Service Manual

Telephone Equipment

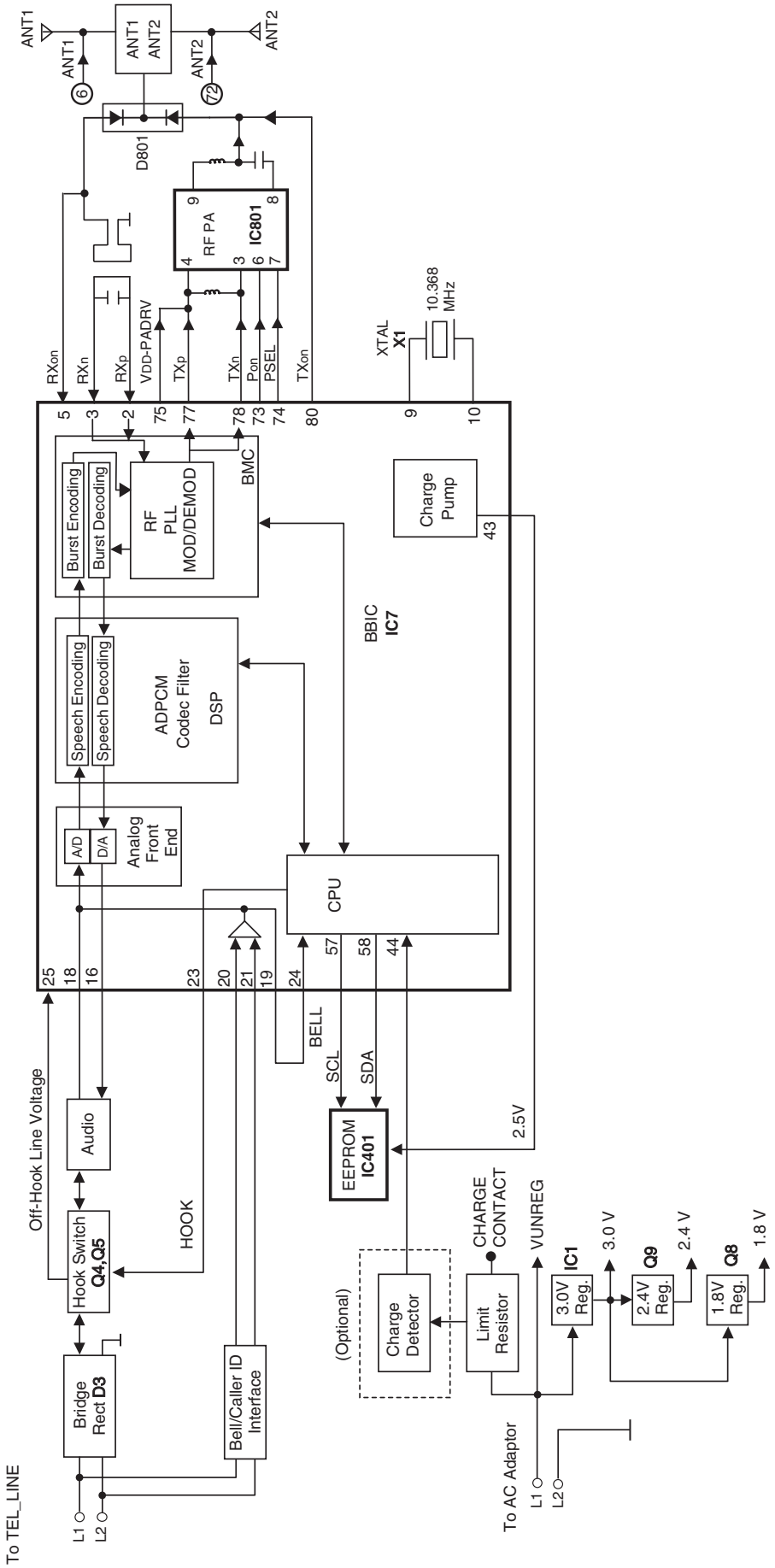
Model No. KX-TG6411BX
KX-TG6412BX
KX-TG6413BX
KX-TGA641BX

(for Asia, Middle Near East and other areas)

Panasonic

1 Technical Descriptions

1.1. Block Diagram (Base Unit)



1.2. Circuit Operation (Base Unit)

1.2.1. Outline

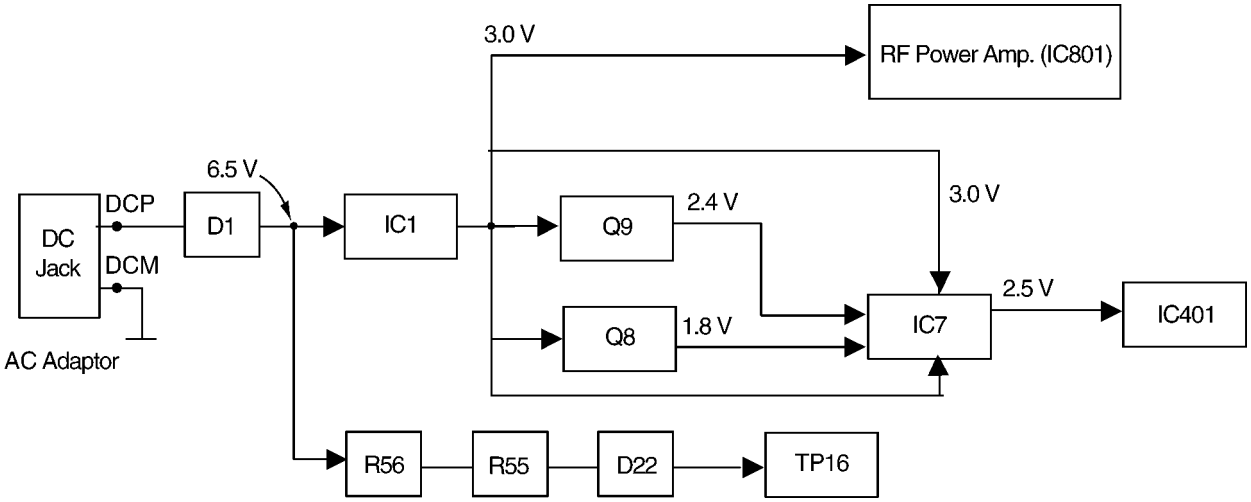
Base Unit consists of the following ICs as shown in **Block Diagram (Base Unit)** (P.2).

- DECT BBIC (**B**ase **B**and IC): IC7
  - Handling all the audio, signal and data processing needed in a DECT base unit
  - Controlling the DECT specific physical layer and radio section (**B**urst **M**odule **C**ontroller section)
  - ADPCM code filter for speech encoding and speech decoding (DSP section)
  - Echo-cancellation and Echo-suppression (DSP section)
  - Any tones (tone, sidetone, ringing tone, etc.) generation (DSP section)
  - DTMF receiver (DSP section)
  - Clock Generation for RF Module
  - ADC, DAC, timer, and power control circuitry
  - PLL Oscillator
  - Detector
  - Compress/Expander
  - First Mixer
  - All interfaces (ex: RF Power Amp, EEPROM, LED, Analog Front End, etc.)
- RF Power Amp.: IC801
  - Amplifier for transmission and reception
- EEPROM: IC401
  - Temporary operating parameters (for RF, etc.)
- Additionally,
  - Power Supply Circuit (+3.0 V, +2.4 V, +1.8 V output)
  - Crystal Circuit (10.368 MHz)
  - Charge Circuit
  - Telephone Line Interface Circuit

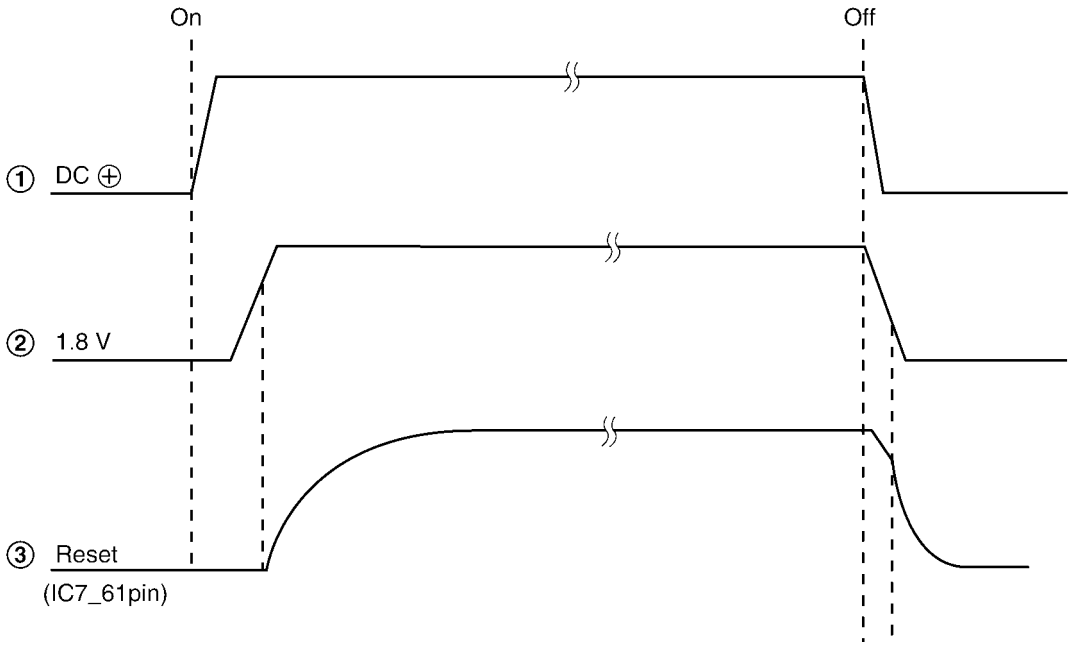
1.2.2. Power Supply Circuit

The power is supplied to the DECT BBIC, RF Module, EEPROM and Charge Contact from AC Adaptor (+6.5 V) as shown in Fig.101. The power supply is as follows;

