

General Information

1995
CRT: 20"
Door Flap: 219 -992001-XX
Main Power Button:
292-992001-XX
Also Covers:
Bush 2160NTX

Service Adjustments

Alignment Instructions

Please Read Before Attempting Service

- 1: Never disconnect any leads while receiver is in operation.
- 2: Disconnect all power before attempting any repairs.
- 3: Do not short any portion of the circuit while the power is on.
- 4: For safety reasons, all parts replaced should be identical (for parts and part numbers see parts list).
- 5: Before alignment the set must be pre-heated for 30 minutes or more to erase magnetism thoroughly from CRT front chassis frame by erase coil.

Test Equipment

- 1: VIF Sweep Generator.
- 2: SIF Sweep generator.
- 3: DC Power Supply (14V).
- 4: Oscilloscope.
- 5: Digital Multi Meter.
- 6: CRT Colour Analyser.
- 7: Demagnetising Coil.
- 8: Phillips Pattern Generator (PM5518TX).
- 9: Frequency Counter.

Tank Coil Alignment

Preparation Step (see fig 1)

- 1: Apply DC +12V to TP - 4 and DC +5.6 to TP - 1.
- 2: Connect the output lead of VIF sweep generator to TP105 through a 1000pf ceramic capacitor and earth.
- 3: Connect the input lead of sweep monitor to TP - 2 through a 100K ohm resistor.
- 4: Connect all DC power supply - GND to the PCB GND.

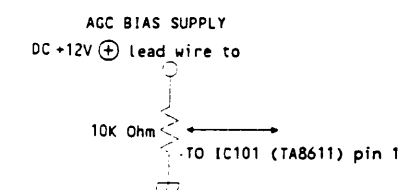


Fig 1.

Alignment Step (see fig 3)

- 1: Adjust the level of sweep generator to achieve 2V p-p output.
- 2: Adjust T102 to obtain maximum amplitude of waveform and the maximum gain of 39.5 MHz as in fig 3.

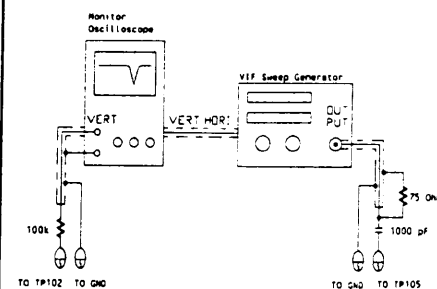


Fig 2.

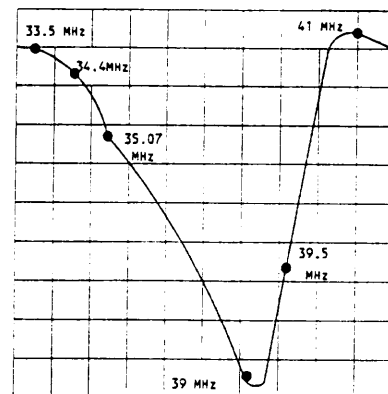


Fig 3.

AFC Alignment

- 1: The preparation steps are the same as for "Tank Coil Alignment".
- 2: Reconnect the input of monitor scope to TP 10 through a 1M ohm resistor (pin 20 of IC101).
- 3: Adjust the output level of VIF signal generator for maximum amplitude waveform without saturation.
- 4: Adjust T101 to obtain the AFC waveform as same as Fig 4.

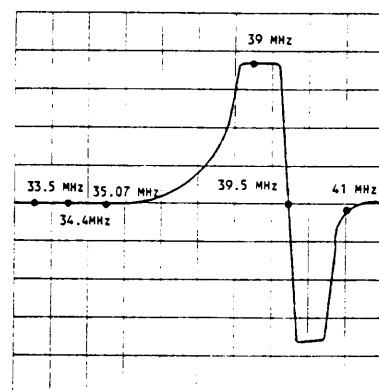


Fig 4.

SIF Alignment

- 1: Preparation steps the same as for "Tank Coil Alignment".
- 2: Reconnect the input of monitor scope TP3 through a 100K ohm resistor.
- 3: Adjust T103 to obtain the waveform same as fig 5.

B+ (111.5V) Check

Caution: to avoid X-Ray hazards, B+ voltage must be set correctly at 111.5V position.

- 1: Insert the AC power cord to AC supply socket.

