5pF	2203-001437	
C401,C402	CERAMIC,CHIP,100pF	2203-000234	
C403	CERAMIC,CHIP,6pF	2203-001178	
C404	CERAMIC,CHIP,47nF	2203-001432	
C405	CERAMIC,CHIP,1nF	2203-000438	
C406	TANTALIUM,CHIP,2.2uF	2404-000167	

NO	DESCRIPTION	SEC. CODE	REMARK
C420	CERAMIC,CHIP,10pF	2203-000278	
C421,C422	CERAMIC,CHIP,33pF	2203-000812	
C423	CERAMIC,CHIP,3pF	2203-000870	
C438	CERAMIC,CHIP,10nF	2203-000254	
C439	CERAMIC,CHIP,1nF	2203-000438	
C440	CERAMIC,CHIP,1.5pF	2203-001385	
C441	CERAMIC,CHIP,1nF	2203-000438	
C442	CERAMIC,CHIP,10nF	2203-000254	
C443	CERAMIC,CHIP,100pF	2203-000234	
C445	CERAMIC,CHIP,1nF	2203-000438	
C446	CERAMIC,CHIP,10nF	2203-000254	
C447	CERAMIC,CHIP,100nF	2203-000189	
C448	CERAMIC,CHIP,1nF	2203-000438	
C451	CERAMIC,CHIP,1nF	2203-000438	
C452	CERAMIC,CHIP,10nF	2203-000254	
C453	CERAMIC,CHIP,47nF	2203-001432	
C457	CERAMIC,CHIP,1nF	2203-000438	
C463	TANTALIUM,CHIP,1uF	2404-000151	
C464	CERAMIC,CHIP,1nF	2204-000151	
C466	CERAMIC,CHIP,15pF	2203-000386	
C467	CERAMIC,CHIP,1.5pF	2203-001385	
C468	CERAMIC,CHIP,10nF	2203-000254	
C469	CERAMIC,CHIP,15pF	2203-000386	
C470	CERAMIC,CHIP,1nF	2203-000438	
C471	CERAMIC,CHIP,100pF	2203-000234	
C472	CERAMIC,CHIP,100nF	2203-000189	
C473	CERAMIC,CHIP,15pF	2203-000386	
C474	CERAMIC,CHIP,10nF	2203-000254	
C475	TANTALIUM,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,100pF	2203-000234	
C491	CERAMIC,CHIP,1pF	2203-000466	
C493	CERAMIC,CHIP,100pF	2203-000234	
C499,C500	CERAMIC,CHIP,10nF	2203-000254	
C501	TANTALIUM,CHIP,10uF	2404-001020	
C503	CERAMIC,CHIP,100nF	2203-000189	

NO	DESCRIPTION	SEC. CODE	REMARK
C504	TANTALIUM,CHIP,10uF	2404-001020	
C505	CERAMIC,CHIP,100pF	2203-000234	
C506	CERAMIC,CHIP,10nF	2203-000254	
C507,C508	CERAMIC,CHIP,100nF	2203-000189	
C509	CERAMIC,CHIP,100pF	2203-000234	
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	TANTALIUM,CHIP,10uF	2404-001020	
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	
C525	CERAMIC,CHIP,1nF	2203-000438	
C526	CERAMIC,CHIP,47nF	2203-001432	
C527	CERAMIC,CHIP,100pF	2203-000234	
C531	CERAMIC,CHIP,10pF	2203-000278	
C532	CERAMIC,CHIP,220pF	2203-000585	
C533	CERAMIC,CHIP,100nF	2203-000189	
C534	TANTALIUM,CHIP,4.7uF	2404-000232	
C535,C536	CERAMIC,CHIP,1nF	2203-000438	
C544	CERAMIC,CHIP,100nF	2203-000189	
C551	CERAMIC,CHIP,10nF	2203-000254	

NO	DESCRIPTION	SEC. CODE	REMARK
	Diods		
D101,D102	DIODE,TVS,SMS05C	0406-001051	
D103,D104	DIODE,ARRAY,DAN202U	0407-000115	
D110	DIODE,SCHOTTKY,RB160L-40	0404-000115	
D401-D403	DIODE,VARACTOR,1SV229	0404-000107	
D406	DIODE,VARACTOR,1SV229	0404-000107	
D407	DIODE,ARRAY,DAN202U	0407-000115	
	Filters		
F301	FILTER,DUPLEXER,1960MHz	2909-001065	
F302	FILTER,SAW,1960MHz	2904-001021	
F303	FILTER,SAW,210.38MHz	2904-001071	
F304	FILTER,SAW,1G7475	2904-001107	
F401	FILTER,SAW,130,38MHz	2904-001082	
F402,F403	FILTER,SAW,1880MHz	2904-001020	
	Connectors		
J101	CONNECTOR,SOCKET	3710-001117	
J102	CONNECTOR,HEADER,BOX	3711-003939	
J103	CONNECTOR,SOCKET	3710-001105	
J104	JACK,AC POWER,SOCKET	3722-001172	
J301	CONNECTOR,SOCKET	3710-001302	

NO	DESCRIPTION	SEC. CODE	REMARK
	Coils		
L101	INDUCTOR,SMD,22uH	2703-001429	
L302	INDUCTOR,SMD,6.8nH	2703-001207	
L303	INDUCTOR,SMD,100nH	2703-001172	
L307,L308	INDUCTOR,SMD,100nH	2703-001172	
L309.L310	INDUCTOR,SMD,150nH	2703-001222	
L310	INDUCTOR,SMD,2.7uH	2703-000301	
L312	INDUCTOR,SMD,18nH	2703-001189	
L313,L314	INDUCTOR,SMD,5.6nH	2703-001284	
L315	INDUCTOR,SMD,2.2nH	2703-001205	
L316	INDUCTOR,SMD,39nH	2703-001285	
L317	INDUCTOR,SMD,33nH	2703-001174	
L318	INDUCTOR,SMD,39nH	2703-001285	
L401	INDUCTOR,SMD,27nH	2703-000304	
L405	INDUCTOR,SMD,15nH	2703-000302	
L407	INDUCTOR,SMD	2703-001206	
L412	INDUCTOR,SMD,1.8uH	2703-000310	
L421	INDUCTOR,SMD,750nH	2703-000237	
L422	INDUCTOR,SMD,2.2nH	2703-001205	
L423	INDUCTOR,SMD,180nH	2703-000143	
L424	INDUCTOR,SMD,3.3nH	2703-001258	
L425	INDUCTOR,SMD,2.7nH	2703-001290	
L434-L436	INDUCTOR,SMD,47nH	2703-001259	

NO	DESCRIPTION	SEC. CODE	REMARK
	Transistors		
Q101	TR,DIGITAL,RN2104	0504-000172	
Q102	TR,DIGITAL,RN1102	0504-000167	
Q103	TR,SMALL SIGNAL.MMBT2222A	0501-000457	
Q104	TR,DIGITAL,RN2104	0504-000172	
Q106	TR,DIGITAL,RN1104	0504-000168	
Q107	TR,SMALL SIGNAL.MMBT2907A	0501-000462	
Q109	TR,SMALL SIGNAL.2SC4081	0501-000218	
Q110	TR,DIGITAL,RN1104	0504-000168	
Q111	TR,SMALL SIGNAL.2SC4081	0501-000218	
Q112	TR,SMALL SIGNAL.MMBT2222A	0501-000457	
Q115	TR,DIGITAL,RN2104	0504-000172	
Q303	TR,SMALL SIGNAL.BFP405	0501-002037	
Q310,Q311	TR,SMALL SIGNAL.AT-32011	0501-002060	
Q404	TR,SMALL SIGNAL.AT-32011	0501-002060	
Q406	TR,SMALL SIGNAL.MMBT2907A	0501-000462	
Q407	TR,SMALL SIGNAL.2SC4081	0501-000218	
Q408	TR,SMALL SIGNAL.2SA1576	0501-000162	
Q409	TR,DIGITAL,RN2104	0504-000172	
Q412	TR,DIGITAL,RN1102	0504-000167	
Q413	TR,SMALL SIGNAL.AT-32011	0501-002060	

NO	DESCRIPTION	SEC. CODE	REMARK
	Resistors		
R101	CHIP,470ohm,5%	2007-000932	
R102	CHIP,47Kohm,5%	2007-000157	
R103	CHIP,10Kohm,5%	2007-000148	
R104	CHIP,0ohm,5%	2007-000171	
R105	CHIP,47Kohm,5%	2007-000157	
R106	CHIP,470ohm,5%	2007-000932	
R107,R108	CHIP,22Kohm,5%	2007-000153	
R111	CHIP,10Kohm,5%	2007-000148	
R113	CHIP,120ohm,5%	2007-001305	
R114,R115	CHIP,470ohm,5%	2007-000932	
R117	CHIP,6.8Kohm,5%	2007-000146	
R118	CHIP,6.8Kohm,5%	2007-007313	
R119	CHIP,0ohm,5%	2007-000171	
R120	CHIP,3.3Kohm,5%	2007-001325	
R121,R122	CHIP,100Kohm,5%	2007-000162	
R123	CHIP,220Kohm,5%	2007-007334	
R124	CHIP,100Kohm,5%	2007-000162	
R125	CHIP,2.2Kohm,5%	2007-000141	
R129	CHIP,100Kohm,5%	2007-000162	
R130	CHIP,270Kohm,5%	2007-000636	
R131	CHIP,75Kohm,5%	2007-007488	
R132	CHIP,10Kohm,5%	2007-000148	
R134	CHIP,4.7Kohm,5%	2007-000143	
R135-R138	CHIP,20Kohm,5%	2007-000152	
R143	CHIP,22Kohm,5%	2007-000153	
R144	CHIP,1Kohm,5%	2007-000140	
R145	CHIP,3.3Kohm,5%	2007-001325	
R149	CHIP,62Kohm,5%	2007-003023	
R163	CHIP,100Kohm,5%	2007-000162	
R179,R180	CHIP,100ohm,5%	2007-000138	
R181	CHIP,1Mohm,5%	2007-000170	
R182	CHIP,4.7Kohm,5%	2007-000143	
R185	CHIP,0ohm,5%	2007-000171	
R186	CHIP,220Kohm,5%	2007-000566	
R191	CHIP,39Kohm,5%	2007-000831	
R192	CHIP,1Kohm,5%	2007-000140	

