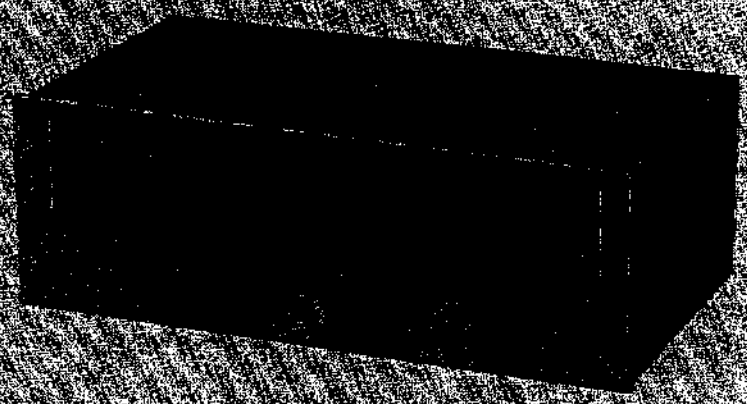
SONY 005D6

# ST-515

*Canadian Model*
*AEP Model*
*UK Model*
*E Model*



## FM-AM PROGRAM TUNER

### SPECIFICATIONS

**GENERAL**

**Power Requirements:** 120 V ac, 60 Hz (Canadian model)
120, 220 or 240 V ac adjustable
50/60 Hz (AEP, E model)
240 V ac, 50 Hz (UK model)

**Power Consumption:** 20 W (Canadian model)
24 W (AEP, E, UK model)

**Dimensions:** Approx. 410 (w) x 145 (h) x 260 (d) mm
16 ¼ (w) x 5 ¾ (h) x 10 ¼ (d) inches
Including projecting parts and controls

**Weight:** Approx. 5.7 kg, 12 lb 9 oz (net)
Approx. 6.7 kg, 14 lb 12 oz (in shipping carton)

**FM SECTION**

**Antenna:** 300 Ω balanced
75 Ω unbalanced

**Tuning Range:** 87.5 – 108 MHz

**Intermediate Frequency:** 10.7 MHz

**Sensitivity at 46dB Quieting:** (40kHz deviation)
4.0 µV (MONO)
50 µV (STEREO)

**Usable Sensitivity:** 1.7 µV, S/N = 26 dB (40kHz deviation)
19 µV, 10.7 dBf; IHF

**S/N Ratio:** 75 dB (MONO)
70 dB (STEREO)

**Harmonic Distortion:** at 100 Hz
0.15 % (MONO)
0.25 % (STEREO)
at 1 kHz
0.15 % (MONO)
0.25 % (STEREO)
at 10 kHz
0.2 % (MONO)
0.5 % (STEREO)

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING AND MARK ⚠ ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ !

LES COMPOSANTS IDENTIFIÉS PAR UN TRAMÉ ET UNE MARQUE ⚠ SUR LES DIAGRAMMES SCHÉMATIQUES, LES VUES EXPLOSÉES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DES SUPPLÉMENTS PUBLIÉS PAR SONY.

– Continued on page 2 –

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SERVICE MANUAL

| | |
|---|---|
| **IM Distortion:** | 0.15 % (MONO)<br>0.25 % (STEREO) |
| **Separation:** | 35 dB at 100 Hz<br>45 dB at 1 kHz<br>40 dB at 10 kHz |
| **Frequency Response:** | 30 Hz – 15 kHz $^{+0.15}_{-2.0}$ dB<br>40 Hz – 12.5 kHz $^{+0.5}_{-1.0}$ dB |
| **Selectivity:** | 40 dB at 300 kHz<br>60 dB at 400 kHz |
| **Capture Ratio:** | 1.0 dB |
| **AM Suppression Ratio:** | 54 dB |
| **Image Response Ratio:** | 80 dB |
| **IF Response Ratio:** | 100 dB |
| **Spurious Response Ratio:** | 90 dB |
| **RF Intermodulation:** | 60 dB |
| **Output Level/Impedance:** | 450 mV, 6.8 kΩ at 1 kHz deviation<br>100 % modulation |

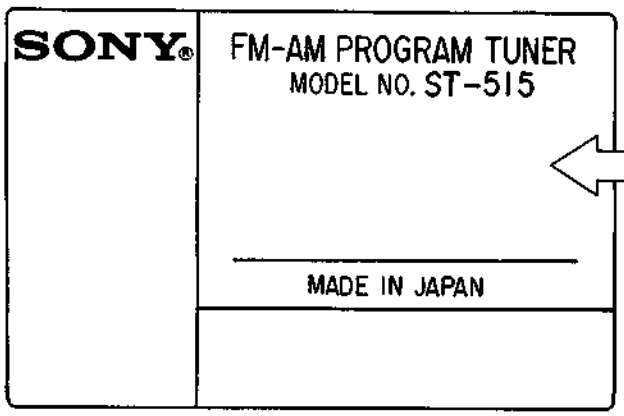
**AM TUNER SECTION**

| | |
|---|---|
| **Frequency Range:** | 530 – 1,605 kHz |
| **Antenna:** | Attached AM antenna wire<br>External antenna terminal |
| **Intermediate Frequency:** | 455 kHz (Canadian, E model)<br>468 kHz (AEP, UK model) |
| **Usable Sensitivity:** | 100 μV, external antenna<br>at 1,000 kHz |
| **S/N Ratio:** | 52 dB at 5 mV/m |
| **Harmonic Distortion:** | 0.3 % at 5 mV/m, 400 Hz |
| **Selectivity:** | 28 dB at 9 kHz<br>30 dB at 10 kHz |

**0 dB = 0.775 V**

## MODEL IDENTIFICATION

**Specification Label**




**– Canadian Model –**

| | | | |
|---|---|---|---|
| FREQ. RANGE | : FM | 87.5 – 108 MHz | |
| | AM | 530 – 1605 kHz | |
| IF | : FM | 10.7 MHz | |
| | AM | 455 MHz | |
| AC 120 V | 60 Hz | 20 W | |

**– AEP Model –**

| | | | |
|---|---|---|---|
| FREQ. RANGE | : FM | 87.5 – 108 MHz | |
| | AM | 530 – 1605 kHz | |
| IF | : FM | 10.7 MHz | |
| | AM | 468 kHz | |
| AC 120, 220, 240 V | ~50 Hz | 24 W | |

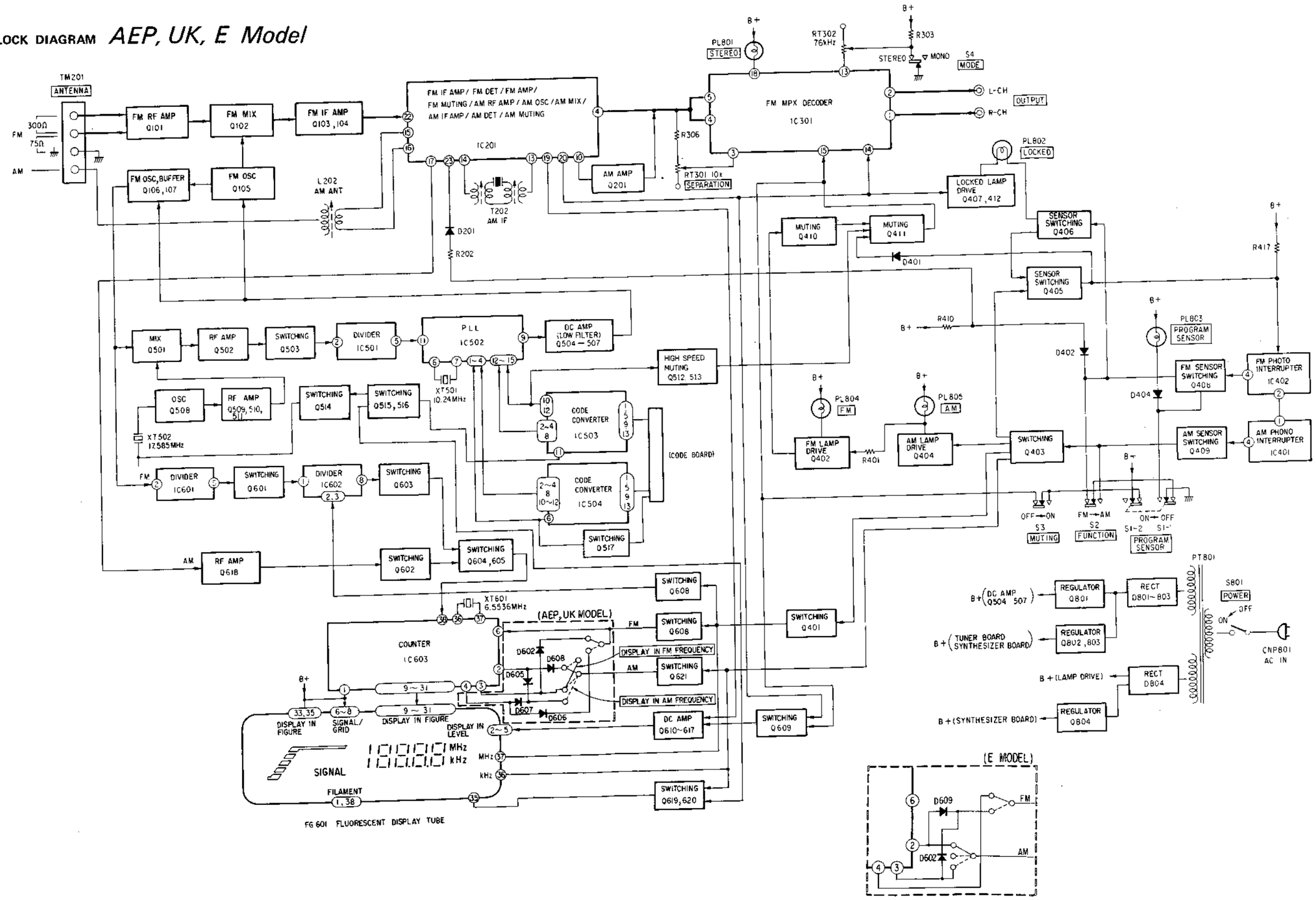
**– UK Model –**

| | | | |
|---|---|---|---|
| FREQ. RANGE | : FM | 87.5 – 108 MHz | |
| | AM | 530 – 1605 kHz | |
| IF | : FM | 10.7 MHz | |
| | AM | 468 kHz | |
| AC 240 V | ~50 Hz | 24W | |

**– E Model –**

| | | | |
|---|---|---|---|
| FREQ. RANGE | : FM | 87.5 – 108 MHz | |
| | AM | 530 – 1605 kHz | |
| IF | : FM | 10.7 MHz | |
| | AM | 455 kHz | |
| AC 120, 220, 240 V | ~50/60 Hz | 24 W | |

## 1-2. BLOCK DIAGRAM *AEP, UK, E Model*



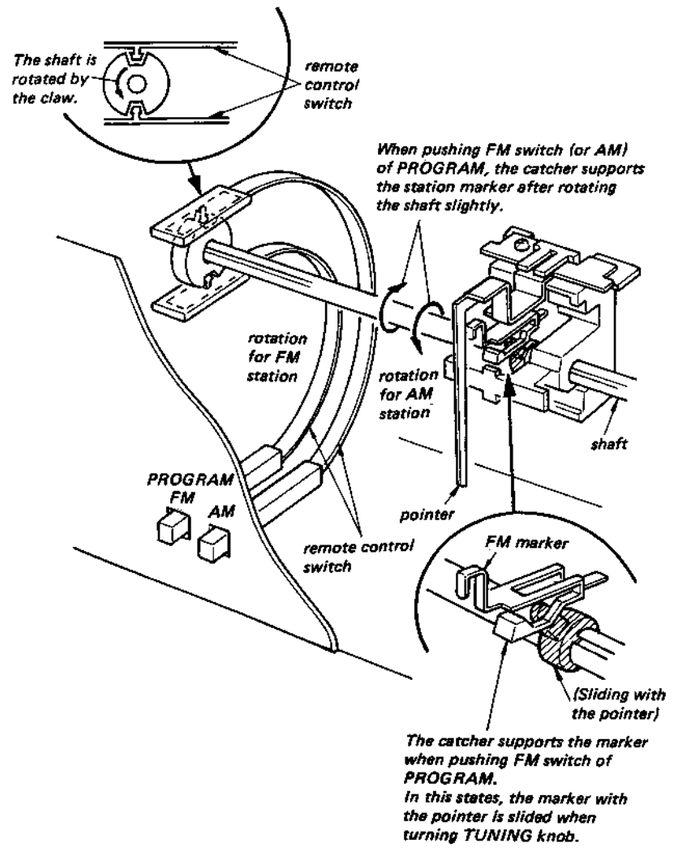
## 1-3. CIRCUIT DESCRIPTION

Program Sensor

The FM or AM band can be changed automatically through the optical detection when the pointer matches to the desired station marker.

Marker Setting

1. Match the pointer to the upper marker (at FM station) or the bottom marker (at AM station) while turning TUNING knob.
2. Slide the station marker with the pointer while pushing FM switch (or AM switch) of PROGRAM in.
3. Set free the PROGRAM switch at the tuning point to the desired station.
4. The station marker is fixed in this position.




**1) When the pointer matches only with the FM station marker:**

a) The light of IC402 (Photo Interrupter) is intercepted by the marker, the impedance between terminals 3 and 4 of IC402 becomes high.
b) The base voltage of Q408 is increased through R415 and Q408 turns on.
c) The cathode of D402 is grounded.
d) The B+ voltage through R410 is not supplied to the terminal 23 of IC201.
e) FM circuit operates (The terminal 23 of IC201 serves as a switch).

**Note:** When B+ voltage is supplied to the terminal 23 , the receiver is in AM mode. When B+ voltage is not supplied, the receiver is in FM mode.

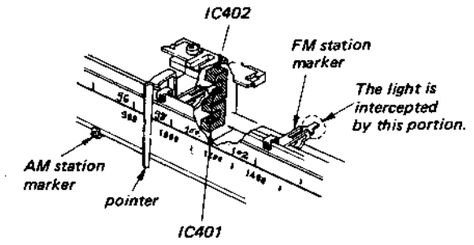
f) The impedance between terminals 3 and 4 of IC401 becomes low. So, Q409, Q403 and Q404 turn off, Q402 turns on. Then, PL804 (FM indicator lamp) lights.
g) The collector voltage of Q408 reduces, Q406 and Q405 turn on.
h) The positive feedback is applied to the terminal 1 of IC402, the circuit operates correctly.
i) Q411 is used as muting when the station marker does not match to the pointer. Namely, Q405 turns on, and Q411 turns off.

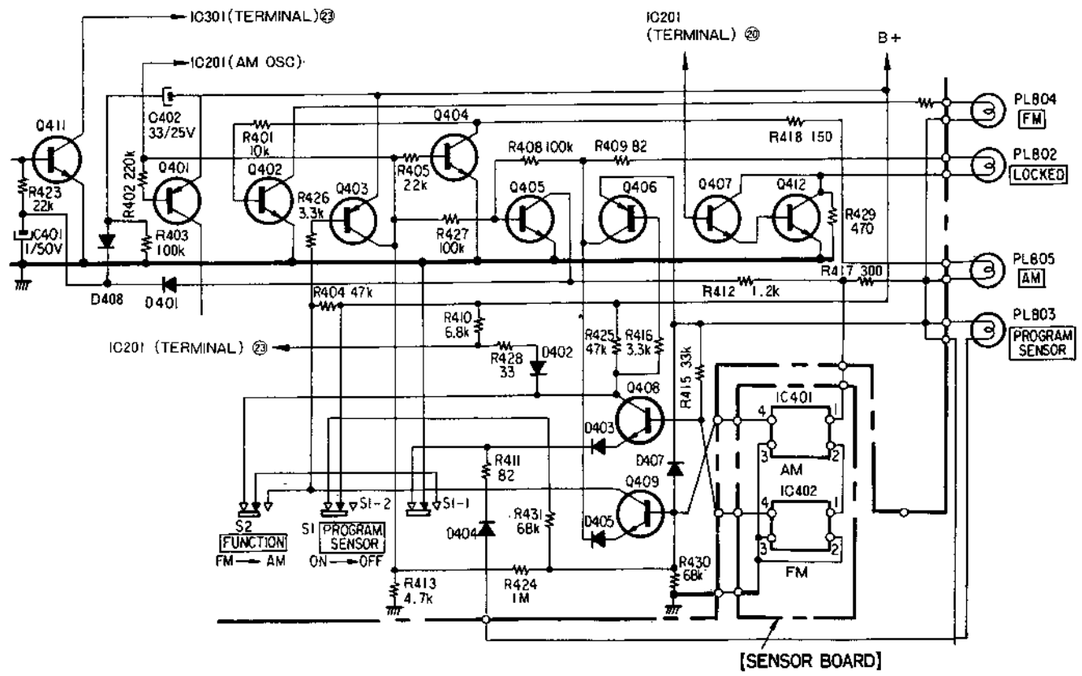
**2) When the pointer matches only with the AM station marker:**

a) As the light of IC402 is not intercepted, the B+ voltage is supplied to the terminal 23 of IC201.
b) On the other hand, the light of IC401 is intercepted, Q409 and Q403 turn on. As a result, the B+ voltage is supplied to L203 (AM oscillator coil).
c) AM circuit operates. At the same time, Q404 turns on, PL805 (AM indicator lamp) lights.
d) The positive feedback is applied to the terminal 1 of IC401 because of Q405 operating, the circuit operates correctly.

