

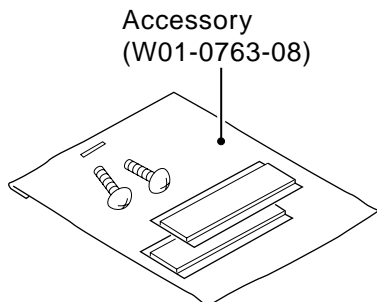
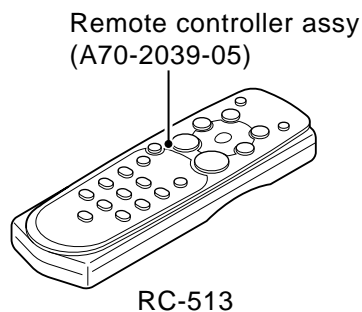
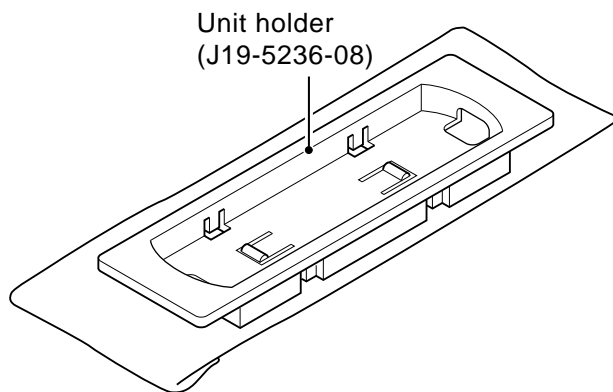
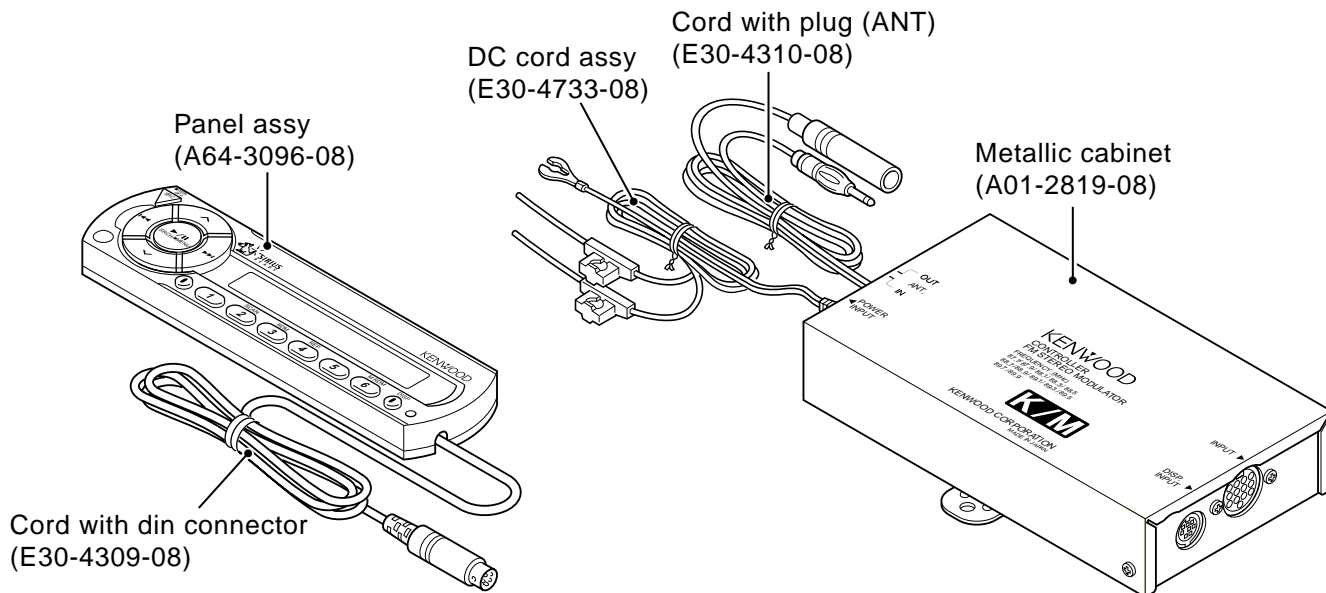
FM STEREO MODULATOR

KCA-R70FM

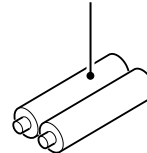
SERVICE MANUAL

KENWOOD

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B51-7967-00 (N) 1459

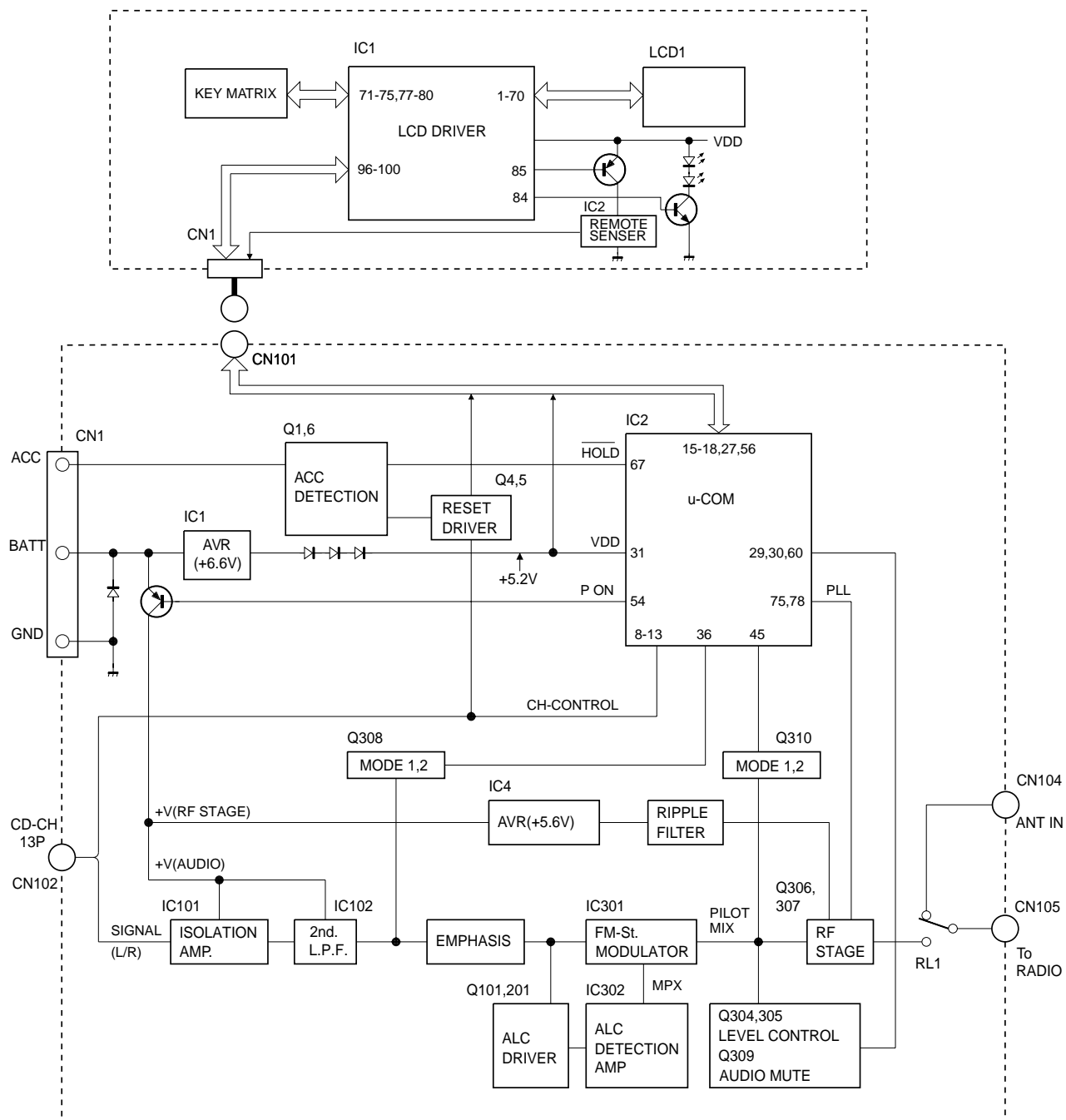


SIZE AAA BATTERY
(NOT SUPPLIED)



KCA-R70FM

BLOCK DIAGRAM



COMPONENTS DESCRIPTION

● RF MODULATOR UNIT

| Ref. No. | Component Name | Appication / Function | Operation / Condition / Compatibility |
|----------|----------------|---------------------------------------|--|
| IC1 | UPC78M06AHF | BU 5V AVR | While BACKUP is applied, AVR outputs +5V. |
| IC2 | LC72366-9B28 | System MI-COM. | System control |
| IC4 | NJM78L05UA | 5V AVR | Power supply for FM modulator and RF amplifier |
| IC101 | NJM2060M | Isolation amp. | |
| IC102 | NJM4565MD | Low pass filter | |
| IC301 | BA1405F | FM ST modulator | |
| IC302 | NJM4565MD | 1/2 VCC driver, ALC detection amp. | |
| Q1 | DTC124EK | ACC detection | When Q4 is turned on , Q1 is turned on during ACC applied. |
| Q2 | 2SA1782(T,U) | POWER SW | When Q3's base goes "Hi", Q2 is turned on, and RF modulator circuit is working. |
| Q3 | DTC124EK | | |
| Q4 | DTC143TK | Reset SW | When RESET SW on display unit is pressed, Q4,Q1 and Q6 are turned off, and IC2 is holding. |
| Q5 | DTC143TK | CH RESET SW | When RESET SW on display unit is pressed, Q5 is turned off, and SYSTEM RESET signal is outputted to CD changer. |
| Q6 | DTA124EK | Hold detection SW | When RESET SW on display unit is pressed or ACC is OFF, Q6 is turned off, and IC2 is holding. |
| Q8 | DTC143TK | Relay driver | FM modulator output / Vehicles antenna input switching. When a base goes "Hi", FM modulator output is selected. |
| Q9 | 2SC4640(T,U) | Ripple filter | Power supply for RF amplifier |
| Q101 | 2SK2158 | ALC control SW | |
| Q201 | 2SK2158 | | |
| Q303 | 2SA1162(GR) | Pilot mix amp. | |
| Q304 | 2SK2158 | Level control SW | Level 1/2 : OFF, Level 3/4 : ON |
| Q305 | 2SK2158 | Level control SW | Level 2/4 : OFF, Level 1/3 : ON |
| Q306 | 2SK508L | RF oscillator buffer | |
| Q307 | 2SC2714(Y) | RF amp. | |
| Q308 | 2SK2158 | Mode (1/2) SW | Mode1 : ON, Mode2 : OFF |
| Q309 | 2SK2158 | Audio mute | POWER ON mode : OFF, POWER OFF mode : ON |
| Q310 | 2SK2158 | Mode (1/2) SW | Mode1 : OFF, Mode2 : ON |