NO	DESCRIPTION	SEC. CODE	REMARK
R193	CHIP,22Kohm,5%	2007-000153	
R194,R195	CHIP,100ohm,5%	2007-000138	
R196	CHIP,100ohm,5%	2007-000138	
R197	CHIP,22Kohm,5%	2007-000153	
R198,R199	CHIP,100ohm,5%	2007-000138	
R201	CHIP,10Kohm,5%	2007-000148	
R203	CHIP,68Kohm,5%	2007-000160	
R204	CHIP,1Kohm,5%	2007-000140	
R205	CHIP,4.7Kohm,5%	2007-000143	
R206	CHIP,47Kohm,5%	2007-000157	
R207	CHIP,30Kohm,5%	2007-000156	
R208	CHIP,1Kohm,5%	2007-000140	
R209	CHIP,30Kohm,5%	2007-000156	
R210	CHIP,10Kohm,5%	2007-000148	
R211	CHIP,56Kohm,5%	2007-000159	
R212	CHIP,43Kohm,5%	2007-007101	
R213	CHIP,91Kohm,5%	2007-001244	
R214	CHIP,3.9Kohm,5%	2007-007001	
R215	CHIP,4.7Kohm,5%	2007-000143	
R216	CHIP,1Kohm,5%	2007-000140	
R217	CHIP,150Kohm,5%	2007-000164	
R218	CHIP,39Kohm,5%	2007-000831	
R219	CHIP,4.7Kohm,5%	2007-000143	
R220	CHIP,1.2Kohm,5%	2007-001319	
R221,R222	CHIP,10Kohm,5%	2007-000148	
R224	CHIP,15Kohm,5%	2007-000151	
R225	CHIP,1Kohm,5%	2007-000140	
R226	CHIP,120Kohm,5%	2007-000163	
R227	CHIP,0ohm,5%	2007-000171	
R228	CHIP,6.8Kohm,5%	2007-000146	
R229	CHIP,8.2Kohm,5%	2007-000147	
R301	CHIP,20Kohm,5%	2007-000152	
R302	CHIP,10ohm,5%	2007-000172	
R304	CHIP,0ohm,5%	2007-000171	
R305	CHIP,4.7ohm,5%	2007-001284	
R306,R307	CHIP,0ohm,5%	2007-000171	
R308,R309	CHIP,3.9Kohm,5%	2007-007001	
R310	CHIP,1.5Kohm,5%	2007-000242	

NO	DESCRIPTION	SEC. CODE	REMARK
R311	CHIP,10ohm,5%	2007-000172	
R312	CHIP,100ohm,5%	2007-000138	
R313	CHIP,15ohm,5%	2007-002965	
R314	CHIP,68ohm,5%	2007-001301	
R315	CHIP,3.9Kohm,5%	2007-007001	
R316	CHIP,33ohm,5%	2007-001292	
R317	CHIP,1Kohm,5%	2007-000140	
R318	CHIP,100ohm,5%	2007-000138	
R319	CHIP,1.2Kohm,5%	2007-001319	
R321	CHIP,15ohm,5%	2007-002965	
R322	CHIP,30ohm,5%	2007-001291	
R323	CHIP,10ohm,5%	2007-000148	
R330	CHIP,27Kohm,5%	2007-000155	
R333	CHIP,27Kohm,5%	2007-000155	
R401	CHIP,10Kohm,5%	2007-000148	
R402	CHIP,1.8Kohm,5%	2007-001320	
R403-R405	CHIP,10Kohm,5%	2007-000148	
R406	CHIP,39Kohm,5%	2007-000831	
R411	CHIP,10ohm,5%	2007-000172	
R412,R413	CHIP,10Kohm,5%	2007-000148	
R421	CHIP,10Kohm,5%	2007-000148	
R422	CHIP,100ohm,5%	2007-000138	
R426	CHIP,1Kohm,5%	2007-000140	
R431	CHIP,2.4ohm,5%	2007-007200	
R433	CHIP,470ohm,5%	2007-000932	
R434,R435	CHIP,0ohm,5%	2007-000171	
R440	CHIP,1.5Kohm,5%	2007-007528	
R441	CHIP,10ohm,5%	2007-000172	
R443	CHIP,22Kohm,5%	2007-000153	
R444	CHIP,4.7Kohm,5%	2007-000143	
R445	CHIP,12Kohm,5%	2007-000149	
R446	CHIP,1Kohm,5%	2007-000140	
R450	CHIP,4.7Kohm,5%	2007-000143	
R451	CHIP,0ohm,5%	2007-000171	
R452	CHIP,12Kohm,5%	2007-000149	
R454	CHIP,10Kohm,5%	2007-000148	

NO	DESCRIPTION	SEC. CODE	REMARK
R455	CHIP,4.7Kohm,5%	2007-000143	
R456	CHIP,12Kohm,5%	2007-000149	
R458	CHIP,27Kohm,5%	2007-000155	
R459	CHIP,15Kohm,5%	2007-000151	
R480	CHIP,0ohm,5%	2007-000171	
R481	CHIP,100ohm,5%	2007-000138	
R482	CHIP,56Kohm,5%	2007-000159	
R484	CHIP,10Kohm,5%	2007-000148	
R485	CHIP,100ohm,5%	2007-000138	
R486	CHIP,10Kohm,5%	2007-000148	
R488	CHIP,10Kohm,1%	2007-007142	
R489	CHIP,11.3Kohm,1%	2007-007491	
R491	CHIP,1.2Kohm,5%	2007-001319	
R503	CHIP,1.2Kohm,5%	2007-001319	
	IC’s		
U101	IC,DATA COMM./GEN,Q5270	1205-001196	
U102	IC,ASP,TLV320AC361PT	1204-001106	
U103	IC,TTL,4W53	0803-003010	
U105	IC,AUDIO AMP,8602	1201-000103	
U106	IC,VOLTAGECOMP,75W393	1202-000192	
U107	IC,EEPROM,24C128	1103-001062	
U108	IC,VOLTAGE REGURATOR,7333	1203-001335	
U109	IC,VOLTAGE REGURATOR,1120	1203-001468	
U110	IC,ANALOG SWITCH,TC4S66FET85	1001-000133	
U113	IC,DC-DC CONVERTER,1204	1203-001402	
U117	IC,CMOS LOGIC,7S04	0801-002192	
U303	IC,AGC AMP,CXA3221N-T4	1201-001257	
U304	IC,PLL/SYNTHESISER,LMX2331LT	1209-001064	
U307	IC,VOLTAGE REGURATOR,1120	1203-001468	
U401	IC,DATA COMM./GEN,Q5312I	1205-001203	
U404	IC,AGC AMP,3222	1201-001261	
U405	IC,MIXER,MRFIC1813	1205-001267	
U407	IC,POWER AMP,23107	1201-001305	
U410	IC,OP AMP,7101	1201-001006	
U414	IC,VOLTAGE REGURATOR,1120	1203-001468	
U415	IC,ANALOG MULTIPLEX,BU4051BC	1001-001019	

NO	DESCRIPTION	SEC. CODE	REMARK
	Miscellaneous		
D105	LED,CHIP,RED	0601-000355	
I401	FREQ-ISOLATOR,800M~20GHz	4709-001127	
TH401	THEMISTOR-NTC,10Kohm	1401-001040	
U302	FREQ-MIXER,210.38MHz	4709-001103	
U305	OSCILLATOR-VCO,1720~1780MHz	2806-001159	
U306	OSCILLATOR-VCTCXO,19.68MHz	2809-001205	
U413	FET-SILICON,SI9933ADY-T1	0505-001170	
T301	RF POWER SPLITTER,2WAY	4709-001119	
X1	RESONATOR,CERAMIC,27MHz	2802-001048	

9-2 Hands-Free Kit

NO	DESCRIPTION	SEC. CODE	REMARK
	Capacitors		
C701	CERAMIC-CAP,0.1uF		
C703,C704	CERAMIC-CAP,22pF		
C712	ELEC-CAP,1000uF,25V		
C715	CERAMIC-CAP,1000pF		
C716	CERAMIC-CAP,0.1uF		
C721	ELEC-CAP,1000uF,16V		
C777	CHIP TANTAL 10uF,10V		
C801,C802	CERAMIC-CAP,0.1uF		
C803	CHIP TANTAL 4.7uF,16V		
C804	ELEC-CAP,1000uF,16V		
C805,C806	ELEC-CAP,47uF,16V		
C807,C808	CERAMIC-CAP,0.1uF		
C809	CERAMIC-CAP,330pF		
C810	CERAMIC-CAP,0.1uF		
C811	CERAMIC-CAP,0.22uF		
C812,C813	CERAMIC-CAP,0.1uF		
C821	CERAMIC-CAP,0.1uF		
C824	CERAMIC-CAP,0.1uF		
C825	CERAMIC-CAP,4700pF		
C826	CERAMIC-CAP,0.1uF		
C828	CHIP TANTAL 2.2uF,6.3V		
C829,C830	CHIP TANTAL 0.47uF,16V		
C831	CHIP TANTAL 2.2uF,6.3V		
C832	CERAMIC-CAP,0.1uF		
C833	CERAMIC-CAP,330pF		
C834	CERAMIC-CAP,0.1uF		
C836	CERAMIC-CAP,0.1uF		
C840	ELEC-CAP,470uF,16V		
C842	CERAMIC-CAP,470pF		
C843,C844	ELEC-CAP,100uF,16V		

NO	DESCRIPTION	SEC. CODE	REMARK
C845	CERAMIC-CAP,0.1uF		
C846	ELEC-CAP,470uF,16V		
C847	ELEC-CAP,100uF,16V		
C851	CERAMIC-CAP,0.1uF		
C858	CERAMIC-CAP,0.1uF		
C861	CHIP TANTAL 10uF,10V		
C862	CERAMIC-CAP,0.1uF		
C863,C864	CHIP TANTAL 10uF,10V		
C872	CERAMIC-CAP,0.1uF		
C888	CERAMIC-CAP,0.1uF		
C900,C901	CERAMIC-CAP,0.1uF		
C902	CHIP TANTAL 2.2uF,10V		
C903	ELEC-CAP,10uF,25V		
C910	SOLID TANTALIUM CAP 10uF,35V		
	Resistors		
R701	CHIP, 10Kohm,5%		
R702	CHIP, 120Kohm,5%		
R703	CHIP, 22Kohm,5%		
R704	CHIP, 10Kohm,5%		
R705	CHIP, 22Kohm,5%		
R706	CHIP, 100Kohm,5%		
R707	CHIP, 680ohm,5%		
R708,R709	CHIP, 10Kohm,5%		
R710,R711	CHIP, 4.7Kohm,5%		
R712	CHIP, 1Kohm,5%		
R713	CHIP, 4.7Kohm,1%		
R714	CHIP, 1Kohm,5%		
R715	CHIP, 51Kohm,5%		
R716	CHIP, 22Kohm,5%		
R717	CHIP, 24Kohm,5%		
R721	CHIP, 4.7Kohm,5%		
R723	CHIP, 4.7Kohm,5%		
R751	CHIP, 10Kohm,5%		

NO	DESCRIPTION	SEC. CODE	REMARK
R752	CHIP, 2.2Kohm,5%		
R756	METAL OXIDE, 1ohm, 1W		
R757	CHIP, 4.3Kohm,5%		
R758	CHIP, 3.3Kohm,5%		
R759	METAL OXIDE, 0.5ohm,2%		
R760	CHIP, 2.2Kohm,5%		
R763	CHIP, 330Kohm,5%		
R764	CHIP, 39Kohm,5%		
R765,R766	CHIP, 10Kohm,5%		
R768	CHIP, 24Kohm,5%		
R776	CHIP, 24Kohm,5%		
R777	CHIP, 56Kohm,5%		
R778	CHIP, 0ohm,5%		
R801,R802	CHIP, 100Kohm,5%		
R803	CHIP, 4.7Kohm,5%		
R804	CHIP, 5Kohm,5%		
R805	CHIP, 43Kohm,5%		
R806	CHIP, 120Kohm,5%		
R807	CHIP, 10Kohm,5%		
R808,R809	CHIP, 100Kohm,5%		
R810	CHIP, 4.7Kohm,5%		
R811	CHIP, 150Kohm,5%		
R812	CHIP, 2.2Kohm,5%		
R813	CHIP, 1Kohm,5%		
R814	CHIP, 2.2Kohm,5%		
R816	CHIP, 1Kohm,5%		
R817-R819	CHIP, 100Kohm,5%		
R820	CHIP, 82Kohm,5%		
R821	CHIP, 100Kohm,5%		
R822	CHIP, 82Kohm,5%		
R824	CHIP, 100Kohm,5%		
R825	CHIP, 24Kohm,5%		
R826,R827	CHIP, 5.1Kohm,5%		
R828	CHIP, 5.1Kohm,5%		
R829	CHIP, 100Kohm,5%		
R830	CHIP, 560Kohm,5%		