**3) When the pointer matches simultaneously with both the FM and AM station markers:**

a) As the lights of IC401 and IC402 are not intercepted simultaneously, Q408 and Q406 turn on.
b) D405 and Q409 turn off, only the FM station signal is received.



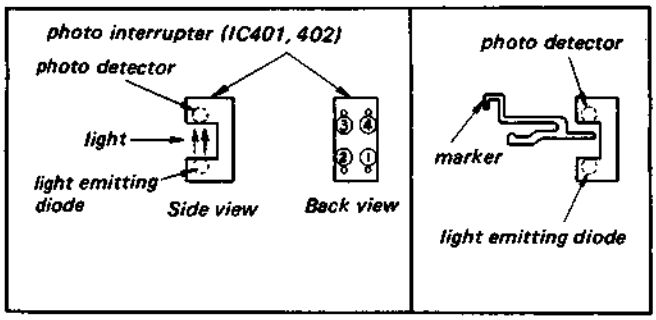
### Photo Interrupter

The terminals 1 and 2 of the photo interrupter operate as the light emitting diode. On the other hand, the terminals 3 and 4 operate as the photo detector. When the photo detector receives the light, the impedance between terminals 3 and 4 becomes low. When light is intercepted by the marker, the impedance becomes high.

### Dial Scale

This scale is made up of nine bits and one common. The contact terminal on the pointer table is slided on the scale. The bits are made up of the conductor side or insulator side comparison with FM scale. The scale is indicated every 50 kHz by the combination of nine bit's conductor side. The contact terminal is slided by turning TUNING knob. When the contact terminal places on the conductor side of a bit, the bit connects to a common. Then, the output of code converter (IC503, 504) is changed to FM frequency.

**When the photo detector receives the light** **When light is intercepted**



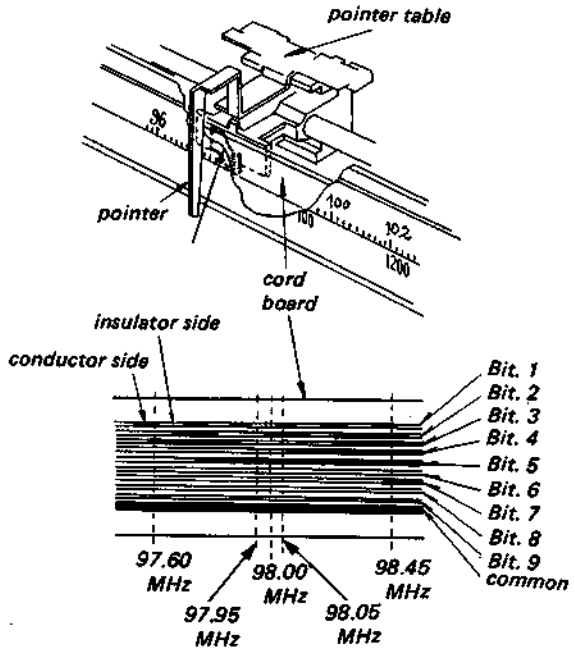

### Fluorescence Display Tube

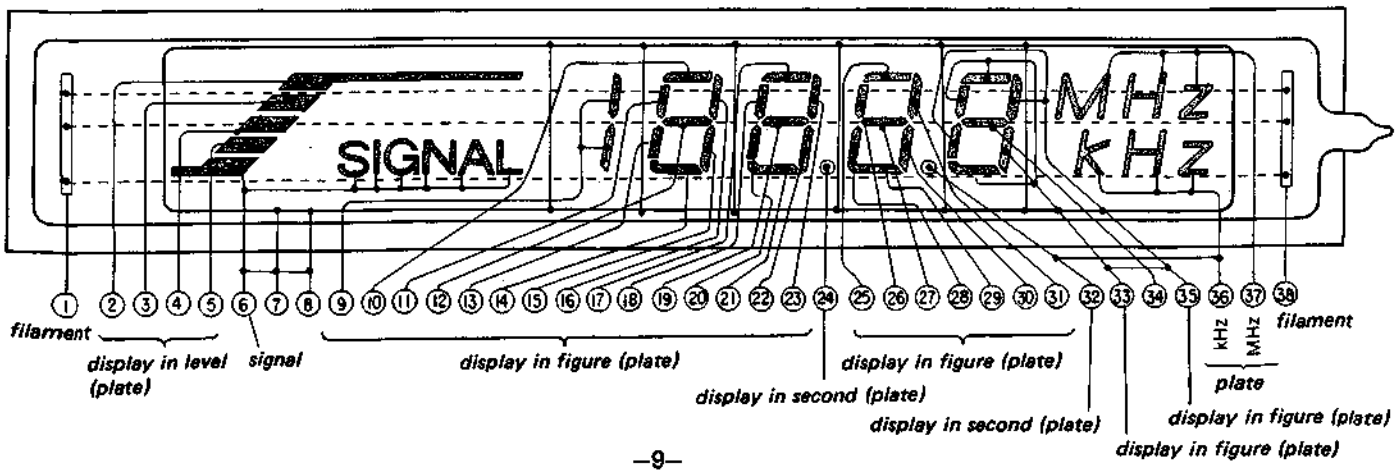
The fluorescence display tube is a kind of compactron. Inside of the tube forms a vacuum, the each electrode of filament, grid and plate is installed. The electron from filament moves to grid which the high voltage is always supplied, so the grid current flows.

The SIGNAL letter, the lowest level indication and the one figure number are connected to grid, so these are always lighted.

If the voltage is supplied to the plate, the electron from filament is accelerated by grid, the plate current flows.

The fluorescence paints is coated on the plate. So, the fluorescence paints light because the plate current flows when the voltage is supplied to the plate. This plate voltage is controlled by the output of IC603 (0 V or B+ voltage appears on the output), the letter on the fluorescence display tube appears.



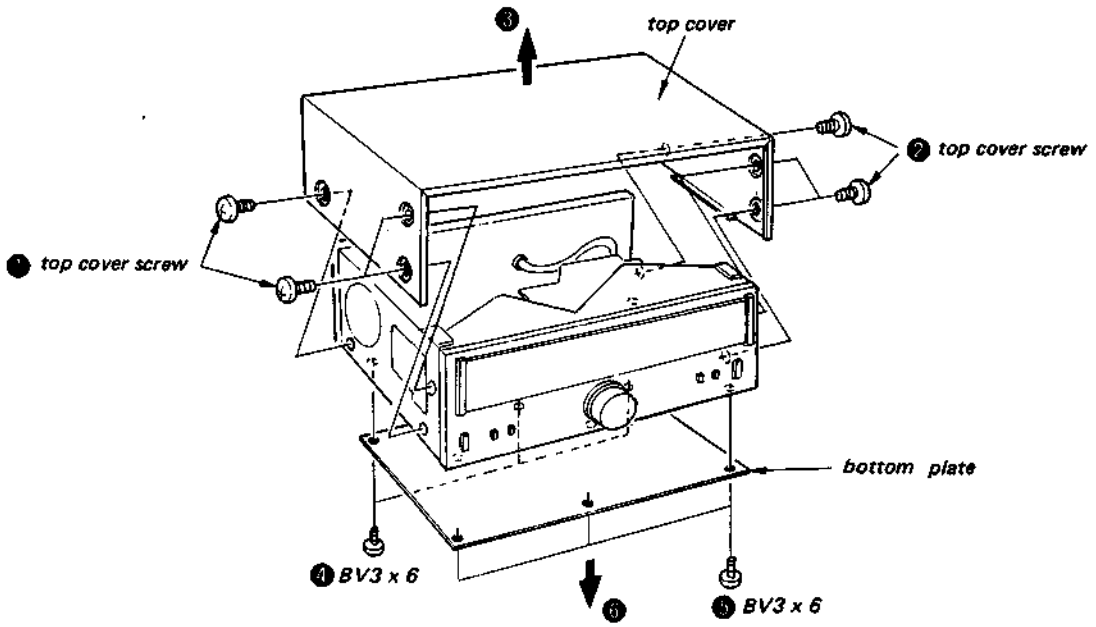



# SECTION 2
# DISASSEMBLY

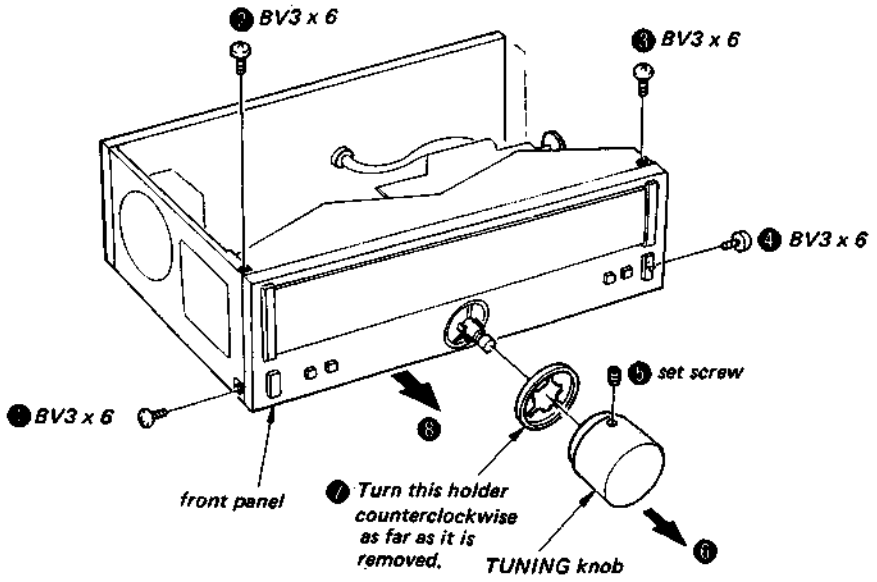
## 2-1. REMOVAL

**Note:** Follow the disassembly procedure in the numerical order given.

### 2-1. TOP COVER AND BOTTOM PLATE REMOVAL

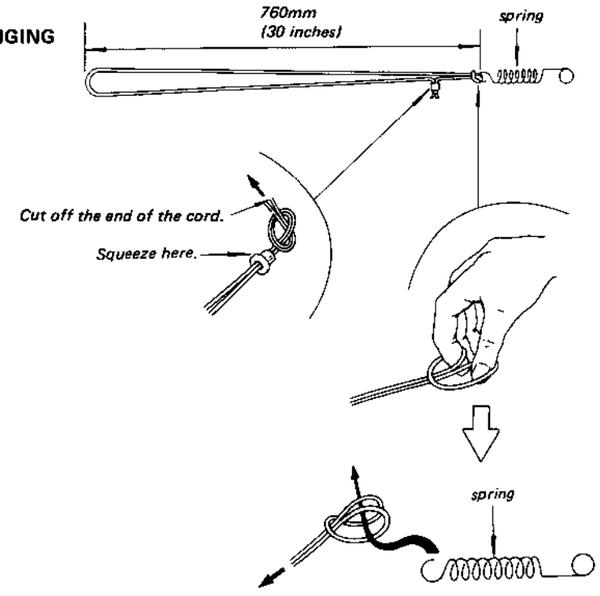



### 2-2. FRONT PANEL REMOVAL

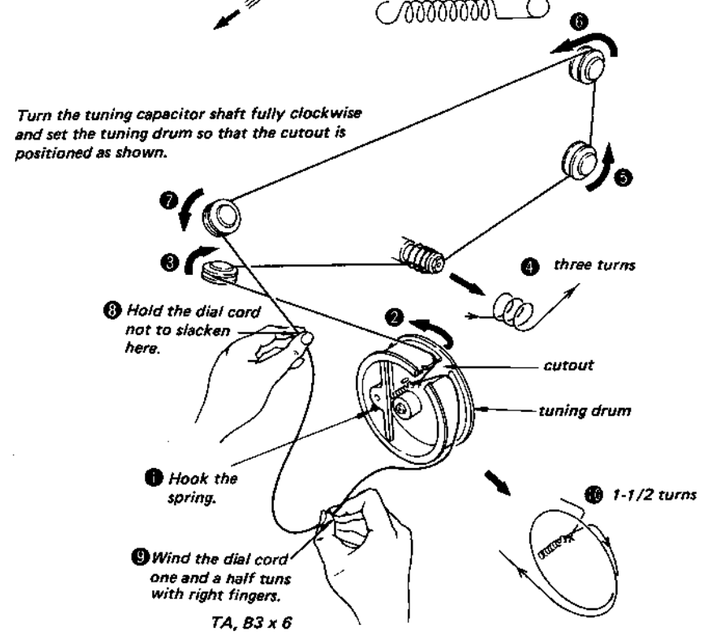


## 2-2. DIAL CORD STRINGING

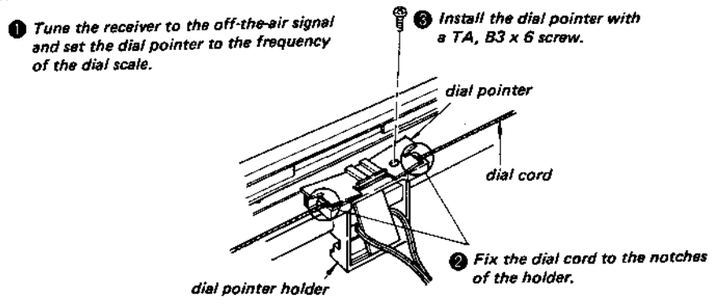
### 1) Preparation



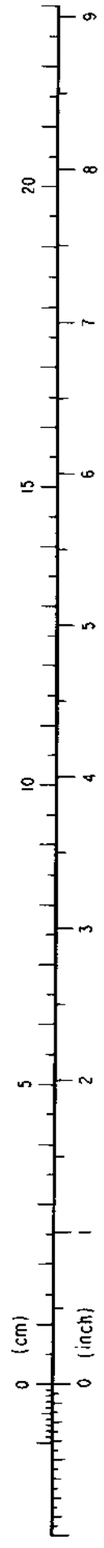

### 2) Stringing




### 3) Dial Pointer Installation





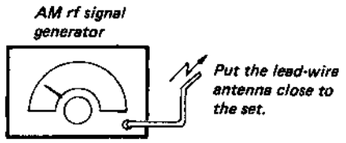




MEMO

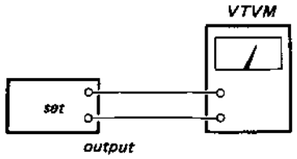
# SECTION 3
# ADJUSTMENTS

## 3-1. AM SECTION

**Setting:** FUNCTION Selector: AM
MODE Selector: MONO




*Modulation: 400 Hz, 30 %*

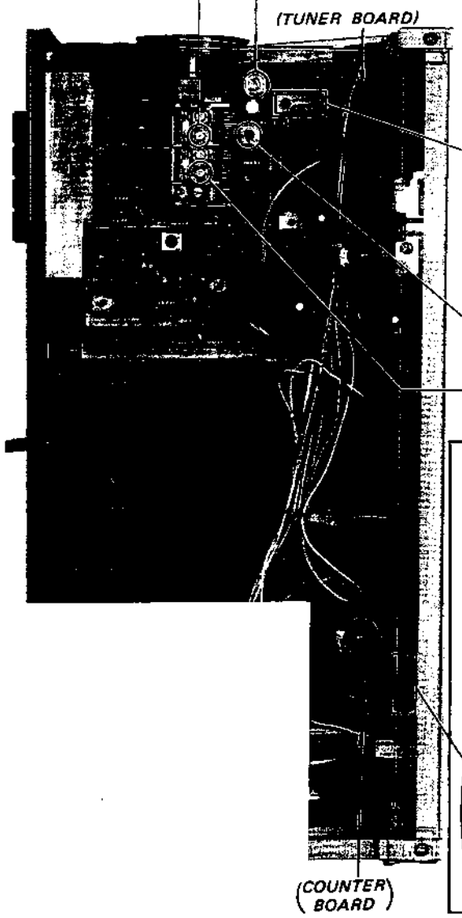


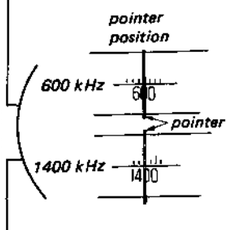

- Repeat the procedures in each adjustment several times, and the frequency coverage and tracking adjustments should be finally done by the trimmer capacitors.

| AM TRACKING ADJUSTMENT | |
|---|---|
| Adjust for a maximum reading on VTVM. | |
| TC104 | 1400 kHz |
| L202 | 600 kHz |

| AM IF ALIGNMENT | |
|---|---|
| Adjust for a maximum reading on VTVM. | |
| T202 | 455 kHz (Canadian, E Model) |
| | 468 kHz (AEP, UK Model) |

| AM FREQUENCY COVERAGE ADJUSTMENT | |
|---|---|
| Adjust for a maximum reading on VTVM. | |
| L203 | 600 kHz |
| TC105 | 1400 kHz |

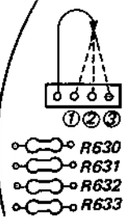



**AM Indication Adjustment (Proceed this adjustment after AM IF alignment)**

**Procedure:**

1. Supply a 600 kHz or 1400 kHz signal to set from an AM signal generator.
2. Change the jumper wire for a maximum reading on the level meter.