● CONTROL UNIT

| Ref. No. | Component Name | Appication / Function | Operation / Condition / Compatibility |
|----------|----------------|-----------------------------|---------------------------------------|
| IC1 | LC75808W | LCD driver with key-matrix | |
| IC2 | RS-21N | Remote control light sensor | |
| Q1 | 2SD2114K | LED ON/OFF SW | |
| Q2 | DTA144EK | Key-matrix permition SW | Ready on key-matrix |
| Q3 | DTA144EK | IC2 ON/OFF SW | |

KCA-R70FM

MICROCOMPUTER'S TERMINAL DESCRIPTION

● SYSTEM MICROCOMPUTER (IC2 : RF MODULATOR UNIT)

| Pin No. | Pin Name | I/O | Terminal name | Description | Operation in HOLD |
|---------|--------------------------|-----|-----------------------------|---|-------------------|
| 1 | XIN | I | X IN | X_tal | - |
| 2 | TEST2 | - | GND | Ground connection terminal | - |
| 3~5 | PG3~1 | O | NC | Not used (pull down to GND lines.) | L |
| 6 | PG0 | I | GND | Connected to GND lines. | - |
| 7 | PF3 | O | NC | Not used (open) | L |
| 8 | PF2 | I | $\overline{\text{REQC}}$ | CD-Chenger REQC (Active "Low") | - |
| 9 | PF1 | O | $\overline{\text{REQH}}$ | CD-Chenger REQH (Active "Low") | H |
| 10 | PF0 | O | CHCON | CD-Chenger ON | L |
| 11 | SI2 | I | CH_DATA_C | CD-Chenger DATA in | - |
| 12 | SO2 | O | CH_DATA_H | CD-Chenger DATA out | L |
| 13 | SCK2 | O | $\overline{\text{CH_CLK}}$ | CD-Chenger DATA SCK (Active "Low") | H |
| 14 | PE0 | O | NC | Not used (open) | L |
| 15 | PD3 | O | LCD DATA out | LCD Driver DATA out | L |
| 16 | PD2 | O | LCD CLK | LCD Driver CLK out | L |
| 17 | PD1 | O | LCD RESET | LCD Driver RESET out | L |
| 18 | PD0 | O | LCD CE | LCD Driver CE out | L |
| 19~26 | PC3~PB0 | O | NC | Not used (open) | L |
| 27 | PA3 | I | LCD DATA in | LCD Driver DATA in | - |
| 28~30 | PA2~0 | I | NC | Not used (pull down to GND lines.) | - |
| 31 | VDD | - | Vdd | 5V | - |
| 32 | PQ0 | O | NC | Not used (open) | L |
| 33~44 | PP3~PN0 | O | GAIN12~1 | Modulation output switching | L |
| 45 | PM3 | O | SEP-ATT | When it has GAIN5 output, "Hi" output | L |
| 46~52 | PM2~PL0 | O | NC | Not used (open) | L |
| 53 | PK3 | O | RELAY | Antenna relay control output terminal | L |
| 54 | PK2 | O | P-on | P_ON | L |
| 55 | PK1 | O | MUTE | Mute output terminal for the Tuner frequency change | L |
| 56 | INT0 | I | REMOCON | Remote controller signal input | |
| 57~60 | PJ3~0 | O | NC | Not used (open) | L |
| 61~66 | PI1~PH0 | I | NC | Not used (pull down to GND lines.) | - |
| 67 | $\overline{\text{HOLD}}$ | I | $\overline{\text{HOLD}}$ | ACC detection (Operation in HOLD "Low") | L |
| 68 | $\overline{\text{SNS}}$ | I | Vdd | Vdd | - |
| 69 | LCTR | I | NC | Not used (pull down to GND lines.) | - |
| 70 | HCTR | I | NC | Not used (pull down to GND lines.) | - |
| 71 | EO3 | O | NC | Not used (open) | Hi-Z |
| 72 | SUBPD | O | NC | Not used (open) | Hi-Z |
| 73 | VDD | - | Vdd | Vdd | - |
| 74 | AMIN | I | NC | Not used (pull down to GND lines.) | - |
| 75 | FMIN | I | VCO in | VCO input | - |

MICROCOMPUTER'S TERMINAL DESCRIPTION

| Pin No. | Pin Name | I/O | Terminal name | Description | Operation in HOLD |
|---------|----------|-----|---------------|------------------------------------|-------------------|
| 76 | VSS | - | Vss | Vss | - |
| 77 | EO2 | O | NC | Not used (open) | Hi-Z |
| 78 | EO1 | O | Error out | Phase Detector Error output | Hi-Z |
| 79 | TEST1 | - | NC | Not used (pull down to GND lines.) | - |
| 80 | XOUT | O | X-out | X-tal | - |

● LCD-DRIVER (IC1 : CONTROL UNIT)

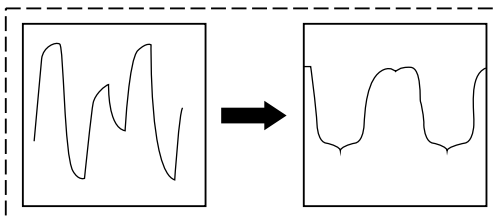
| Pin No. | Pin Name | I/O | Terminal name | Description | Operation in HOLD |
|---------|----------|-----|---------------|--|-------------------|
| 82 | P1 | O | KEY-ON | PANEL key matrix compulsory ON control terminal | L |
| 83 | P2 | O | NC | Not used (open) | L |
| 84 | P3 | O | ILLMI | Display panel illuminations Control terminal | L |
| 85 | P4 | O | REMO-ON | Power supply control terminal for remote control | H |

ADJUSTMENT

RF MODULATOR UNIT

1. DC balance adjustment (VR301)

While observing the waveform with an oscilloscope at pin 13 of IC301, adjust VR301 to minimize the waveform level.



2. PLL control voltage adjustment (VC301)

First set the transmission frequency to *87.9MHz with the commander, then adjust VC301 so that the DC Voltage at the + pole of C317, measured using a multi-meter or digital tester, is +3V ($\pm 0.1V$).

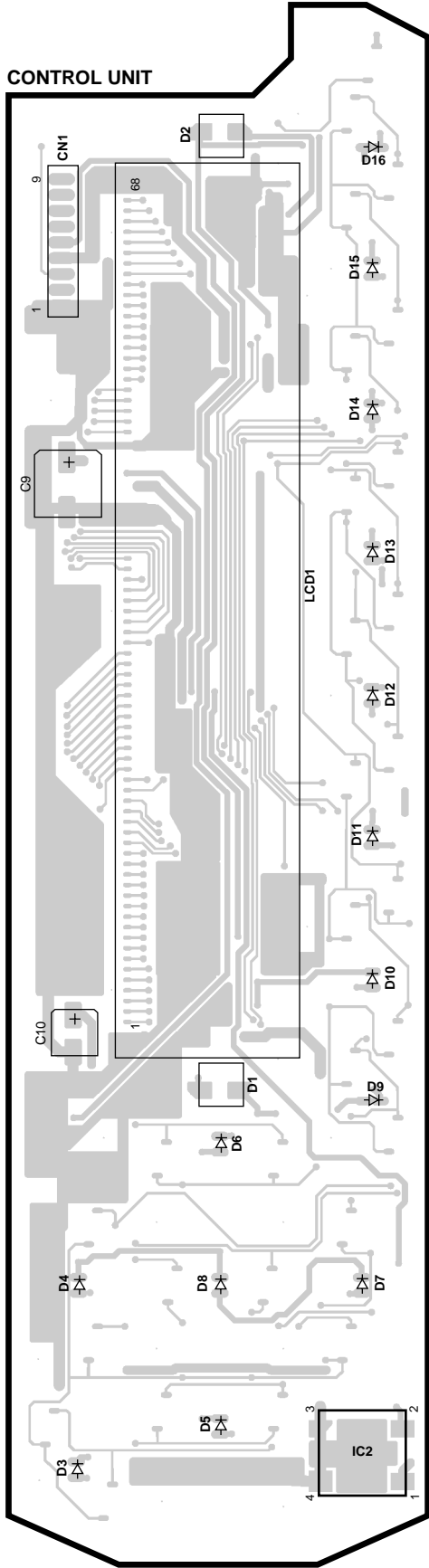
* Note : E type is 87.7MHz.

3. Modulation level adjustment (VR303)

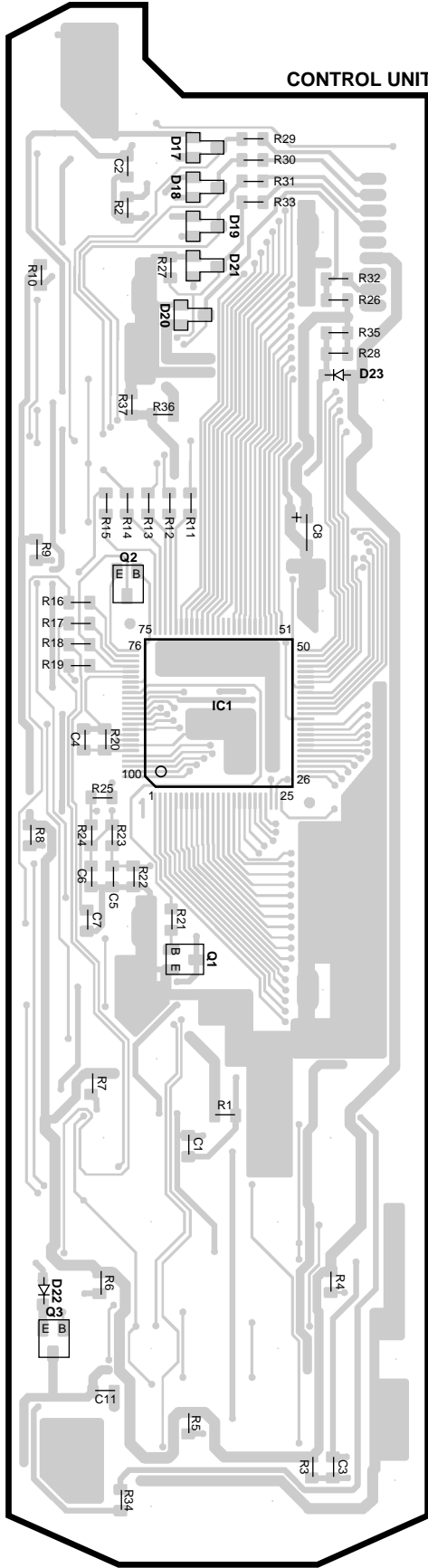
The method uses a standard receiver or tuner.

Adjust VR303 so that the output level from the standard receiver or tuner is as specified.