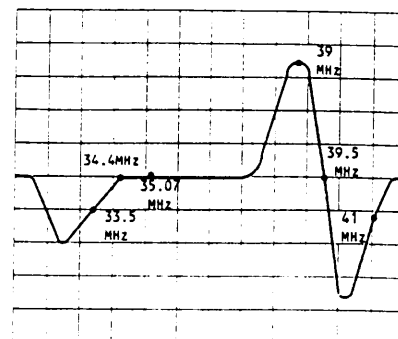


Fig 5.

- 2: Switch on the TV receiver, tune in an active channel and adjust brightness/contrast for normal position.
- 3: On power PCB, check the B+ voltage at C992 with a reliable voltmeter.
- 4: When AC supply changes from 180V to 245V assure B+ variation range within 111.5V ± 1V.

RF AGC Alignment

- 1: Receive a TV signal level to 60 - 62 dB.
- 2: Adjust RF AGC control (VR101) until the noise is disappeared.
- 3: Increase the signal level to 90 - 92 dB, and no de-synchronising will appear.

Horizontal Circuit Adjustment

PAL System

- 1: Receive Phillips pattern signal.
- 2: Adjust VR302 to make the horizontal position of the pattern for centre.

Vertical Circuit Adjustment

- 1: Receive the Phillips pattern signal.
- 2: Adjust the height control (VR401) to slightly overscan the screen.

Focus Adjustment

- 1: Receive a crosshatch pattern.
- 2: Set contrast control to maximum position and brightness control to middle position.
- 3: Adjust focus control (on the FBT) to obtain the sharpest picture on the screen.

Teletext Picture Alignment

- 1: Without input signal.
- 2: Select the teletext.
- 3: Connect frequency counter to the CRT heater.
- 4: Adjust T815 until the frequency is 15.625 KHz ± 10 Hz.

OSD Position Adjustment

- 1: Receive a colour bar pattern, and press the volume up or down.
- 2: Adjust CT601 for adjust lettering to centre of the screen (see fig 6).

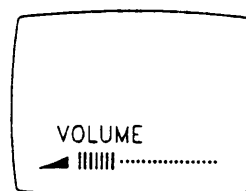


Fig 6.

White Balance Adjustment

- 1: Receive a monoscope pattern picture signal.
- 2: Turn the red, green and blue LOW LIGHT (VR505, VR504, VR503) controls to middle position and turn the DRIVE (VR501, VR502) control to middle.
- 3: Set the sub-brightness (VR301) control to middle position.
- 4: Press the handset "NORMAL" button to normal.
- 5: Turn the screen control on the FBT to minimum position.
- 6: Set the service (SW301) to "SERVICE" position.
- 7: Slowly turn the screen control clockwise to the point where a horizontal line just illuminates.
- 8: Adjust VR505 to get a red horizontal line on CRT.
- 9: Adjust VR504 to get a yellow horizontal line on CRT.
- 10: Adjust VR503 to get a white horizontal line on CRT.
- 11: Reset the service switch (SW301) to normal position and turn brightness control to middle position.
- 12: Adjust DRIVE (VR501, VR502) control to obtain a uniform white picture.

Sub-Brightness Alignment

- 1: Receive a monoscope pattern.
- 2: Press handset NORMAL button once: Brightness: Centre position. Contrast: Centre position. Colour: Centre position.
- 3: Adjust Sub-Brightness (VR301) to get nine step of the grey scale just illuminate in monoscope pattern as shown in fig 7.

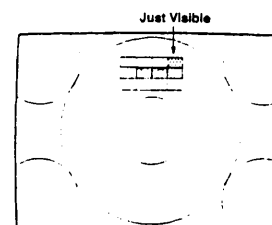


Fig 7.

Convergence Adjustment (see fig 8)

- 1: Receive a crosshatch pattern.
- 2: Unfix the convergence magnet clumper and align red with blue dots at the centre of the screen by rotating (R, B) static convergence magnets.
- 3: Align red/blue with green dots at the centre of the screen by rotating (RB-G) static convergence magnet.
- 4: Fix the convergence magnets by turning the clumper.
- 5: Remove the DY wedges and slightly tilt the deflection yoke horizontally and vertically to obtain good overall convergence.
- 6: Fix the deflection yoke by wedges.
- 7: If purity error is found, follow "Purity Adjustment" instructions.

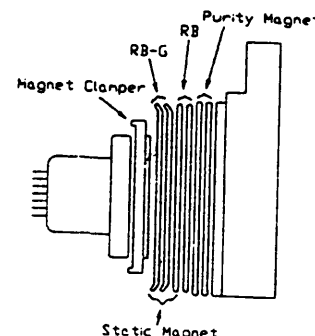


Fig 8.

Selecting the MCU Option Code

When replacing the E²PROM (IC602) the MCU option code (which is 207124 for this unit) must be re-entered.