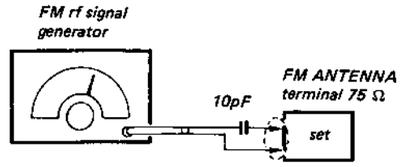



Connect the jumper wire in the numerical order given as shown in the figure when the level meter does not indicate a maximum point.

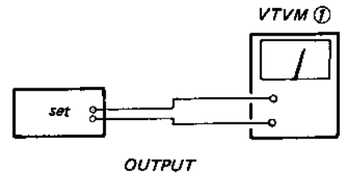


## 3-2. FM SECTION

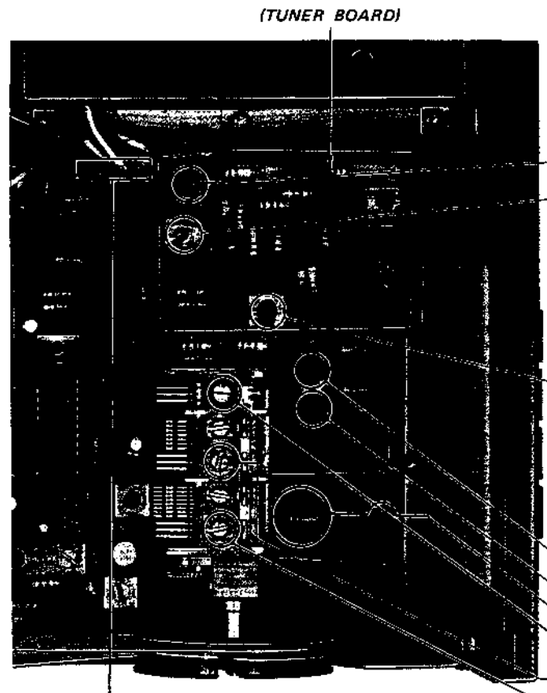
**Setting:** FUNCTION Selector: FM
MODE Selector: MONO




*Modulation: 400 Hz, 75 kHz deviation (100 %)*



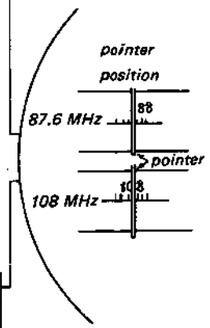

- Repeat the procedures in each adjustment several times, and the frequency coverage and tracking adjustments should be finally done by the trimmer capacitors.

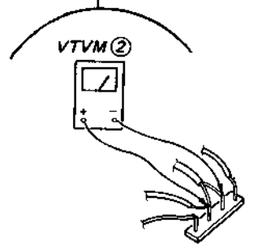



| FM FREQUENCY COVERAGE ADJUSTMENT | |
|---|---|
| Adjust for a maximum reading on VTVM ①. | |
| L106 | 87.6 MHz |
| CT102 | 108 MHz |

| FM IF ALIGNMENT | |
|---|---|
| Adjust for a maximum reading on VTVM ②. | |
| T101 | 10.7 MHz |

| FM TRACKING ADJUSTMENT | |
|---|---|
| Adjust for a maximum reading on VTVM ①. | |
| L104 | 87.6 MHz |
| L103 | |
| L102 | |
| CT103 | 108 MHz |
| CT106 | |
| CT107 | |



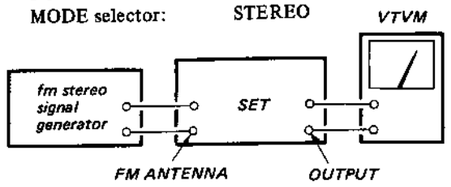



FM SECTION

## FM STEREO SEPARATION ADJUSTMENT

Setup:

FUNCTION selector: FM
MODE selector: STEREO




**FM Stereo Signal Generator Setting:**

Carrier frequency: 98 MHz
Output level: 1 mV (60 dB)
Mode: Stereo
Modulation:
Audio (400 Hz): 67.5 kHz deviation (90%)
Pilot (19 kHz) 7.5 kHz deviation (10%)
Sub channel (38 kHz): 67.5 kHz deviation (90%)

**Procedure:**

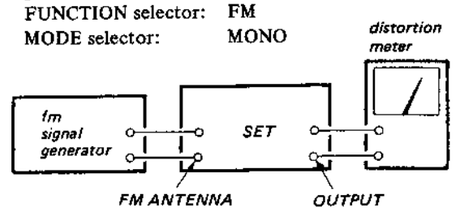
| FM stereo signal generator output channel | VTVM connection | VTVM reading |
|---|---|---|
| L-CH | L-CH | Ⓐ |
| R-CH | L-CH | Ⓑ Adjust RT301 for minimum reading. |
| R-CH | R-CH | Ⓒ |
| L-CH | R-CH | Ⓓ Adjust RT301 for minimum reading. |

Readjust RT301 for minimum difference between left channel separation ( Ⓐ – Ⓑ ) and right channel separation ( Ⓒ – Ⓓ ).

## DISCRIMINATOR ADJUSTMENT

**Setup:**

FUNCTION selector: FM
MODE selector: MONO

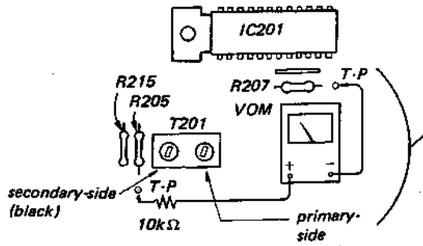



**FM Signal Generator Setting:**

Carrier frequency: 98 MHz
Modulation: 400 Hz, 75 kHz deviation (100%)
Output level: 1 mV (60 dB)

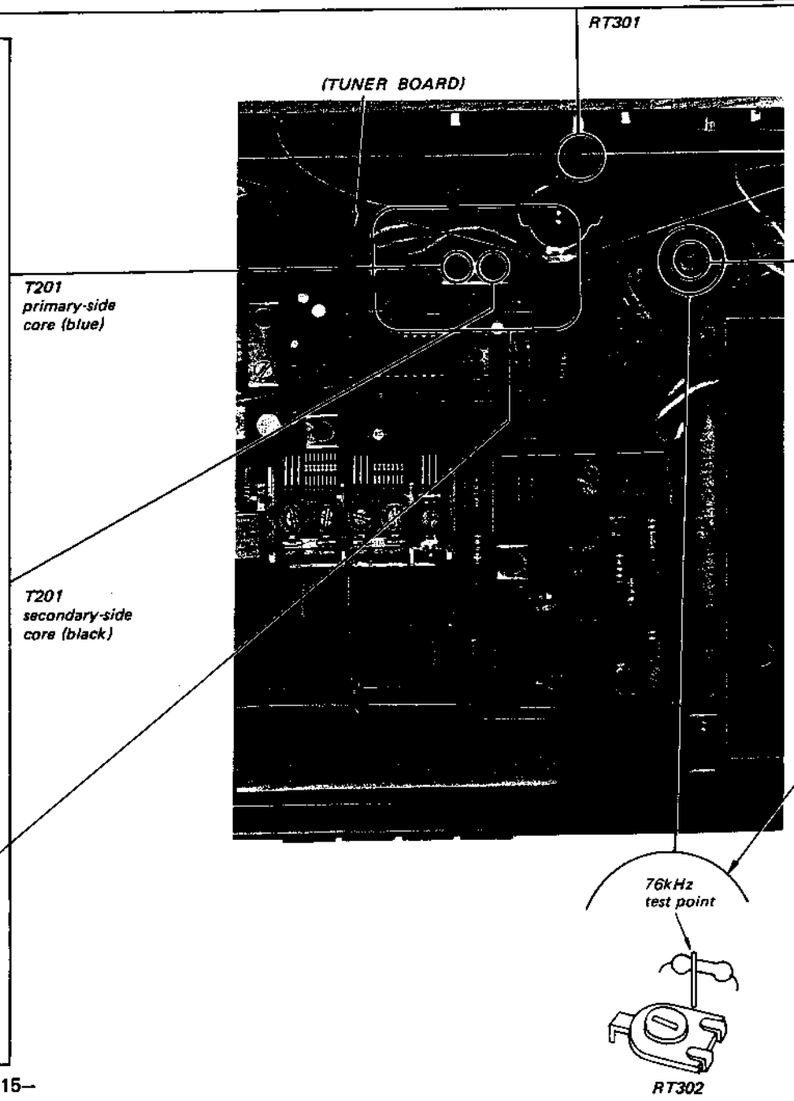
**Procedure:**

1. Secondary-Side of T201
   Tune the set to 98 MHz and adjust the secondary-side core (black) of T201 for minimum reading on the distortion meter.
2. Primary-Side of T201
   1) Detune the set.
   2) Adjust the primary-side core (blue) of T201 for zero reading on the VOM.




*(Perform this procedure when replacing ceramic filter (CF201)).*

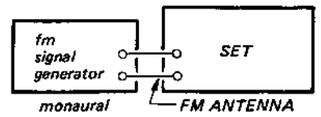
3. Repeat the above steps 1 and 2 several times.




## 76 kHz ADJUSTMENT

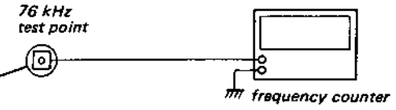
**Setup:** FUNCTION selector: FM
MODE selector: STEREO

**A) Regular Method**




**FM Signal Generator Setting:**

Carrier frequency: 98 MHz
Modulation: no modulation
Output level: 1 mV (60 dB)



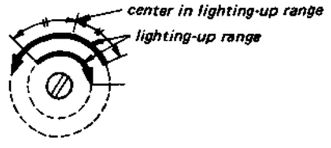

**Procedure:**

1. Tune the set to 98 MHz.
2. Adjust RT302 for 76 kHz ± 100 Hz on the counter.

**B) Simple Method**

**Procedure:**

1. Tune the set to the FM stereo station signal.
2. Turn RT302 clockwise or counterclockwise and memorize the lighting-up range of STEREO lamp.
3. Secure RT302 at the center in lighting-up range of both turns as shown below.



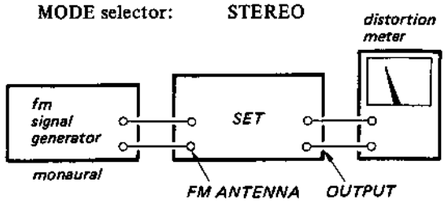
## FM SECTION

### PLL FREQUENCY ADJUSTMENT

(This adjustment should be made after the discriminator adjustment mentioned on page 15.)

**Setup:**

FUNCTION selector: FM
MODE selector: STEREO

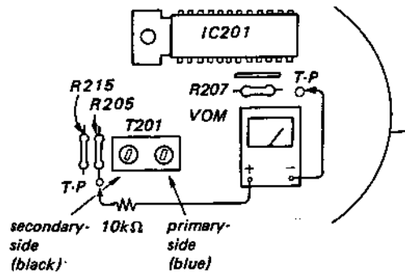



**FM Signal Generator Setting:**

Carrier frequency: 98 MHz
Modulation: 400 Hz, 75 kHz deviation (100 %)
Output level: 1 mV (60 dB)

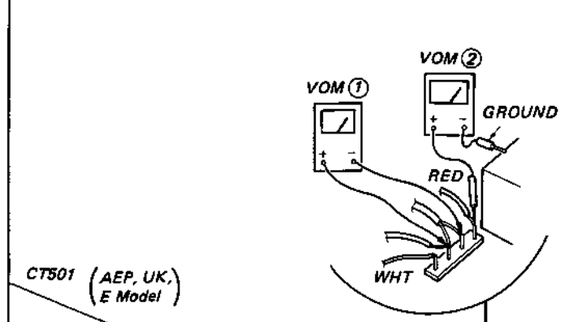
**Procedure:**

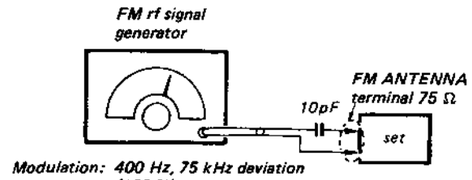
1. Tune the set to 98 MHz and adjust CT501 (AEP, UK, E Model) and CT502 for zero reading on the VOM.
2. Secondary-Side of T201
   1) Detune the set.
   2) Adjust the secondary-side core (black) of T201 for minimum reading on the distortion meter.



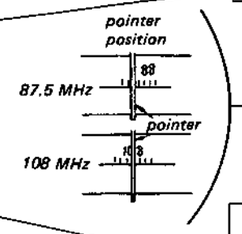

3. Repeat the above steps 1 and 2 several times.

**Setting:** FUNCTION selector: FM
MODE selector: STEREO

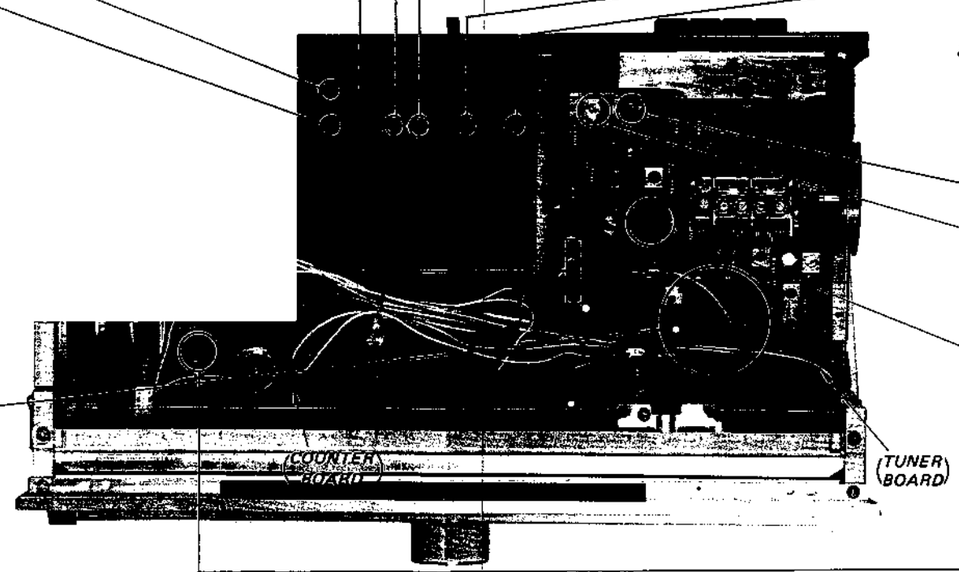



| PLL ALIGNMENT (2) | | |
|---|---|---|
| Adjust for a maximum reading on VOM ①. | | |
| L505 | 132.1 MHz | |
| L506 | | |
| L507 | | |
| L509 | | |




| PLL ALIGNMENT (1) | | |
|---|---|---|
| L105 | 87.5 MHz | Adjust for a 3 V reading on VOM ②. |
| CT101 | 108 MHz | Adjust for a 22 V reading on VOM ②. |
| Repeat the above steps L105 and CT101 several times. | | |

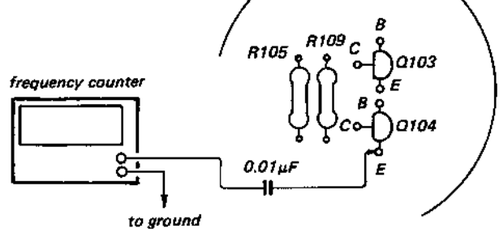


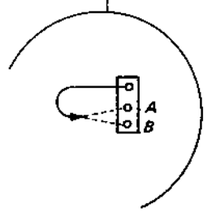

(AEP, UK, E Model)

### FM FREQUENCY DISPLAY ADJUSTMENT

**Note: This adjustment should be made after FM IF adjustment.**

1. Detune the set.
2. Connect the frequency counter to the emitter of Q104.
3. Solder the jumper wire to A point when the frequency is less than 10.7 MHz.
4. Solder the jumper wire to B point when the frequency is more than 10.7 MHz.