PC BOARD (COMPONENT SIDE VIEW)



(FOIL SIDE VIEW)



CONTROL UNIT

| IC | Q | Address |
|----|---|---------|
| 2 | | 7C |

CONTROL UNIT

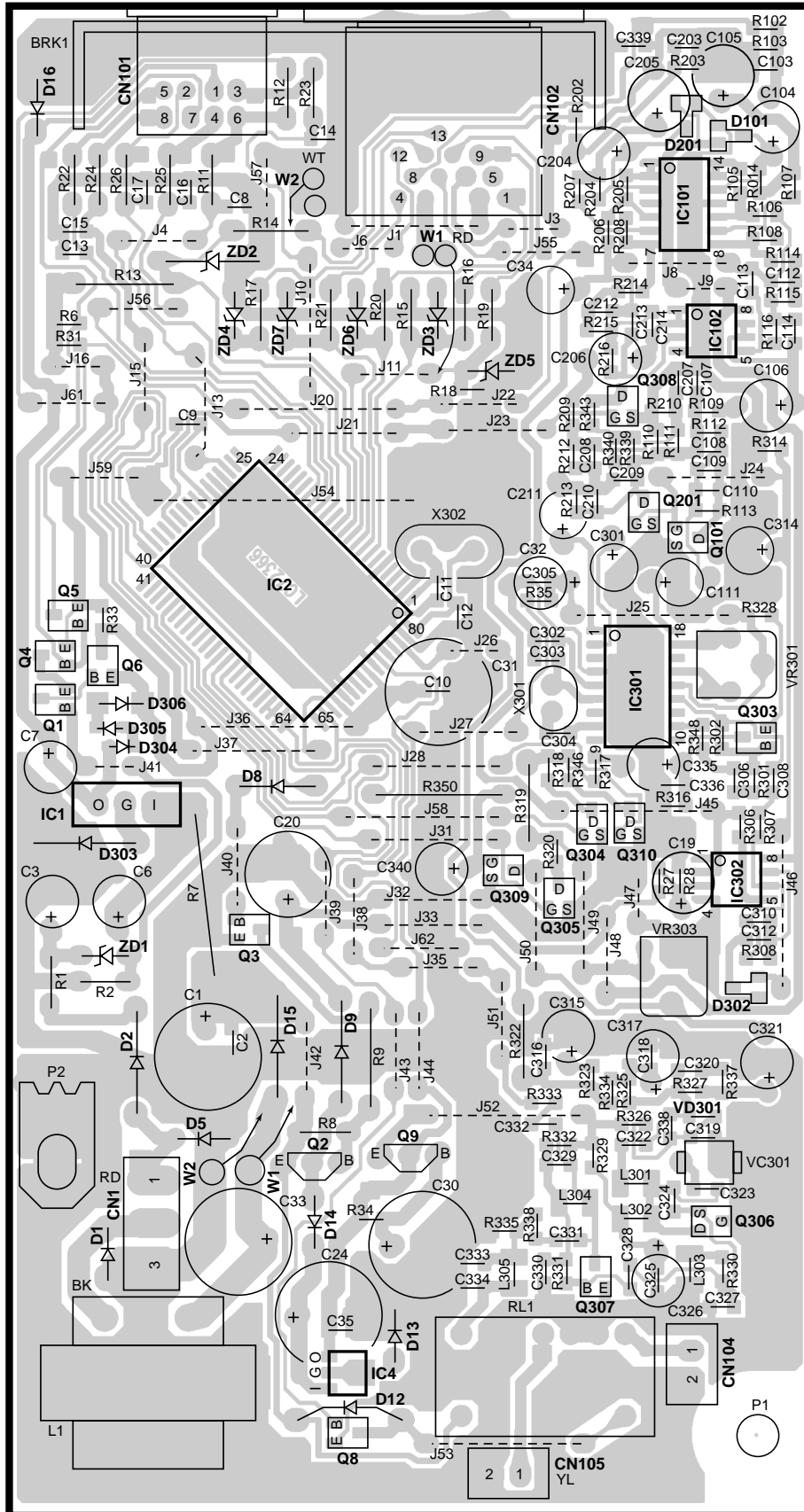
| IC | Q | Address |
|----|---|---------|
| 1 | | 4D |
| | 1 | 5D |
| | 2 | 3D |
| | 3 | 6C |

PC BOARD (FOIL SIDE VIEW)

MODULATOR UNIT

DISP INPUT

INPUT

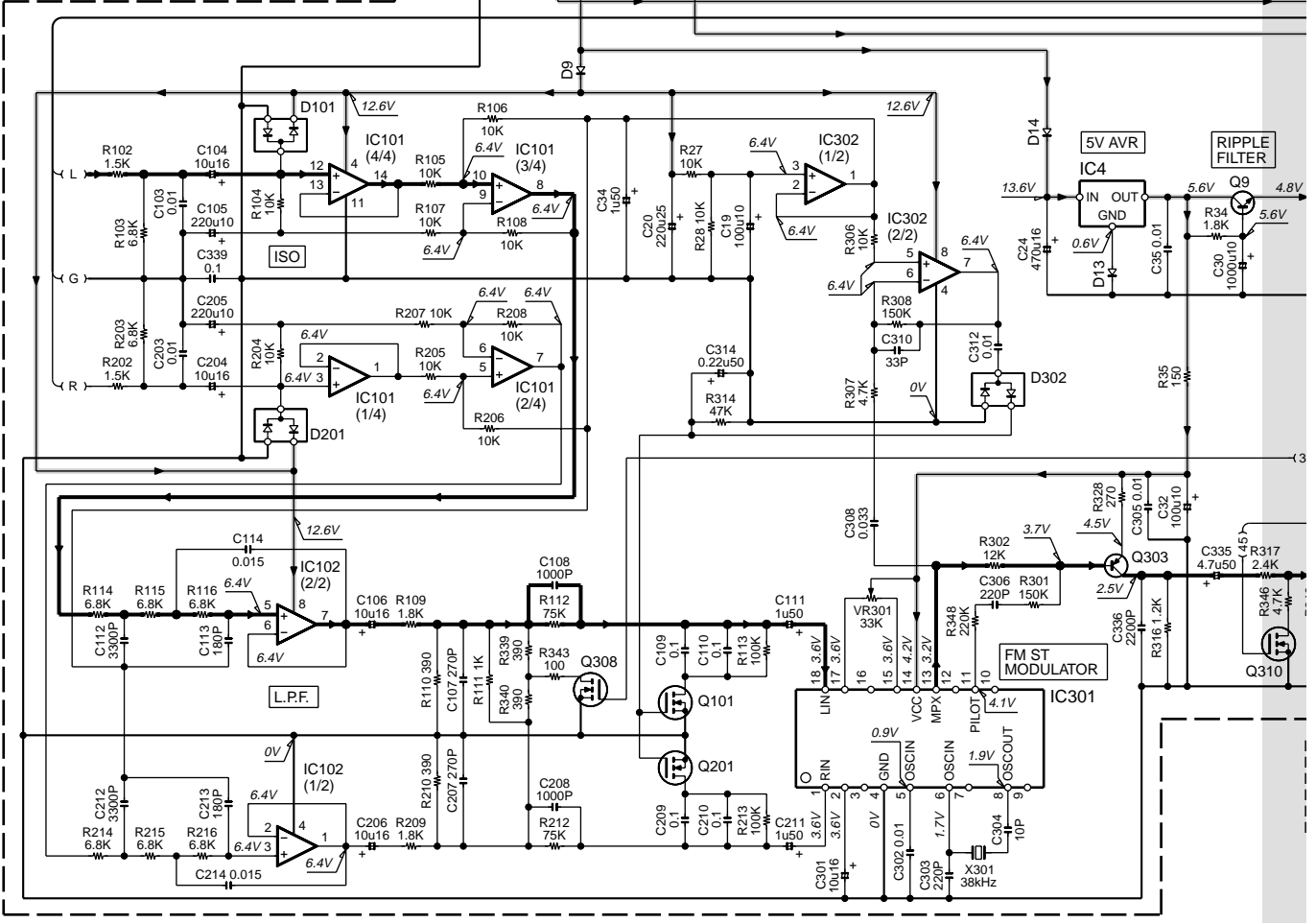
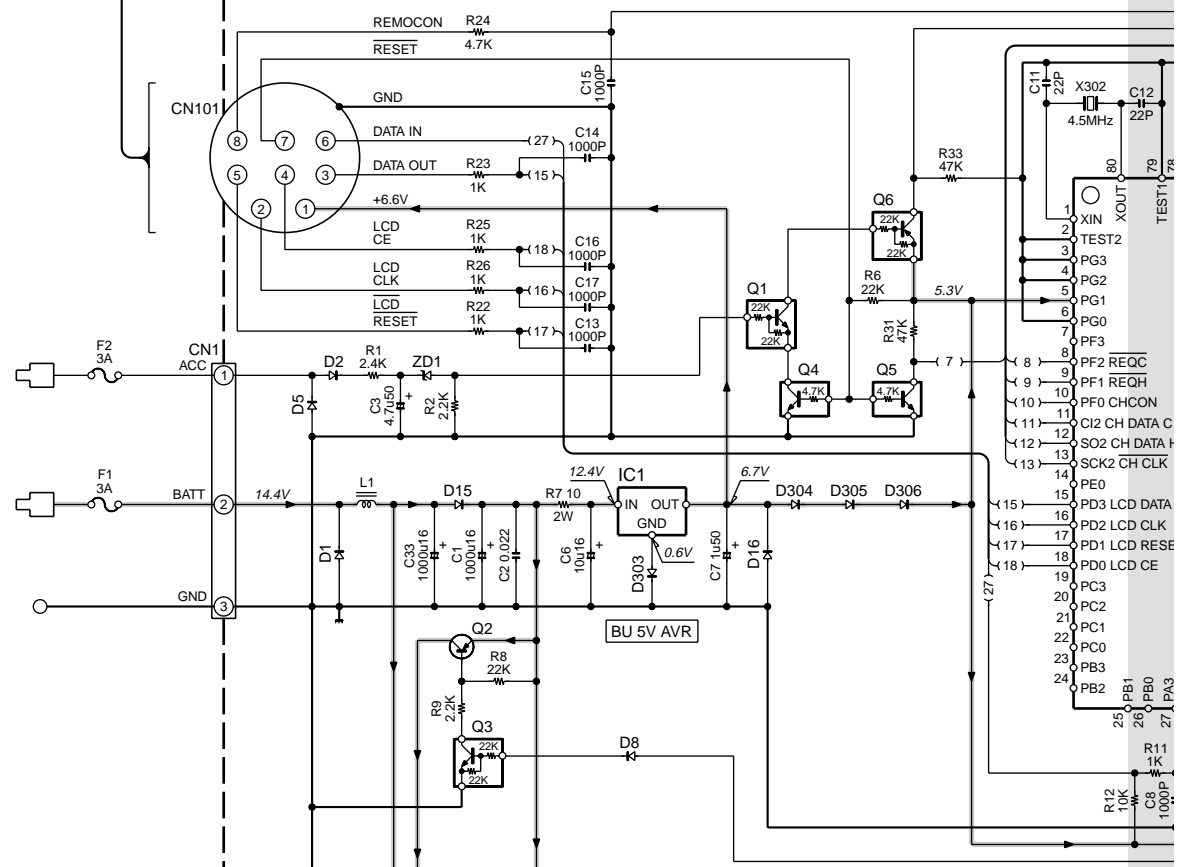