- DECT BBIC (IC7):
  DC Jack (+6.5 V) →D1→ IC1 → IC7
  DC Jack (+6.5 V) →D1→ IC1 → Q9 → IC7
  DC Jack (+6.5 V) →D1→ IC1 → Q8 → IC7
- RF Power Amp. (IC801):
  DC Jack (+6.5 V) →D1→ IC1 → IC801 (Power AMP)
- EEPROM (IC401):
  DC Jack (+6.5 V) →D1→ IC1 → IC7→ IC401
- Charge Contact (TP16):
  DC Jack (+6.5 V) →D1→ R56 → R55 → D22→ TP16



<Fig.101>



1.2.3. Telephone Line Interface

<Function>

- Bell signal detection
- Clip signal detection
- ON/OFF hook circuit

Bell & Clip (: Calling Line Identification Presentation: Caller ID) signal detection:

In the standby mode, Q3 is open to cut the DC loop current and decrease the ring load.

When ring voltage appears at the L1T (A) and L1R (B) leads (when the telephone rings), the AC ring voltage is transferred as follows;

- B → L2 → C4 → R6 → R33 → IC7 Pin 21 (CID INp)
- A → L1 → C3 → R4 → R35 → IC7 Pin 20 (CID INn)

ON/OFF hook circuit:

In the standby mode, Q3 is open, and connected as to cut the DC loop current and to cut the voice signal. The unit is consequently in an **on-hook condition**.

When IC7 detects a ring signal or press the TALK Key onto the handset, Q4 turns on and then Q3 turns on, thus providing an **off-hook condition** (DC current flows through the circuit) and the following signal flow makes the loop current.

- B → L2 →D3 → Q3 → Q5 → R21 → R22 → D3 → L1 →A [**OFF HOOK**]

1.2.4. Transmitter/Receiver

- Audio Circuits and DTMF tone signal circuits.

Base Unit and Handset mainly consist of RF Module and DECT BBIC.

Base Unit and Handset transmit/receive voice signal and data signal through the antenna on carrier frequency.

1.2.4.1. Transmitter Block

The voice signal input from the TEL LINE interface goes to RF Power Amp. (IC801) through DECT BBIC (IC7) as shown in **Block Diagram (Base Unit)** (P.2)

The voice signal passes through the analog part of IC7 where it is amplified and converted to a digital audio stream signal. The burst switch controller processes this stream performing encryption and scrambling, adding the various other fields to produce the GAP (**G**eneric **A**ccess **P**rofile) standard DECT frame, assigning to a time slot and channel etc.

In IC7, the carrier frequency is changing, and frequency modulated RF signal is generated.In IC801,RF signal is amplified, and radiated from antenna. Handset detects the voice signal or data signal in the circuit same as the following explanation of Receiver Block.

1.2.4.2. Receiver Block

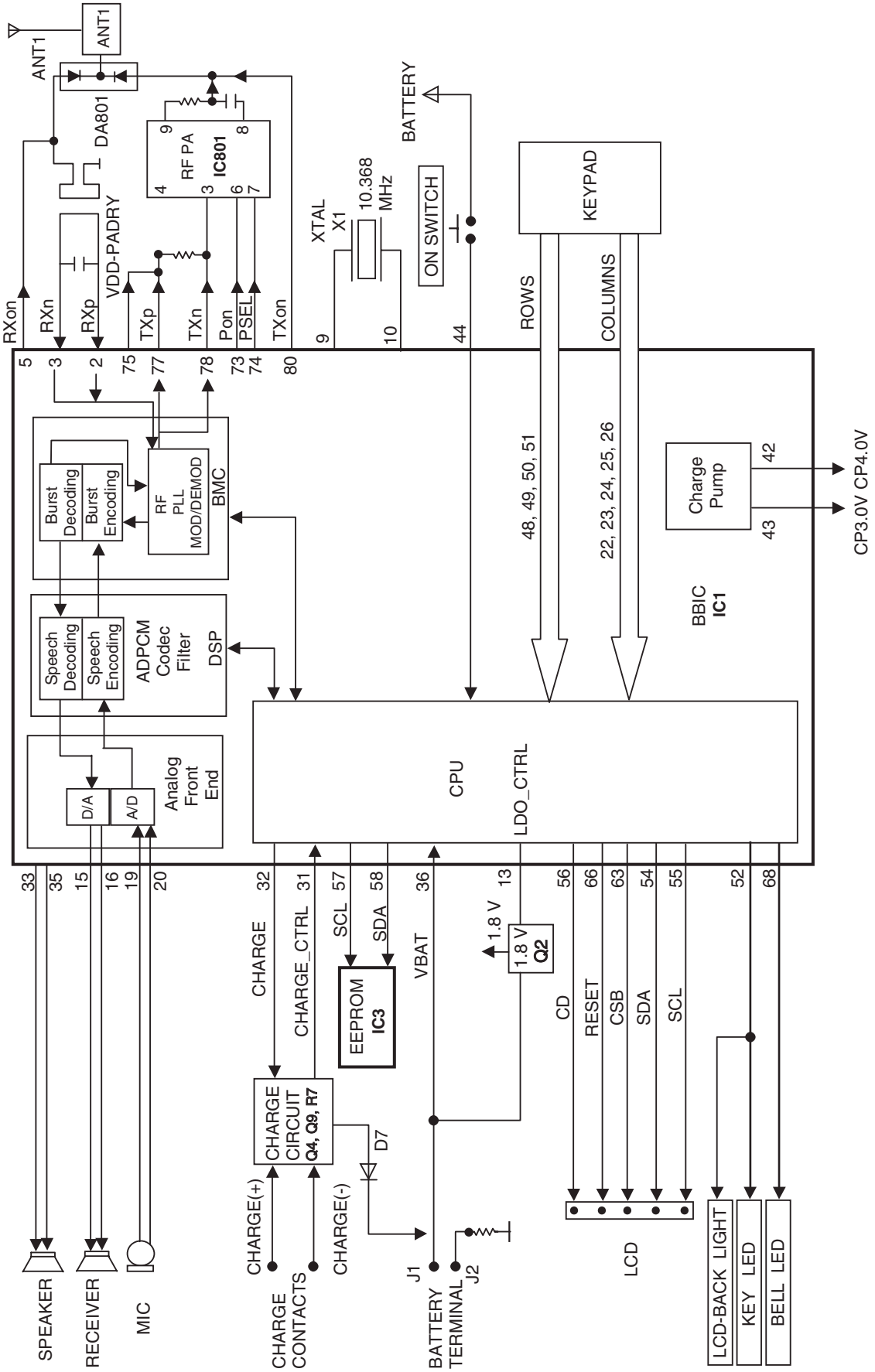
The signal of 1900 MHz band (1881.792 MHz ~ 1897.344 MHz) which is input from antenna is input to IC7 as shown in **Block Diagram (Base Unit)** (P.2).

In IC7, the signal of 1900 MHz band is downconverted to 864 kHz signal and demodulated, as GAP (**G**eneric **A**ccess **P**rofile) standard DECT frames. It passes through the decoding section burst switch controller where it separates out the frame information and performs de-encryption and de-scrambling as required. It then goes to the DSP section where it is turned back into analog audio. This is amplified by the analog front end, and goes to the TEL LINE Interface.

1.2.5. Pulse Dialling

During pulse dialing the hookswitch (Q3, Q4) is used to generate the pulses using the HOOK control signal, which is set high during pulses. To force the line impedance low during the “pause” intervals between dial pulses, the PULSE_DIAL signal turns on Q2.

1.3. Block Diagram (Handset)



1.4. Circuit Operation (Handset)

1.4.1. Outline

Handset consists of the following ICs as shown in **Block Diagram (Handset)** (P.6).

- DECT BBIC (**B**ase **B**and IC): IC1
  - All data signals (forming/analyzing ACK or CMD signal)
  - All interfaces (ex: Key, Detector Circuit, Charge, DC/DC Converter, EEPROM, LCD, RF Power Amp.)
  - PLL Oscillator
  - Detector
  - Compress/Expander
  - Reception
- RF Power Amp: IC801
  - Amplifier for transmission
- EEPROM: IC3
  - Temporary operating parameters (for RF, etc.)