NO	DESCRIPTION	SEC. CODE	REMARK
R832	CHIP, 10Kohm,5%		
R835	CHIP, 10Kohm,5%		
R836	CHIP, 2.2Kohm,5%		
R837	CHIP, 15Kohm,5%		
R841	CHIP, 330Kohm,5%		
R842	CHIP, 180Kohm,5%		
R843	CHIP, 120Kohm,5%		
R844	CHIP, 82Kohm,5%		
R845	CHIP, 56Kohm,5%		
R846	CHIP, 33Kohm,5%		
R848	CHIP, 5.1Kohm,5%		
R849	CHIP, 100Kohm,5%		
R851	CHIP, 680ohm,5%		
R852	CHIP, 330ohm,5%		
R854	CHIP, 510ohm,5%		
R855	CHIP, 100Kohm,5%		
R861	CHIP, 150Kohm,5%		
R862	CHIP, 1Mohm,5%		
R863	CHIP, 3.3Kohm,5%		
R864	CHIP, 100Kohm,5%		
R865	CHIP, 2.2Kohm,5%		
R871	CHIP, 0ohm,5%		
R872	CHIP, 680ohm,5%		
R874,R875	CHIP, 270ohm,5%		
R887	CHIP, 0ohm,5%		
R888	CHIP, 560Kohm,5%		
R889	CHIP, 100Kohm,5%		
R900	CHIP, 100Kohm,5%		
R901	CHIP, 1Mohm,5%		
R902	CHIP, 10Kohm,5%		
R903	CHIP, 100Kohm,5%		
R904-R906	CHIP, 10Kohm,5%		
R907	CHIP, 4.7Kohm,5%		
R908	CHIP, 100Kohm,5%		
R909	CHIP, 15Kohm,5%		

NO	DESCRIPTION	SEC. CODE	REMARK
	Diodes		
D701	DIODE,CHIP,SDS7000		
D705	DIODE,RECTIFIER,1N4004RL		
D711	DIODE,IN5818RL		
D712	DIODE,CHIP,SDS2838		
D713	DIODE,IN5818RL		
D714	DIODE,CHIP,SDS2838		
D715	DIODE,IN5818RL		
D719	DIODE,ZENER,MMBZ5234BLT1		
D804	DIODE,ZENER,MMBZ5234BLT1		
D861	DIODE,CHIP,SDS7000		
D900	DIODE,CHIP,SDS2838		
	Capacitors		
Q701-Q704	TR,KSR1104/NPN,20		
Q708	TR,KSR1104/NPN,20		
Q711	TR,KSR1104/NPN,20		
Q712	TR,MMBT2907A		
Q713,Q714	TR,KSR1104/NPN,20		
Q801	TR,KSB1151-Y		
Q802,Q803	TR,KSR1104/NPN,20		
Q804	TR,KSB1151-Y		
Q871,Q872	TR, KSR1104		
Q900-Q902	TR,KSR1104/NPN,20		
Q903	TR, IRF9540		
Q904	TR, CHIP, KSR2104		
Q905	TR,KSR1104/NPN,20		

NO	DESCRIPTION	SEC. CODE	REMARK
	IC's		
U701	MPU,PIC16C73A		
U705	O.P AMP(8P),KA358D		
U707	IC, REGURATOR, LM2575T-ADJ		
U801	O.P AMP(14P),KA2902D/T		
U802	IC,SPEAK PHONE,MC34118DW		
U803	IC,ANALOG S/W,MC14053BDR2		
U804	AMP SPEAKER, KA2206		
U805	IC,ANALOG S/W,MC14051BDR2		
U806	VOLTAGE REGURATOR,KA7808		
U807	IC,REGURATOR,KA78L05		
U808	IC,FIXED REGURATOR,ICL7660SCBA-T		
U871	PHOTO DIODE, SG215		
	Miscellaneous		
JP871	GILS-15P-S2L2-EF		
JP872	GILS-12P-S2L2-EF		
JP873	CONNECTOR,ESQ-103-44-T		
J701	CONNECTOR,RP13A-13PB		
J703	CONNECTOR,RP13A-20PB		
J704	GILS-2P-S2L2-EF		
J705	MIC JACK, HSJ1045-01-010		
X701	CRYSTAL,X-TAL,UNIT/4MHz		
VZR701	VARISTOR,SVS330D-10B		
VR701	V-CHIP RES, 10K		
L702	CHOKE COIL RF-600/600uH		
L704	CHOKE COIL RF-600/600uH		

9-3 Desk-Top Rapid Charger

NO	DESCRIPTION	SEC. CODE	REMARK
	- Capacitors -		
C1,C2	CAP-EL, 400V,10uF,85'C		
C3	MYLAR CAP,0.0015uF		
C4	CHIP-CAP,0.22uF,1206		
C5	CAP-EL, 16V,47uF,85'C		
C6	CHIP-CAP,0.1uF,0805		
C7	CHIP-CAP,470pF,500V,1KV		
C8,C9	CAP-EL, 16V,330uF,105'C		
C10	CER-CAP,102K,0805,1KV		
C11,C12	CAP-EL, 16V,330uF,105'C		
C13	CE-CAP,250VAC,222-Y1		
C15	CHIP-CAP,0.1uF,0805		
C17	CHIP-CAP,0.1uF,1206		
C19	CAP-EL, 16V,330uF,105'C		
C22,C23	CHIP-CAP,0.1uF,0805		
C24	CAP-EL, 16V,47uF,85'C		
C25	CHIP-CAP,0.1uF,0805		
C26,C27	CAP-EL, 16V,330uF,105'C		
C28	CHIP-CAP,0.1uF,1206		
C29	CHIP-CAP,0.1uF,0805		
C30	CHIP-CAP,0.1uF,1206		
	Resistors		
R1	CHIP,6.2ohm,MCR18		
R3	CHIP,20Kohm,MCR18		
R5,R6	CHIP,1ohm,MCR18		
R7	CHIP,10Kohm,MCR10		
R8	CHIP,68ohm,MCR18		
R11,R12	RESISTOR,1/4W,1ohm		
R13	CHIP,1.5Kohm,MCR18		
R14	CHIP,2.2Kohm,MCR10		
R15	RESISTOR,1/4W,4.7Mohm		
R17	CHIP,470ohm,MCR18		
R19	CHIP,470ohm,MCR18		
VR1	SEMI-FIXED RES,1Kohm,20%		

NO	DESCRIPTION	SEC. CODE	REMARK
	Inductors		
L1,L2	CHOKE ASS'Y,DR6.5,0.5-17.5TS		
L3	CHOKE ASS'Y,13PHI,82Ts,0.4M/M		
L4,L5	INDUCTOR,DR5X11,S6H,530TS		
	Transistors		
Q1-Q3	TR,SOT-89		
	Diodes		
D1	T.V.S DIODE,600W200V,5%,SOD-57		
D2	DIODE UF,1KV,1A		
D3	DIODE SW,75V,225MA,D0-35		
D4	DIODE SCHOTKY,3A,40V,D0-201AD		
D5	DIODE SCHOTKY,1A,60V		
D6-D8	DIODE SCHOTKY,1A,40V,D0-41		
DZ1	DIODE ZENER,4.7V		
BD1	DIODE BRIG,1000V,1A,BD TYPE		
	IC's		
IC1	IC PWM P/S 220VAC,3PIN		
IC3	IC V.REF,36V 100MA 1%		
IC7	IC OPTO 32V,50mA,4PIN		
	55V,60MA,4PIN,GB		
HIC	IC HYBRID,AH1511B		
U10	MICOM IC,PIN16C72,28PIN SOP		
	Miscellaneous		
LED1,2	LED,RECT(RED/GREEN)		
TH1	THERMISTOR,10Kohm,25'C		
PTF1	DTC55 TRANS,MAIN TRANS ASS'Y		
F1	MICRO FUSE,250VAC 1A/TR5-T,TUV		
MOV1	VARISTOR,300V,3KV 'VDE'		
	M.O.V,300V,PHI 12		

9-4 Cigarette Lighter Adapter

NO	DESCRIPTION	SEC. CODE	REMARK
	Capacitors		
C1	ELEC-CAP,100uF,35V		
C2	ELEC-CAP,330uF,16V		
C3	CHIP-CAP,0.01uF		
C4	ELEC-CAP,330uF,16V		
C5	CERAMIC-CAP,0.22uF		
C6	CERAMIC-CAP,0.1uF		
C7	ELEC-CAP,10uF,16V		
C9	CERAMIC-CAP,0.1uF		
	Resistors		
R1	CHIP,470ohm		
R2	CHIP,11Kohm		
R3	CARBON FILM,680ohm,1/4W		
R4	METAL OXIDE,0.5ohm,1/2W		
R5	CHIP,2.2Kohm		
R6	CHIP,5.6Kohm		
R7	CHIP,9.1Kohm		
R11,R12	CHIP,100Kohm		
R13	CHIP,4.7Kohm		
R14	CHIP,3.3Mohm		
R15	CHIP,2.2Kohm		
R16	CHIP,430ohm		
R18-R20	CHIP,4.7Kohm		
R21	CHIP,2.2Kohm		
R22	CHIP,100Kohm		
R23	CHIP,1Kohm		
VR1	V-RESI,1Kohm		

NO	DESCRIPTION	SEC. CODE	REMARK
	Diods		
D1 D2 D3 D4 D5 U4	DIODE,P6KE36A DIODE,1N5819 CHIP-DIODE,KSD184 DIODE,1N5819 CHIP-DIODE,KSD184 DIODE,TL431		
	Inductors		
L1	CHOKE COIL,		
	Transistors		
Q1 Q3 Q4 Q5 Q6 Q7 Q8	CHIP-TR,KTA1504 TR,KSR1104,NPN CHIP-TR,KSR2104 TR,KSR1104,NPN CHIP-TR,KTA1504 TR,KSR1104,NPN CHIP-TR,KSR2104		
	IC’s		
U1 U2 U3	ADJUST REGURATOR I.C, LM257T-ADJ O.P AMP, KA393D O.P AMP, KA358D		
	Miscellaneous		
J1 F1 LED	5PIN CONNECTOR,GIL-S-5P FUSE,250V/2A LED(DUAL),SM3511		