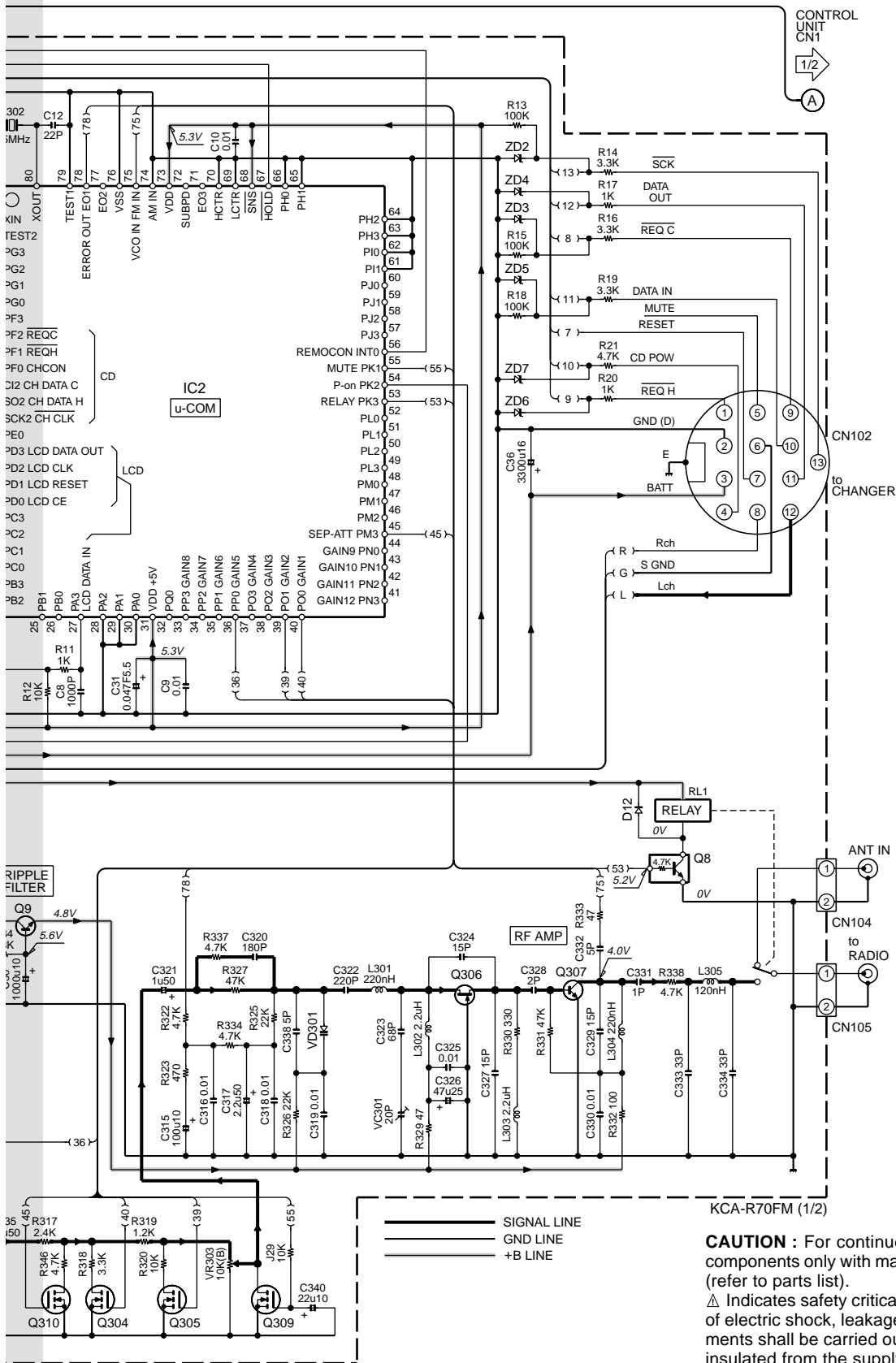
MODULATOR UNIT

| IC | Q | Address |
|-----|---|---------|
| 1 | | 4F |
| 2 | | 4G |
| 4 | | 7G |
| 101 | | 2H |
| 102 | | 3I |
| 301 | | 4H |
| 302 | | 5I |
| | 1 | 4F |
| | 2 | 6G |
| | 3 | 5G |
| | 4 | 4F |
| | 5 | 4F |
| | 6 | 4F |
| | 8 | 7G |
| | 9 | 6G |
| 101 | | 3I |
| 201 | | 3H |
| 303 | | 4I |
| 304 | | 5H |
| 305 | | 5H |
| 306 | | 6I |
| 307 | | 6H |
| 308 | | 3H |
| 309 | | 5H |
| 310 | | 5H |

Refer to the schematic diagram for the values of resistors and capacitors.

MODULATOR UNIT



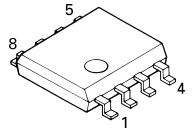


| | | |
|-----------------------|------------------------------------|---------------------------|
| IC1 : UPC78M06AHF | Q1,3 : DTC124EK | D1,2,5,14,15 : DSK10C-ET1 |
| IC2 : LC72366-9B28 | Q2 : 2SA1782(T,U) | D8,9,12,13,16 : 1SS133 |
| IC4 : NJM78L05UA | Q4,5,8 : DTC143TK | D101,201,302 : DA204K |
| IC101 : NJM2060M | Q6 : DTA124EK | VD301 : HVU306A-3 |
| IC102,302 : NJM4565MD | Q9 : 2SC4640(T,U) | ZD1-7 : HZS6C2 |
| IC301 : BA1405F | Q101,201,304,305,308-310 : 2SK2158 | |
| | Q303 : 2SA1162(GR) | |
| | Q306 : 2SK508L | |
| | Q307 : 2SC2714(Y) | |

DTA124EK
DTA144EK
DTC124EK
DTC143TK
2SA1162
2SC2714
2SD2114K



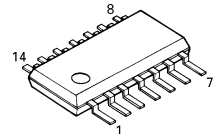
NJM4565MD



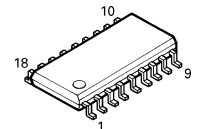
DA204K



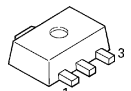
NJM2060M



BA1405F



NJM78L05UA



CAUTION : For continued safety, replace safety critical components only with manufacturer's recommended parts (refer to parts list).

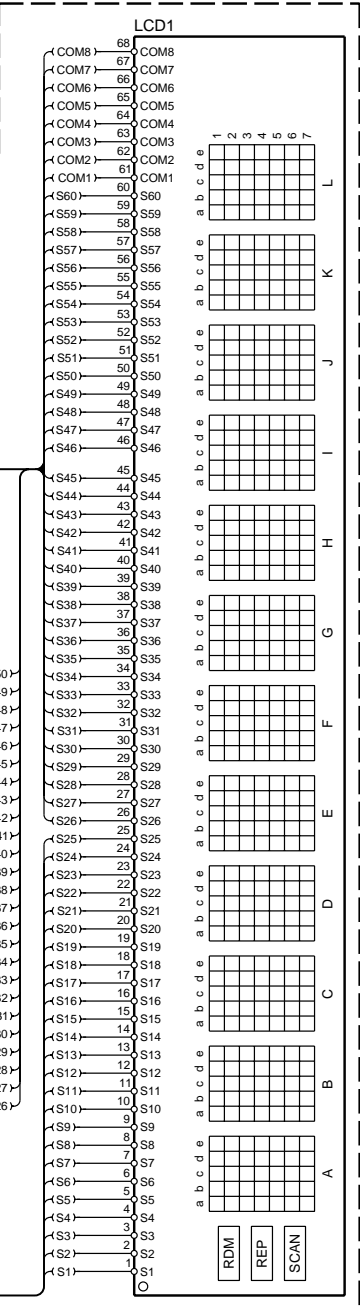
⚠ Indicates safety critical components. To reduce the risk of electric shock, leakage-current or resistance measurements shall be carried out (exposed parts are acceptably insulated from the supply circuit) before the appliance is returned to the customer.

- DC voltages are as measured with a high impedance voltmeter. Values may vary slightly due to variations between individual instruments or/and units.