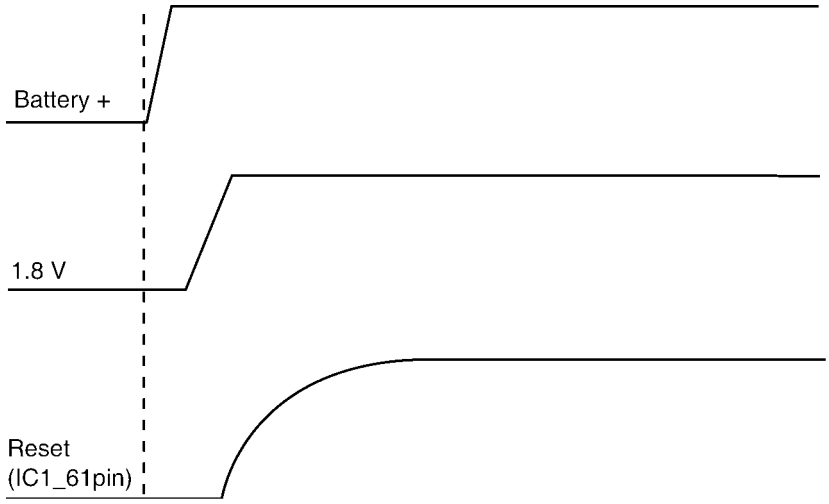
1.4.2. Power Supply Circuit/Reset Circuit

Circuit Operation:

When power on the Handset, the voltage is as follows;

BATTERY(2.2 V ~ 2.6 V: BATT+) → F1 → Q2 (1.8 V), IC1-43pin (2.5V)

The Reset signal generates IC1 (61 pin) and 1.8 V.



1.4.3. Charge Circuit

Circuit Operation:

When charging the handset on the Base Unit, the charge current is as follows;

DC+(6.5 V) → D1 → R56 → R55 → D22 → CHARGE+(Base) → CHARGE+(Handset) → Q4 → D7→ F1 → BATTERY+... Battery...

BATTERY- → R45 → GND → CHARGE-(Handset)→ CHARGE-(Base) → GND → DC-(GND)

In this way, the BBIC on Handset detects the fact that the battery is charged.

The charge current is controlled by switching Q9 of Handset.

Refer to Fig.101 in **Power Supply Circuit** (P.4).

1.4.4. Battery Low/Power Down Detector

Circuit Operation:

"Battery Low" and "Power Down" are detected by BBIC which check the voltage from battery.

The detected voltage is as follows;

- Battery Low

  Battery voltage: V(Batt) ≦ 2.25 V ± 50 mV

  The BBIC detects this level and "▭" starts flashing.
- Power Down

  Battery voltage: V(Batt) ≦ 2.0 V ± 50 mV

  The BBIC detects this level and power down.

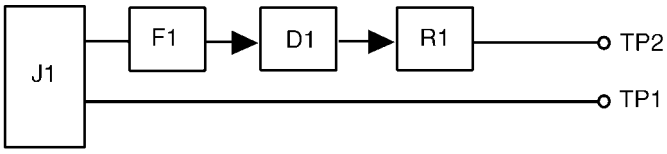
1.4.5. Speakerphone

The hands-free loudspeaker at SP+ and SP- is used to generate the ring alarm.

1.5. Circuit Operation (Charger Unit)

1.5.1. Power Supply Circuit

The power supply is as shown.



AC Adaptor

2 Schematic Diagram

2.1. For Schematic Diagram

2.1.1. Base Unit (Schematic Diagram (Base Unit))

Notes:

1. DC voltage measurements are taken with voltmeter from the negative voltage line.

> Important Safety Notice:
> Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only the manufacturer's specified parts.

2. The schematic diagrams may be modified at any time with the development of new technology.

2.1.2. Handset (Schematic Diagram (Handset))

Notes:

1. DC voltage measurements are taken with an oscilloscope or a tester with a ground.
2. The schematic diagram may be modified at any time with the development of new technology.

2.1.3. Charger Unit (Schematic Diagram (Charger Unit))

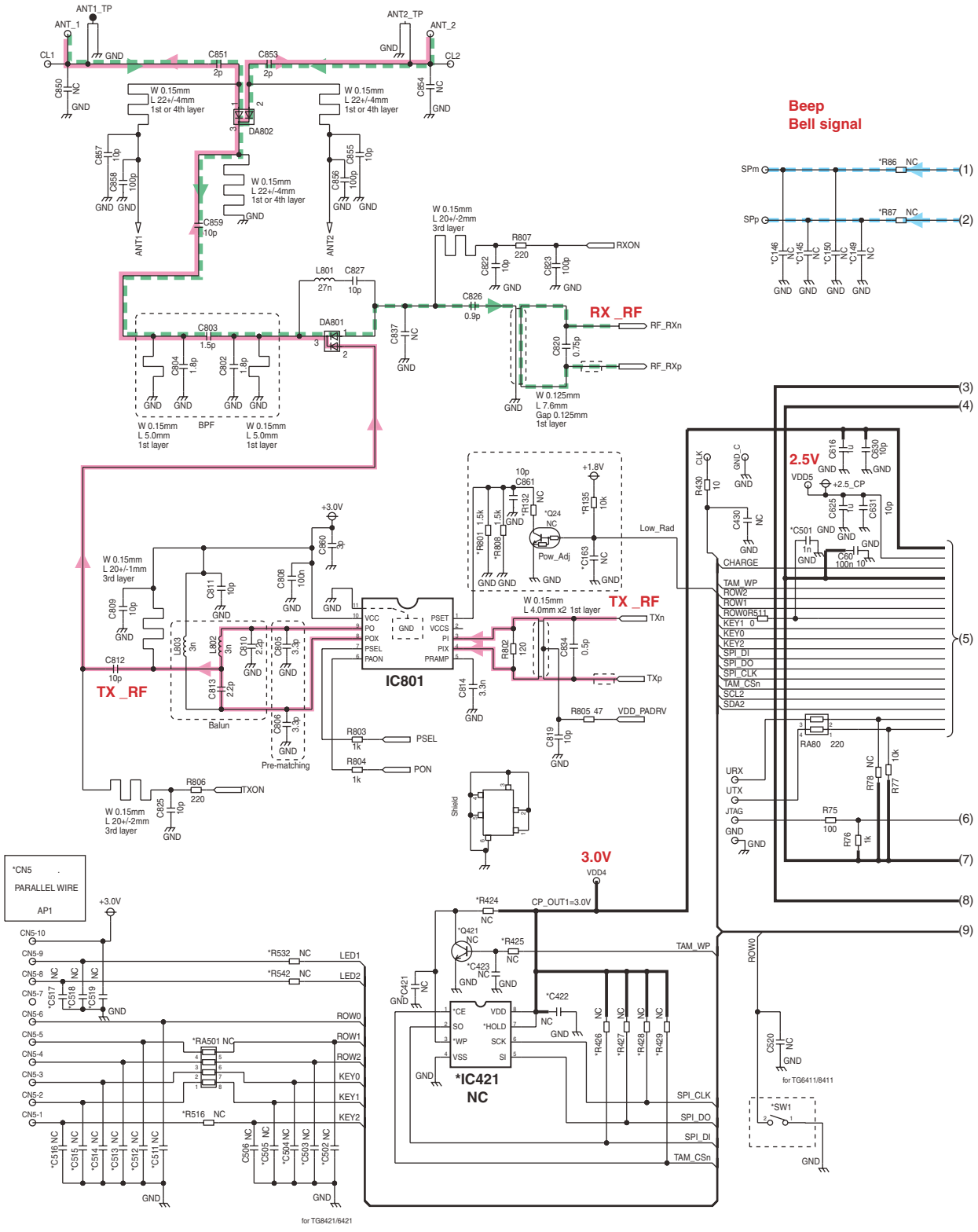
Notes:

1. DC voltage measurements are taken with voltmeter from the negative voltage line.

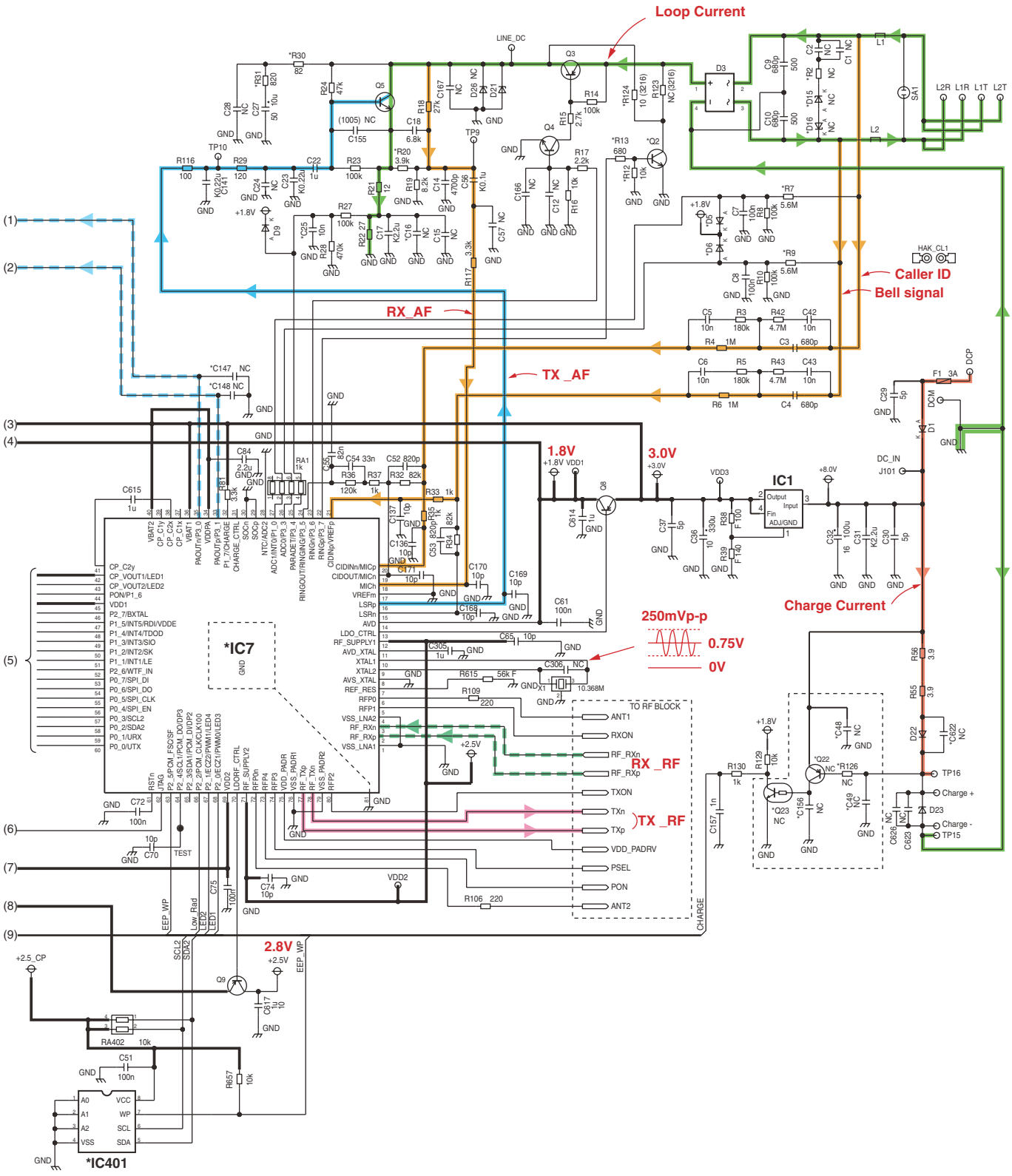
> Important Safety Notice:
> Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only the manufacturer's specified parts.