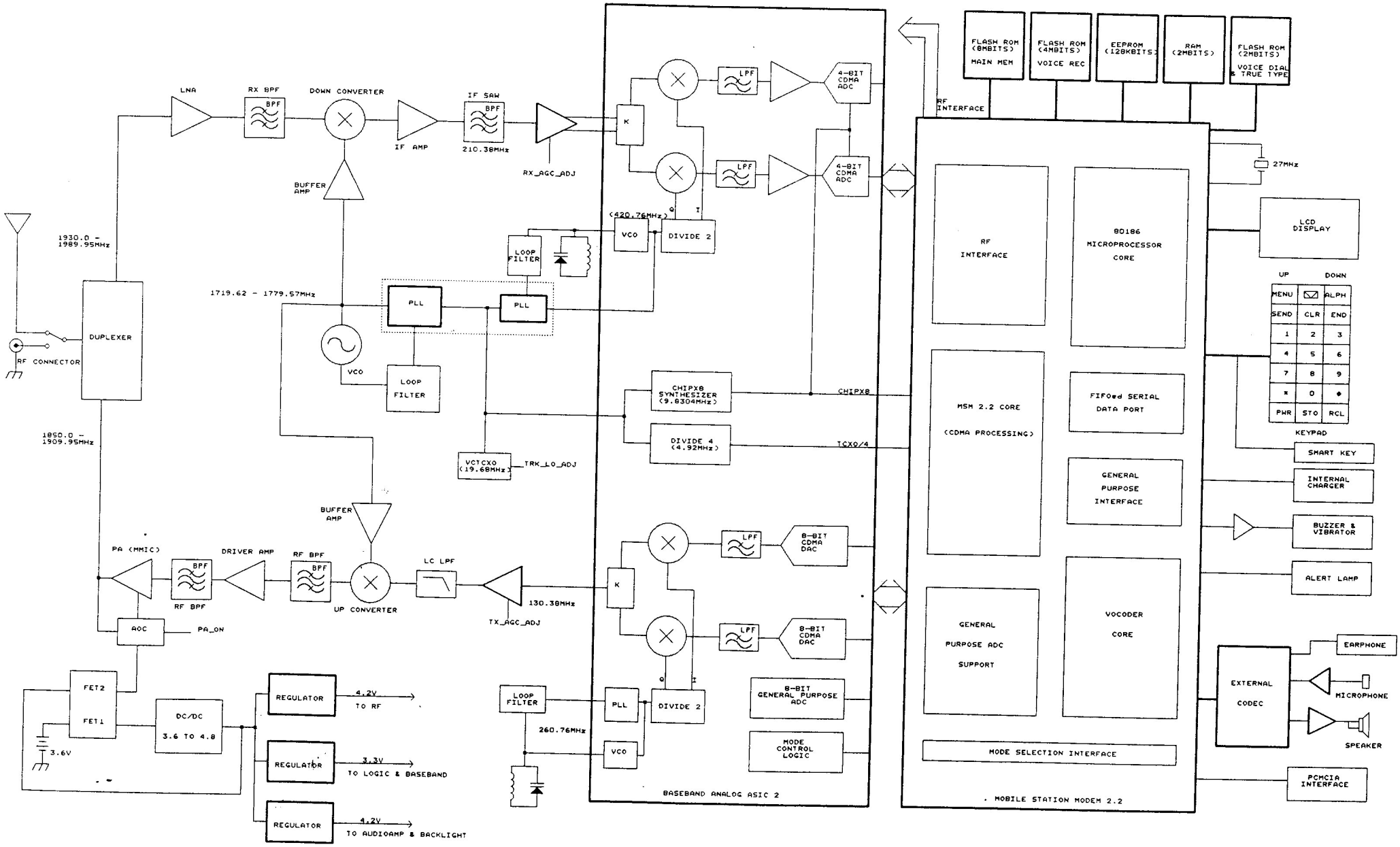
9-5 Travel Charger

NO	DESCRIPTION	SEC. CODE	REMARK
	Resistors		
R1	CHIP,1206,10Kohm		
R2	CHIP,MRC18,6.2ohm		
R4,R5	SURGE,0.5W,4.7Mohm		
R14-R16	CHIP,MRC18,0ohm		
R17	CHIP,0805,47ohm		
R57	CHIP,MRC10,1.5Kohm		
R58	CHIP,MRC10,2.2Kohm		
R59	CHIP,MRC10,1Kohm		
R66,R67	CHIP,MRC18,510ohm		
JP1,2,3	CHIP,MRC18,0ohm		
JP4,5	CHIP,MRC10,0ohm		
	Capacitors		
C1,C2	CAP-ELEC,400V,10uF,85'C		
C3	CE-CAP,1KV,22pF		
C4	CAP-ELEC,16V,47uF,85'C		
C5	CHIP-CAP,1206,0.22uF		
C6	MY-CAP,100V,0.0015uF		
C8	CE-CAP,250VAC,472-Y1		
C20	CAP-ELEC,16V,47uF,85'C		
C21	CAP-ELEC,10V,1000uF,105'C		
C22	CAP-ELEC,16V,330uF,105'C		
C23	CHIP-CAP,0805,330pF		
C24	CAP-ELEC,16V,47uF,85'C		
C25-C29	CHIP-CAP,0805,1uF		
	Diodes		
D1-D4	DIODE,REC,1000V,1A		
D5	DIODE,TVS,600W,160V,SOD57		
D6	DIODE,UF,1KV,1A		
D7	DIODE,SW,75V,200mA,LL-34		
D20	DIODE,SW,75V,200mA,LL-34		
D21	DIODE,SCHOTKY,60V,5A		
D24	DIODE,ZENER,4.3V,0.5W		

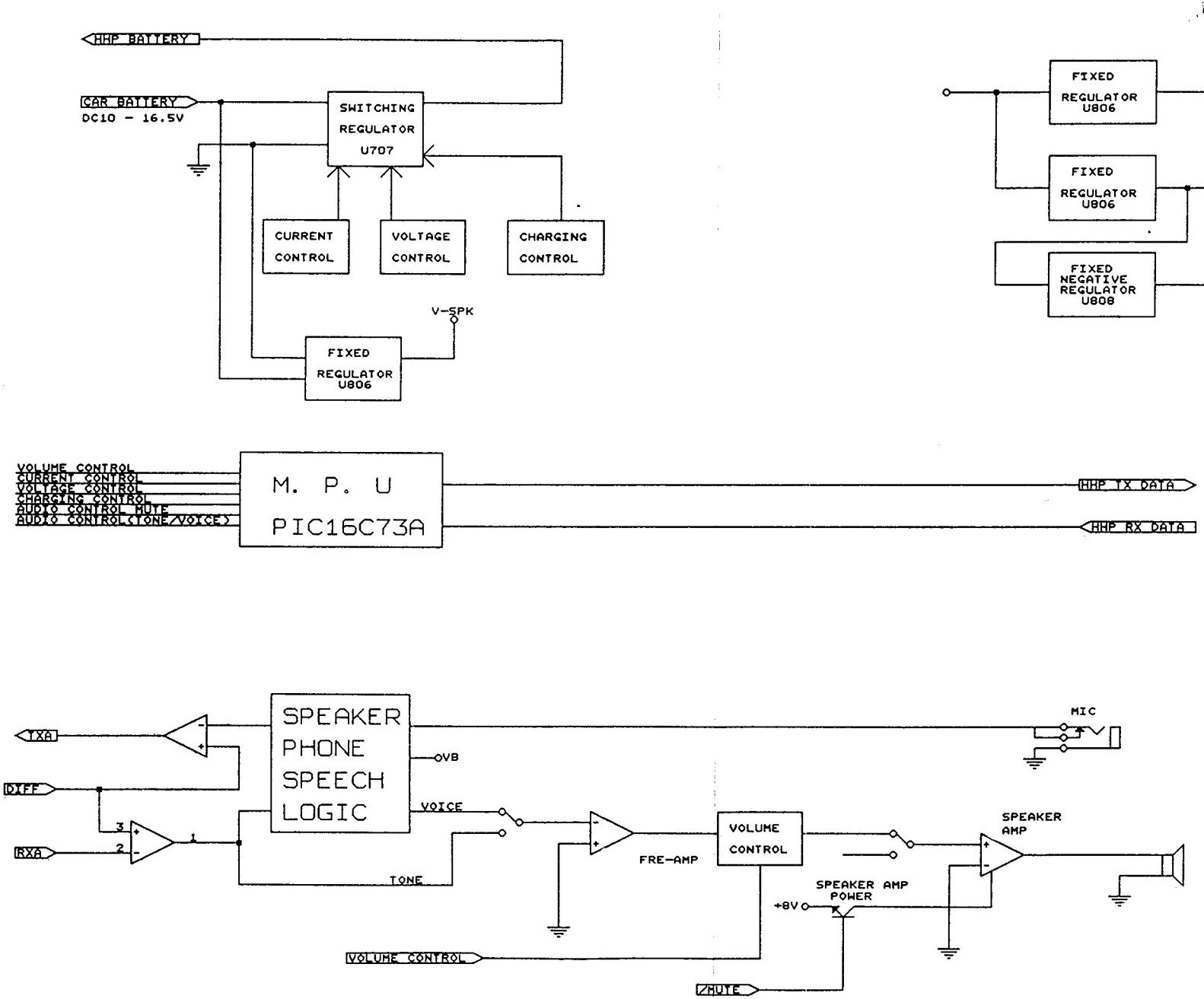
NO	DESCRIPTION	SEC. CODE	REMARK
	Transistors		
Q7	S.S.TR,30V,-2A,TO-92		
	IC's		
U1 U2 U3 U4	IC,PWM P/S,DIP-8 IC,OPTO,32V,50mA,4PIN IC,HYBRID,AH1504F IC,V.REF,36V,100MA 1% IC,MICOM,PIC16C711,18PIN,SOP		
	LED's		
LED	LED, RED/GREEN		
	Inductors		
L1,L2 L20	INDUCTORS,S6H,530TS CHOKE ASS'Y,1.2uH,DR4		
	Miscellaneous		
MOV1 VR1 TH F1 SK2	VARISTOR,30V,3KA,'VDE' M.O.V,300V,PHI 12 REMI-FIXED RES,1Kohm 20% THERMISTOR,10Kohm 25'C MICRO FUSE,250VAC,1.0A/TR5-T,TUV CONN.HEADER,4PIN(5267-04A)		