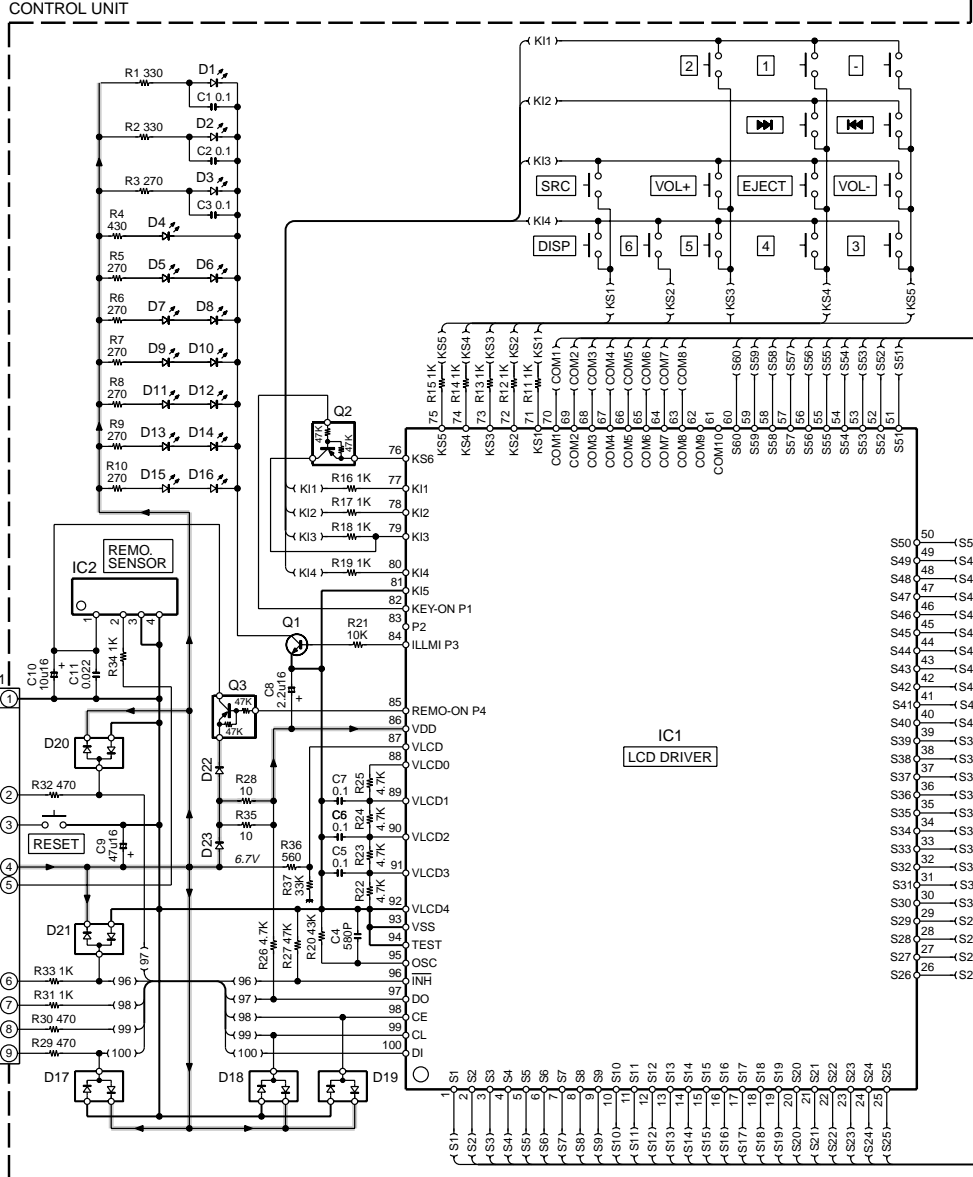
KCA-R70FM

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| | COM1 | COM2 | COM3 | COM4 | COM5 | COM6 | COM7 | COM8 |
|-----|-------|-------|-------|-------|-------|-------|-------|------|
| S1 | A-a-1 | A-a-2 | A-a-3 | A-a-4 | A-a-5 | A-a-6 | A-a-7 | RDM |
| S2 | A-b-1 | A-b-2 | A-b-3 | A-b-4 | A-b-5 | A-b-6 | A-b-7 | REP |
| S3 | A-c-1 | A-c-2 | A-c-3 | A-c-4 | A-c-5 | A-c-6 | A-c-7 | SCAN |
| S4 | A-d-1 | A-d-2 | A-d-3 | A-d-4 | A-d-5 | A-d-6 | A-d-7 | |
| S5 | A-e-1 | A-e-2 | A-e-3 | A-e-4 | A-e-5 | A-e-6 | A-e-7 | |
| S6 | B-a-1 | B-a-2 | B-a-3 | B-a-4 | B-a-5 | B-a-6 | B-a-7 | |
| S7 | B-b-1 | B-b-2 | B-b-3 | B-b-4 | B-b-5 | B-b-6 | B-b-7 | |
| S8 | B-c-1 | B-c-2 | B-c-3 | B-c-4 | B-c-5 | B-c-6 | B-c-7 | |
| S9 | B-d-1 | B-d-2 | B-d-3 | B-d-4 | B-d-5 | B-d-6 | B-d-7 | |
| S10 | B-e-1 | B-e-2 | B-e-3 | B-e-4 | B-e-5 | B-e-6 | B-e-7 | |
| S11 | C-a-1 | C-a-2 | C-a-3 | C-a-4 | C-a-5 | C-a-6 | C-a-7 | |
| S12 | C-b-1 | C-b-2 | C-b-3 | C-b-4 | C-b-5 | C-b-6 | C-b-7 | |
| S13 | C-c-1 | C-c-2 | C-c-3 | C-c-4 | C-c-5 | C-c-6 | C-c-7 | |
| S14 | C-d-1 | C-d-2 | C-d-3 | C-d-4 | C-d-5 | C-d-6 | C-d-7 | |
| S15 | C-e-1 | C-e-2 | C-e-3 | C-e-4 | C-e-5 | C-e-6 | C-e-7 | |
| S16 | D-a-1 | D-a-2 | D-a-3 | D-a-4 | D-a-5 | D-a-6 | D-a-7 | |
| S17 | D-b-1 | D-b-2 | D-b-3 | D-b-4 | D-b-5 | D-b-6 | D-b-7 | |
| S18 | D-c-1 | D-c-2 | D-c-3 | D-c-4 | D-c-5 | D-c-6 | D-c-7 | |
| S19 | D-d-1 | D-d-2 | D-d-3 | D-d-4 | D-d-5 | D-d-6 | D-d-7 | |
| S20 | D-e-1 | D-e-2 | D-e-3 | D-e-4 | D-e-5 | D-e-6 | D-e-7 | |
| S21 | E-a-1 | E-a-2 | E-a-3 | E-a-4 | E-a-5 | E-a-6 | E-a-7 | |
| S22 | E-b-1 | E-b-2 | E-b-3 | E-b-4 | E-b-5 | E-b-6 | E-b-7 | |
| S23 | E-c-1 | E-c-2 | E-c-3 | E-c-4 | E-c-5 | E-c-6 | E-c-7 | |
| S24 | E-d-1 | E-d-2 | E-d-3 | E-d-4 | E-d-5 | E-d-6 | E-d-7 | |
| S25 | E-e-1 | E-e-2 | E-e-3 | E-e-4 | E-e-5 | E-e-6 | E-e-7 | |
| S26 | F-a-1 | F-a-2 | F-a-3 | F-a-4 | F-a-5 | F-a-6 | F-a-7 | |
| S27 | F-b-1 | F-b-2 | F-b-3 | F-b-4 | F-b-5 | F-b-6 | F-b-7 | |
| S28 | F-c-1 | F-c-2 | F-c-3 | F-c-4 | F-c-5 | F-c-6 | F-c-7 | |
| S29 | F-d-1 | F-d-2 | F-d-3 | F-d-4 | F-d-5 | F-d-6 | F-d-7 | |
| S30 | F-e-1 | F-e-2 | F-e-3 | F-e-4 | F-e-5 | F-e-6 | F-e-7 | |
| S31 | G-a-1 | G-a-2 | G-a-3 | G-a-4 | G-a-5 | G-a-6 | G-a-7 | |
| S32 | G-b-1 | G-b-2 | G-b-3 | G-b-4 | G-b-5 | G-b-6 | G-b-7 | |
| S33 | G-c-1 | G-c-2 | G-c-3 | G-c-4 | G-c-5 | G-c-6 | G-c-7 | |
| S34 | G-d-1 | G-d-2 | G-d-3 | G-d-4 | G-d-5 | G-d-6 | G-d-7 | |
| S35 | G-e-1 | G-e-2 | G-e-3 | G-e-4 | G-e-5 | G-e-6 | G-e-7 | |
| S36 | H-a-1 | H-a-2 | H-a-3 | H-a-4 | H-a-5 | H-a-6 | H-a-7 | |
| S37 | H-b-1 | H-b-2 | H-b-3 | H-b-4 | H-b-5 | H-b-6 | H-b-7 | |
| S38 | H-c-1 | H-c-2 | H-c-3 | H-c-4 | H-c-5 | H-c-6 | H-c-7 | |
| S39 | H-d-1 | H-d-2 | H-d-3 | H-d-4 | H-d-5 | H-d-6 | H-d-7 | |
| S40 | H-e-1 | H-e-2 | H-e-3 | H-e-4 | H-e-5 | H-e-6 | H-e-7 | |
| S41 | I-a-1 | I-a-2 | I-a-3 | I-a-4 | I-a-5 | I-a-6 | I-a-7 | |
| S42 | I-b-1 | I-b-2 | I-b-3 | I-b-4 | I-b-5 | I-b-6 | I-b-7 | |
| S43 | I-c-1 | I-c-2 | I-c-3 | I-c-4 | I-c-5 | I-c-6 | I-c-7 | |
| S44 | I-d-1 | I-d-2 | I-d-3 | I-d-4 | I-d-5 | I-d-6 | I-d-7 | |
| S45 | I-e-1 | I-e-2 | I-e-3 | I-e-4 | I-e-5 | I-e-6 | I-e-7 | |
| S46 | J-a-1 | J-a-2 | J-a-3 | J-a-4 | J-a-5 | J-a-6 | J-a-7 | |
| S47 | J-b-1 | J-b-2 | J-b-3 | J-b-4 | J-b-5 | J-b-6 | J-b-7 | |
| S48 | J-c-1 | J-c-2 | J-c-3 | J-c-4 | J-c-5 | J-c-6 | J-c-7 | |
| S49 | J-d-1 | J-d-2 | J-d-3 | J-d-4 | J-d-5 | J-d-6 | J-d-7 | |
| S50 | J-e-1 | J-e-2 | J-e-3 | J-e-4 | J-e-5 | J-e-6 | J-e-7 | |
| S51 | K-a-1 | K-a-2 | K-a-3 | K-a-4 | K-a-5 | K-a-6 | K-a-7 | |
| S52 | K-b-1 | K-b-2 | K-b-3 | K-b-4 | K-b-5 | K-b-6 | K-b-7 | |
| S53 | K-c-1 | K-c-2 | K-c-3 | K-c-4 | K-c-5 | K-c-6 | K-c-7 | |
| S54 | K-d-1 | K-d-2 | K-d-3 | K-d-4 | K-d-5 | K-d-6 | K-d-7 | |
| S55 | K-e-1 | K-e-2 | K-e-3 | K-e-4 | K-e-5 | K-e-6 | K-e-7 | |
| S56 | L-a-1 | L-a-2 | L-a-3 | L-a-4 | L-a-5 | L-a-6 | L-a-7 | |
| S57 | L-b-1 | L-b-2 | L-b-3 | L-b-4 | L-b-5 | L-b-6 | L-b-7 | |
| S58 | L-c-1 | L-c-2 | L-c-3 | L-c-4 | L-c-5 | L-c-6 | L-c-7 | |
| S59 | L-d-1 | L-d-2 | L-d-3 | L-d-4 | L-d-5 | L-d-6 | L-d-7 | |
| S60 | L-e-1 | L-e-2 | L-e-3 | L-e-4 | L-e-5 | L-e-6 | L-e-7 | |



- IC1 : LC75808W D1,2 : B30-1663-05
- IC2 : RS-21N D3 : B30-1564-05
- D4-16 : B30-1566-05
- Q1 : 2SD2114K DA204K
- Q2,3 : DTA144EK D22,23 : MA111