2. The schematic diagram may be modified at any time with the development of new technology.

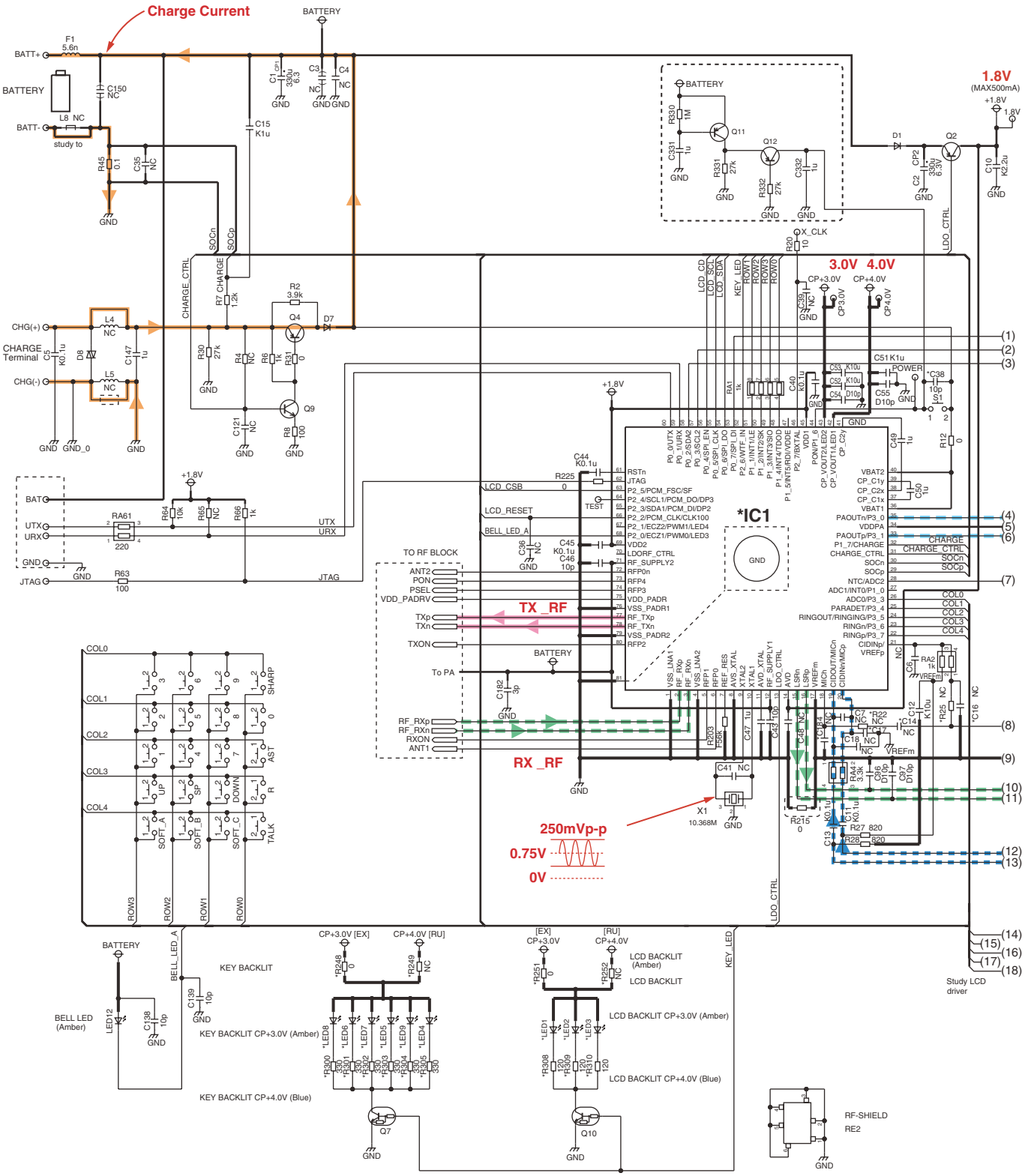
2.2. Schematic Diagram (Base Unit)



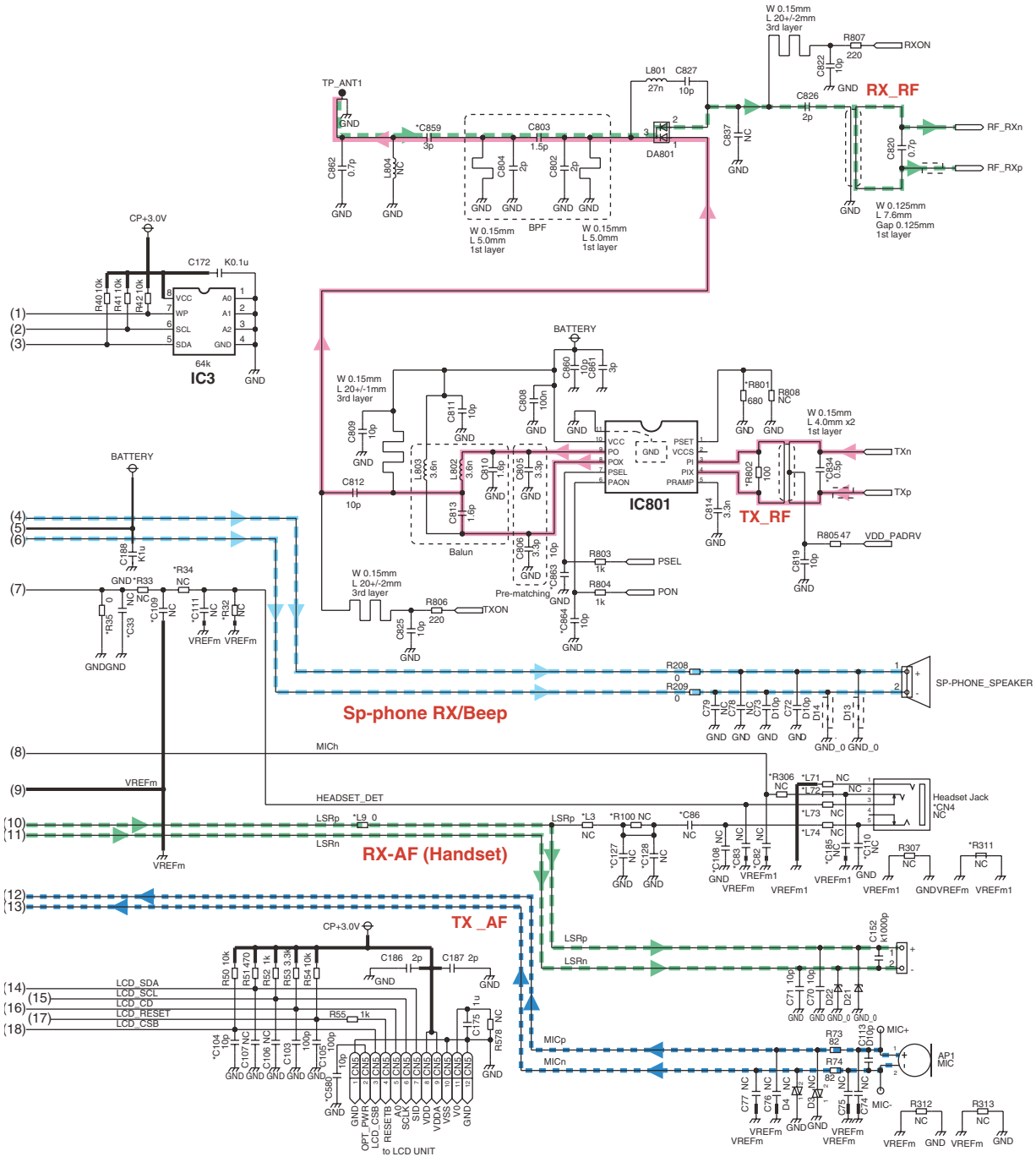
NC: No Components


Loop Current
RX_AF
TX _AF
Caller ID
Bell signal
Charge Current
1.8V
3.0V
2.8V
250mVp-p
0.75V
0V
IC1
*IC7
*IC401
TO RF BLOCK
RX _RF
TX _RF
CHARGE
NC: No Components