Note: Entering an incorrect MCU option code will lead to malfunctioning. When electrostatic surge appeared the option code stored may be corrupted. Go into the MCU option code menu to check and re-enter the code if necessary.

Entering the MCU Option Code Menu

- 1: Turn on the unit by pressing the main power switch button, then turn the main power switch off while holding down the "Normal" key on the remote.
- 2: Depress the "CH" and "Chv" buttons in the TV panel simultaneously and switch on the power.
- 3: A 6 digit option code will be displayed on the screen in green colour. If the code is wrong, use the number keys on the remote handset to enter the correct option code.
- 4: Key in all 6 digits. Colour of the re-entered numbers displayed on screen will change from green to red. The unit will return to standby automatically.

NICAM detection

- 1: The limit time of NICAM detection should be <8 seconds.
- 2: the signal level >70dB, colour bar pattern.
- 3: Once the result is out of limit try it again. If it is still out of limit it failed.

MSP Oscillating Frequency Check

- 1: Without input signal.
- 2: Connect frequency counter with high impedance probe (X10) to TP1901.
- 3: The frequency is 18.430 MHz ± 360 Hz.

X-Ray Protection Circuit Test

- 1: Receive a colour bar pattern.
- 2: Connect a resistor 18K ohm parallel with ZD403.
- 3: Horizontal output must be shut down.
- 4: Remove the resistor 18K ohm.

Chroma Trap Alignment

- 1: Receive a colour bar pattern.
- 2: Connect an oscilloscope to pin 6 of IC301.
- 3: Adjust DL301 trap coil for minimum chrominance signal.

Output Power at Centre Volume Position of Front/Rear Amplifier

- 1: Set treble, bass, balance at centre position with clear effect.
- 2: Select centre volume position (31 steps) by volume button.
- 3: The output voltage of speaker should be 4.2V ± 0.3V.
- 4: Check that the Front/Rear balance should be less than ±3dB (SURROUND ON).
- 5: Adjust volume control to max. and check that the maximum output power should be greater than 4W (SURROUND ON).

Colour Purity Adjustment (see fig 7)

Before all adjustments described below are attempted, V-Hold, H-Hold, V-High, B+ Voltage and Focusing Adjustment must be completed.

- 1: Place the TV receiver facing North or South.
- 2: Plug in the receiver and turn it on.
- 3: Operate the TV receiver for over 30 minutes.
- 4: Fully degauss the TV receiver by using an external degaussing coil.
- 5: Receive a crosshatch pattern and adjust the static convergence control roughly.
- 6: Loosen the clamp screw of the deflection yoke and pull the deflection yoke towards you.
- 7: Fully turn the red and blue Low Light (VR505, VR503, VR501) controls counter-clockwise.
- 8: Adjust the purity magnets so that green field is obtained at the centre of the screen.
- 9: Slowly push the deflection yoke towards bell of CRT and set it where a uniform green field is obtained.
- 10: Tighten the clamp screw of the deflection yoke.