10. Block & Circuit Diagrams

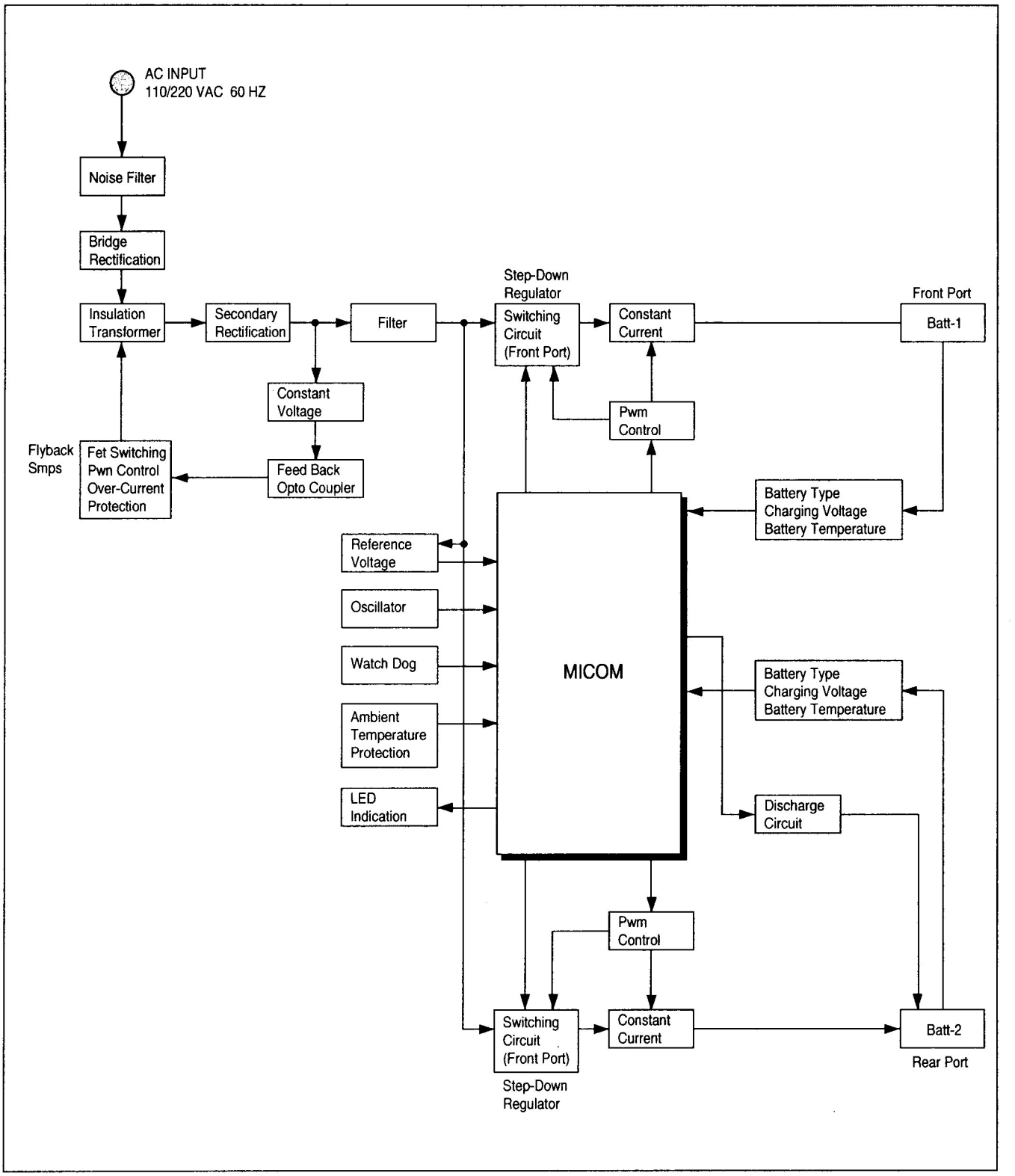
10-1 Main Block Diagram



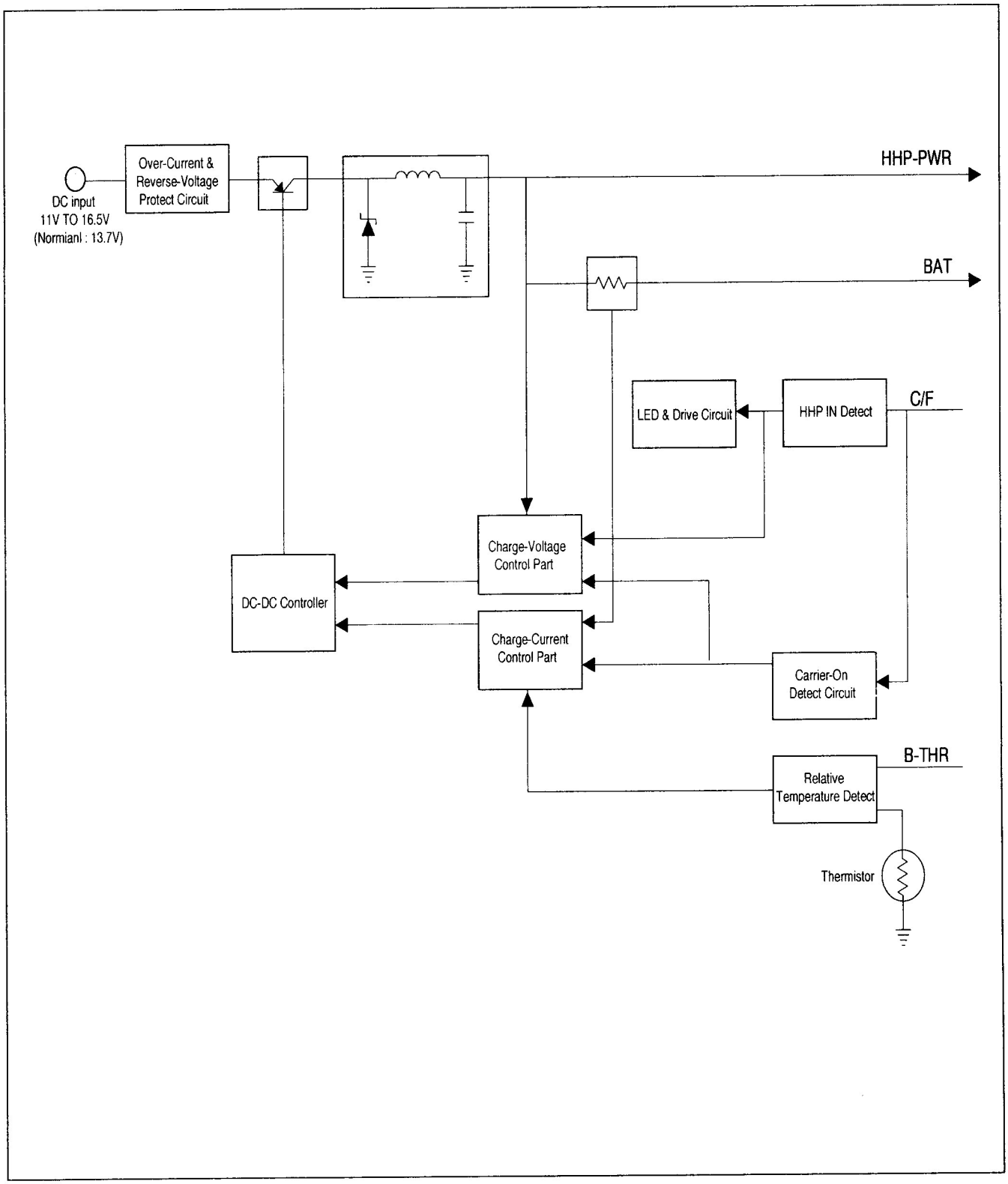
10-2 Hands-Free Kit Block Diagram



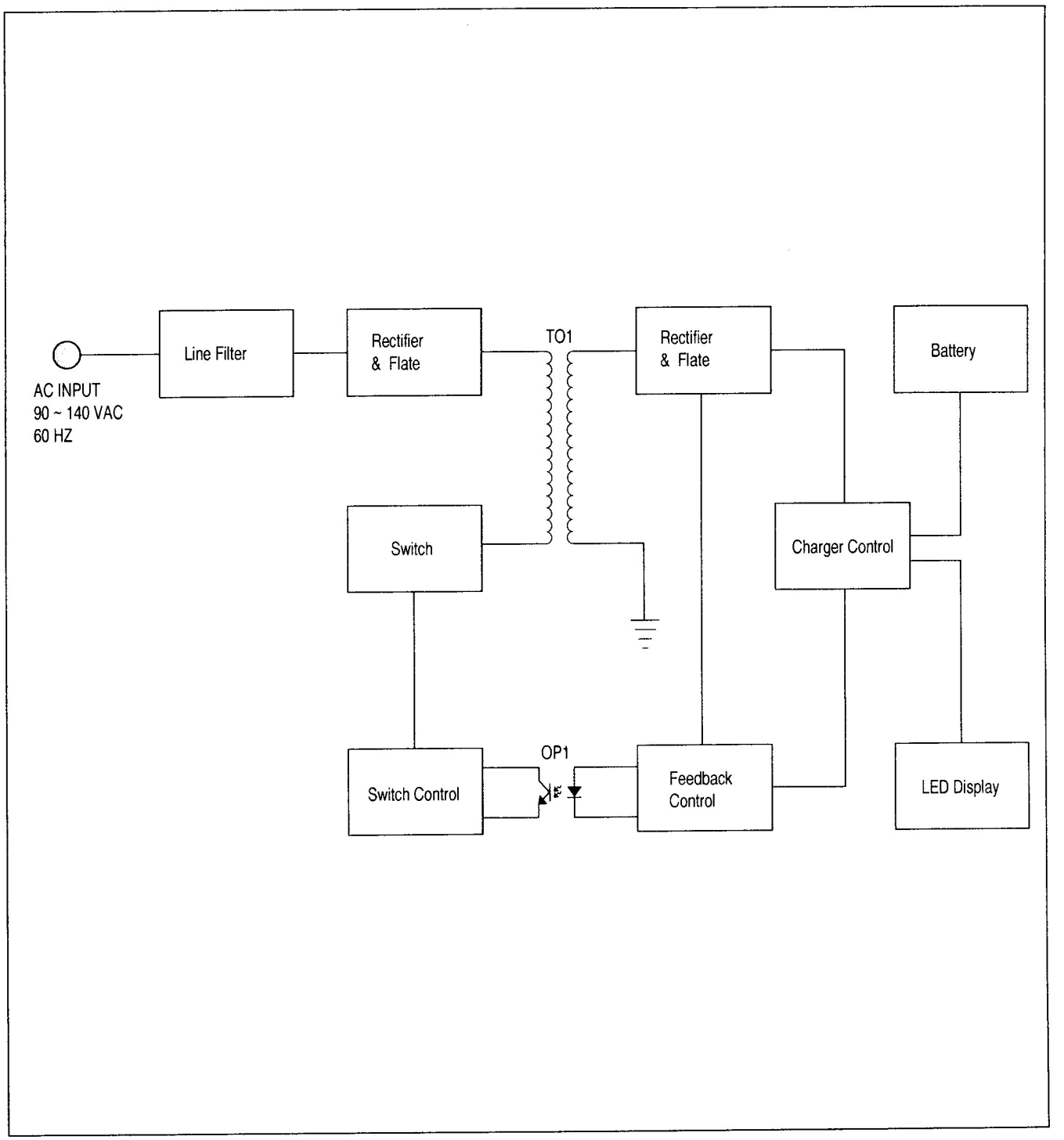
10-3 Desk-Top Rapid Charger Block Diagram