2.3. Schematic Diagram (Handset)

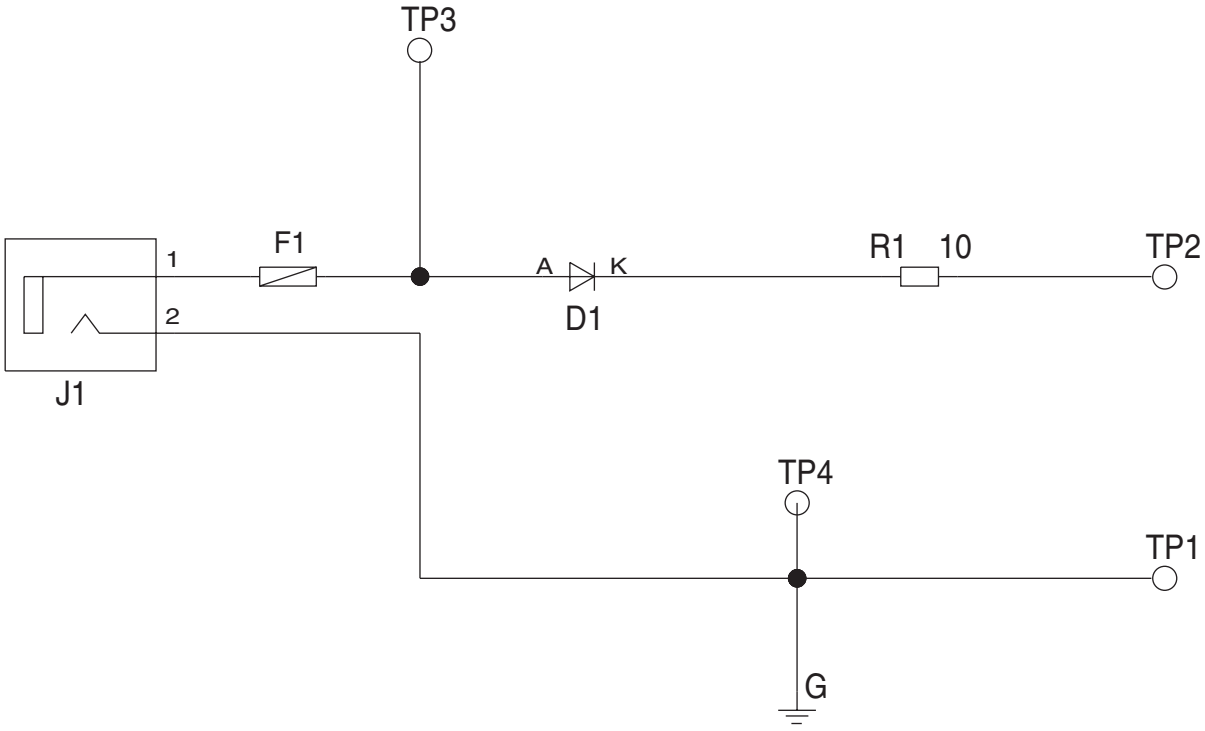


NC: No Components



NC: No Components

2.4. Schematic Diagram (Charger Unit)

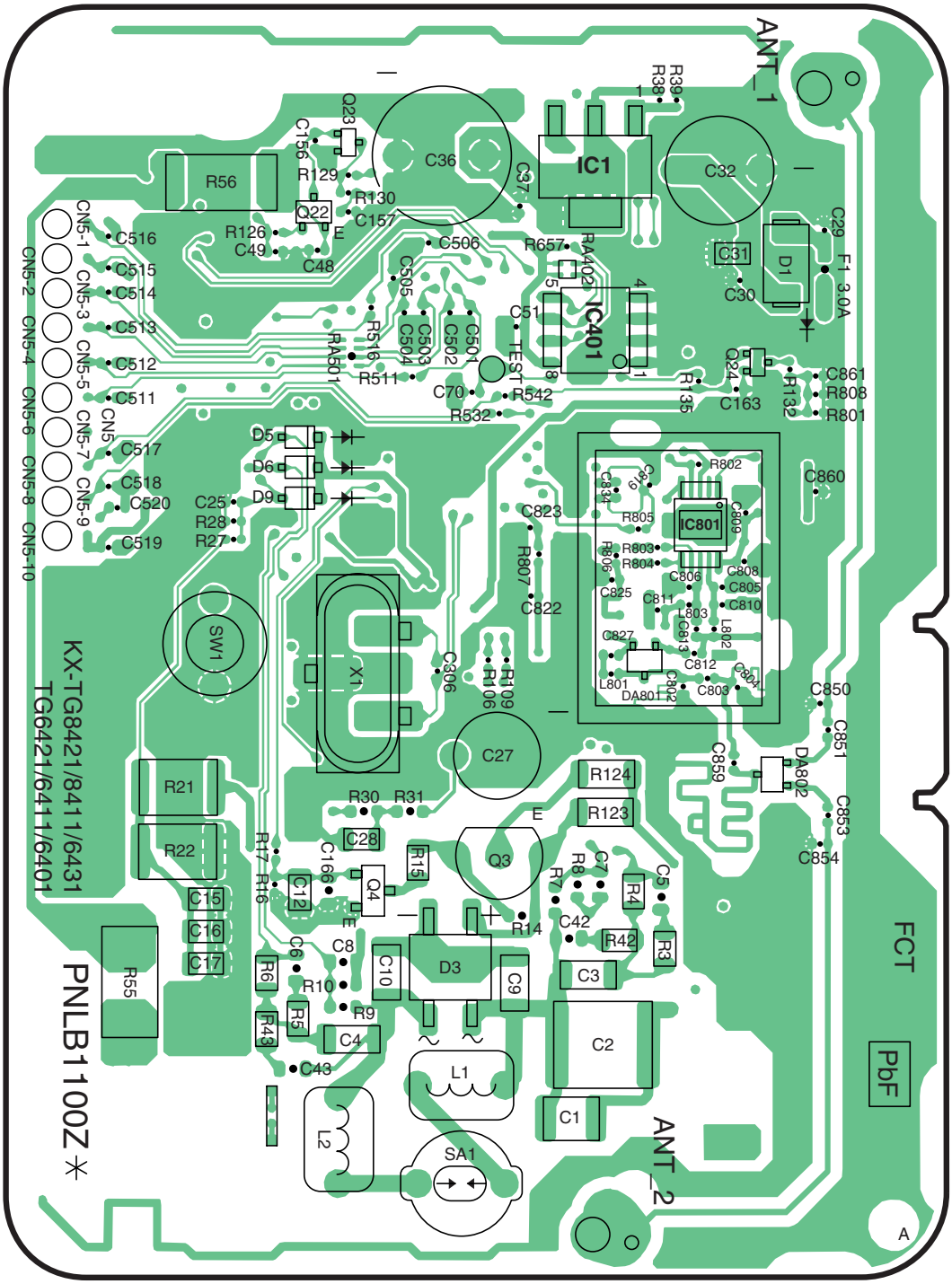


SCHEMATIC DIAGRAM (Charger Unit)