Sound Effect Test

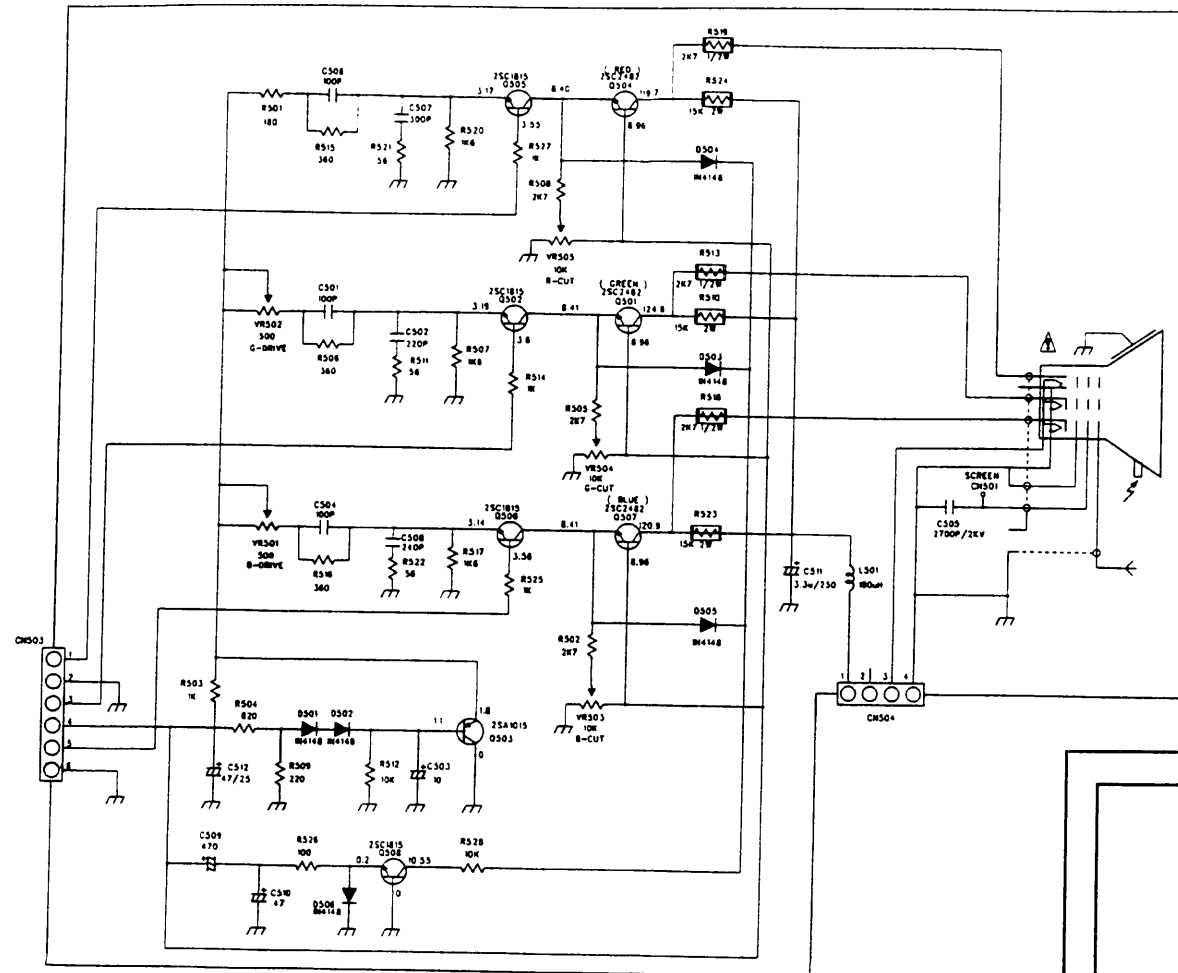
- 1: Select SV mode with 1KHz 500mV rms audio output.
- 2: Select CLEAR mode with remote handset.
- 3: Adjust 1KHz 500mW output as reference output 0dB.
- 4: Check the dB level of 100Hz and 10KHz.
- 5: Check the dB level of 100Hz, 1KHz and 10K at THEATRE, LIVE and HALL mode.
- 6: The limit of specification is shown as below:

Clear:	
100Hz	-1dB±3dB
1K	0dB
10K	-4dB±3dB

Theatre:	
100Hz	-1.5dB±3dB
1K	-7dB±3dB
10K	-7dB±3dB

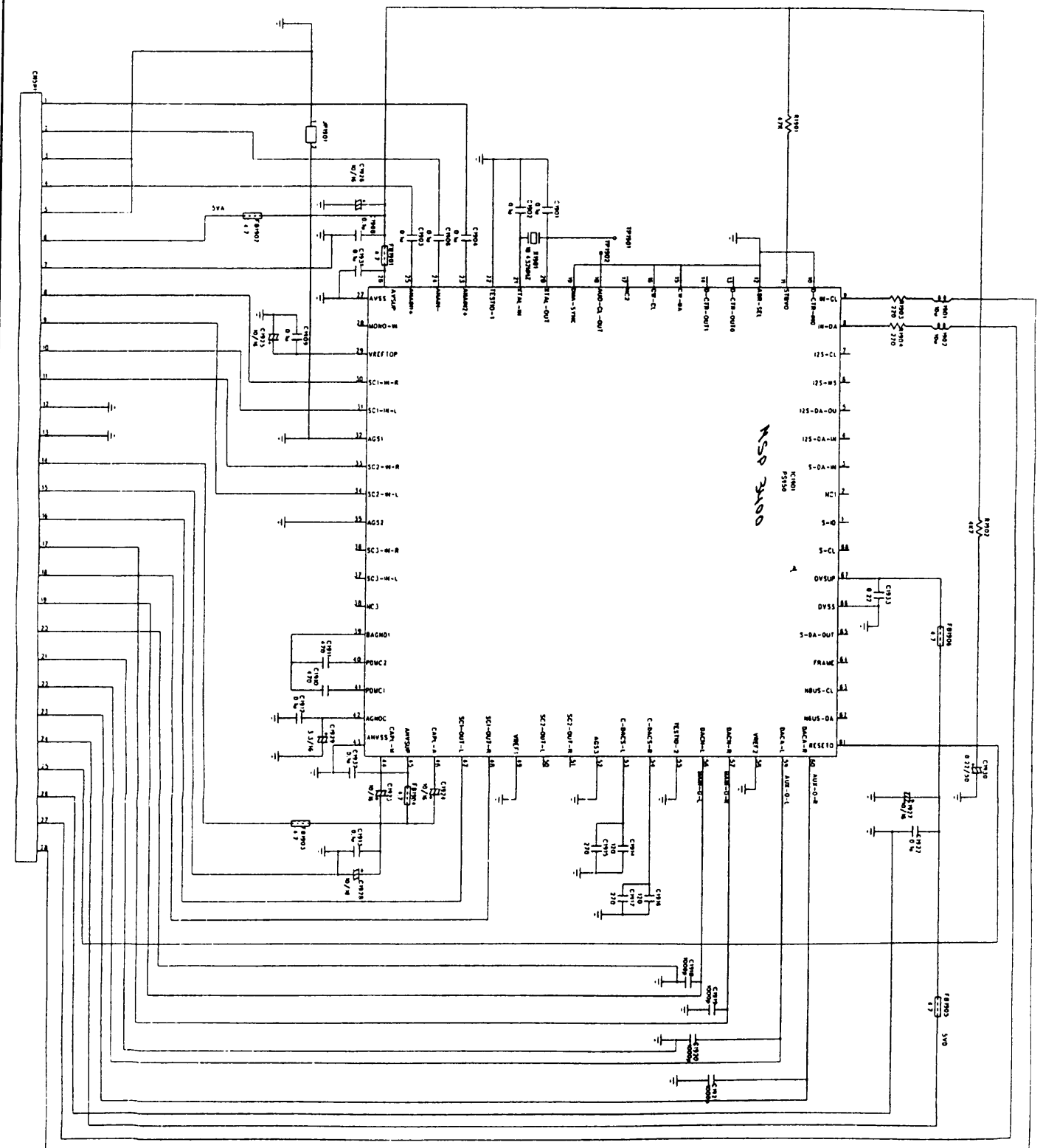
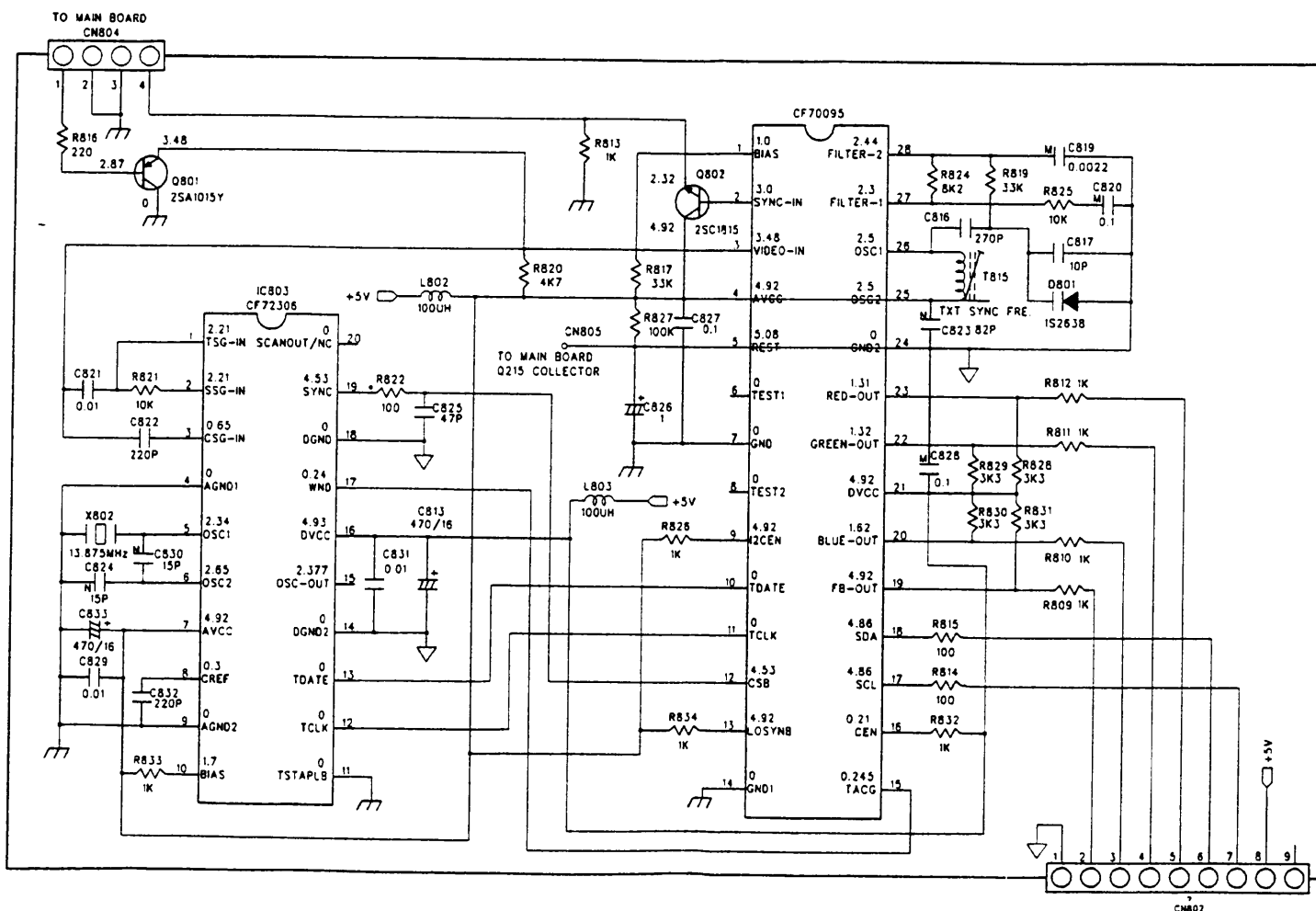
Live:	
100Hz	-0.5dB±3dB
1K	-6.5dB±3dB
10K	-2.3dB±3dB