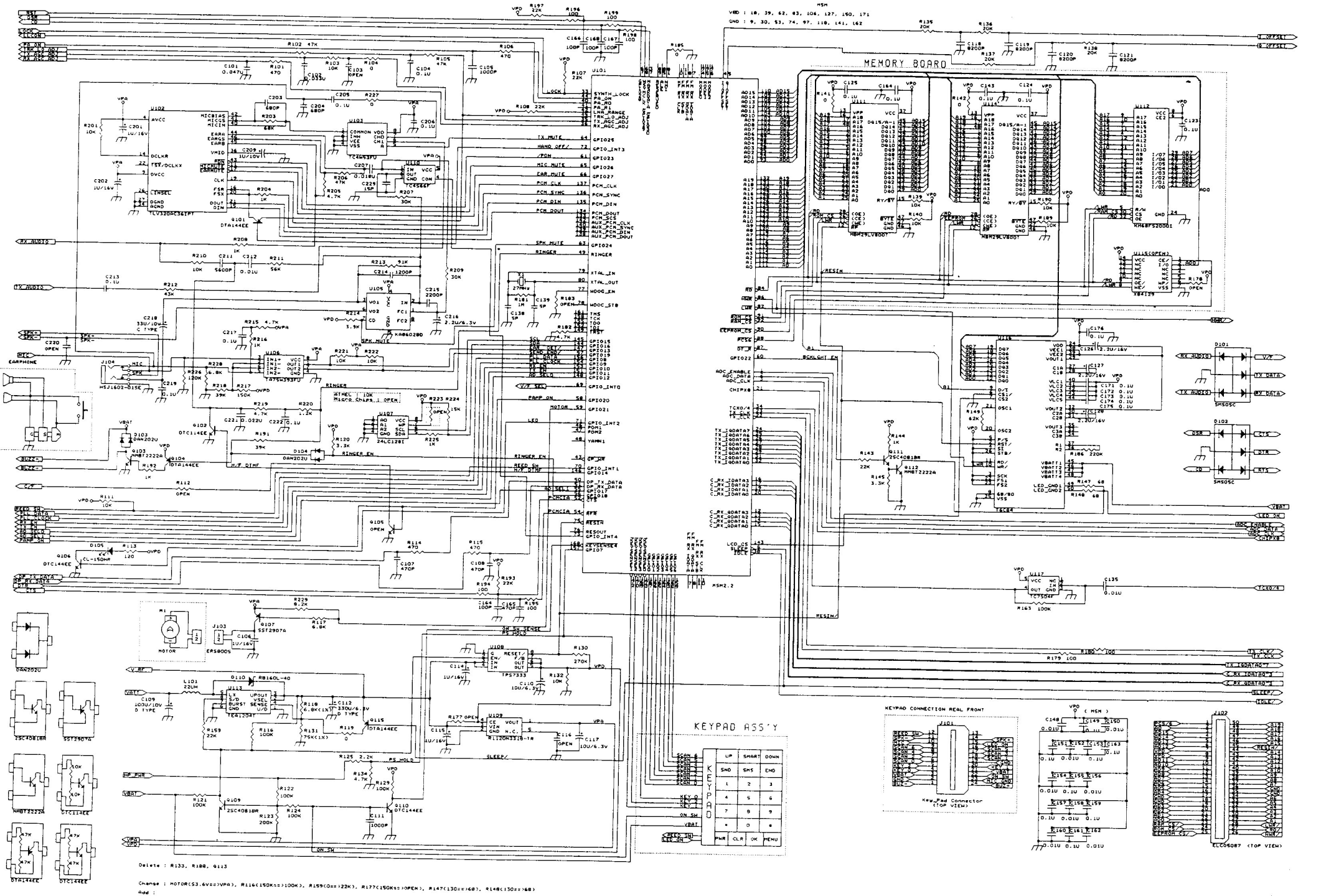
10-4 Cigarette Lighter Adapter Block Diagram