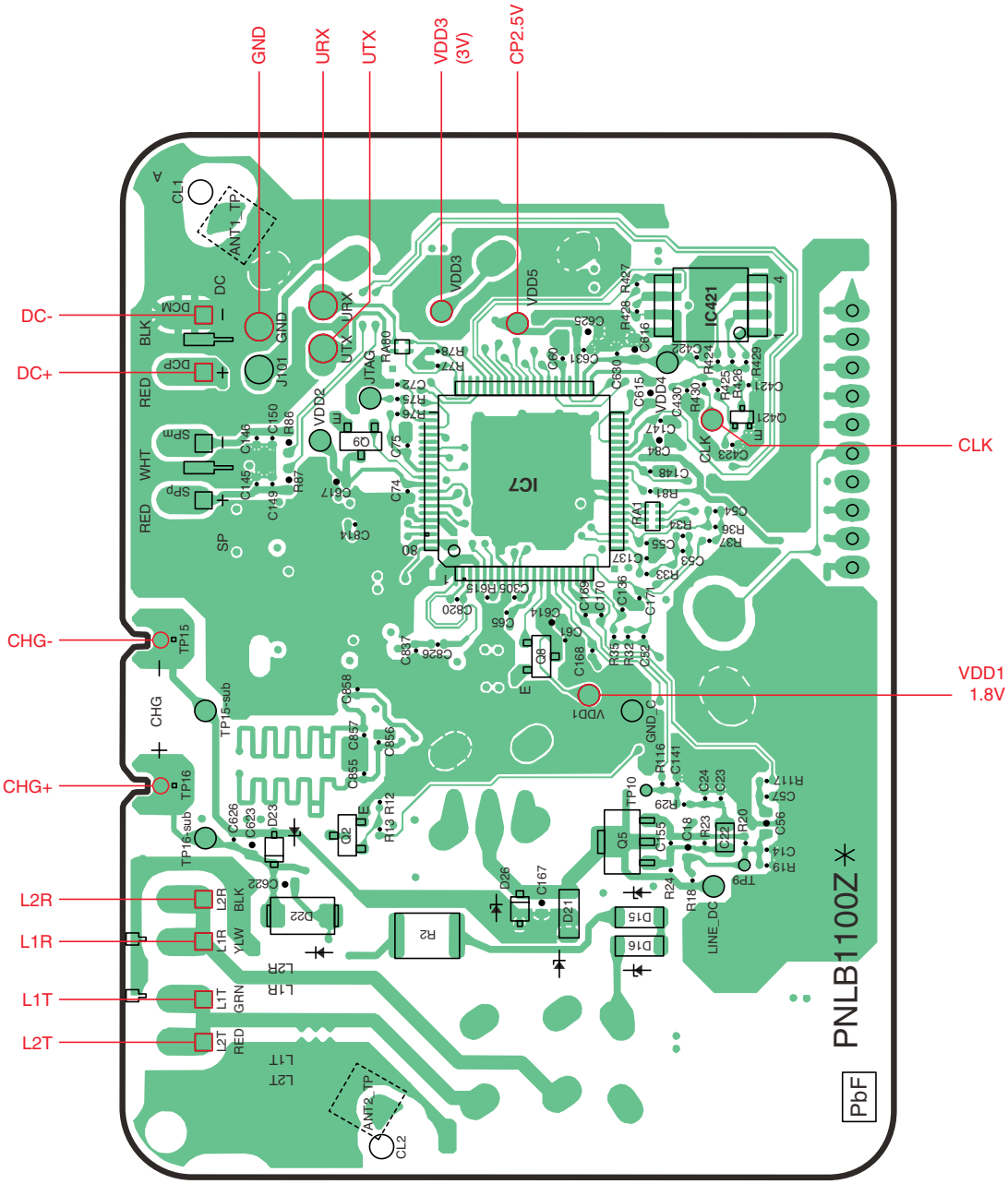
3 Printed Circuit Board

3.1. Circuit Board (Base Unit_MAIN)

3.1.1. Component View

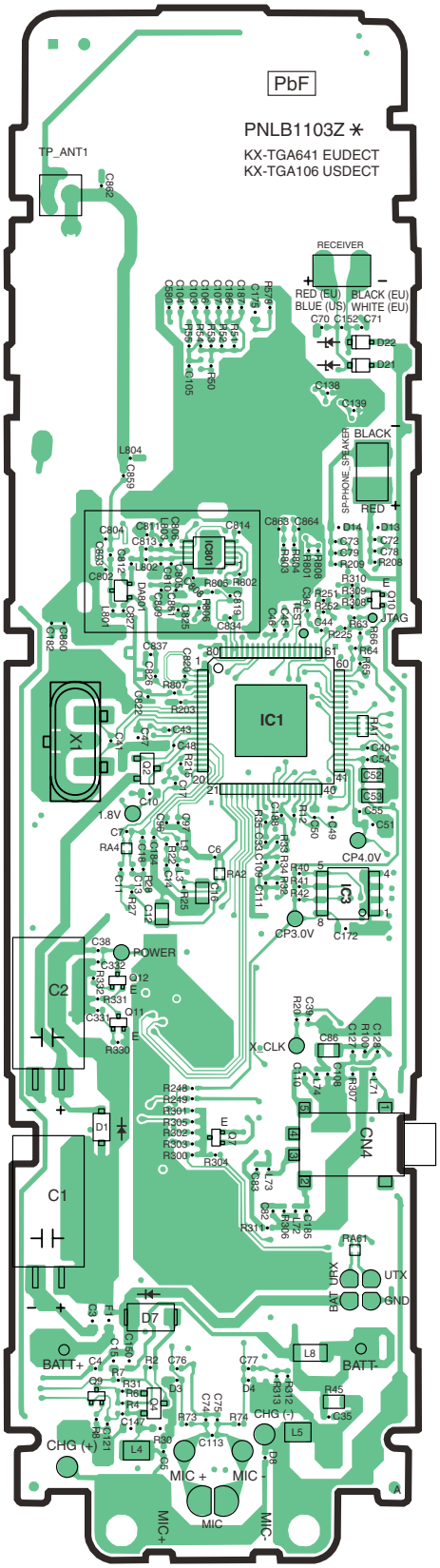


3.1.2. Bottom View

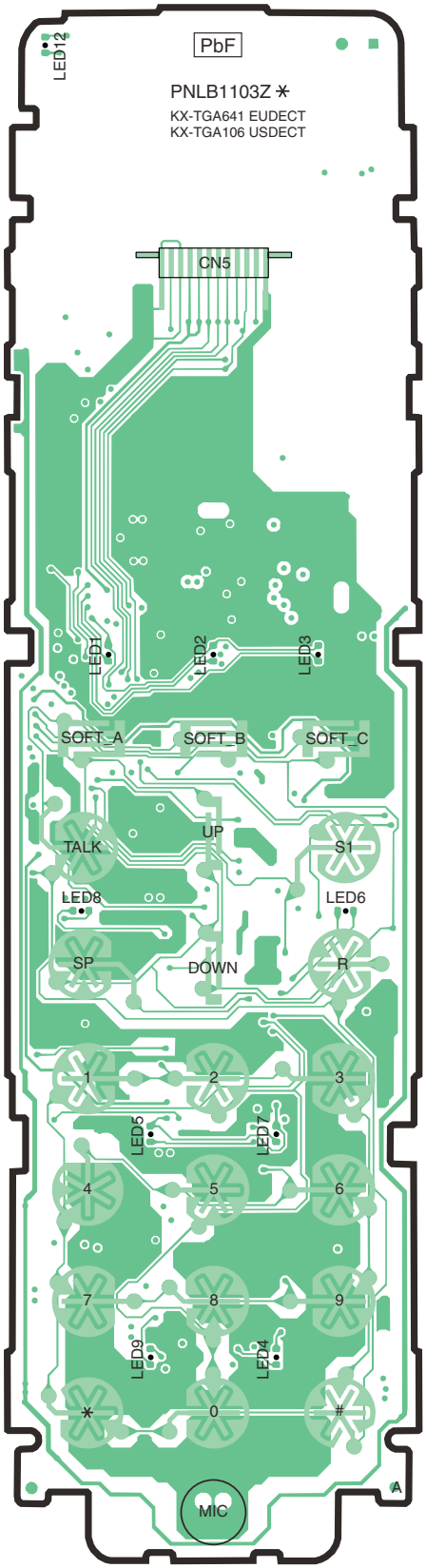


3.2. Circuit Board (Handset)

3.2.1. Component View

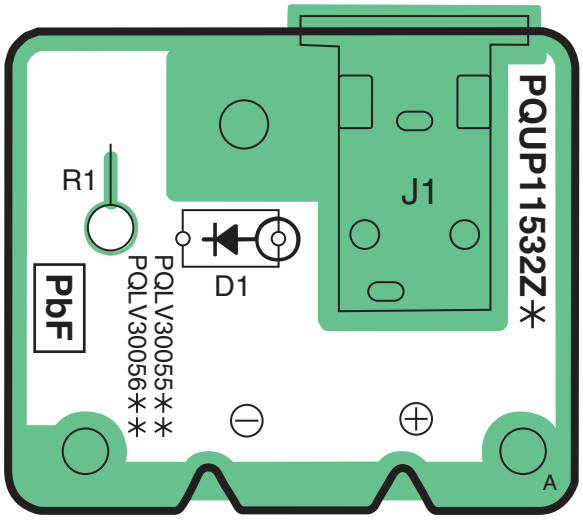


3.2.2. Bottom View

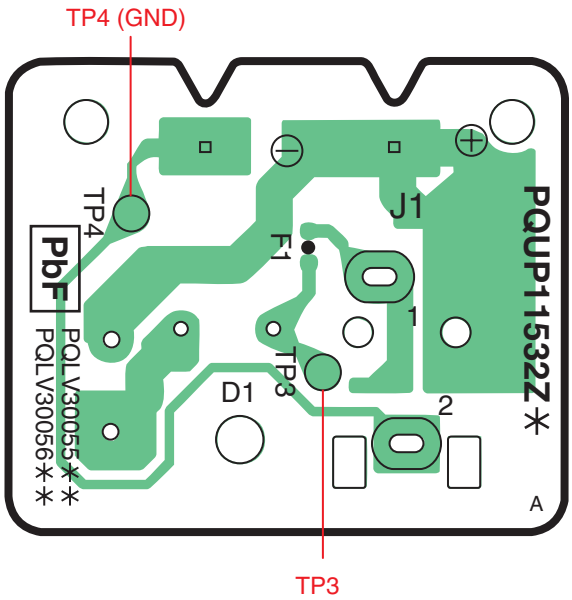


3.3. Circuit Board (Charger Unit)

3.3.1. Component View



3.3.2. Bottom View



4 Exploded View and Replacement Parts List

4.1. Replacement Part List

1. RTL (Retention Time Limited)

   Note:

   The “RTL” marking indicates that its Retention Time is Limited.

   When production is discontinued, this item will continue to be available only for a specific period of time. This period of time depends on the type of item, and the local laws governing parts and product retention.

   At the end of this period, the item will no longer be available.

2. Important safety notice

   Components identified by the ⚠ mark indicates special characteristics important for safety. When replacing any of these components, only use specified manufacture’s parts.

3. The S mark means the part is one of some identical parts. For that reason, it may be different from the installed part.

4. ISO code (Example: ABS-94HB) of the remarks column shows quality of the material and a flame resisting grade about plastics.