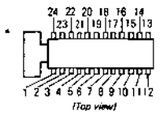



# SECTION 4
# DIAGRAMS

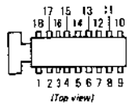
## Replacement Semiconductors

For replacement, use semiconductors except in ( ).

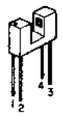
**IC201: CX168**



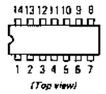
**IC301: CX178**



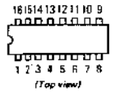
**IC401, 402: SPI201**



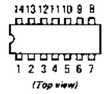
**IC501, 602: M53290P (μPB551C)**



**IC502: MSM5807**

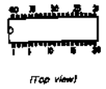


**IC503, 504: MSM4030**

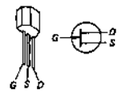


**IC601: μPB551C**

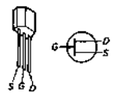
**IC603: MSM5525**



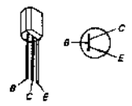
**Q101: 2SK42-3**



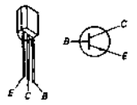
**Q102, 618: 2SK23A-834**



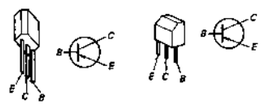
**Q103–107, Q501, 502, Q508–510, Q602 : 2SC710**



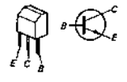
**Q201, 402, Q404, 405, Q407–410, Q411, 412, Q511, 512, Q513–517, Q601, Q603–605, Q608–617, Q621, Q619, 620, Q801 : 2SC1364 (2SC945)**



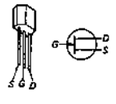
**Q401, 403, 406: 2SA678 (2SA844)**



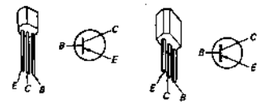
**Q503: 2SC641K**



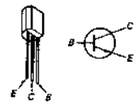
**Q504, 507: 2SK23A-940 (2SK23)**



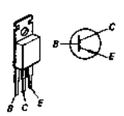
**Q505, 506: 2SA872-D (2SA705)**



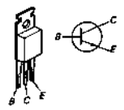
**Q515, 516: 2SC1364 (2SC945)**



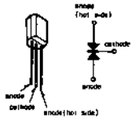
**Q802, 804: 2SC1061 (2SC1419)**



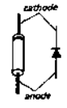
**Q803: 2SC1061**



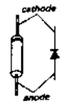
**D101, 102: 1SV55**



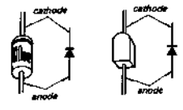
**D201, 202, D301, 303, D401–405, D408–409, D501, D602–609, D807 : 1S1555 (1T40)**



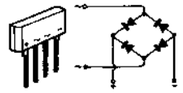
**D601: EQB01-09**



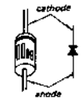
**D801–803: 10E2 (RA-1Z)**



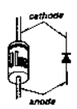
**D804: SIVB10**



**D805: EQB01-30 (EQA01-30R)**



**D806: EQB01-06 (EQA01-06R)**





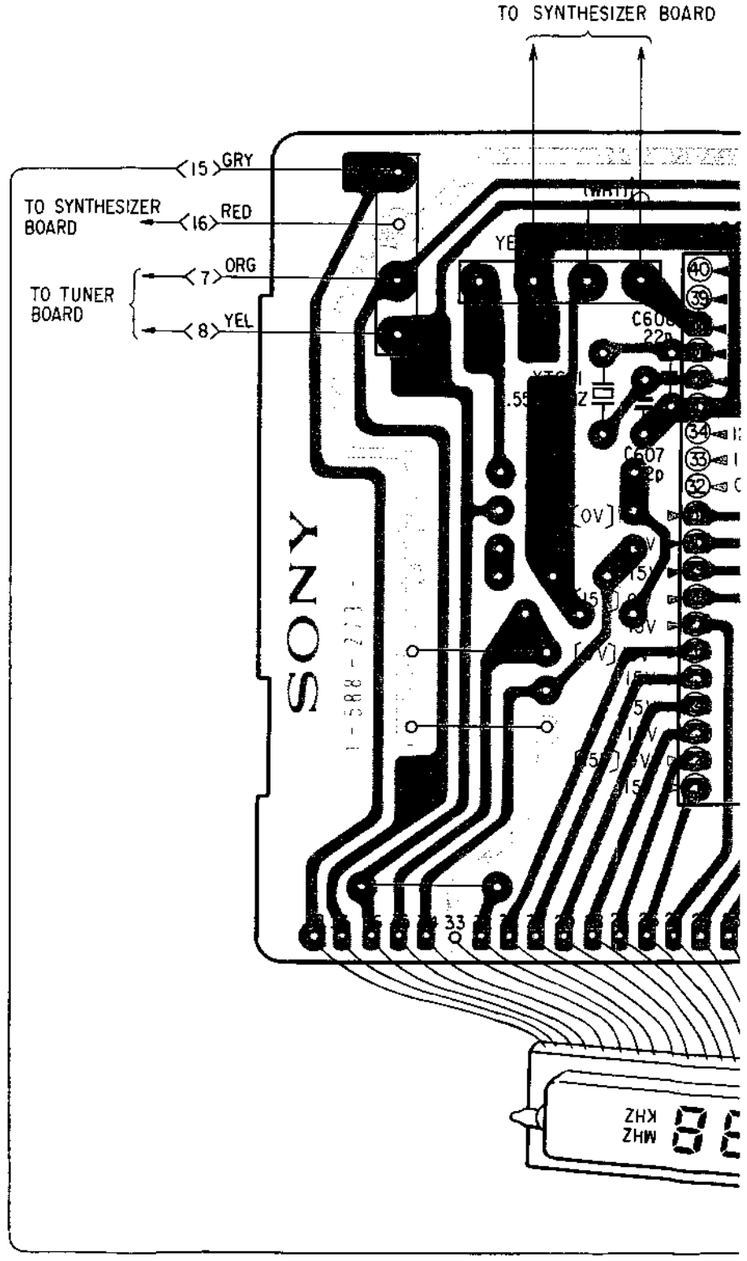
## 4-1. MOUNTING DIAGRAM – Counter Board –

*– Conductor Side –*

*Canadian Model*

**Refer to P. 25 for the AEP, UK, E Model.**

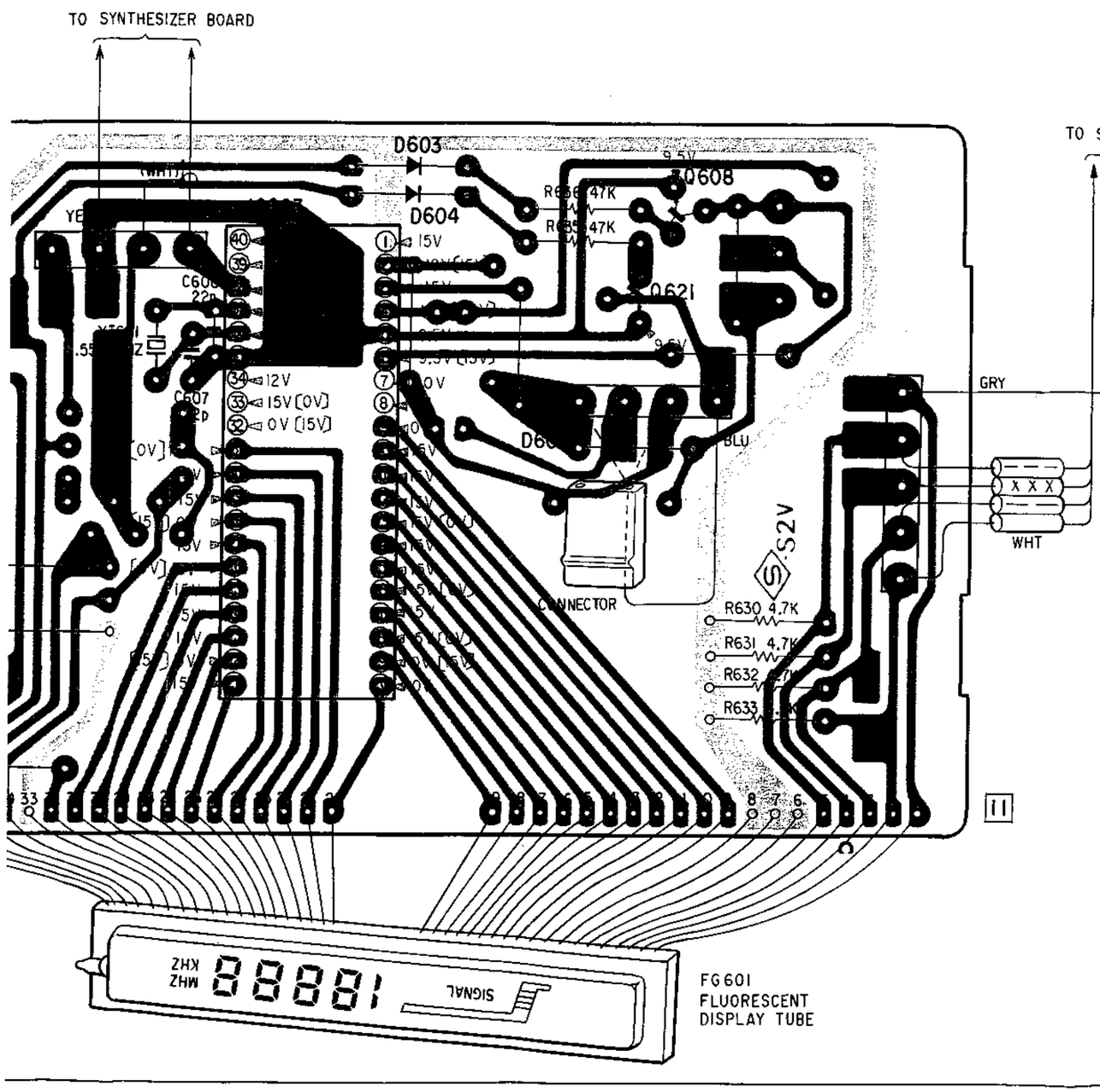
| | |
|---|---|
| D | |
| Q<br>IC | |

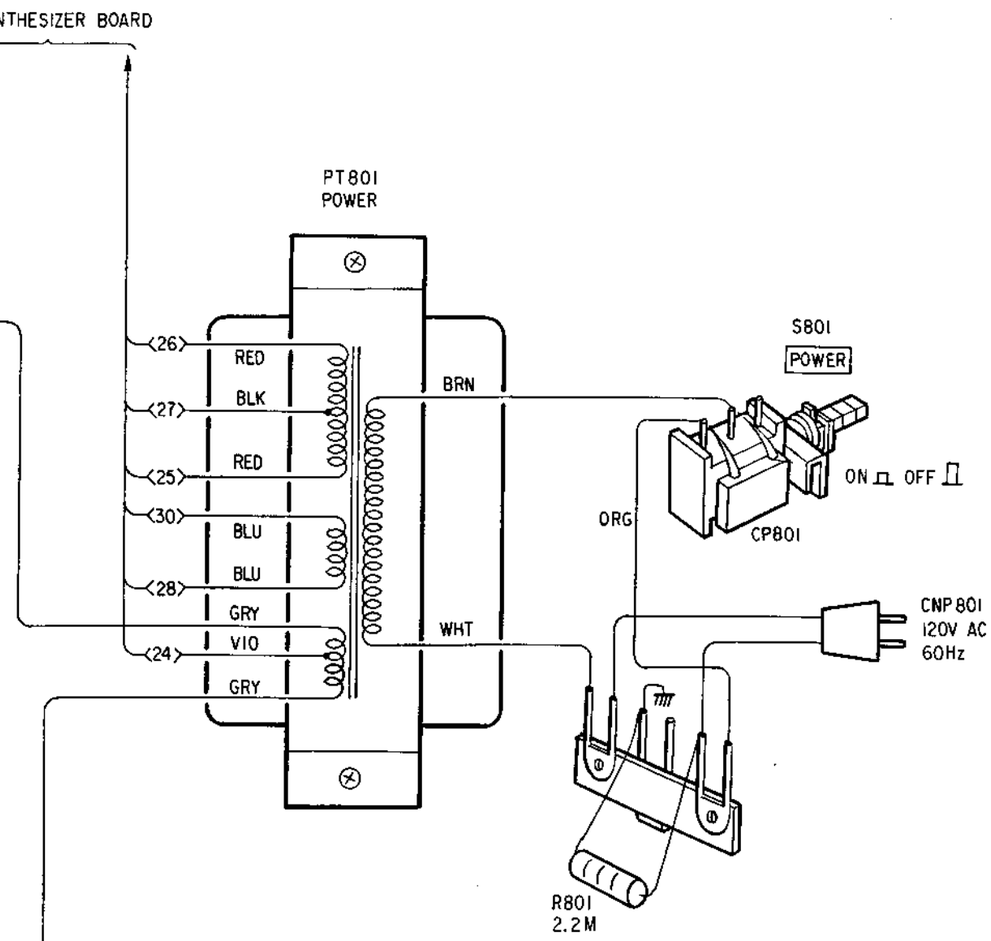


*Model* *Canadian Model*

| | | |
|---|---|---|
| | 603<br>604 | 602 |
| IC603 | | 621 608 |

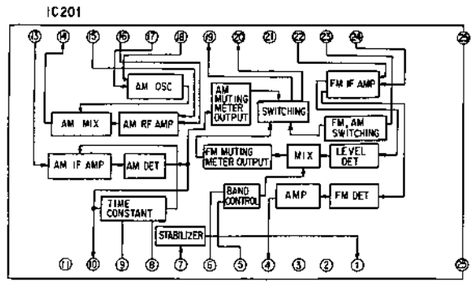
**Note:**
- ▭: adjustment for repair.
- ▨: B+ pattern.
- Readings are taken under no signal (detuned) conditions with a VOM (20 kΩ/V).
  no mark : FM (87.5 MHz)
  ( ) : AM (530 kHz)