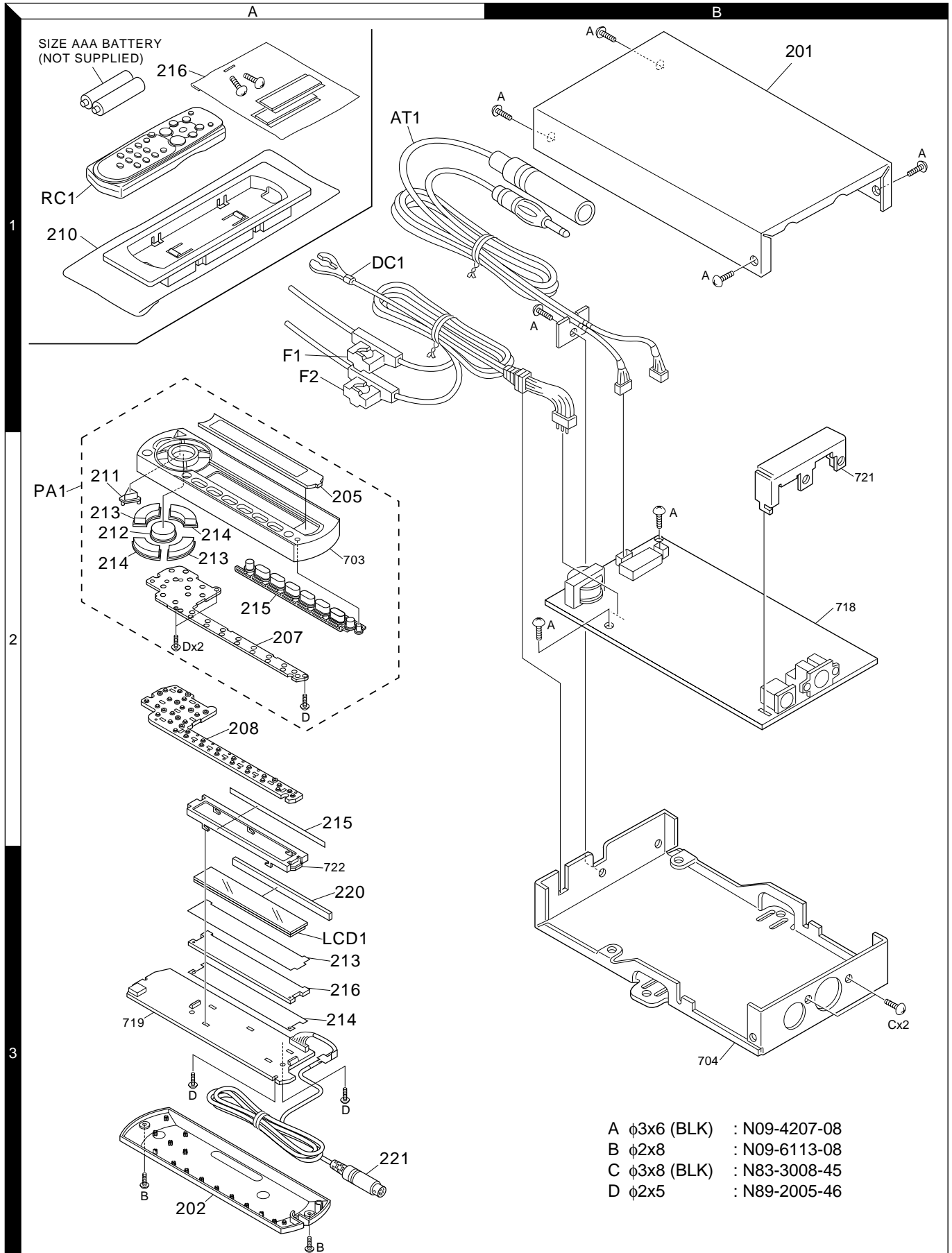


KCA-R70FM (2/2)

CAUTION : For continued safety, replace safety critical components only with manufacturer's recommended parts (refer to parts list).
 Δ Indicates safety critical components. To reduce the risk of electric shock, leakage-current or resistance measurements shall be carried out (exposed parts are acceptably insulated from the supply circuit) before the appliance is returned to the customer.

• DC voltages are as measured with a high impedance voltmeter. Values may vary slightly due to variations between individual instruments or/and units

EXPLODED VIEW



Parts with the exploded numbers larger than 700 are not supplied.

KCA-R70FM

PARTS LIST

* New parts

Parts without **Parts No.** are not supplied.

Les articles non mentionnés dans le **Parts No.** ne sont pas fournis.

Teile ohne **Parts No.** werden nicht geliefert.

| Ref. No. | Ad | New | Parts No. | Description | Destination |
|--------------------------|----|-----|---------------|---------------------------------|-------------|
| KCA-R70FM | | | | | |
| 201 | 1B | * | A01-2819-08 | METALLIC CABINET | |
| 202 | 3A | * | A46-1787-08 | REAR COVER | |
| PA1 | 2A | * | A64-3096-08 | PANEL ASSY | |
| RC1 | 1A | * | A70-2039-05 | REMOTE CONTROLLER ASSY (RC-513) | |
| - | | * | B64-2432-10 | INSTRUCTION MANUAL | |
| 205 | 2A | * | B10-4408-08 | FRONT GLASS ASSY | |
| 207 | 2A | * | B19-2221-08 | LIGHTING BOARD | |
| 208 | 2A | * | E29-1944-08 | CONDUCTIVE RUBBER | |
| AT1 | 1A | | E30-4310-08 | CORD WITH PLUG (ANT) | |
| F1,2 | 1A | | F06-3026-05 | FUSE (3A) | |
| - | | * | H12-2722-08 | PACKING FIXTURE | |
| - | | | H25-0236-04 | PROTECTION BAG (100X400) | |
| - | | | H25-1101-04 | PROTECTION BAG (150X500) | |
| - | | | H25-1642-04 | PROTECTION BAG (200X300) | |
| - | | * | H54-2707-08 | ITEM CARTON CASE | |
| 210 | 1A | * | J19-5236-08 | UNIT HOLDER | |
| 211 | 2A | * | K24-4071-08 | KNOB (POWER KEY) | |
| 212 | 2A | * | K24-4072-08 | KNOB (CENTER KEY) | |
| 213 | 2A | * | K24-4073-08 | KNOB (L-R KEY) | |
| 214 | 2A | * | K24-4074-08 | KNOB (UP-DOWN KEY) | |
| 215 | 2A | * | K25-1559-08 | KNOB (SUB KEY) | |
| A | 1B | | N09-4207-08 | TAPTITE SCREW | |
| B | 3A | * | N09-6113-08 | TAPTITE SCREW (2X8 B TITE) | |
| C | 3B | | N83-3008-45 | PAN HEAD TAPTITE SCREW | |
| D | 3A | | N89-2005-46 | BINDING HEAD TAPTITE SCREW | |
| 216 | 1A | | W01-0763-08 | ACCESSORY | |
| RF MODULATOR UNIT | | | | | |
| C1 | | | C90-5249-08 | ELECTRO 1000UF 16WV | |
| C2 | | | CK73FB1H223K | CHIP C 0.022UF K | |
| C3 | | | CE04DW1H4R7M | ELECTRO 4.7UF 50WV | |
| C6 | | | CE04NW1C100M | ELECTRO 10UF 16WV | |
| C7 | | | CE04DW1H010M | ELECTRO 1.0UF 50WV | |
| C8 | | | CK73FB1H102K | CHIP C 1000PF K | |
| C9,10 | | | CK73FB1H103K | CHIP C 0.010UF K | |
| C11,12 | | | CC73FCH1H220J | CHIP C 22PF J | |
| C13-17 | | | CK73FB1H102K | CHIP C 1000PF K | |
| C19 | | | CE04DW1A101M | ELECTRO 100UF 10WV | |
| C20 | | | CE04DW1E221M | ELECTRO 220UF 25WV | |
| C24 | | | CE04DW1C471M | ELECTRO 470UF 16WV | |
| C30 | | | CE04DW1A102M | ELECTRO 1000UF 10WV | |
| C31 | | | C90-2945-05 | ELECTRO 0.047F 5.5WV | |
| C32 | | | CE04DW1A101M | ELECTRO 100UF 10WV | |
| C33 | | | C90-5249-08 | ELECTRO 1000UF 16WV | |
| C34 | | | CE04DW1H010M | ELECTRO 1.0UF 50WV | |
| C35 | | | CK73FB1H103K | CHIP C 0.010UF K | |
| C36 | | | C90-2689-05 | ELECTRO 3300UF 16WV | |
| C103 | | | CK73FB1H103K | CHIP C 0.010UF K | |
| C104 | | | CE04NW1C100M | ELECTRO 10UF 16WV | |
| C105 | | | CE04DW1A221M | ELECTRO 220UF 10WV | |
| C106 | | | CE04NW1C100M | ELECTRO 10UF 16WV | |

| Ref. No. | Ad | New | Parts No. | Description | Destination |
|----------|----|-----|---------------|---------------------------|-------------|
| C107 | | | CC73FCH1H271J | CHIP C 270PF J | |
| C108 | | | CK73FB1H102K | CHIP C 1000PF K | |
| C109,110 | | | CK73FB1H104K | CHIP C 0.10UF K | |
| C111 | | | CE04DW1H010M | ELECTRO 1.0UF 50WV | |
| C112 | | | CK73FB1H332K | CHIP C 3300PF K | |
| C113 | | | CC73FCH1H181J | CHIP C 180PF J | |
| C114 | | | CK73FB1H153K | CHIP C 0.015UF K | |
| C203 | | | CK73FB1H103K | CHIP C 0.010UF K | |
| C204 | | | CE04NW1C100M | ELECTRO 10UF 16WV | |
| C205 | | | CE04DW1A221M | ELECTRO 220UF 10WV | |
| C206 | | | CE04NW1C100M | ELECTRO 10UF 16WV | |
| C207 | | | CC73FCH1H271J | CHIP C 270PF J | |
| C208 | | | CK73FB1H102K | CHIP C 1000PF K | |
| C209,210 | | | CK73FB1H104K | CHIP C 0.10UF K | |
| C211 | | | CE04DW1H010M | ELECTRO 1.0UF 50WV | |
| C212 | | | CK73FB1H332K | CHIP C 3300PF K | |
| C213 | | | CC73FCH1H181J | CHIP C 180PF J | |
| C214 | | | CK73FB1H153K | CHIP C 0.015UF K | |
| C301 | | | CE04NW1C100M | ELECTRO 10UF 16WV | |
| C302 | | | CK73FB1H103K | CHIP C 0.010UF K | |
| C303 | | | CC73FCH1H221J | CHIP C 220PF J | |
| C304 | | | CC73FCH1H100D | CHIP C 10PF D | |
| C305 | | | CK73FB1H103K | CHIP C 0.010UF K | |
| C306 | | | CC73FCH1H221J | CHIP C 220PF J | |
| C308 | | | CK73FB1H333K | CHIP C 0.033UF K | |
| C310 | | | CC73FCH1H330J | CHIP C 33PF J | |
| C312 | | | CK73FB1H103K | CHIP C 0.010UF K | |
| C314 | | | CE04NW1HR22M | ELECTRO 0.22UF 50WV | |
| C315 | | | CE04DW1A101M | ELECTRO 100UF 10WV | |
| C316 | | | CK73FB1H103K | CHIP C 0.010UF K | |
| C317 | | | CE04DW1H2R2M | ELECTRO 2.2UF 50WV | |
| C318,319 | | | CK73FB1H103K | CHIP C 0.010UF K | |
| C320 | | | CC73FCH1H181J | CHIP C 180PF J | |
| C321 | | | CE04DW1H010M | ELECTRO 1.0UF 50WV | |
| C322 | | | CC73FUJ1H221J | CHIP C 220PF J | |
| C323 | | | CC73FSL1H680J | CHIP C 68PF J | |
| C324 | | | CC73FUJ1H150J | CHIP C 15PF J | |
| C325 | | | CK73FB1H103K | CHIP C 0.010UF K | |
| C326 | | | CE04DW1E470M | ELECTRO 47UF 25WV | |
| C327 | | | CC73FUJ1H150J | CHIP C 15PF J | |
| C328 | | | CC73FCH1H020C | CHIP C 2.0PF C | |
| C329 | | | CC73FCH1H150J | CHIP C 15PF J | |
| C330 | | | CK73FB1H103K | CHIP C 0.010UF K | |
| C331 | | | CC73FCH1H010C | CHIP C 1.0PF C | |
| C332 | | | CC73FCH1H050C | CHIP C 5.0PF C | |
| C333,334 | | | CC73FCH1H330J | CHIP C 33PF J | |
| C335 | | | CE04DW1H4R7M | ELECTRO 4.7UF 50WV | |
| C336 | | | CK73FB1H222K | CHIP C 2200PF K | |
| C338 | | | CC73FCH1H050C | CHIP C 5.0PF C | |
| C339 | | | CK73FB1H104K | CHIP C 0.10UF K | |
| C340 | | | CE04DW1A220M | ELECTRO 22UF 10WV | |
| VC301 | | | C05-0513-08 | CERAMIC TRIMMER CAPACITOR | |
| CN101 | | | E56-0811-05 | CYLINDRICAL RECEPTACLE | |
| CN102 | | | E56-0833-08 | CYLINDRICAL RECEPTACLE | |