5. RESISTORS & CAPACITORS

   Unless otherwise specified;

   All resistors are in ohms (Ω) k=1000 Ω, M=1000 kΩ

   All capacitors are in MICRO FARADS (μF)p=μμF

   *Type & Wattage of Resistor

Type

ERC:Solid ERDS:Carbon ERJ:Chip	ERX:Metal Film ERG:Metal Oxide ER0:Metal Film	PQ4R:Chip ERS:Fusible Resistor ERF:Cement Resistor

Wattage

10,16:1/8W	14,25:1/4W	12:1/2W	1:1W	2:2W	3:3W

*Type & Voltage Of Capacitor

Type

ECFD:Semi-Conductor ECQS:Styrol ECUV,PQCUV,ECUE:Chip ECQMS:Mica	ECCD,ECKD,ECBT,F1K,ECUV:Ceramic ECQE,ECQV,ECQG:Polyester ECEA,ECST,EEE:Electlytic ECQP:Polypropylene

Voltage

ECQ Type	ECQG ECQV Type	ECSZ Type	Others	
1H:50V 2A:100V 2E:250V 2H:500V	05:50V 1:100V 2:200V	0F:3.15V 1A:10V 1V:35V 0J:6.3V	0J :6.3V 1A :10V 1C :16V 1E,25:25V	1V :35V 50,1H:50V 1J :16V 2A :100V

4.1.1. Base Unit

4.1.1.1. Main P.C.Board Parts

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	PCB1	PNWPG6411BXH	MAIN P.C.BOARD ASS'Y (RTL)	S
	C10	F1K2H681A008	680p	
	C136	ECUE1H100DCQ	10p	
	C137	ECUE1H100DCQ	10p	
	C14	ECUE1E472KBQ	0.0047	
	C141	ECJ0EB0J224K	0.22	S
	C157	ECUE1H102KBQ	0.001	
	C168	ECUE1H100DCQ	10p	
	C169	ECUE1H100DCQ	10p	
	C17	PQCUV1A225KB	2.2	
	C170	ECUE1H100DCQ	10p	
	C171	ECUE1H100DCQ	10p	
	C18	ERJ3GEYJ682	6.8k	
	C22	PQCUV1A105KB	1	
	C23	ECJ0EB0J224K	0.22	S
	C25	ECUE1C103KBQ	0.01	
	C27	F2A1H100B132	10	
	C29	F1G1H5R0A480	5p	
	C3	F1K2H681A008	680p	
	C30	F1G1H5R0A480	5p	
	C305	ECUE0J105KBQ	1	
	C31	PQCUV1A225KB	2.2	
	C32	F2A1C1010119	100	
	C36	F2A1A3310040	330	
	C37	F1G1H5R0A480	5p	
	C4	F1K2H681A008	680p	
	C42	ECUV1C103KBV	0.01	
	C43	ECUV1C103KBV	0.01	
	C5	ECUV1C103KBV	0.01	
	C501	ECUE1H102KBQ	0.001	
	C51	ECUE1A104KBQ	0.1	
	C52	ECUE1H821KBQ	820p	
	C53	ECUE1H821KBQ	820p	
	C54	ECUE1A333KBQ	0.033	
	C55	ECUE1A823KBQ	0.082	
	C56	ECUV1C104KBV	0.1	
	C6	ECUV1C103KBV	0.01	
	C60	ECUE1A104KBQ	0.1	
	C61	ECUE1A104KBQ	0.1	
	C614	ECUV1A105KBV	1	
	C615	ECUV1A105KBV	1	
	C616	ECUV1A105KBV	1	
	C617	ECUV1A105KBV	1	
	C625	ECUV1A105KBV	1	
	C630	ECUE1H100DCQ	10p	
	C631	ECUE1H100DCQ	10p	
	C65	ECUE1H100DCQ	10p	
	C7	ECUV1C104KBV	0.1	
	C70	ECUE1H100DCQ	10p	
	C72	ECUE1A104KBQ	0.1	
	C74	ECUE1H100DCQ	10p	
	C75	ECUE1A104KBQ	0.1	
	C8	ECUV1C104KBV	0.1	
	C802	F1G1H1R8A480	1.8p	
	C803	F1G1H1R5A480	1.5p	
	C804	F1G1H1R8A480	1.8p	
	C805	F1G1H3R3A480	3.3p	
	C806	F1G1H3R3A480	3.3p	
	C808	ECUE1A104KBQ	0.1	
	C809	ECUE1H100DCQ	10p	
	C810	F1G1H2R2A480	2.2p	
	C811	ECUE1H100DCQ	10p	
	C812	ECUE1H100DCQ	10p	
	C813	F1G1H2R2A480	2.2p	
	C814	ECUE1H332KBQ	0.0033	
	C819	ECUE1H100DCQ	10p	
	C820	F1G1HR75A480	0.75p	
	C822	ECUE1H100DCQ	10p	
	C823	ECUE1H101JCQ	100p	
	C825	ECUE1H100DCQ	10p	
	C826	F1G1HR90A480	0.9p	
	C827	ECUE1H100DCQ	10p	
	C834	F1G1HR50A480	0.5p	
	C84	ECUV1A225KB	2.2	
	C851	F1G1H2R0A480	2p	
	C853	F1G1H2R0A480	2p	
	C855	ECUE1H100DCQ	10p	
	C856	ECUE1H101JCQ	100p	

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	C857	ECUE1H100DCQ	10p	
	C858	ECUE1H101JCQ	100p	
	C859	ECUE1H100DCQ	10p	
	C860	F1G1H3R0A480	3p	
	C861	ECUE1H100DCQ	10p	
	C9	F1K2H681A008	680p	
	D1	B0JCME000035	DIODE(SI)	
	D21	PQVDRLZ20A	DIODE(SI)	S
	D22	B0ECKM000008	DIODE(SI)	
	D23	MA8220	DIODE(SI)	S
	D3	B0EDER000009	DIODE(SI)	
	D5	MA111	DIODE(SI)	S
	D6	MA111	DIODE(SI)	S
	D9	MA111	DIODE(SI)	S
	DA801	B0DDCD000001	DIODE(SI)	
	DA802	B0DDCD000001	DIODE(SI)	
	F1	K5H302Y00003	FUSE	
	IC1	C0CBAYG00016	IC	S
	IC401	PQWID300NEHR	IC (EEPROM)	
	IC7	C1CB00002906	IC	
	IC801	C1CB00001842	IC	
	L1	PQLQXF330K	COIL	S
	L2	PQLQXF330K	COIL	S
	L801	G1C27NJ00010	COIL	
	L802	G1C3N0ZA0063	COIL	
	L803	G1C3N0ZA0063	COIL	
	Q2	B1ABCE000009	TRANSISTOR(SI)	
	Q3	B1ACGP000007	TRANSISTOR(SI)	
	Q4	PQVTBF822T7	TRANSISTOR(SI)	
	Q5	2SD0874AS	TRANSISTOR(SI)	
	Q8	B1ADGE000004	TRANSISTOR(SI)	
	Q9	B1ADGE000004	TRANSISTOR(SI)	
	R10	ERJ3GEYJ104	100k	
	R106	ERJ2GEJ221	220	
	R109	ERJ2GEJ221	220	
	R116	ERJ2GEJ101	100	
	R117	ERJ2GEJ332	3.3k	
	R12	ERJ2GEJ103	10k	
	R124	PQ4R18XJ100	10	S
	R129	ERJ2GEJ103	10k	
	R13	ERJ2GEJ681	680	
	R130	ERJ2GEJ102	1k	
	R135	ERJ2GEJ103	10k	
	R14	ERJ3GEYJ104	100k	
	R15	PQ4R10XJ272	2.7k	S
	R16	ERJ2GEJ103	10k	
	R17	ERJ2GEJ222	2.2k	
	R18	ERJ2GEJ273X	27k	
	R19	ERJ2GEJ822	8.2k	
	R20	ERJ2GEJ392	3.9k	
	R21	ERJ12YJ120	12	
	R22	ERJ12YJ270	27	
	R23	ERJ2GEJ104	100k	
	R24	ERJ2GEJ473	47k	
	R27	ERJ2GEJ104	100k	
	R28	ERJ2GEYJ474	470k	S
	R29	ERJ2GEJ121	120	
	R3	PQ4R10XJ184	180k	S
	R30	ERJ3GEYJ820	82	
	R31	ERJ3GEYJ821	820	
	R32	ERJ2GEJ823	82k	
	R33	ERJ2GEJ102	1k	
	R34	ERJ2GEJ823	82k	
	R35	ERJ2GEJ102	1k	
	R36	ERJ2GEJ124	120k	
	R37	ERJ2GEJ102	1k	
	R38	ERJ2RKF1000	100	
	R39	ERJ2RKF1400	140	
	R4	PQ4R10XJ105	1M	S
	R42	PQ4R10XJ475	4.7M	S
	R43	PQ4R10XJ475	4.7M	S
	R430	ERJ2GEJ100	10	
	R5	PQ4R10XJ184	180k	S

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	R511	ERJ2GE0R00	0	
	R55	ERJ1TYJ3R9U	3.9	
	R56	ERJ1TYJ3R9U	3.9	
	R6	PQ4R10XJ105	1M	S
	R615	D0GA563ZA006	56k	
	R657	ERJ2GEJ103	10k	
	R7	ERJ3GEYJ565	5.6M	
	R75	ERJ2GEJ101	100	
	R76	ERJ2GEJ102	1k	
	R77	ERJ2GEJ103	10k	
	R8	ERJ3GEYJ104	100k	
	R801	ERJ2GEJ152	1.5k	
	R802	ERJ2GEJ121	120	
	R803	ERJ2GEJ102	1k	
	R804	ERJ2GEJ102	1k	
	R805	ERJ2GEJ470	47	
	R806	ERJ2GEJ221	220	
	R807	ERJ2GEJ221	220	
	R808	ERJ2GEJ152	1.5k	
	R81	ERJ2GEJ332	3.3k	
	R9	ERJ3GEYJ565	5.6M	
	RA1	D1H810240004	RESISTOR ARRAY	S
	RA402	D1H410320002	RESISTOR ARRAY	
	RA80	D1H422120001	RESISTOR ARRAY	
	SA1	J0LF00000026	VARISTOR (SURGE ABSORBER)	
	E1	PNMC1013Z	MAGNETIC SHIELD	
	SW1	K0H1BA000259	SPECIAL SWITCH	
	X1	H0J103500027	CRYSTAL OSCILLATOR	