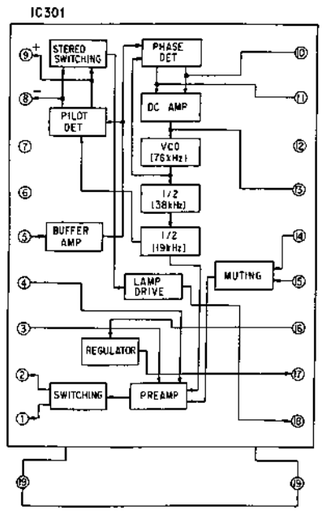


## 4-2. MOUNTING DIAGRAM — Tuner, Synthesizer, Counter, Photo interrupter, Code and Fuse Board —

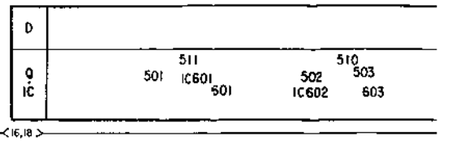
*Conductor Side —*

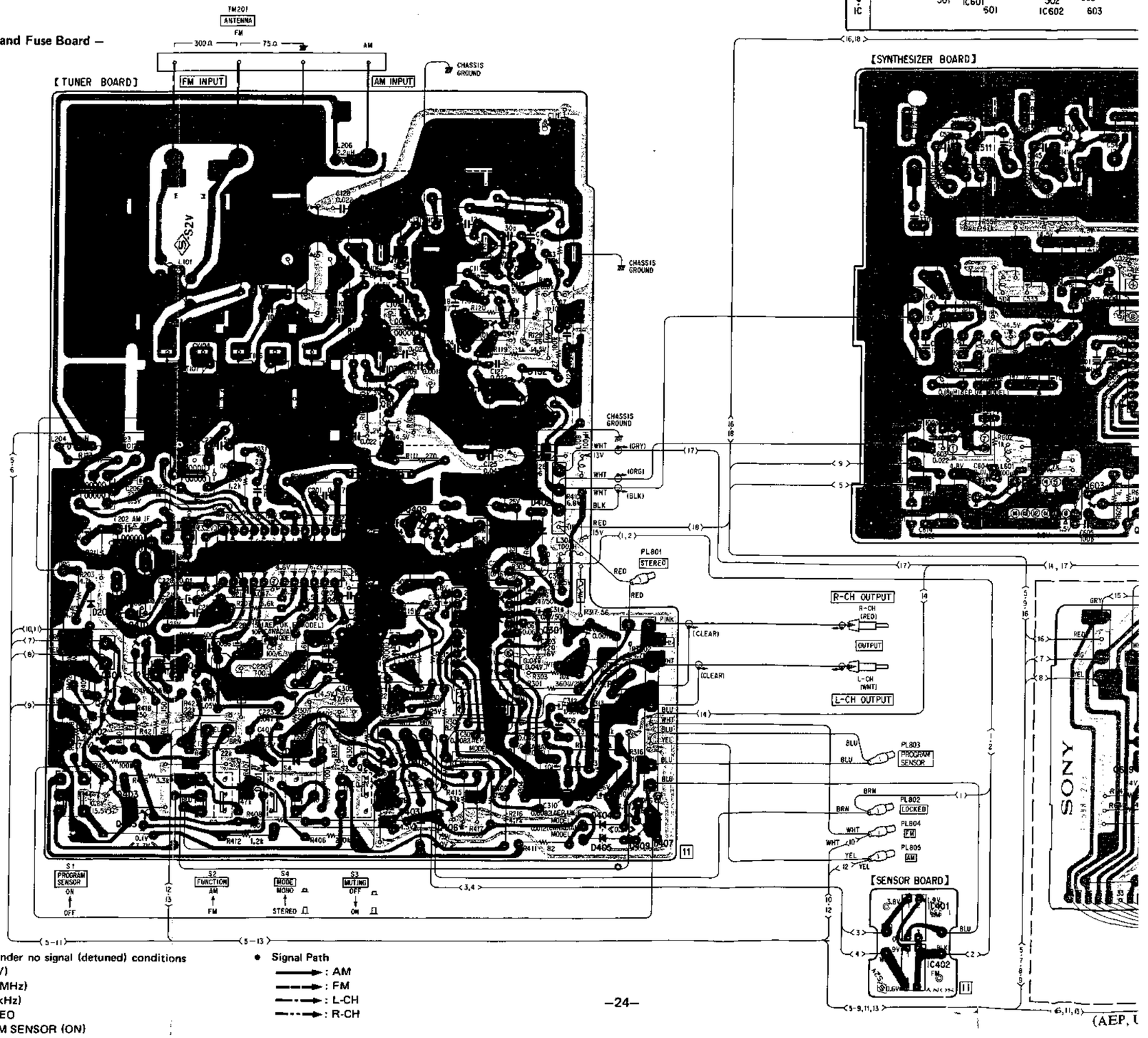



| D | Q, IC |
|---|---|
| | 1 |
| | 102 105 |
| | 101 106 |
| | 107 |
| 102 | 103 |
| | 104 |
| 201 | 409 407 |
| 402 | 412 IC201 |
| 202 | 301 IC301 |
| 406 | 410 |
| | 411 |
| | 404 |
| | 401 |
| | 402 |
| 408 302 401 | 201 408 |
| | 403 |
| 407 403 404 405 | 406 405 409 |

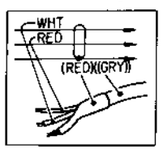
| D | Q, IC |
|---|---|




**Note:**

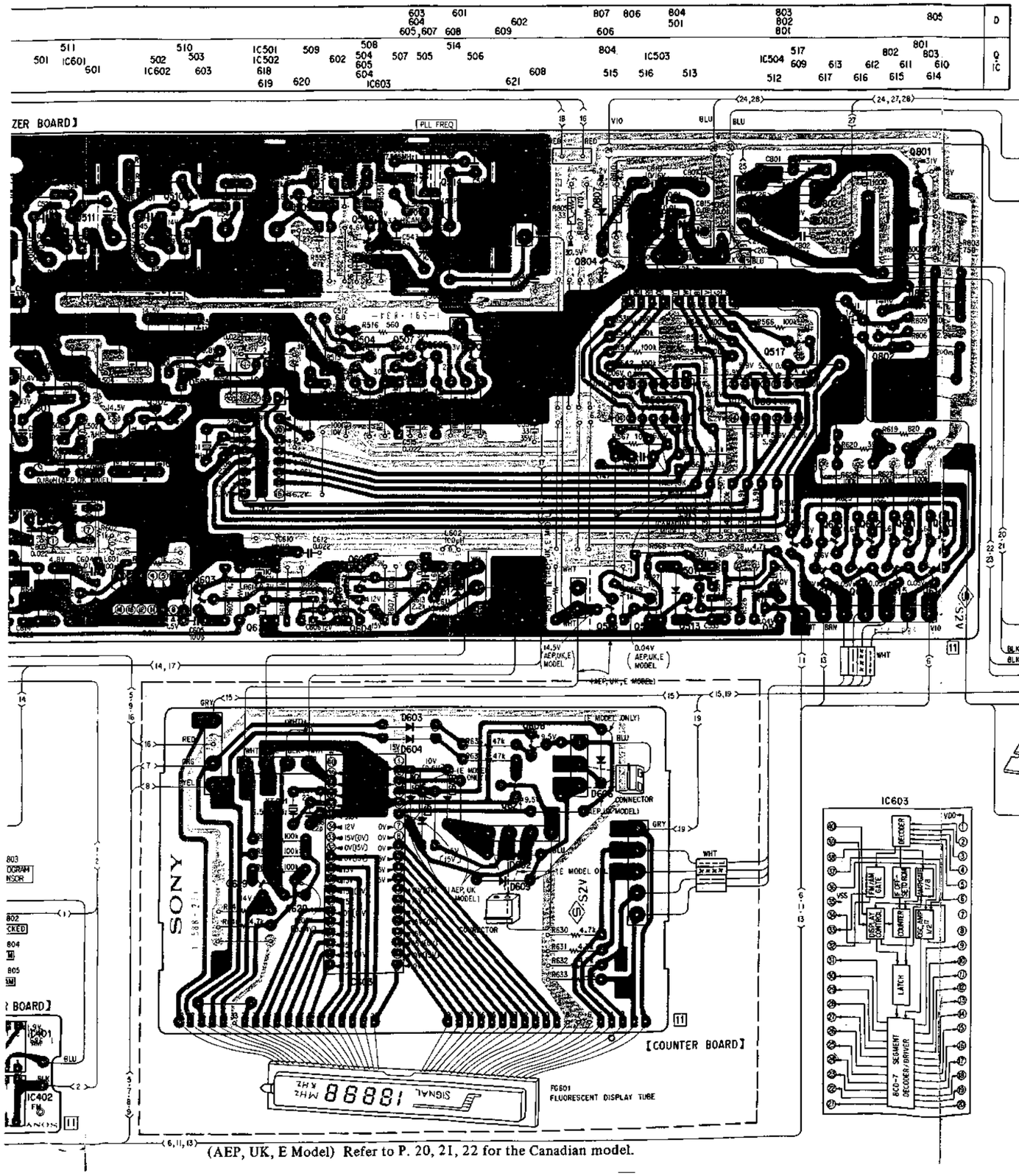
- Color code of sleeving over the end of the jacket.




- ▭▪: indicates side identified with part number.
- ▪ : part mounted on the conductor side.
- ▭ : adjustment for repair.
- ▨ : B+ pattern.

- Readings are taken under no signal (detuned) conditions with a VOM (20 kΩ/V)
  no mark : FM (38.5 MHz)
  〔 〕 : AM (530 kHz)
  ( ) : FM STEREO
  ≪ ≫ : PROGRAM SENSOR (ON)

- Signal Path
  ——▶ : AM
  ▬▬▶ : FM
  —·—▶ : L-CH
  —··—▶ : R-CH

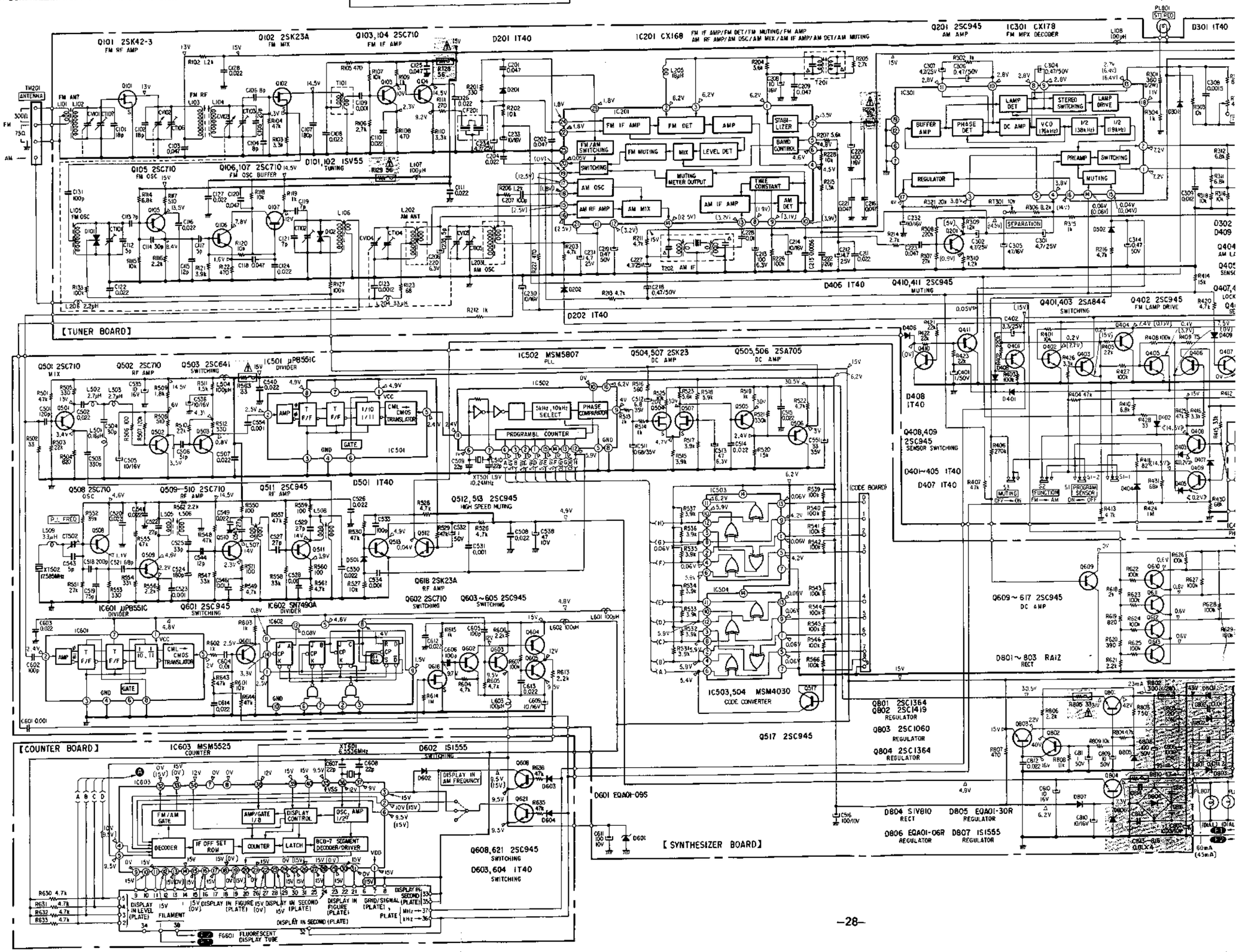


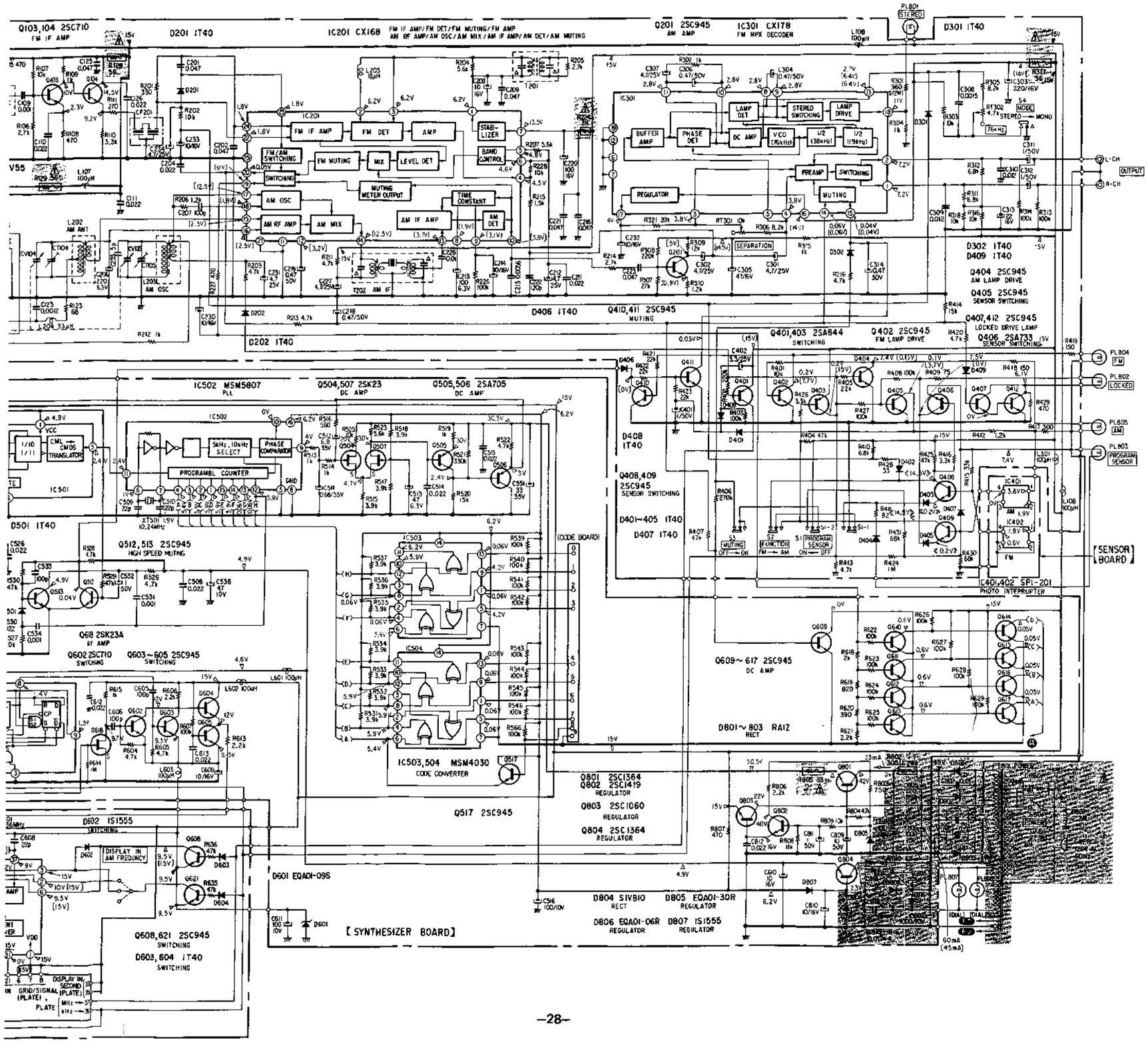

Refer to page 22 for Canadian Model.

(AEP, UK, E Model) Refer to P. 20, 21, 22 for the Canadian model.