E : Europe K : North America M : Other Areas W : Without Europe

△ Indicates safety critical components.

PARTS LIST

* New parts

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Teile ohne **Parts No.** werden nicht geliefert.

RF MODULATOR UNIT

| Ref. No. | Add | New | Parts No. | Description | Destination | Ref. No. | Add | New | Parts No. | Description | Destination |
|------------------|-----|-----|----------------------------|----------------------------|-------------|----------|-----|-----|--------------|------------------------------|-------------|
| CN104,105 DC1 | 1A | | E40-3237-05 E30-4733-08 | PIN ASSY DC CORD ASSY | | R302 | | | RK73FB2A123J | CHIP R 12K J 1/10W | |
| L1 | | | L33-0934-08 | CHOKE COIL | | R306 | | | RK73FB2A103J | CHIP R 10K J 1/10W | |
| L301 | | | L33-1043-08 | SMALL FIXED INDUCTOR | | R307 | | | RK73FB2A472J | CHIP R 4.7K J 1/10W | |
| L302,303 | | | L33-0976-08 | SMALL FIXED INDUCTOR | | R308 | | | RK73FB2A154J | CHIP R 150K J 1/10W | |
| L304 | | | L33-1043-08 | SMALL FIXED INDUCTOR | | R314 | | | RK73FB2A473J | CHIP R 47K J 1/10W | |
| L305 | | | L33-1042-08 | SMALL FIXED INDUCTOR | | R316 | | | RK73FB2A122J | CHIP R 1.2K J 1/10W | |
| X301 | | | L77-2716-08 | CRYSTAL RESONATOR (38KHz) | | R317 | | | RK73FB2A242J | CHIP R 2.4K J 1/10W | |
| X302 | | | L77-2067-08 | CRYSTAL RESONATOR (4.5MHz) | | R318 | | | RK73FB2A332J | CHIP R 3.3K J 1/10W | |
| R1 | | | RD14BB2C242J | RD 2.4K J 1/6W | | R319 | | | RD14BB2C122J | RD 1.2K J 1/6W | |
| R2 | | | RD14BB2C222J | RD 2.2K J 1/6W | | R320 | | | RK73FB2A103J | CHIP R 10K J 1/10W | |
| R6 | | | RK73FB2A223J | CHIP R 22K J 1/10W | | R322 | | | RD14BB2C472J | RD 4.7K J 1/6W | |
| R7 | | | RS14AB3D100J | FL-PROOF RS 10 J 2W | | R323 | | | RK73FB2A471J | CHIP R 470 J 1/10W | |
| R8 | | | RD14BB2C223J | RD 22K J 1/6W | | R325,326 | | | RK73FB2A223J | CHIP R 22K J 1/10W | |
| R9 | | | RD14BB2C222J | RD 2.2K J 1/6W | | R327 | | | RK73FB2A473J | CHIP R 47K J 1/10W | |
| R11 | | | RD14BB2C102J | RD 1.0K J 1/6W | | R328 | | | RK73FB2A271J | CHIP R 270 J 1/10W | |
| R12 | | | RD14BB2C103J | RD 10K J 1/6W | | R329 | | | RK73FB2A470J | CHIP R 47 J 1/10W | |
| R13 | | | RD14BB2C104J | RD 100K J 1/6W | | R330 | | | RK73FB2A331J | CHIP R 330 J 1/10W | |
| R14 | | | RD14BB2C332J | RD 3.3K J 1/6W | | R331 | | | RK73FB2A473J | CHIP R 47K J 1/10W | |
| R15 | | | RD14BB2C104J | RD 100K J 1/6W | | R332 | | | RK73FB2A101J | CHIP R 100 J 1/10W | |
| R16 | | | RD14BB2C332J | RD 3.3K J 1/6W | | R333 | | | RK73FB2A470J | CHIP R 47 J 1/10W | |
| R17 | | | RD14BB2C102J | RD 1.0K J 1/6W | | R334 | | | RK73FB2A472J | CHIP R 4.7K J 1/10W | |
| R18 | | | RK73FB2A104J | CHIP R 100K J 1/10W | | R337,338 | | | RK73FB2A472J | CHIP R 4.7K J 1/10W | |
| R19 | | | RD14BB2C332J | RD 3.3K J 1/6W | | R339,340 | | | RK73FB2A391J | CHIP R 390 J 1/10W | |
| R20 | | | RD14BB2C102J | RD 1.0K J 1/6W | | R343 | | | RK73FB2A101J | CHIP R 100 J 1/10W | |
| R21 | | | RD14BB2C472J | RD 4.7K J 1/6W | | R346 | | | RK73FB2A472J | CHIP R 4.7K J 1/10W | |
| R22,23 | | | RD14BB2C102J | RD 1.0K J 1/6W | | R348 | | | RK73FB2A224J | CHIP R 220K J 1/10W | |
| R24 | | | RD14BB2C472J | RD 4.7K J 1/6W | | R350 | | | RD14BB2C103J | RD 10K J 1/6W | |
| R25,26 | | | RD14BB2C102J | RD 1.0K J 1/6W | | VR301 | | | R32-0208-08 | SEMI FIXED VARIABLE RESISTOR | |
| R27,28 | | | RK73FB2A103J | CHIP R 10K J 1/10W | | VR303 | | | R32-0207-08 | SEMI FIXED VARIABLE RESISTOR | |
| R31 | | | RK73FB2A473J | CHIP R 47K J 1/10W | | RL1 | | | S76-0802-08 | MAGNETIC RELAY | |
| R33 | | | RK73FB2A473J | CHIP R 47K J 1/10W | | D1 | | | DSK10C-ET1 | DIODE | |
| R34 | | | RK73FB2A182J | CHIP R 1.8K J 1/10W | | D2 | | | DSK10C-BT | DIODE | |
| R35 | | | RK73FB2A151J | CHIP R 150 J 1/10W | | D5 | | | DSK10C-ET1 | DIODE | |
| R102 | | | RK73FB2A152J | CHIP R 1.5K J 1/10W | | D8,9 | | | 1SS133 | DIODE | |
| R103 | | | RK73FB2A682J | CHIP R 6.8K J 1/10W | | D12,13 | | | 1SS133 | DIODE | |
| R104 | | | RK73FB2A103J | CHIP R 10K J 1/10W | | D14 | | | DSK10C-ET1 | DIODE | |
| R105-108 | | | R92-0363-05 | CHIP R 10K F 1/10W | | D15 | | | DSK10C-BT | DIODE | |
| R109 | | | RK73FB2A182J | CHIP R 1.8K J 1/10W | | D16 | | | 1SS133 | DIODE | |
| R110 | | | RK73FB2A391J | CHIP R 390 J 1/10W | | D101 | | | DA204K | DIODE | |
| R111 | | | RK73FB2A102J | CHIP R 1.0K J 1/10W | | D201 | | | DA204K | DIODE | |
| R112 | | | RK73FB2A753J | CHIP R 75K J 1/10W | | D302 | | | DA204K | DIODE | |
| R113 | | | RK73FB2A104J | CHIP R 100K J 1/10W | | D303 | | | DSK10C-BT | DIODE | |
| R114-116 | | | RK73FB2A682J | CHIP R 6.8K J 1/10W | | D304,305 | | | MA111 | DIODE | |
| R202 | | | RK73FB2A152J | CHIP R 1.5K J 1/10W | | D306 | | | RB160L-40 | DIODE | |
| R203 | | | RK73FB2A682J | CHIP R 6.8K J 1/10W | | IC1 | * | | UPC78M06AHF | ANALOGUE IC | |
| R204 | | | RK73FB2A103J | CHIP R 10K J 1/10W | | IC2 | * | | LC72366-9B28 | MI-COM IC | |
| R205-208 | | | R92-0363-05 | CHIP R 10K F 1/10W | | IC4 | | | NJM78L05UA | IC (VOLTAGE REGULATOR/ +5V) | |
| R209 | | | RK73FB2A182J | CHIP R 1.8K J 1/10W | | IC101 | | | NJM2060M | ANALOGUE IC | |
| R210 | | | RK73FB2A391J | CHIP R 390 J 1/10W | | IC102 | | | NJM4565MD | IC (OP AMP X2) | |
| R212 | | | RK73FB2A753J | CHIP R 75K J 1/10W | | IC301 | | | BA1405F | ANALOGUE IC | |
| R213 | | | RK73FB2A104J | CHIP R 100K J 1/10W | | IC302 | | | NJM4565MD | IC (OP AMP X2) | |
| R214-216 | | | RK73FB2A682J | CHIP R 6.8K J 1/10W | | Q1 | | | DTC124EK | DIGITAL TRANSISTOR | |
| R301 | | | RK73FB2A154J | CHIP R 150K J 1/10W | | Q2 | | | 2SA1782(T,U) | TRANSISTOR | |
| | | | | | | Q3 | | | DTC124EK | DIGITAL TRANSISTOR | |

E : Europe K : North America M : Other Areas W : Without Europe

△ Indicates safety critical components.