4.1.2. Handset

4.1.2.1. Main P.C.Board Parts

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	PCB100	PNWPGA641BXR	MAIN P.C.BOARD ASS'Y(RTL)	
	C1	F2A0J3310067	1	
	C10	ECUV1A225KB	2.2	
	C103	ECUE1H101JCQ	100p	
	C104	ECUE1H100DCQ	10p	
	C105	ECUE1H101JCQ	100p	
	C11	ECUE1A104KBQ	0.1	
	C113	ECUE1H100DCQ	10p	
	C12	PQCUV0J106KB	10	
	C13	ECUE1A104KBQ	0.1	
	C138	ECUE1H100DCQ	10p	
	C139	ECUE1H100DCQ	10p	
	C147	ECUV1C105KBV	1	
	C15	ECUV1A105KBV	1	
	C152	ECUE1H102KBQ	0.001	
	C172	ECUV1C104KBV	0.1	
	C175	ECUV1C105KBV	1	
	C182	F1G1H3R0A480	3p	
	C186	F1G1H2R0A480	2p	
	C187	F1G1H2R0A480	2p	
	C188	ECUE0J105KBQ	1	
	C2	F2A0J3310067	1	
	C331	ECUE0J105KBQ	1	
	C332	ECUE0J105KBQ	1	
	C38	ECUE1H100DCQ	10p	
	C40	ECUE1A104KBQ	0.1	
	C43	ECUE1H100DCQ	10p	
	C44	ECUE1A104KBQ	0.1	
	C45	ECUE1A104KBQ	0.1	
	C46	ECUE1H100DCQ	10p	
	C47	ECUV1A105KBV	1	
	C49	ECUV1A105KBV	1	
	C5	ECUE1A104KBQ	0.1	
	C50	ECUV1A105KBV	1	
	C51	ECUV1A105KBV	1	
	C52	PQCUV0J106KB	10	

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	C53	PQCUV0J106KB	10	
	C54	ECUE1H100DCQ	10p	
	C55	ECUE1H100DCQ	10p	
	C580	ECUE1H100DCQ	10p	
	C70	ECUE1H100DCQ	10p	
	C71	ECUE1H100DCQ	10p	
	C72	ECUE1H100DCQ	10p	
	C73	ECUE1H100DCQ	10p	
	C802	F1G1H2R0A480	2p	
	C803	F1G1H1R5A480	1.5p	
	C804	F1G1H2R0A480	2p	
	C805	F1G1H3R3A480	3.3p	
	C806	F1G1H3R3A480	3.3p	
	C808	ECUE1A104KBQ	0.1	
	C809	ECUE1H100DCQ	10p	
	C810	F1G1H1R6A480	1.6p	
	C811	ECUE1H100DCQ	10p	
	C812	ECUE1H100DCQ	10p	
	C813	F1G1H1R6A480	1.6p	
	C814	ECUE1H332KBQ	0.0033	
	C819	ECUE1H100DCQ	10p	
	C820	F1G1HR70A480	0.7p	
	C822	ECUE1H100DCQ	10p	
	C825	ECUE1H100DCQ	10p	
	C826	F1G1H2R0A480	1.6p	
	C827	ECUE1H100DCQ	10p	
	C834	F1G1HR50A480	0.5p	
	C859	F1G1H3R0A480	3p	
	C860	ECUE1H100DCQ	10p	
	C861	F1G1H3R0A480	3p	
	C862	F1G1HR70A480	0.7p	
	C863	ECUE1H100DCQ	10p	
	C864	ECUE1H100DCQ	10p	
	C96	ECUE1H100DCQ	10p	
	C97	ECUE1H100DCQ	10p	
	D1	MA2YD2120L	DIODE(SI)	
	D13	D4ZZ00000024	VARISTOR	
	D14	D4ZZ00000024	VARISTOR	
	D21	MA8043M	DIODE(SI)	S
	D22	MA8043M	DIODE(SI)	S
	D7	B0JCME000035	DIODE(SI)	
	D8	D4ED1270A014	VARISTOR	
	DA801	B0DDCD000001	DIODE(SI)	
	E1	PNMC1013Z	CASE,MAGNETICSHIELD	
	F1	PQLQR2M5N6K	COIL	S
	IC1	CICB00002906	IC(BBIC(FLASH))	
	IC3	PQWIA130EXRR	IC(EEPROM)	
	IC801	C1CB00001842	IC	
	L801	G1C27NJ00010	COIL	
	L802	G1C3N6ZA0063	COIL	
	L803	G1C3N6ZA0063	COIL	
	L9	ERJ2GE0R00	0	
	LED1	B3ACB0000216	DIODE(SI)	
	LED12	B3ACB0000216	DIODE(SI)	
	LED2	B3ACB0000216	DIODE(SI)	
	LED3	B3ACB0000216	DIODE(SI)	
	LED4	B3ACB0000216	DIODE(SI)	
	LED5	B3ACB0000216	DIODE(SI)	
	LED6	B3ACB0000216	DIODE(SI)	
	LED7	B3ACB0000216	DIODE(SI)	
	LED8	B3ACB0000216	DIODE(SI)	
	LED9	B3ACB0000216	DIODE(SI)	
	MIC	L0CBAY000032	MICROPHONE	
	Q10	UN9219J	TRANSISTOR(SI)	S
	Q11	B1ADCF000161	TRANSISTOR(SI)	
	Q12	B1ADCF000161	TRANSISTOR(SI)	
	Q2	B1ADGE000004	TRANSISTOR(SI)	
	Q4	B1ADGE000004	TRANSISTOR(SI)	
	Q7	UN9219J	TRANSISTOR(SI)	S
	Q9	2SC6054JSL	TRANSISTOR(SI)	
	R12	ERJ2GE0R00	0	
	R2	ERJ2GEJ392	3.9k	
	R20	ERJ2GEJ100	10	

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	R203	D0GA563ZA006	56k	
	R208	ERJ2GE0R00	0	
	R209	ERJ2GE0R00	0	
	R215	ERJ2GE0R00	0	
	R225	ERJ2GE0R00	0	
	R248	ERJ2GE0R00	0	
	R251	ERJ2GE0R00	0	
	R27	ERJ2GEJ821	820	
	R28	ERJ2GEJ821	820	
	R30	ERJ3GEYJ273	27k	
	R31	ERJ2GE0R00	0	
	R35	ERJ2GE0R00	0	
	R300	ERJ2GEJ331	330	
	R301	ERJ2GEJ331	330	
	R302	ERJ2GEJ331	330	
	R303	ERJ2GEJ331	330	
	R304	ERJ2GEJ331	330	
	R305	ERJ2GEJ331	330	
	R308	ERJ2GEJ121	120	
	R309	ERJ2GEJ121	120	
	R31	ERJ2GE0R00	0	
	R310	ERJ2GEJ121	120	
	R330	ERJ2GEJ105X	1M	
	R331	ERJ2GEJ273X	27k	
	R332	ERJ2GEJ273X	27k	
	R35	ERJ2GE0R00	0	
	R40	ERJ2GEJ103	10k	
	R41	ERJ2GEJ103	10k	
	R42	ERJ2GEJ103	10k	
	R45	ERJ6RSJR10V	0.1	
	R50	ERJ2GEJ103	10k	
	R51	ERJ2GEJ471	470	
	R52	ERJ2GEJ102	1k	
	R53	ERJ2GEJ332	3.3k	
	R54	ERJ2GEJ103	10k	
	R55	ERJ2GEJ102	1k	
	R6	ERJ2GEJ102	1k	
	R63	ERJ2GEJ101	100	
	R64	ERJ2GEJ103	10k	
	R66	ERJ2GEJ102	1k	
	R7	ERJ2GEJ122	1.2k	
	R73	ERJ2GEJ820	82	
	R74	ERJ2GEJ820	82	
	R8	ERJ2GEJ101	100	
	R801	ERJ2GEJ681	680	
	R802	ERJ2GEJ101	100	
	R803	ERJ2GEJ102	1k	
	R804	ERJ2GEJ102	1k	
	R805	ERJ2GEJ470	47	
	R806	ERJ2GEJ221	220	
	R807	ERJ2GEJ221	220	
	RA1	D1H810240004	RESISTORARRAY	S
	RA2	D1H410220001	RESISTORARRAY	
	RA4	D1H433220001	RESISTORARRAY	
	RA61	D1H422120001	RESISTORARRAY	
	X1	H0J103500034	CRYSTALOSCILLATOR	

4.1.3. Charger Unit

4.1.3.1. Main P.C.Board Parts

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	PCB200	PQWPTGA721CH	MAIN P.C.BOARD ASS'Y (RTL)	
	D1	B0JAME000095	DIODE(SI)	
	F1	K5H302Y00003	FUSE	
	J1	K2ECYB000001	JACK	S
	R1	ERG2SJ100E	10	