*Canadian Model*

## 4-3. SCHEMATIC DIAGRAM






## Canadian Model

**Note:**

- Tuner reference numbers are not included in the Electrical Parts List.
- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics.
- All resistors are in ohms, ¼W unless otherwise noted. kΩ : 1000Ω, MΩ : 1000kΩ
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ▭ : fusible resistor.
- △ : internal component.
- ▭ : panel designation.
- ▭ : adjustment for repair.
- ○ —— : B+ bus.
- ○ Readings are taken under no signal (detuned) conditions with a VOM (20 kΩ/V).
  - no mark : FM (87.5 MHz)
  - ( ) : AM (530 kHz)
  - ( ) : FM STEREO
  - < > : PROGRAM SENSOR (ON)
- Switch

| Ref. No. | Switch | Position |
|---|---|---|
| S1 | PROGRAM SENSOR | OFF |
| S2 | FUNCTION | FM |
| S3 | MUTING | OFF |
| S4 | MODE | STEREO |
| S801 | POWER | OFF |

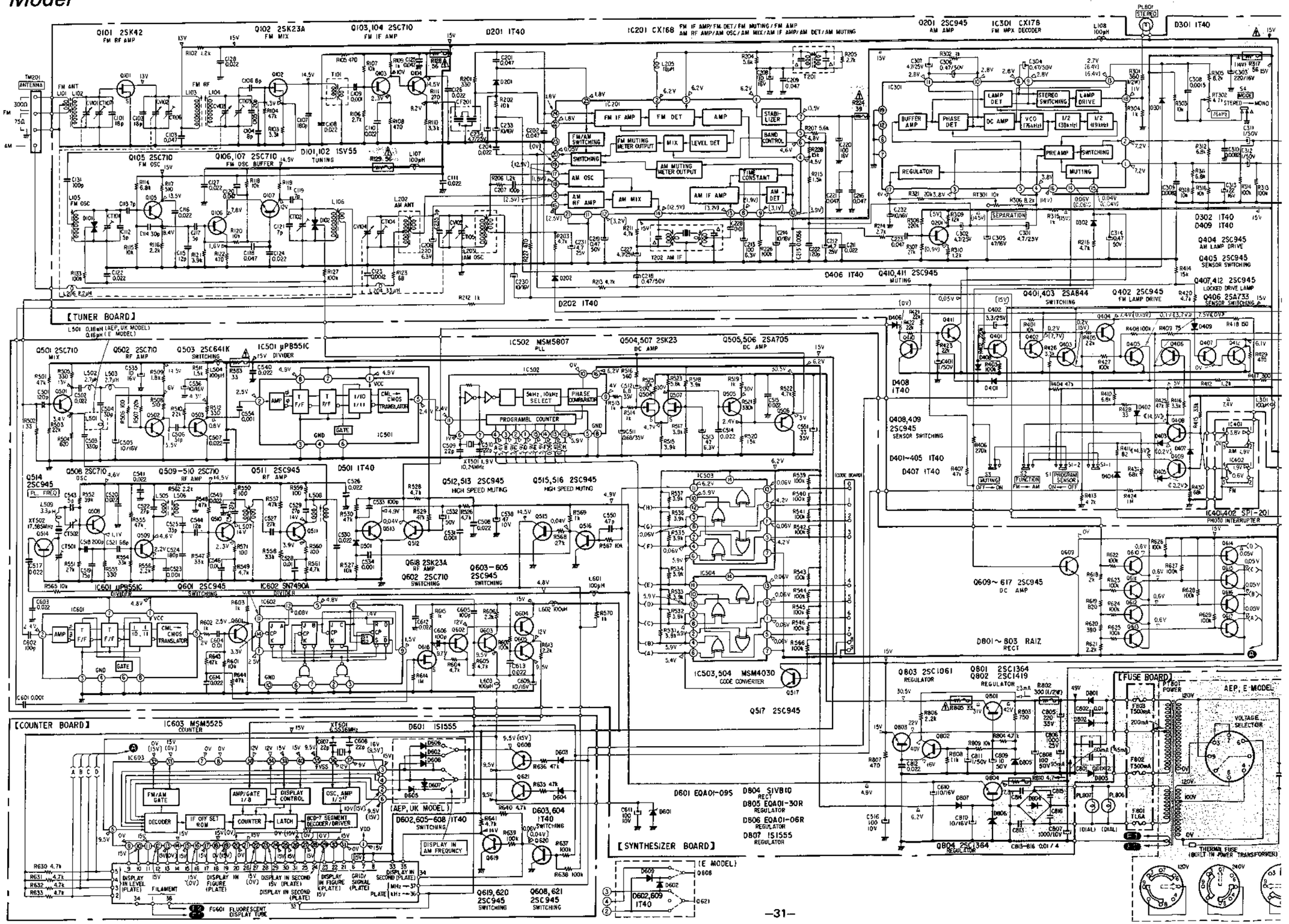
**Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.**

**Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.**

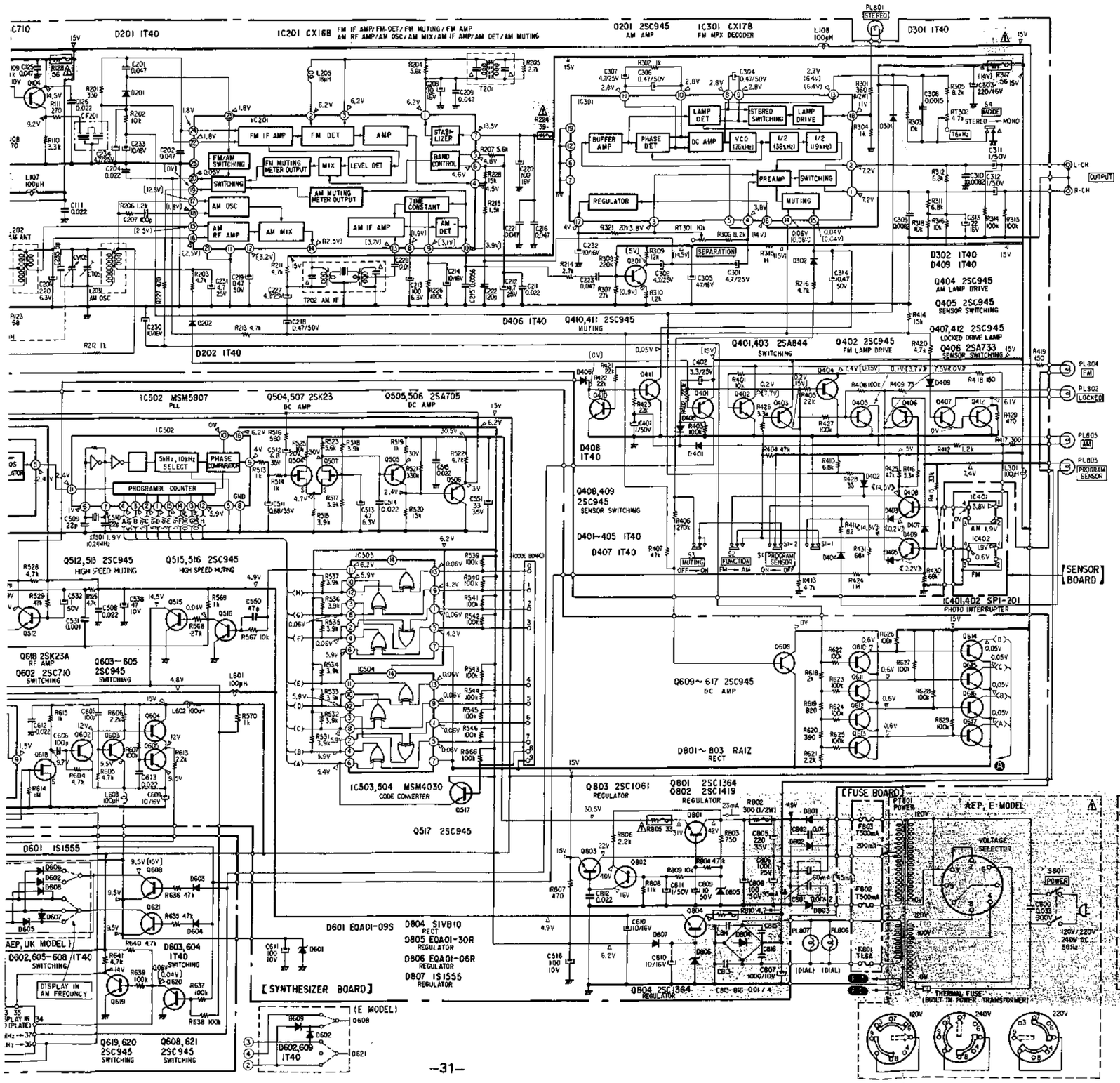
# AEP, UK, E Model

ST-515 ST-515

## 4-4. SCHEMATIC DIAGRAM



# AEP, UK, E Model




**Note:**

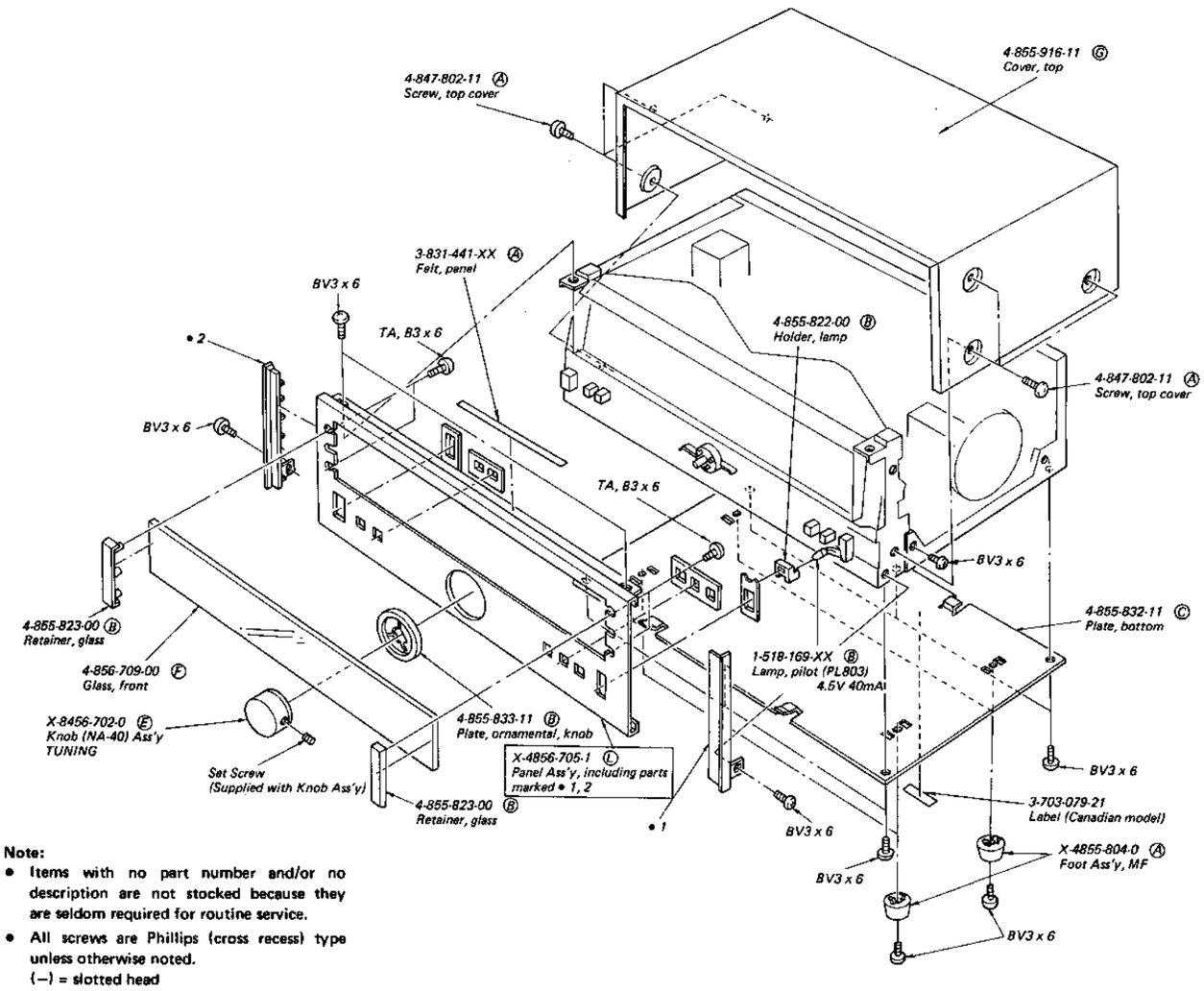
- Tuner reference numbers are not included in the Electrical Parts List.
- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics.
- All resistors are in ohms, ¼W unless otherwise noted. kΩ : 1000Ω, MΩ : 1000kΩ
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ⎓ : fusible resistor.
- △ : internal component.
- ▭ : panel designation.
- ▭ : adjustment for repair.
- ○ —— : B+ bus.
- ○ Readings are taken under no signal (detuned) conditions with a VOM (20 kΩ/V).
  - no mark : FM (87.5 MHz)
  - [ ] : AM (530 kHz)
  - ( ) : FM STEREO
  - ≪ ≫ : PROGRAM SENSOR (ON)
- Switch

| Ref. No. | Switch | Position |
|---|---|---|
| S1 | PROGRAM SENSOR | OFF |
| S2 | FUNCTION | FM |
| S3 | MUTING | OFF |
| S4 | MODE | STEREO |
| S801 | POWER | OFF |

**Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.**

**Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.**

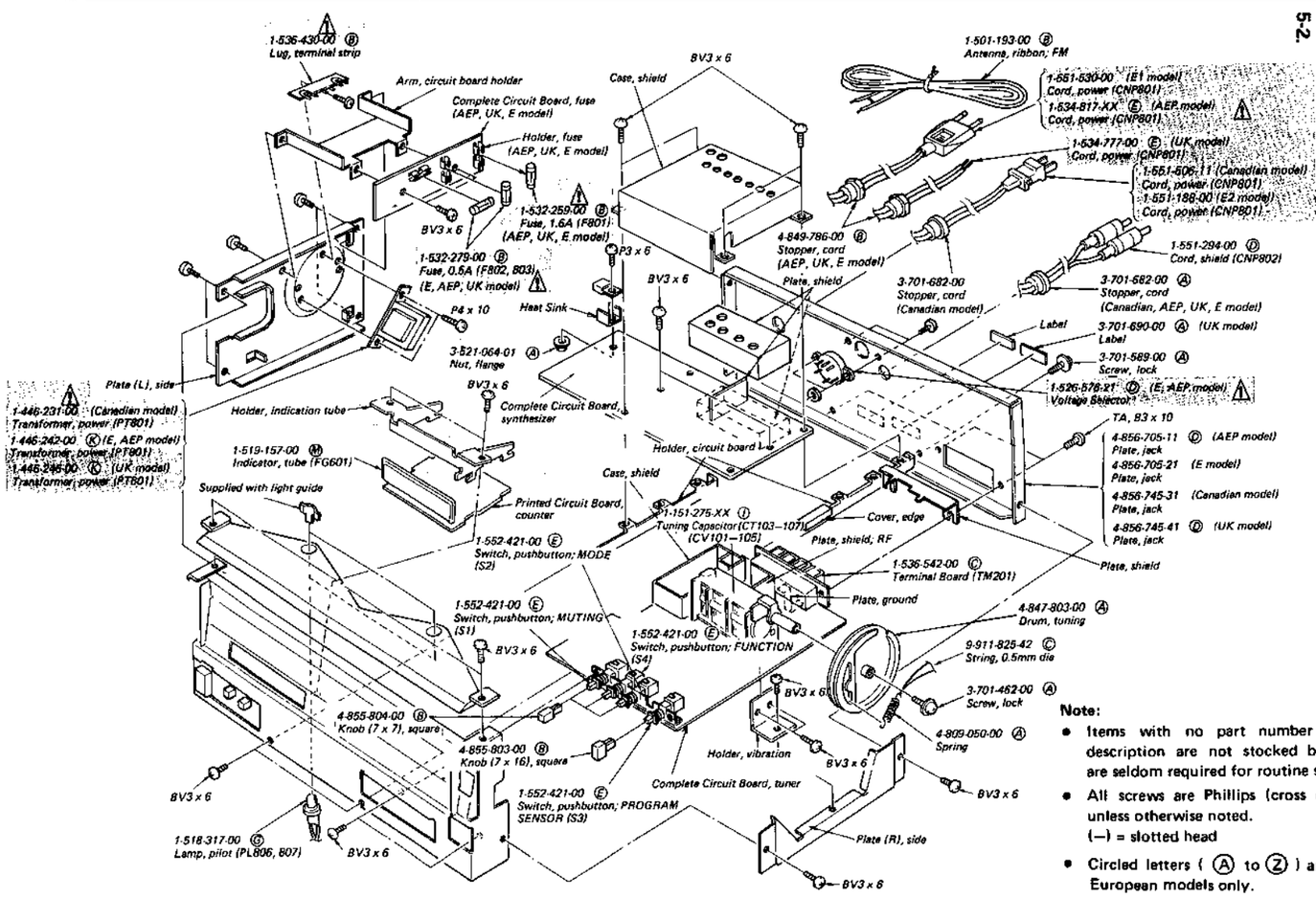
5-1.




**Note:**

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (–) = slotted head
- Circled letters ( Ⓐ to Ⓩ ) are applicable to European models only.

5-2.