Hall:	
100Hz	-1.5dB±3dB
1K	-7.5dB±3dB
10K	-13dB±3dB

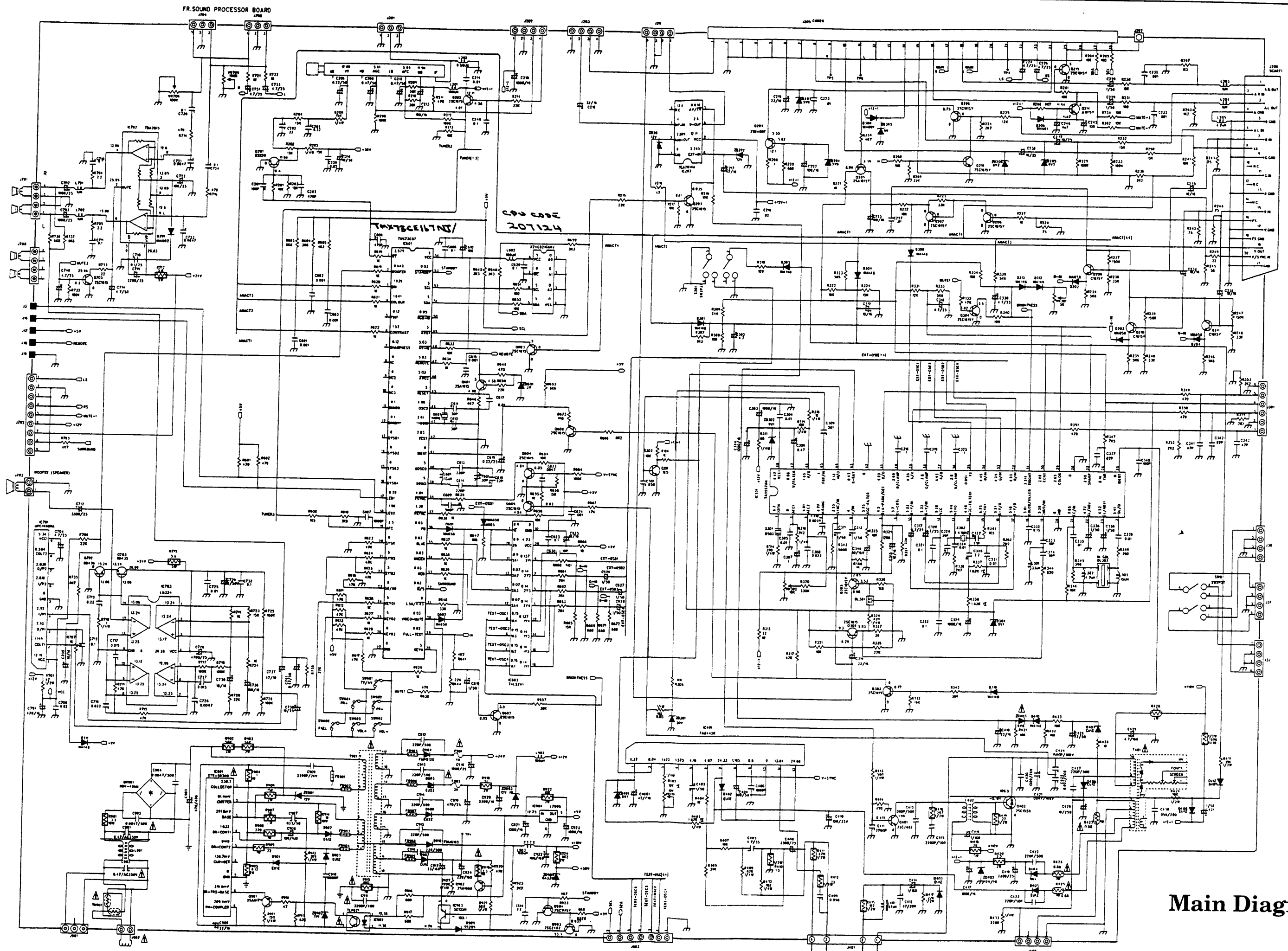


CRT Diagram