KCA-R70FM

PARTS LIST

* New parts

Parts without **Parts No.** are not supplied.

Les articles non mentionnes dans le **Parts No.** ne sont pas fournis.

Teile ohne **Parts No.** werden nicht geliefert.

RF MODULATOR UNIT

| Ref. No. | Add | New | Parts No. | Description | Destination |
|--|----------------------|------------------|--|--|-------------|
| Q4,5 Q6 Q8 Q9 Q101 | | | DTC143TK DTA124EK DTC143TK 2SC4640(T,U) 2SK2158 | DIGITAL TRANSISTOR DIGITAL TRANSISTOR DIGITAL TRANSISTOR TRANSISTOR FET | |
| Q201 Q303 Q304,305 Q306 Q307 | | | 2SK2158 2SA1162(GR) 2SK2158 2SK508L 2SC2714(Y) | FET TRANSISTOR FET FET TRANSISTOR | |
| Q308-310 VD301 ZD1-7 | | | 2SK2158 HVU306A-3 HZS6C2 | FET VARIABLE CAPACITANCE DIODE ZENER DIODE | |
| CONTROL UNIT | | | | | |
| 213 214 215 216 D1,2 | 3A 3A 2A 3A | * * * * | B11-1420-08 B11-1421-08 B11-1422-08 B19-2222-08 B30-1663-05 | OPTICAL DIFFUSER REFLECTION SHEET REFLECTION SHEET (SIDE) LIGHTING BOARD W-LED | |
| D3 D4-16 LCD1 | | | B30-1564-05 B30-1566-05 B38-1125-08 | LED BLUE LED RED LIQUID CRYSTAL | |
| C1-3 C4 C5-7 C8 C9 | | | CK73FB1H104K CC73FCH1H681J CK73FB1H104K C92-1358-05 C92-0040-05 | CHIP C 0.10UF K CHIP C 680PF J CHIP C 0.10UF K CHIP-TAN 2.2UF 16WV CHIP-ELE 47UF 16WV | |
| C10 C11 | | | C92-0037-05 CK73FB1H223K | CHIP-ELE 10UF 16WV CHIP C 0.022UF K | |
| 220 221 | 3A 3A | * * | E29-1945-08 E30-4309-08 | CONDUCTIVE RUBBER CORD WITH DIN CONNECTOR | |
| R1,2 R3 R4 R5-10 R11-19 | | | RK73FB2A331J RK73FB2A271J RK73FB2A431J RK73FB2A271J RK73FB2A102J | CHIP R 330 J 1/10W CHIP R 270 J 1/10W CHIP R 430 J 1/10W CHIP R 270 J 1/10W CHIP R 1.0K J 1/10W | |
| R20 R21 R22-26 R27 R28 | | | RK73FB2A433J RK73FB2A103J RK73FB2A472J RK73FB2A473J RK73FB2A101J | CHIP R 43K J 1/10W CHIP R 10K J 1/10W CHIP R 4.7K J 1/10W CHIP R 47K J 1/10W CHIP R 100 J 1/10W | |
| R29,30 R31 R32 R33,34 R35 | | | RK73FB2A471J RK73FB2A102J RK73FB2A471J RK73FB2A102J RK73FB2A101J | CHIP R 470 J 1/10W CHIP R 1.0K J 1/10W CHIP R 470 J 1/10W CHIP R 1.0K J 1/10W CHIP R 100 J 1/10W | |
| R36 R37 | | | RK73FB2A331J RK73FB2A103J | CHIP R 330 J 1/10W CHIP R 10K J 1/10W | |
| D17-21 D22,23 IC1 IC2 Q1 | | | DA204K MA111 LC75808W RS-21N 2SD2114K | DIODE DIODE MOS-IC ANALOGUE IC TRANSISTOR | |

| Ref. No. | Add | New | Parts No. | Description | Destination |
|----------|-----|-----|-----------|--------------------|-------------|
| Q2,3 | | | DTA144EK | DIGITAL TRANSISTOR | |

E : Europe K : North America M : Other Areas W : Without Europe

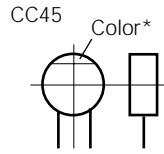
△ Indicates safety critical components.

PARTS LIST

CAPACITORS

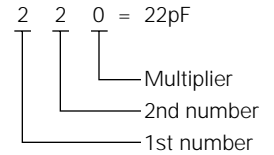
$\frac{CC}{1} \frac{45}{2} \frac{TH}{3} \frac{1H}{4} \frac{220}{5} \frac{J}{6}$

- 1 = Type ... ceramic, electrolytic, etc.
- 2 = Shape ... round, square, etc.
- 3 = Temp. coefficient
- 4 = Voltage rating
- 5 = Value
- 6 = Tolerance



• Capacitor value

- 010 = 1pF
- 100 = 10pF
- 101 = 100pF
- 102 = 1000pF = 0.001μF
- 103 = 0.01μF



• Temperature coefficient

| 1st Word | C | L | P | R | S | T | U |
|----------|-------|-----|--------|--------|-------|------|--------|
| Color* | Black | Red | Orange | Yellow | Green | Blue | Violet |
| ppm/°C | 0 | -80 | -150 | -220 | -330 | -470 | -750 |

| 2nd Word | G | H | J | K | L |
|----------|-----|-----|------|------|------|
| ppm/°C | ±30 | ±60 | ±120 | ±250 | ±500 |

Example : CC45TH = -470±60ppm/°C

• Tolerance (More than 10pF)

| Code | C | D | G | J | K | M | X | Z | P | No code |
|------|-------|------|----|----|-----|-----|------------|------------|------------|---|
| (%) | ±0.25 | ±0.5 | ±2 | ±5 | ±10 | ±20 | +40 -20 | +80 -20 | +100 -0 | More than 10μF : -10~+50 Less than 4.7μF : -10~+75 |

(Less than 10pF)

| Code | B | C | D | F | G |
|------|------|-------|------|----|----|
| (pF) | ±0.1 | ±0.25 | ±0.5 | ±1 | ±2 |

• Voltage rating

| 2nd word \ 1st word | A | B | C | D | E | F | G | H | J | K | V |
|---------------------|------|------|------|------|------|------|------|------|------|------|----|
| 0 | 1.0 | 1.25 | 1.6 | 2.0 | 2.5 | 3.15 | 4.0 | 5.0 | 6.3 | 8.0 | - |
| 1 | 10 | 12.5 | 16 | 20 | 25 | 31.5 | 40 | 50 | 63 | 80 | 35 |
| 2 | 100 | 125 | 160 | 200 | 250 | 315 | 400 | 500 | 630 | 800 | - |
| 3 | 1000 | 1250 | 1600 | 2000 | 2500 | 2150 | 4000 | 5000 | 6300 | 8000 | - |

CHIP CAPACITORS

(EX) $\frac{CC}{1} \frac{73}{2} \frac{F}{3} \frac{SL}{4} \frac{1H}{5} \frac{000}{6} \frac{J}{7}$

(Chip) (CH, RH, UJ, SL)

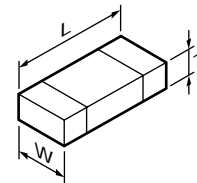
(EX) $\frac{CK}{1} \frac{73}{2} \frac{F}{3} \frac{F}{4} \frac{1H}{5} \frac{000}{6} \frac{Z}{7}$

(Chip) (B, F)

Refer to the table above.

- 1 = Type
- 2 = Shape
- 3 = Dimension
- 4 = Temp. coefficient
- 5 = Voltage rating
- 6 = Value
- 7 = Tolerance

• Dimension



Chip capacitor

| Code | L | W | T |
|-------|----------|----------|----------------|
| Empty | 5.6±0.5 | 5.0±0.5 | Less than 2.0 |
| A | 4.5±0.5 | 3.2±0.4 | Less than 2.0 |
| B | 4.5±0.5 | 2.0±0.3 | Less than 2.0 |
| C | 4.5±0.5 | 1.25±0.2 | Less than 1.25 |
| D | 3.2±0.4 | 2.5±0.3 | Less than 1.5 |
| E | 3.2±0.2 | 1.6±0.2 | Less than 1.25 |
| F | 2.0±0.3 | 1.25±0.2 | Less than 1.25 |
| G | 1.6±0.2 | 0.8±0.2 | Less than 1.0 |
| H | 1.0±0.05 | 0.5±0.05 | 0.5±0.05 |

Chip resistor

| Code | L | W | T |
|------|----------|----------|-----------|
| E | 3.2±0.2 | 1.6±0.2 | 1.0 |
| F | 2.0±0.3 | 1.25±0.2 | 1.0 |
| G | 1.6±0.2 | 0.8±0.2 | 0.5±0.1 |
| H | 1.0±0.05 | 0.5±0.05 | 0.35±0.05 |

RESISTORS

• Chip resistor (Carbon)

(EX) $\frac{RD}{1} \frac{73}{2} \frac{E}{3} \frac{B}{4} \frac{2B}{5} \frac{000}{6} \frac{J}{7}$

(Chip) (B, F)

• Carbon resistor (Normal type)

(EX) $\frac{RD}{1} \frac{14}{2} \frac{B}{3} \frac{B}{4} \frac{2C}{5} \frac{000}{6} \frac{J}{7}$

(Chip) (B, F)

- 1 = Type ... ceramic, electrolytic, etc.
- 2 = Shape ... round, square, etc.
- 3 = Dimension
- 4 = Temp. coefficient
- 5 = Voltage rating
- 6 = Value
- 7 = Tolerance

• Rating wattage

| Code | Wattage | Code | Wattage | Code | Wattage |
|------|---------|------|---------|------|---------|
| 1J | 1/16W | 2C | 1/6W | 3A | 1W |
| 2A | 1/10W | 2E | 1/4W | 3D | 2W |
| 2B | 1/8W | 2H | 1/2W | | |

KCA-R70FM

SPECIFICATIONS

Modulating Frequency (200kHz step) 87.7, 87.9, 88.1, 88.3, 88.5, 88.7, 88.9,
89.1, 89.3, 89.5, 89.7, 89.9MHz

General

Operating Voltage 14.4V (11~16V)
Current Consumption 1.4A
Operating Temperature -10~50°C
Size (W x H x D)
Remote Controller 43 x 135 x 22 mm (1-11/16 x 5-5/16 x 7/8 in.)
Display Unit 154 x 43 x 17 mm (6-1/16 x 1-11/16 x 11/16 in.)
FM Modulator Unit 150 x 30 x 80 mm (5-7/8 x 1-3/16 x 3-1/8 in.)
Trim Mount Plate 188 x 58 x 18 mm (7-3/8 x 2-5/16 x 11/16 in.)
Weight
Remote Controller 50g (0.11 lbs)
Display Unit 145g (0.32 lbs)
FM Modulator Unit 460g (1.01 lbs)

KENWOOD follows a policy of continuous advancements in development. For this reason specifications may be changed without notice.

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