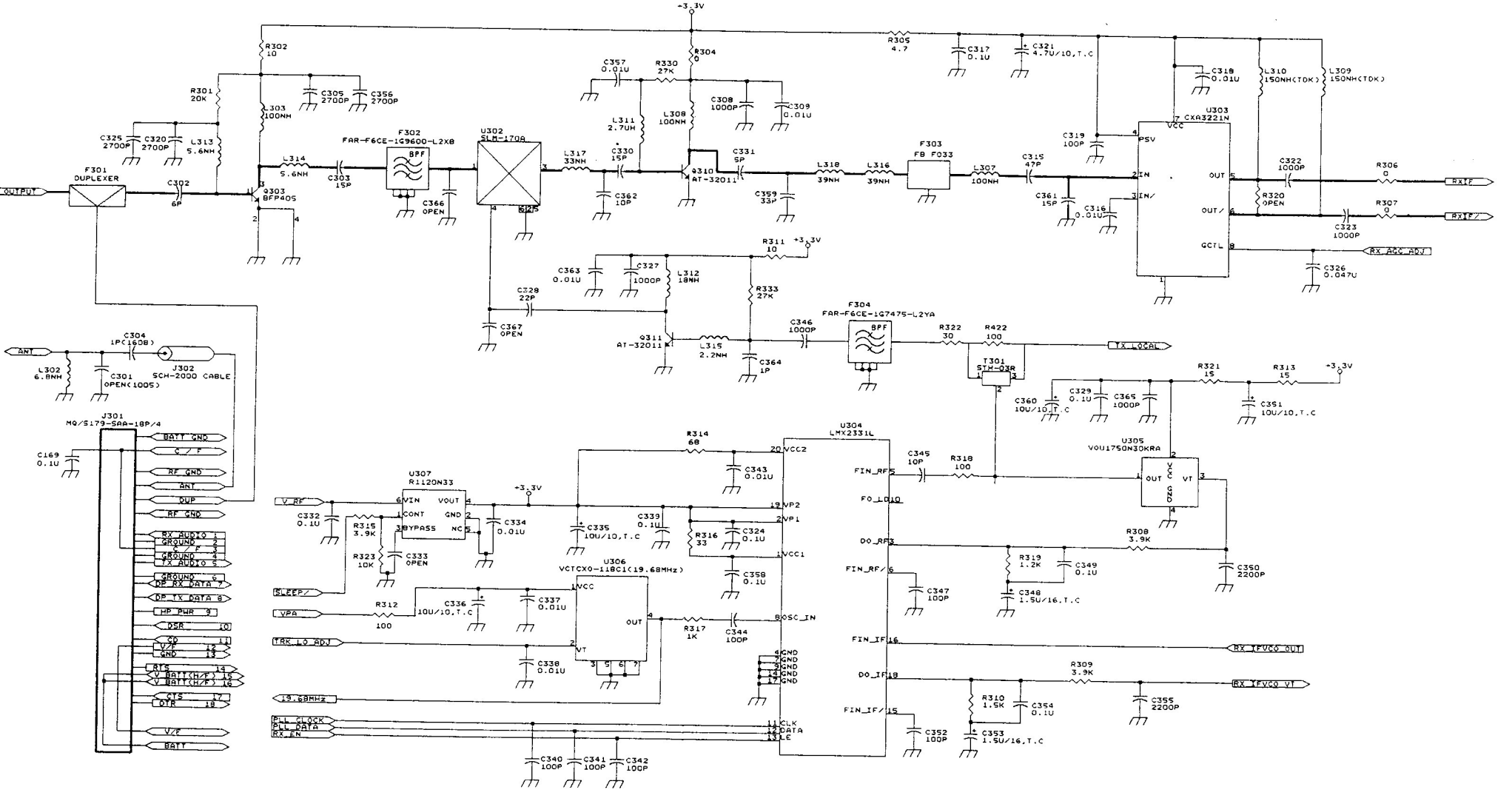
10-5 Travel Charger Block Diagram



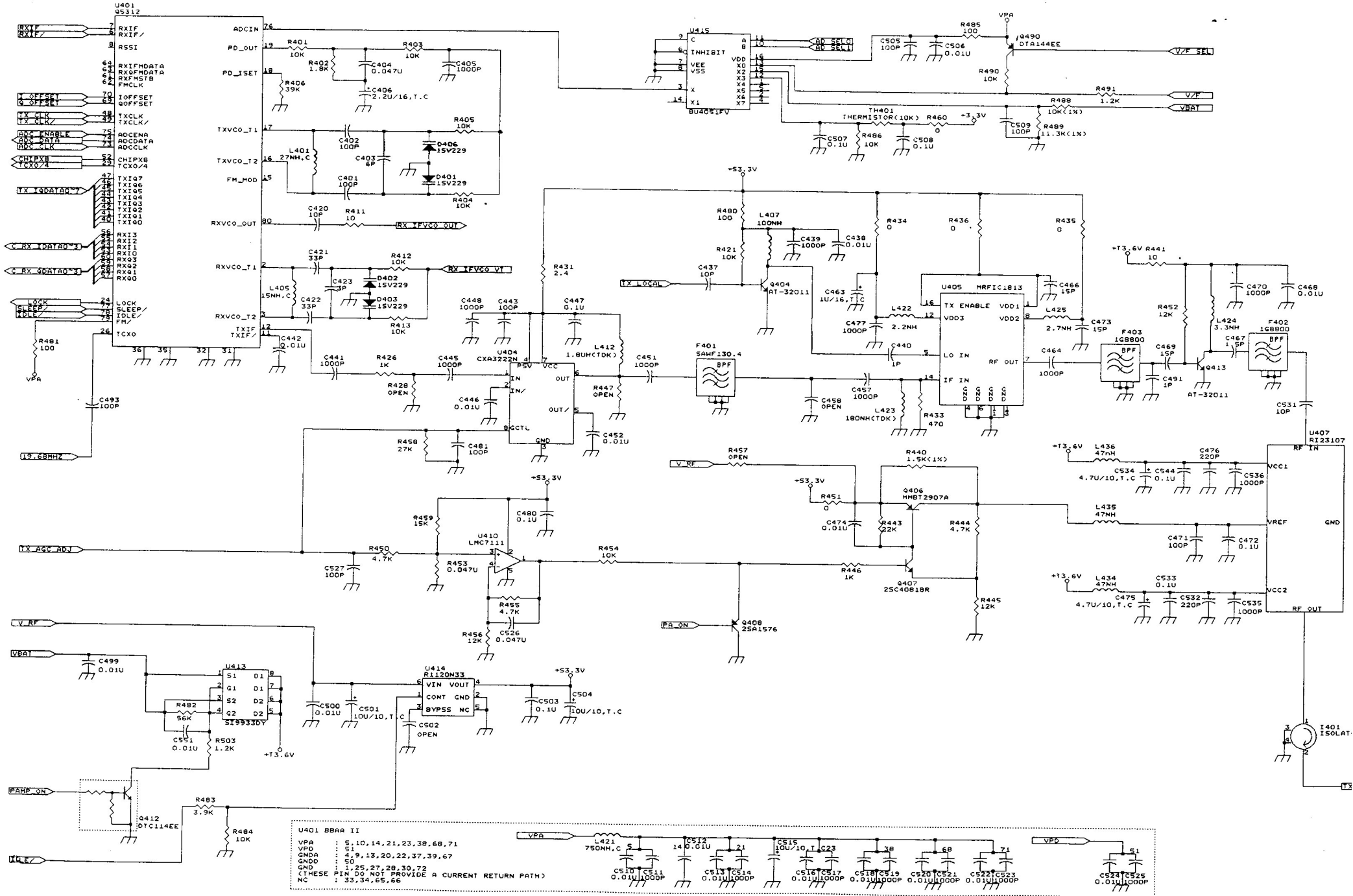
10-6 Logic Circuit Diagram



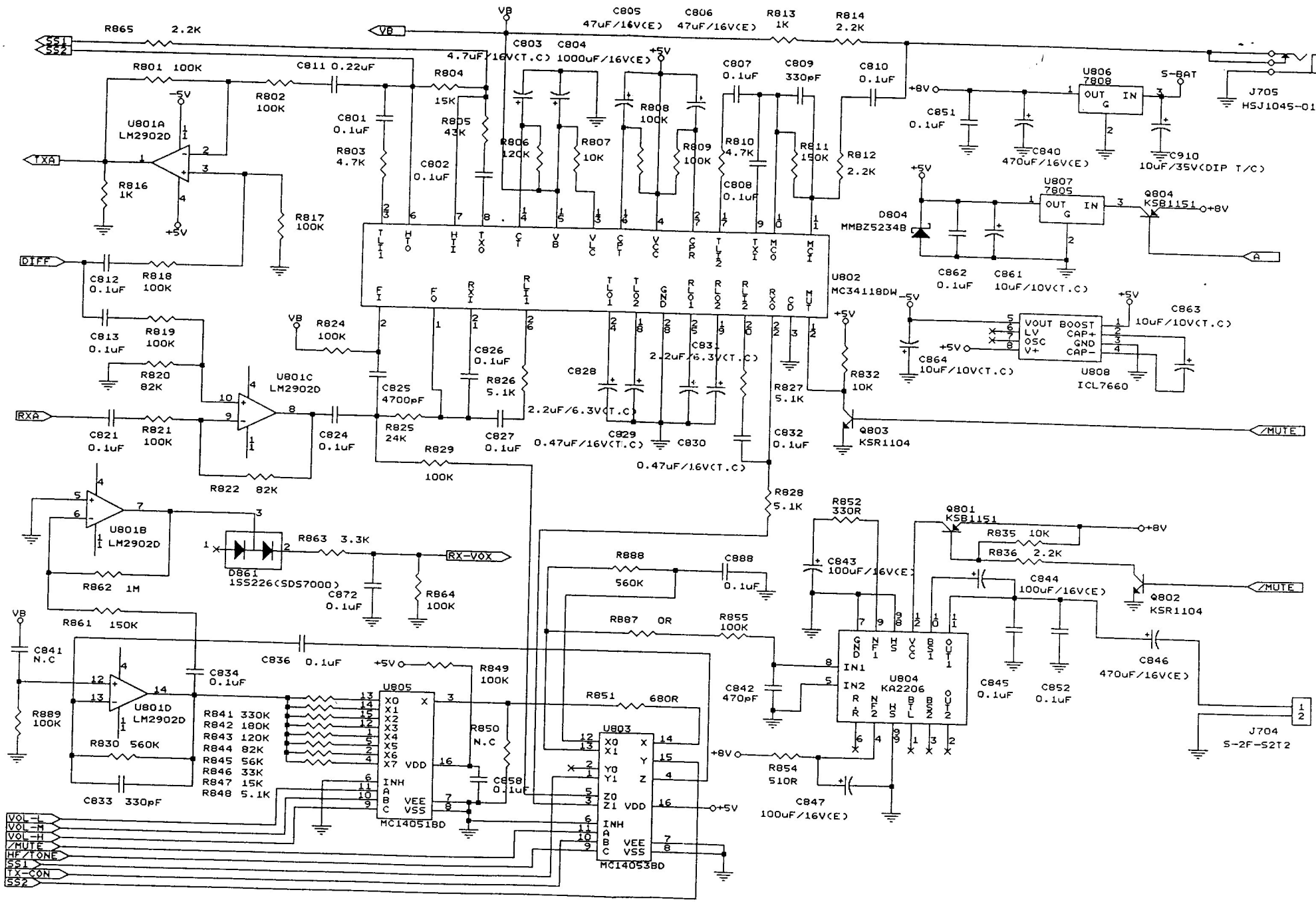
Receiver Circuit Diagram



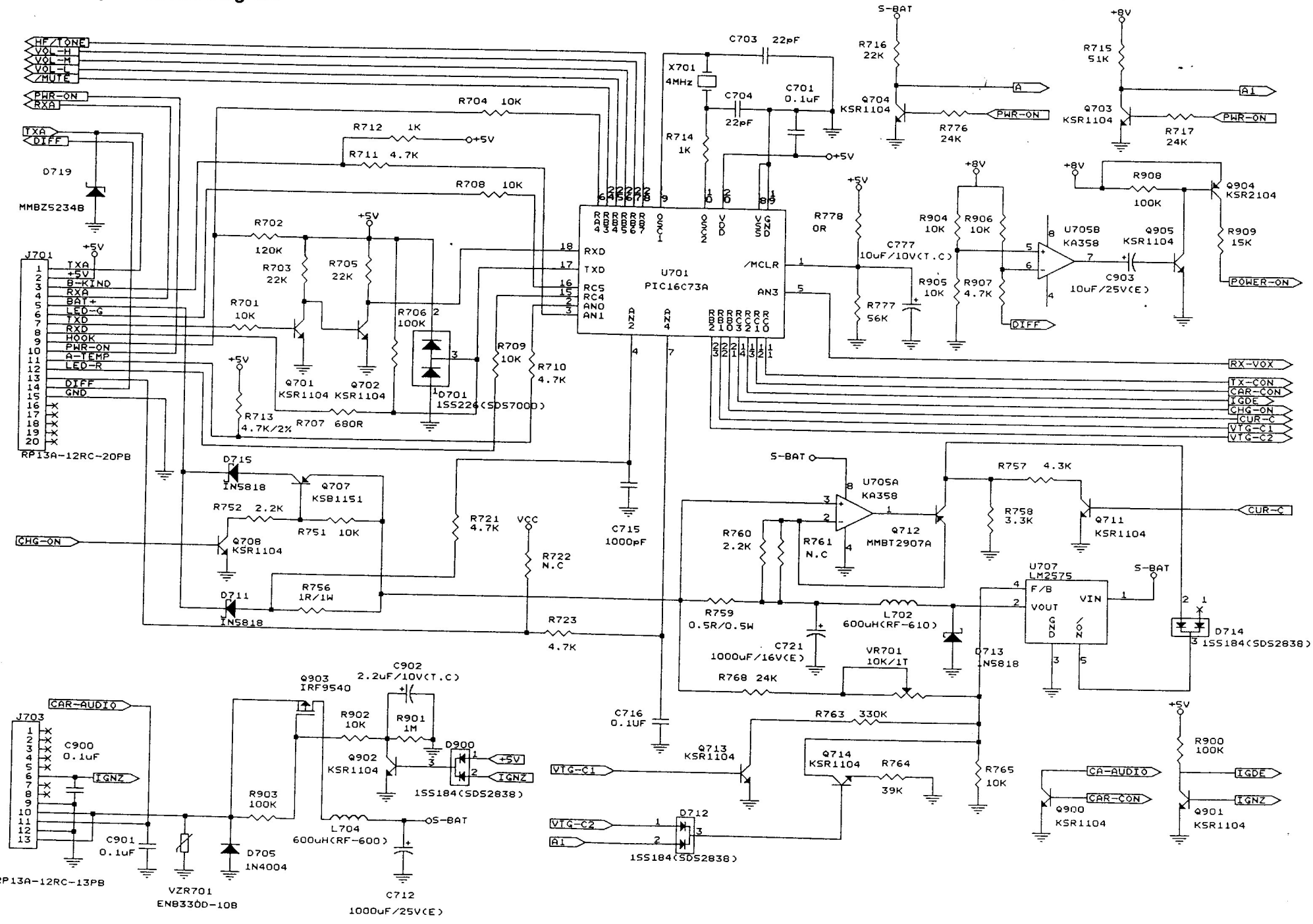
10-8 Transmitter Circuit Diagram



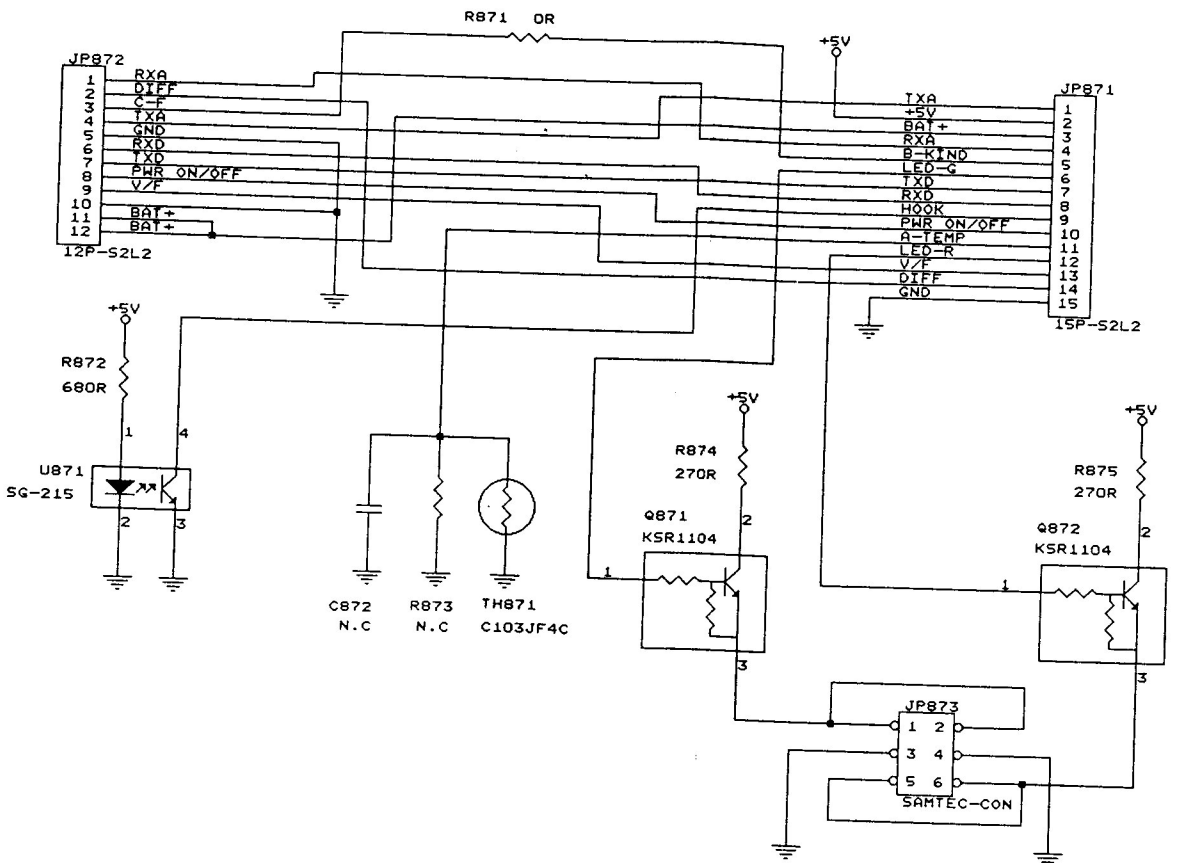
10-9 Hands-Free Circuit Diagram



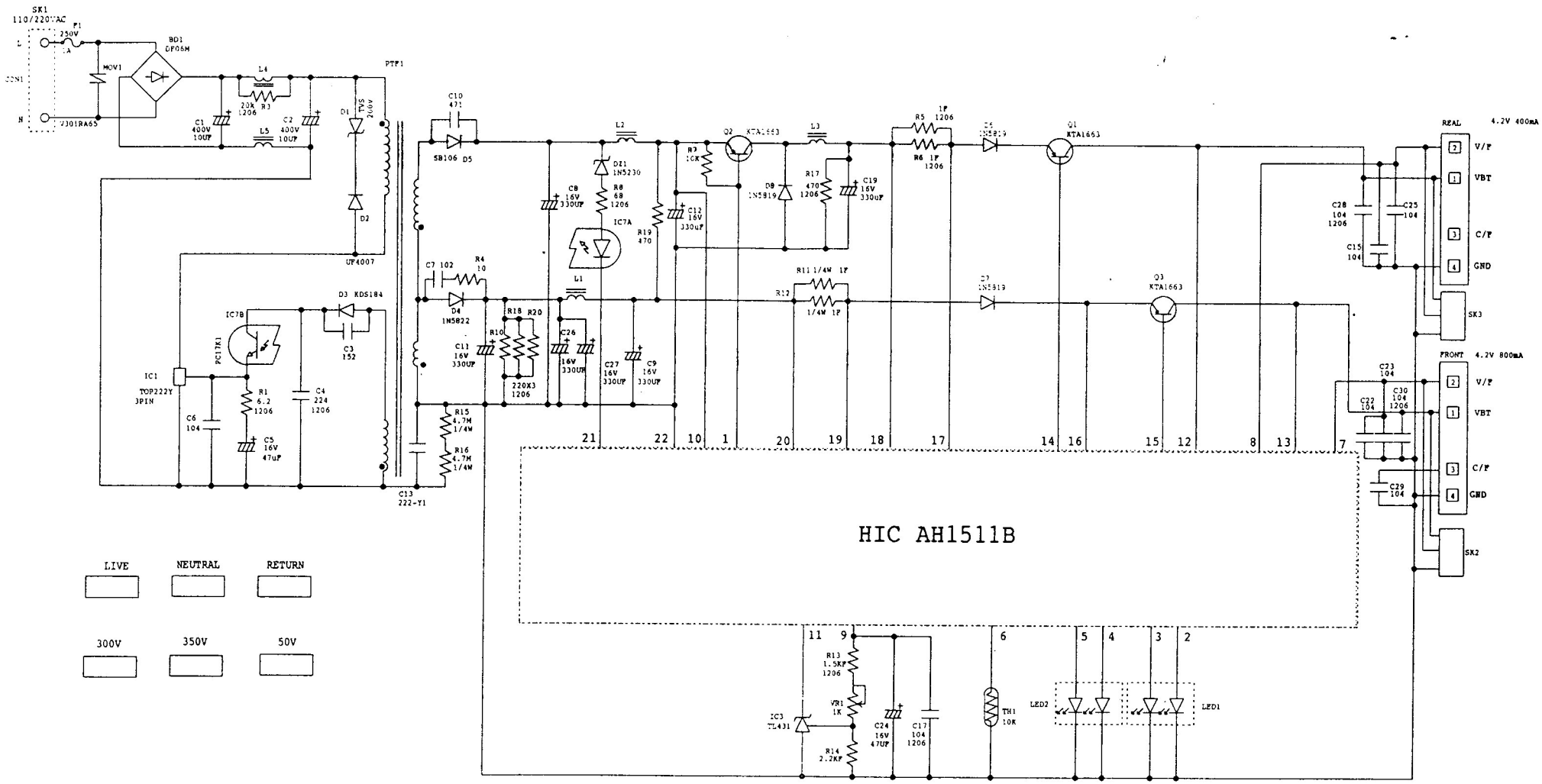
10-10 Car Adapter Circuit Diagram



10-11 Cradle Circuit Diagram



10-12 Desk-Top Rapid Charger Circuit Diagram