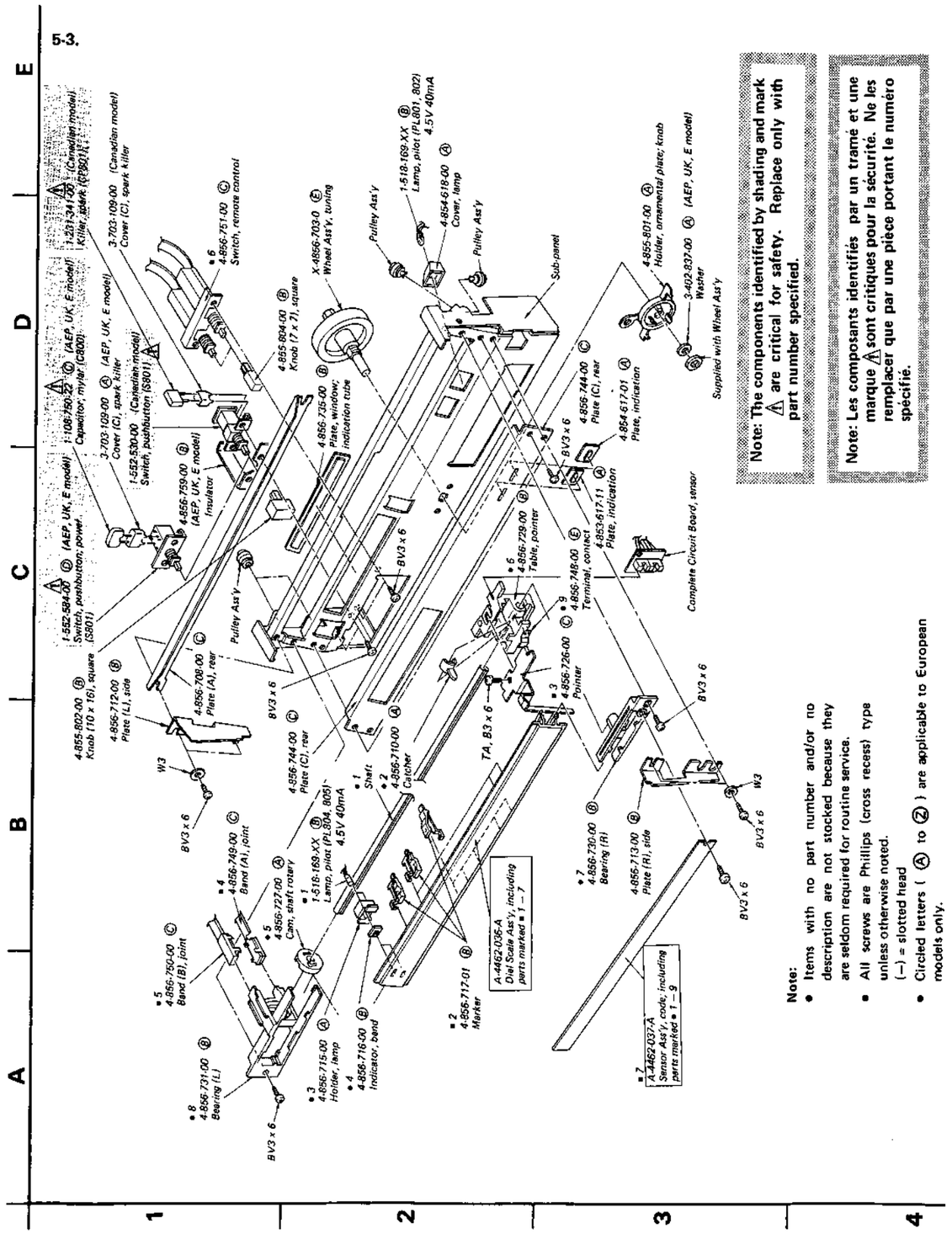



**Note:**

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (–) = slotted head
- Circled letters ( Ⓐ to Ⓩ ) are applicable to European models only.

**Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.**

**Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.**




Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.



# SECTION 6
# ELECTRICAL PARTS LIST

Note:
• Circled letters ( Ⓐ to Ⓩ ) are applicable to European models only.

| Ref. No. | Part No. | | Description |
|---|---|---|---|
| | | | **SEMICONDUCTORS** |
| | | | **ICs** |
| IC201 | 8-751-680-01 | Ⓘ | CX168 |
| IC301 | 8-751-780-00 | Ⓖ | CX178 |
| IC401, 402 | 8-719-902-01 | Ⓓ | SPI201 |
| ⇒IC501 | 8-759-632-90 | Ⓔ | M53290P |
| IC502 | 8-759-958-07 | Ⓙ | MSM5807 |
| IC503, 504 | 8-759-940-30 | Ⓒ | MSM4030 |
| IC601 | 8-759-155-10 | Ⓙ | μPB551C |
| ⇒IC602 | 8-759-632-90 | Ⓔ | M53290P |
| IC603 | 8-759-955-25 | Ⓜ | MSM5525 |
| | | | **Transistors** |
| Q101 | 8-727-313-00 | Ⓒ | 2SK42-3 |
| Q102 | 8-722-383-40 | Ⓑ | 2SK23A-834 |
| Q103–107 | 8-729-671-13 | Ⓑ | 2SC710 |
| ⇒Q201 | 8-729-663-47 | Ⓑ | 2SC1364 |
| ⇒Q401 | 8-727-788-00 | Ⓑ | 2SA678 |
| ⇒Q402 | 8-729-663-47 | Ⓑ | 2SC1364 |
| ⇒Q403 | 8-727-788-00 | Ⓑ | 2SA678 |
| ⇒Q404, 405 | 8-729-663-47 | Ⓑ | 2SC1364 |
| ⇒Q406 | 8-727-788-00 | Ⓑ | 2SA678 |
| ⇒Q407–412 | 8-729-663-47 | Ⓑ | 2SC1364 |
| Q501, 502 | 8-729-671-13 | Ⓑ | 2SC710 |
| Q503 | 8-729-364-12 | Ⓒ | 2SC641K |
| ⇒Q504 | 8-722-394-60 | Ⓑ | 2SK23A-940 |
| ⇒Q505, 506 | 8-729-387-27 | Ⓑ | 2SA872-D |
| ⇒Q507 | 8-722-394-60 | Ⓑ | 2SK23A-940 |
| Q508–510 | 8-729-671-13 | Ⓑ | 2SC710 |
| ⇒Q511–513 | 8-729-663-47 | Ⓑ | 2SC1364 |
| ⇒Q514–516 | 8-729-663-47 | Ⓑ | 2SC1364 (AEP, UK, E model) |
| ⇒Q517 | 8-729-663-47 | Ⓑ | 2SC1364 |
| ⇒Q601 | 8-729-663-47 | Ⓑ | 2SC1364 |
| Q602 | 8-729-671-13 | Ⓑ | 2SC710 |
| ⇒Q603–605 | 8-729-663-47 | Ⓑ | 2SC1364 |
| ⇒Q608–617 | 8-729-663-47 | Ⓑ | 2SC1364 |
| Q618 | 8-722-383-40 | Ⓑ | 2SK23A-834 |
| ⇒Q619, 620 | 8-729-663-47 | Ⓑ | 2SC1364 (AEP, UK, E model) |
| ⇒Q621 | 8-729-663-47 | Ⓑ | 2SC1364 |
| ⇒Q801 | 8-729-663-47 | Ⓑ | 2SC1364 |
| ⇒Q802, 804 | 8-729-316-12 | Ⓒ | 2SC1061 |
| Q803 | 8-729-316-12 | Ⓒ | 2SC1061 |
| | | | **Diodes** |
| ⇒D201, 202<br>⇒D301, 303<br>⇒D401–405<br>⇒D408, 409<br>⇒D501 | 8-719-815-55 | Ⓐ | 1S1555 |
| D601 | 8-719-931-09 | Ⓑ | EQB01-09 |
| D602 | 8-719-815-55 | | 1S1555 (Canadian model) |
| ⇒D602 | 8-719-815-55 | Ⓐ | 1S1555 (AEP, UK, E model) |
| ⇒D603, 604 | 8-719-815-55 | Ⓐ | 1S1555 |
| ⇒D605 | 8-719-815-55 | Ⓐ | 1S1555 (AEP, UK, E model) |
| ⇒D606 | 8-719-815-55 | Ⓐ | 1S1555 (AEP, UK model) |
| ⇒D607, 608 | 8-719-815-55 | Ⓐ | 1S1555 (AEP, UK, E model) |
| ⇒D609 | 8-719-815-55 | | 1S1555 (E model) |
| ⇒D801–803 | ⚠8-719-200-02 | Ⓑ | 10E2 |
| D804 | ⚠8-719-511-10 | Ⓑ | SIVB10 |
| ⇒D805 | 8-719-931-30 | Ⓑ | EQB01-30 |
| ⇒D806 | ⚠8-719-931-06 | Ⓐ | EQB01-06 |
| D807 | 8-719-815-55 | Ⓐ | 1S1555 |
| | | | **COILS** |
| L103, 104 | 1-425-903-00 | Ⓑ | FM RF2 |
| L107, 108 | 1-407-169-XX | Ⓐ | 100μH |
| L202 | 1-401-731-00 | Ⓑ | Antenna |
| L203 | | | AM OSC |
| L204 | 1-407-163-XX | Ⓐ | 33μH |
| L205 | 1-407-741-00 | Ⓐ | 18μH |
| L206 | 1-407-182-XX | Ⓐ | 2μH |
| L301 | 1-407-169-XX | Ⓐ | 100μH |
| L502, 503 | 1-407-183-XX | Ⓐ | 2.7μH |
| L504 | 1-407-169-XX | Ⓐ | 100μH |
| L505, 506 | 1-459-221-00 | Ⓑ | Core |
| L507, 508 | 1-425-902-00 | Ⓑ | FM RF1 |
| L509 | 1-407-184-XX | Ⓐ | 3.3μH |
| L601–603 | 1-407-169-XX | Ⓐ | 100μH |

• ⇒: Due to standardization, interchangeable replacements may be substituted for parts specified in the diagrams.

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

• Circled letters ( Ⓐ to Ⓩ ) are applicable to European models only.

| Ref. No. | Part No. | Description |
|---|---|---|
| | | **TRANSFORMERS & FILTERS** |
| CF201 | 1-527-277-11 | Ⓖ Filter, solid state 10.7MHz (AEP, Canadian, UK model) |
| | 1-527-278-XX | Filter, solid state 10.7MHz (E model) |
| PT801 | ⚠1-446-242-00 | Ⓚ Transformer, power (E, AEP model) |
| | ⚠1-446-246-00 | Ⓚ Transformer, power (UK model) |
| | ⚠1-446-231-00 | Transformer, power (Canadian model) |
| T101 | 1-403-295-12 | Ⓑ IFT |
| T201 | 1-404-011-00 | Ⓒ Transformer, discri, FM |
| T202 | 1-404-086-00 | IFT (E model) |
| | 1-404-087-00 | Ⓒ IFT (AEP, Canadian, UK model) |
| | | **CAPACITORS** |
| | | All capacitors are in μF and ceramic unless otherwise noted. 50WV or less are not indicated except for electrolytics. pF : μμF, elect : electrolytic |
| C101, 102 | 1-102-953-00 | Ⓐ 18p |
| C103 | 1-101-006-00 | Ⓐ 0.047 |
| C104 | 1-102-945-00 | Ⓐ 8p |
| C105 | 1-102-958-00 | Ⓐ 20p |
| C106 | 1-102-945-00 | Ⓐ 8p |
| C107 | 1-102-848-00 | Ⓐ 180p |
| C108 | 1-101-005-00 | Ⓐ 0.022 |
| C109 | 1-101-455-00 | Ⓐ 0.001 |
| C110, 111 | 1-101-005-00 | Ⓐ 0.022 |
| C112 | 1-102-856-00 | Ⓐ 5p |
| C113 | 1-102-662-00 | Ⓐ 7p |
| C114 | 1-102-673-00 | Ⓐ 30p |
| C115 | 1-102-666-00 | Ⓐ 12p |
| C116 | 1-101-005-00 | Ⓐ 0.022 |
| C117 | 1-101-005-00 | Ⓐ 0.022 (AEP, UK, E model) |
| C117 | 1-102-856-00 | Ⓐ 5p |
| C118 | 1-101-006-00 | Ⓐ 0.047 |
| C119 | 1-102-662-00 | Ⓐ 7p |
| C120 | 1-101-006-00 | Ⓐ 0.047 |
| C121 | 1-102-662-00 | Ⓐ 7p |

**Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.**

| Ref. No. | Part No. | Description | | |
|---|---|---|---|---|
| C122 | 1-101-005-00 | Ⓐ 0.022 | | |
| C123 | 1-102-118-00 | Ⓐ 0.0012 | | |
| C124 | 1-101-005-00 | Ⓐ 0.022 | | |
| C125 | 1-101-006-00 | Ⓐ 0.047 | | |
| C126–128 | 1-101-005-00 | Ⓐ 0.022 | | |
| C131 | 1-102-106-00 | Ⓐ 100p | | |
| C201, 202 | 1-101-006-00 | Ⓐ 0.047 | | |
| C204 | 1-101-005-00 | Ⓐ 0.022 | | |
| C206 | 1-121-419-00 | Ⓐ 220 | 6.3V | elect |
| C207 | 1-102-975-00 | Ⓐ 100p | | |
| C208 | 1-121-651-00 | Ⓐ 10 | 16V | elect |
| C209 | 1-101-006-00 | Ⓐ 0.047 | | |
| C211 | 1-101-005-00 | Ⓐ 0.022 | | |
| C212 | 1-121-395-00 | Ⓐ 4.7 | 25V | elect |
| C213 | 1-121-414-00 | Ⓐ 100 | 6.3V | elect |
| C214 | 1-121-651-00 | Ⓐ 10 | 16V | elect |
| C215 | 1-108-355-00 | Ⓐ 0.0056 | | mylar |
| C216 | 1-101-006-00 | Ⓐ 0.047 | | |
| C218, 219 | 1-121-726-00 | Ⓐ 0.47 | 50V | elect |
| C220 | 1-121-415-00 | Ⓐ 100 | 16V | elect |
| C221 | 1-101-006-21 | Ⓐ 0.047 | | |
| C222 | 1-102-816-00 | Ⓐ 120p | | |
| C223 | 1-108-246-00 | Ⓐ 0.047 | | mylar |
| C227 | 1-121-395-11 | Ⓐ 4.7 | 25V | elect |
| C228 | 1-101-004-21 | Ⓐ 0.01 | | |
| C230 | 1-121-651-11 | Ⓐ 10 | 16V | elect |
| C231 | 1-121-395-11 | Ⓐ 4.7 | 25V | elect |
| C232, 233 | 1-121-651-11 | Ⓐ 10 | 16V | elect |
| C234 | 1-121-395-11 | Ⓐ 4.7 | 25V | elect |
| C235 | 1-102-998-11 | Ⓐ 5p | | |
| C301, 302 | 1-121-395-11 | Ⓐ 4.7 | 25V | elect |
| C303 | 1-121-419-11 | Ⓐ 220 | 6.3V | elect |
| C304 | 1-121-726-11 | Ⓐ 0.47 | 50V | elect |
| C305 | 1-121-409-11 | Ⓐ 47 | 16V | elect |
| C306 | 1-121-726-11 | Ⓐ 0.47 | 50V | elect |
| C307 | 1-121-395-11 | Ⓐ 4.7 | 25V | elect |
| C308 | 1-104-081-00 | Ⓐ 0.0015 | | styrol |
| C309, 310 | 1-101-004-21 | Ⓐ 0.01 | | |
| C311, 312 | 1-121-391-11 | Ⓐ 1 | 50V | elect |
| C313 | 1-121-479-11 | Ⓐ 22 | 16V | elect |

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• Circled letters ( Ⓐ to Ⓩ ) are applicable to European models only.

| Ref. No. | Part No. | Description | | |
|---|---|---|---|---|
| C314 | 1-121-726-11 | Ⓐ 0.47 | 50V | elect |
| C401 | 1-121-391-11 | Ⓐ 1 | 50V | elect |
| C402 | 1-121-392-11 | Ⓐ 3.3 | 25V | elect |
| C501 | 1-102-816-00 | Ⓐ 120p | | |
| C502 | 1-101-005-21 | Ⓐ 0.022 | | |
| C503 | 1-102-820-00 | Ⓐ 330p | | |
| C504 | 1-102-962-00 | Ⓐ 30p | | |
| C505 | 1-121-651-11 | Ⓐ 10 | 16V | elect |
| C506 | 1-101-882-00 | Ⓐ 51p | | |
| C507, 508 | 1-101-005-21 | Ⓐ 0.022 | | |
| C509, 510 | 1-102-959-00 | Ⓐ 22p | | |
| C511 | 1-131-407-00 | Ⓑ 0.68 | 35V | tantalum |
| C512 | 1-131-352-00 | Ⓑ 6.8 | 35V | tantalum |
| C513 | 1-131-387-11 | Ⓑ 47 | 6.3V | tantalum |
| C514, 515 | 1-101-005-21 | Ⓐ 0.022 | | |
| C516 | 1-121-414-11 | Ⓐ 100 | 10V | elect |
| C517 | 1-101-005-21 | Ⓐ 0.002 | | |
| C518 | 1-102-977-00 | Ⓐ 200p | | |
| C519 | 1-101-890-21 | Ⓐ 75p | | |
| C520 | 1-101-005-21 | Ⓐ 0.022 | | |
| C521 | 1-101-888-00 | Ⓐ 68p | | |
| C522 | 1-102-516-51 | Ⓐ 27p | | |
| C523 | 1-102-074-21 | Ⓐ 0.001 | | |
| C524 | 1-102-976-00 | Ⓐ 180p | | |
| C525 | 1-102-518-51 | Ⓐ 33p | | |
| C526 | 1-101-005-21 | Ⓐ 0.022 | | |
| C527 | 1-102-516-51 | Ⓐ 27p | | |
| C528 | 1-101-004-21 | Ⓐ 0.01 | | |
| C529 | 1-102-516-51 | Ⓐ 27p | | |
| C530 | 1-101-005-00 | Ⓐ 0.022 | | |
| C531 | 1-101-074-21 | Ⓐ 0.001 | | |
| C532 | 1-121-391-11 | Ⓐ 1 | 50V | elect |
| C533 | 1-102-975-00 | Ⓐ 100p | | |
| C534 | 1-102-074-21 | Ⓐ 0.001 | | |
| C535, 536 | 1-121-651-00 | Ⓐ 10 | 16V | elect |
| C538 | 1-121-352-11 | Ⓐ 47 | 10V | elect |
| C540, 541 | 1-101-005-21 | Ⓐ 0.022 | | |
| C543 | 1-102-942-21 | Ⓐ 5p | | |
| C544 | 1-102-510-51 | Ⓐ 12p | | |

**Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.**

| Ref. No. | Part No. | Description | | |
|---|---|---|---|---|
| C545 | 1-102-516-51 | Ⓐ 27p | | |
| C546 | 1-101-004-21 | Ⓐ 0.01 | | |
| C549 | 1-101-005-21 | Ⓐ 0.022 | | |
| C550 | 1-101-881-00 | Ⓐ 47p | (AEP, UK, E model) | |
| C551 | 1-121-652-11 | Ⓐ 33 | 35V | elect |
| C554 | 1-102-074-21 | Ⓐ 0.001 | | |
| C601 | 1-102-074-21 | Ⓐ 0.001 | | |
| C602 | 1-102-975-00 | Ⓐ 100p | | |
| C603 | 1-101-005-21 | Ⓐ 0.022 | | |
| C604 | 1-101-004-21 | Ⓐ 0.01 | | |
| C605, 606 | 1-102-975-00 | Ⓐ 100p | | |
| C607, 608 | 1-102-959-00 | Ⓐ 22p | | |
| C609, 610 | 1-121-651-11 | Ⓐ 10 | 16V | elect |
| C611 | 1-121-414-11 | Ⓐ 100 | 10V | elect |
| C612–614 | 1-101-005-21 | Ⓐ 0.022 | | |
| C800 | ⚠1-108-750-22 | Ⓒ 0.033 (E, AEP, UK model) | 300V | mylar |
| C801 | ⚠1-102-355-00 | Ⓑ 0.01 x 2 | 500V | |
| C802 | ⚠1-101-004-21 | Ⓐ 0.01 | | |
| C805 | ⚠1-121-261-11 | Ⓑ 220 | 35V | elect |
| C806 | ⚠1-121-657-11 | Ⓑ 1000 | 25V | elect |
| C807 | ⚠1-121-736-11 | Ⓑ 1000 | 10V | elect |
| C808 | ⚠1-121-417-00 | Ⓑ 100 | 50V | elect |
| C809 | 1-121-738-11 | Ⓐ 10 | 50V | elect |
| C810 | 1-121-651-11 | Ⓐ 10 | 16V | elect |
| C811 | 1-121-391-11 | Ⓐ 1 | 50V | elect |
| C812 | 1-101-005-21 | Ⓐ 0.022 | | |
| C813–816 | ⚠1-101-004-21 | Ⓐ 0.01 | | |
| CT101, 102 | 1-141-178-00 | Ⓑ Trimmer | | |
| CT501, 502 | 1-141-181-11 | Ⓑ Trimmer (AEP, UK, E model) | | |
| CV101–105, CT103–107 | 1-151-275-XX | Ⓘ Tuning (Air) Capacitor | | |
| | | **RESISTORS** | | |
| | | All resistors are in ohms. Common ¼W carbon resistors are omitted. Refer to the list on the last page for their part numers. | | |
| R128, 129 | ⚠1-212-875-51 | Ⓐ 56 | ¼W | fuse (nonflammable) |

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| Ref. No. | Part No. | | Description | | |
|---|---|---|---|---|---|
| R224 | ⚠1-217-394-00 | (B) | 39 | ¼W | fuse (nonflammable) |
| R301 | 1-244-862-00 | (A) | 360 | ½W | carbon |
| R317 | ⚠1-212-875-51 | (A) | 56 | ¼W | fuse (nonflammable) |
| R563 | ⚠1-217-393-00 | (B) | 33 | ¼W | fuse (nonflammable) |
| R801 | ⚠1-202-723-00 | | 2.2M | ½W | composition (Canadian model) |
| R802 | ⚠1-212-993-51 | (A) | 300 | ½W | fuse (nonflammable) |
| R805 | ⚠1-217-393-00 | (B) | 33 | ¼W | fuse (nonflammable) |
| R810 | ⚠1-212-849-51 | (A) | 4.7 | ¼W | fuse (nonflammable) |

**MISCELLANEOUS**

| | | | |
|---|---|---|---|
| CNP801 ⚠ | 1-534-817-XX | (E) | Cord, power (AEP model) |
| | 1-534-777-00 | (E) | Cord, power (UK model) |
| | 1-551-188-00 | | Cord, power (E2 model) |
| | 1-551-506-11 | | Cord, power (Canadian model) |
| | 1-551-530-00 | | Cord, power (E1 model) |
| CNP802 | 1-551-294-00 | (D) | Cord, shielded |
| CP801 | ⚠1-231-341-00 | | Killer, spark (Canadian model) |
| F801 | ⚠1-532-259-00 | (B) | Fuse, 1.6A (E, AEP, UK model) |
| F802, 803 | ⚠1-532-279-00 | (B) | Fuse, 0.5A (E, AEP, UK model) |
| FG601 | 1-519-157-00 | (M) | Indicator, tube |
| PL801–805 | 1-518-169-XX | (B) | Lamp, pilot; 4.5V 40mA; STEREO, LOCKED, PROGRAM-SENSOR, FM, AM |
| PL806, 807 | 1-518-317-00 | (G) | Lamp, pilot; dial |
| S1–4 | 1-552-421-00 | (E) | Switch, pushbutton |
| S801 | ⚠1-552-530-00 | | Switch, pushbutton, POWER (Canadian model) |
| | ⚠1-552-584-00 | (D) | Switch, pushbutton, POWER (AEP, UK, E model) |

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

- Circled letters ( (A) to (Z) ) are applicable to European models only.

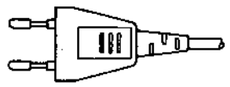
| Ref. No. | Part No. | | Description |
|---|---|---|---|
| TM201 | 1-536-542-00 | (C) | Terminal Board |
| X501 | 1-527-293-21 | (E) | Crystal |
| XT502 | 1-527-388-00 | (D) | Crystal, osc |
| XT601 | 1-527-352-00 | (D) | Crystal, osc |
| | 1-508-754-00 | (A) | Pin, MCD connector; 4p |
| | 1-508-755-00 | (B) | Pin, MCD connector; 6p |
| | ⚠1-526-376-21 | (D) | Voltage Selector (AEP, E model) |
| | 1-536-354-00 | (A) | Post Pin |
| | ⚠1-536-430-00 | (B) | Lug, terminal strip |

**ACCESSORIES & PACKING MATERIALS**

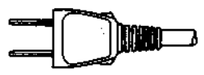
| Part No. | | Description |
|---|---|---|
| 1-501-184-00 | (C) | Antenna, ribbon; FM |
| 1-501-193-00 | (B) | Antenna, AM |
| 3-701-630-00 | (A) | Bag, plastic |
| 3-770-622-11 | (C) | Manual, instruction (Canadian, UK model) |
| 3-794-367-00, 3-770-622-11 | (A) (C) | Manual, instruction (AEP, E model) |
| 4-855-829-00 | (B) | Cushion |
| 4-856-763-00 | (D) | Carton |

— Power Cord —

**Euro-plug (1-551-530-00)**



**Parallel-blade plug (1-551-188-00)**



Note: Les composants identifiés par un tramé et une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

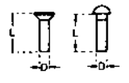


**1/4 WATT CARBON RESISTORS Ⓐ** Note: Circled letter (A) is applicable to European models only.

| Ω | Part No. | Ω | Part No. | Ω | Part No. | Ω | Part No. | Ω | Part No. | Ω | Part No. | Ω | Part No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.0 | 1-246-401-00 | 10 | 1-246-425-00 | 100 | 1-246-449-00 | 1.0k | 1-246-473-00 | 10k | 1-246-497-00 | 100k | 1-246-521-00 | 1.0M | 1-246-545-00 |
| 1.1 | 1-246-402-00 | 11 | 1-246-426-00 | 110 | 1-246-450-00 | 1.1k | 1-246-474-00 | 11k | 1-246-498-00 | 110k | 1-246-522-00 | 1.1M | 1-210-814-00 |
| 1.2 | 1-246-403-00 | 12 | 1-246-427-00 | 120 | 1-246-451-00 | 1.2k | 1-246-475-00 | 12k | 1-246-499-00 | 120k | 1-246-523-00 | 1.2M | 1-210-815-00 |
| 1.3 | 1-246-404-00 | 13 | 1-246-428-00 | 130 | 1-246-452-00 | 1.3k | 1-246-576-00 | 13k | 1-246-500-00 | 130k | 1-246-524-00 | 1.3M | 1-210-816-00 |
| 1.5 | 1-246-405-00 | 15 | 1-246-429-00 | 150 | 1-246-453-00 | 1.5k | 1-246-577-00 | 15k | 1-246-501-00 | 150k | 1-246-525-00 | 1.5M | 1-210-817-00 |
| 1.6 | 1-246-406-00 | 16 | 1-246-430-00 | 160 | 1-246-454-00 | 1.6k | 1-246-578-00 | 16k | 1-246-502-00 | 160k | 1-246-526-00 | 1.6M | 1-210-818-00 |
| 1.8 | 1-246-407-00 | 18 | 1-246-431-00 | 180 | 1-246-455-00 | 1.8k | 1-246-579-00 | 18k | 1-246-503-00 | 180k | 1-246-527-00 | 1.8M | 1-210-819-00 |
| 2.0 | 1-246-408-00 | 20 | 1-246-432-00 | 200 | 1-246-456-00 | 2.0k | 1-246-580-00 | 20k | 1-246-504-00 | 200k | 1-246-528-00 | 2.0M | 1-210-820-00 |
| 2.2 | 1-246-409-00 | 22 | 1-246-433-00 | 220 | 1-246-457-00 | 2.2k | 1-246-581-00 | 22k | 1-246-505-00 | 220k | 1-246-529-00 | 2.2M | 1-210-821-00 |
| 2.4 | 1-246-410-00 | 24 | 1-246-434-00 | 240 | 1-246-458-00 | 2.4k | 1-246-582-00 | 24k | 1-246-506-00 | 240k | 1-246-530-00 | 2.4M | 1-244-754-00 |
| 2.7 | 1-246-411-00 | 27 | 1-246-435-00 | 270 | 1-246-459-00 | 2.7k | 1-246-583-00 | 27k | 1-246-507-00 | 270k | 1-246-531-00 | 2.7M | 1-244-755-00 |
| 3.0 | 1-246-412-00 | 30 | 1-246-436-00 | 300 | 1-246-460-00 | 3.0k | 1-246-584-00 | 30k | 1-246-508-00 | 300k | 1-246-532-00 | 3.0M | 1-244-756-00 |
| 3.3 | 1-246-413-00 | 33 | 1-246-437-00 | 330 | 1-246-461-00 | 3.3k | 1-246-585-00 | 33k | 1-246-509-00 | 330k | 1-246-533-00 | 3.3M | 1-244-757-00 |
| 3.6 | 1-246-414-00 | 36 | 1-246-438-00 | 360 | 1-246-462-00 | 3.6k | 1-246-586-00 | 36k | 1-246-510-00 | 360k | 1-246-534-00 | 3.6M | 1-244-758-00 |
| 3.9 | 1-246-415-00 | 39 | 1-246-439-00 | 390 | 1-246-463-00 | 3.9k | 1-246-587-00 | 39k | 1-246-511-00 | 390k | 1-246-535-00 | 3.9M | 1-244-759-00 |
| 4.3 | 1-246-416-00 | 43 | 1-246-440-00 | 430 | 1-246-464-00 | 4.3k | 1-246-488-00 | 43k | 1-246-512-00 | 430k | 1-246-536-00 | 4.3M | 1-244-760-00 |
| 4.7 | 1-246-417-00 | 47 | 1-246-441-00 | 470 | 1-246-465-00 | 4.7k | 1-246-489-00 | 47k | 1-246-513-00 | 470k | 1-246-537-00 | 4.7M | 1-244-761-00 |
| 5.1 | 1-246-418-00 | 51 | 1-246-442-00 | 510 | 1-246-466-00 | 5.1k | 1-246-490-00 | 51k | 1-246-514-00 | 510k | 1-246-538-00 | 5.1M | 1-244-762-00 |
| 5.6 | 1-246-419-00 | 56 | 1-246-443-00 | 560 | 1-246-467-00 | 5.6k | 1-246-491-00 | 56k | 1-246-515-00 | 560k | 1-246-539-00 | | |
| 6.2 | 1-246-420-00 | 62 | 1-246-444-00 | 620 | 1-246-468-00 | 6.2k | 1-246-492-00 | 62k | 1-246-516-00 | 620k | 1-246-540-00 | | |
| 6.8 | 1-246-421-00 | 68 | 1-246-445-00 | 680 | 1-246-469-00 | 6.8k | 1-246-493-00 | 68k | 1-246-517-00 | 680k | 1-246-541-00 | | |
| 7.5 | 1-246-422-00 | 75 | 1-246-446-00 | 750 | 1-246-470-00 | 7.5k | 1-246-494-00 | 75k | 1-246-518-00 | 750k | 1-246-542-00 | | |
| 8.2 | 1-246-423-00 | 82 | 1-246-447-00 | 820 | 1-246-471-00 | 8.2k | 1-246-495-00 | 82k | 1-246-519-00 | 820k | 1-246-543-00 | | |
| 9.1 | 1-246-424-00 | 91 | 1-246-448-00 | 910 | 1-246-472-00 | 9.1k | 1-246-496-00 | 91k | 1-246-520-00 | 910k | 1-246-544-00 | | |

**HARDWARE NOMENCLATURE**

Screw: P 3 x 10
- L: Length in mm
- D: Diameter in mm
- Type of head
- Indicated slotted-head only. Unless otherwise indicated, it means cross-recessed head (Phillips type).



Nut, Washer, Retaining ring: N 3
- Diameter of usable screw or shaft
- Reference designation

| Reference Designation | Shape | Description | Remarks |
|---|---|---|---|
| **SCREWS** | | | |
| P | | pan-head screw | binding-head (B) screw for replacement |
| PWH | | pan-head screw with washer face | binding-head (B) screw and flat washer for replacement |
| PS PSP | | pan-head screw with spring washer | binding-head (B) screw and spring washer for replacement |
| PSW PSPW | | pan-head screw with spring and flat washers | binding-head (B) screw and spring and flat washers for replacement |
| R | | round-head screw | binding-head (B) screw for replacement |
| K | | flat-countersunk-head screw | |
| RK | | oval-countersunk-head screw | |
| B | | binding-head screw | |
| T | | truss-head screw | binding-head (B) screw for replacement |
| F | | flat-fillister-head screw | |
| RF | | fillister-head screw | |
| BV | | braizer-head screw | |

| Reference Designation | Shape | Description | Remarks |
|---|---|---|---|
| **SELF-TAPPING SCREWS** | | | |
| TA | | self-tapping screw | ex: TA, P 3 x 10 |
| PTP | | pan-head self-tapping screw | binding-head self-tapping (TA, B) screw for replacement |
| PTPWH | | pan-head self-tapping screw with washer face | binding-head self tapping (TA, B) screw and flat washer for replacement |
| PTTWH | | pan-head thread-rolling screw with washer face | binding-head (B) screw and flat washer for replacement |
| **SET SCREWS** | | | |
| SC | | set screw | |
| SC | | hexagon-socket set screw | ex: SC 2.6 x 4, hexagon socket |
| **NUT** | | | |
| N | | nut | |
| **WASHERS** | | | |
| W | | flat washer | |
| SW | | spring washer | |
| LW | | internal-tooth lock washer | ex: LW3, internal |
| LW | | external-tooth lock washer | ex: LW3, external |
| **RETAINING RINGS** | | | |
| E | | retaining ring | |
| G | | grip-type retaining ring | |

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