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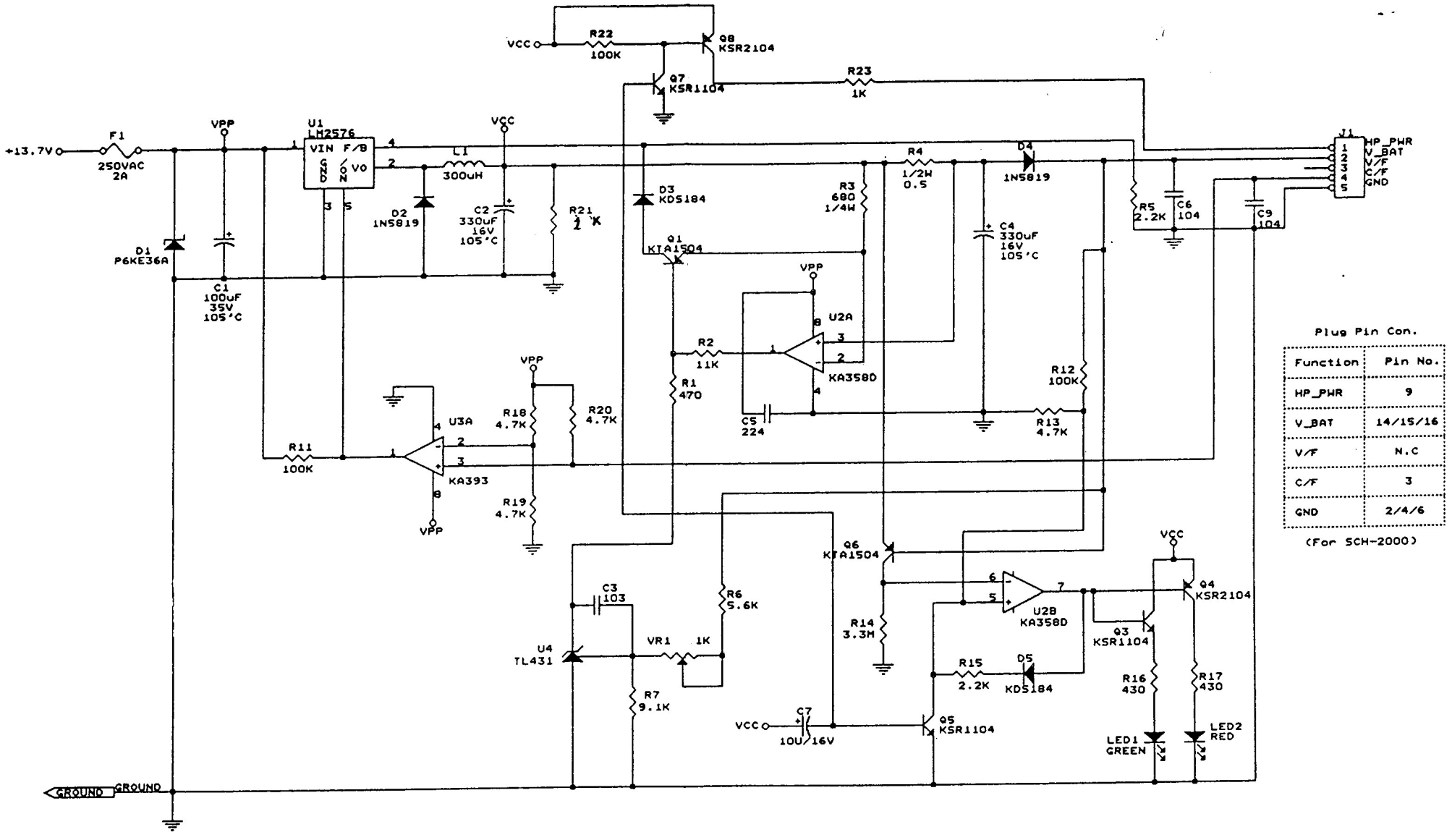
NOTES : UNLESS OTHERWISE SPECIFIED, ALL RESISTORS ARE IN OHMS, 5% 0805
AND ALL CAPACITORS ARE IN MICROFARADS,50V

10-13 Cigarette Lighter Adapter Circuit Diagram

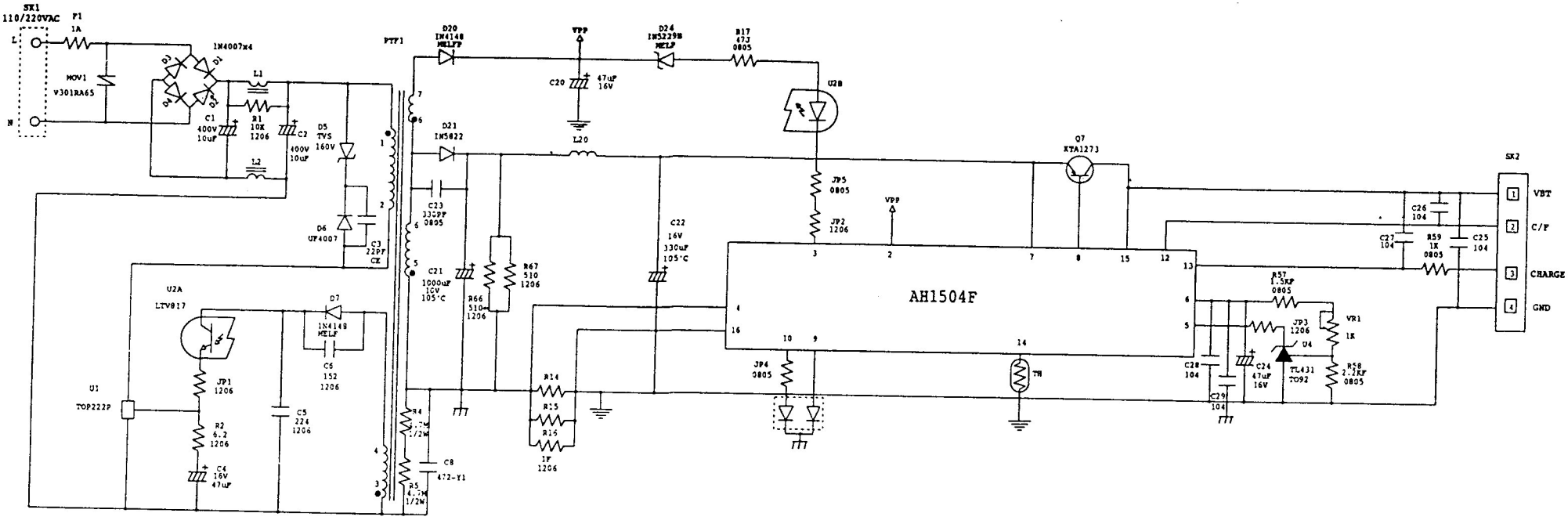


Plug Pin Con.

Function	Pin No.
HP_PWR	9
V_BAT	14/15/16
V/F	N.C
C/F	3
GND	2/4/6

(For SCH-2000)

10-14 Travel Charger Circuit Diagram



NOTES : UNLESS OTHERWISE SPECIFIED, ALL RESISTORS ARE IN OHMS, 5% 0805
AND ALL CAPACITORS ARE IN MICROFARADS,50V

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