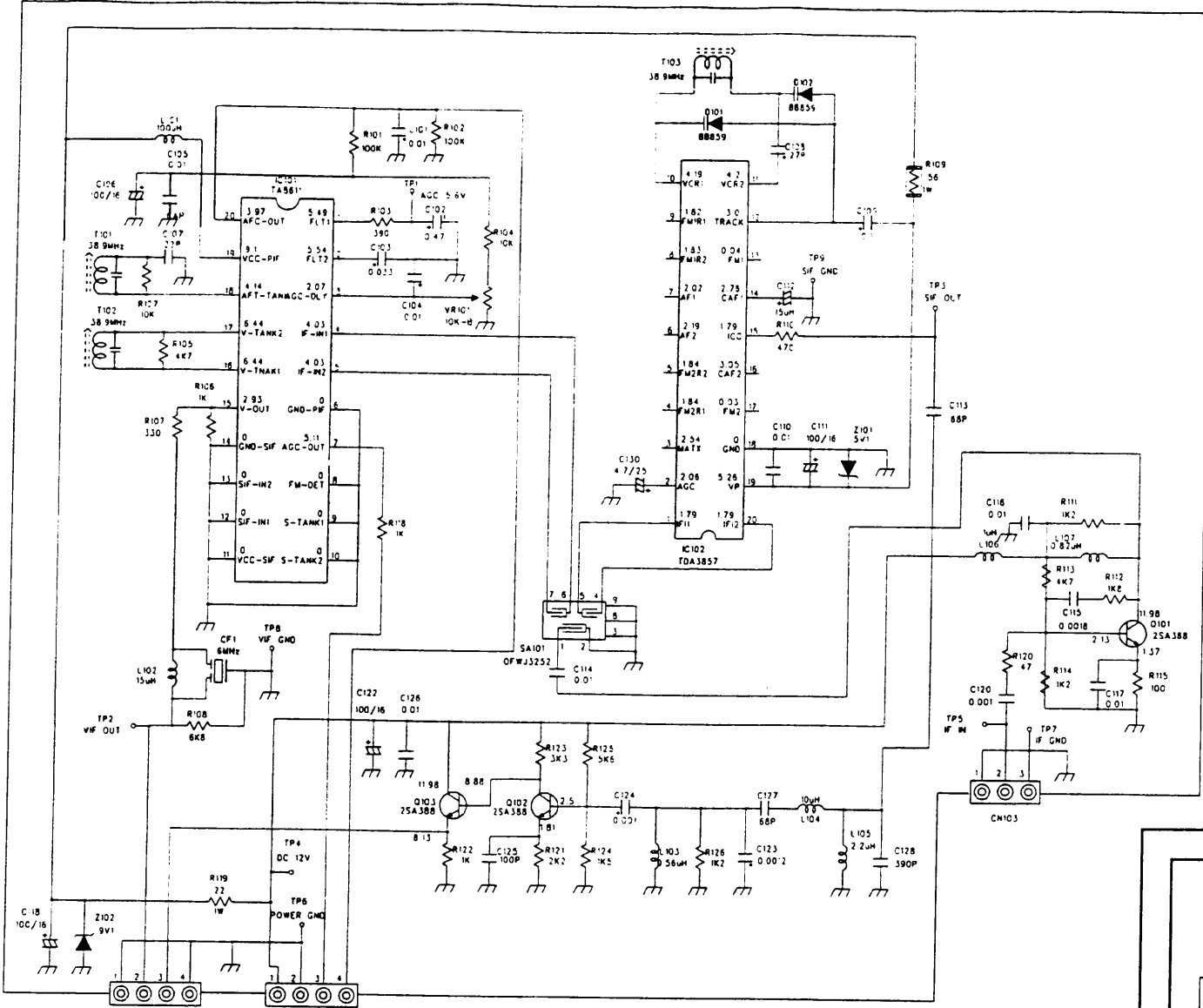
Text Diagram



IC901 Diagram

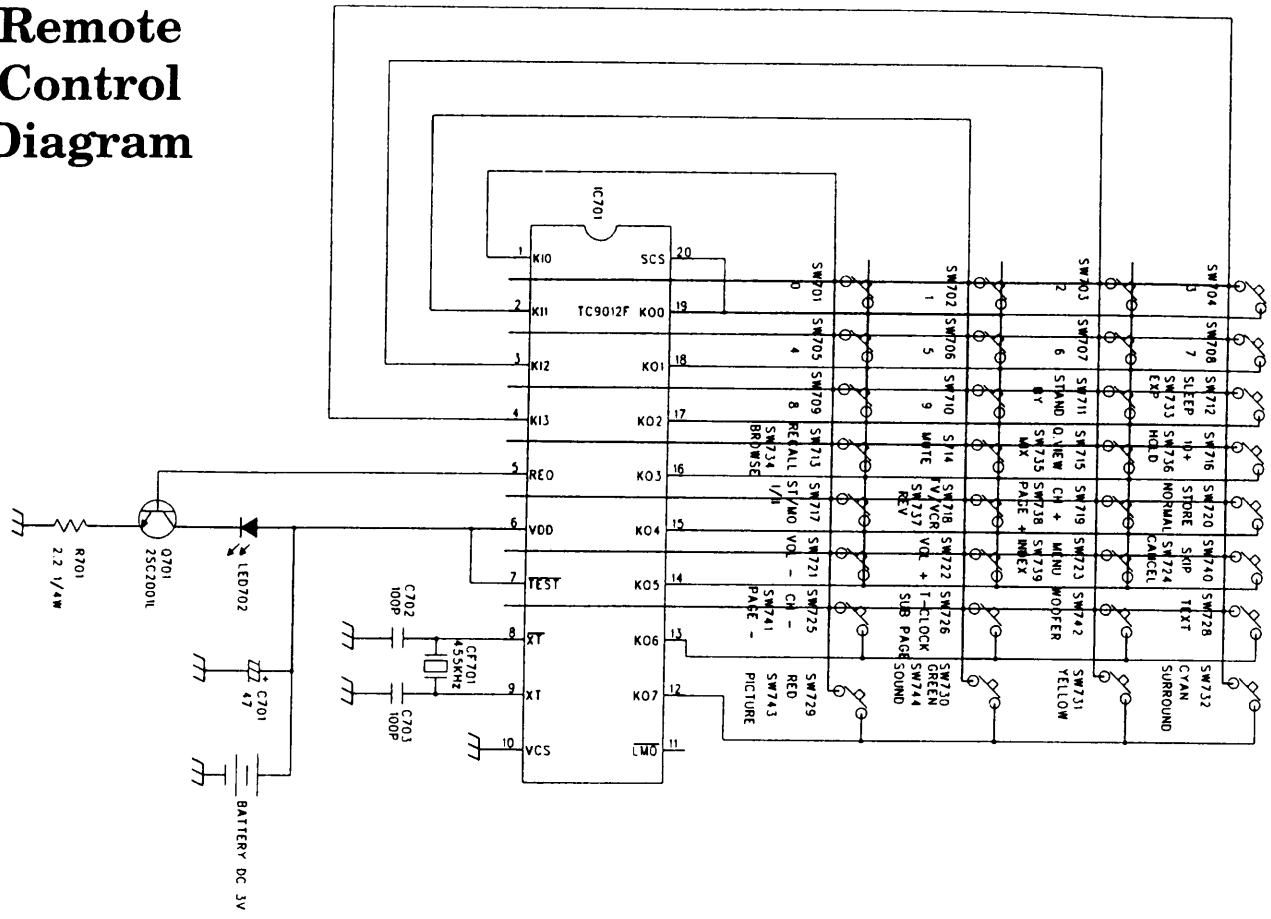


Main Diagram

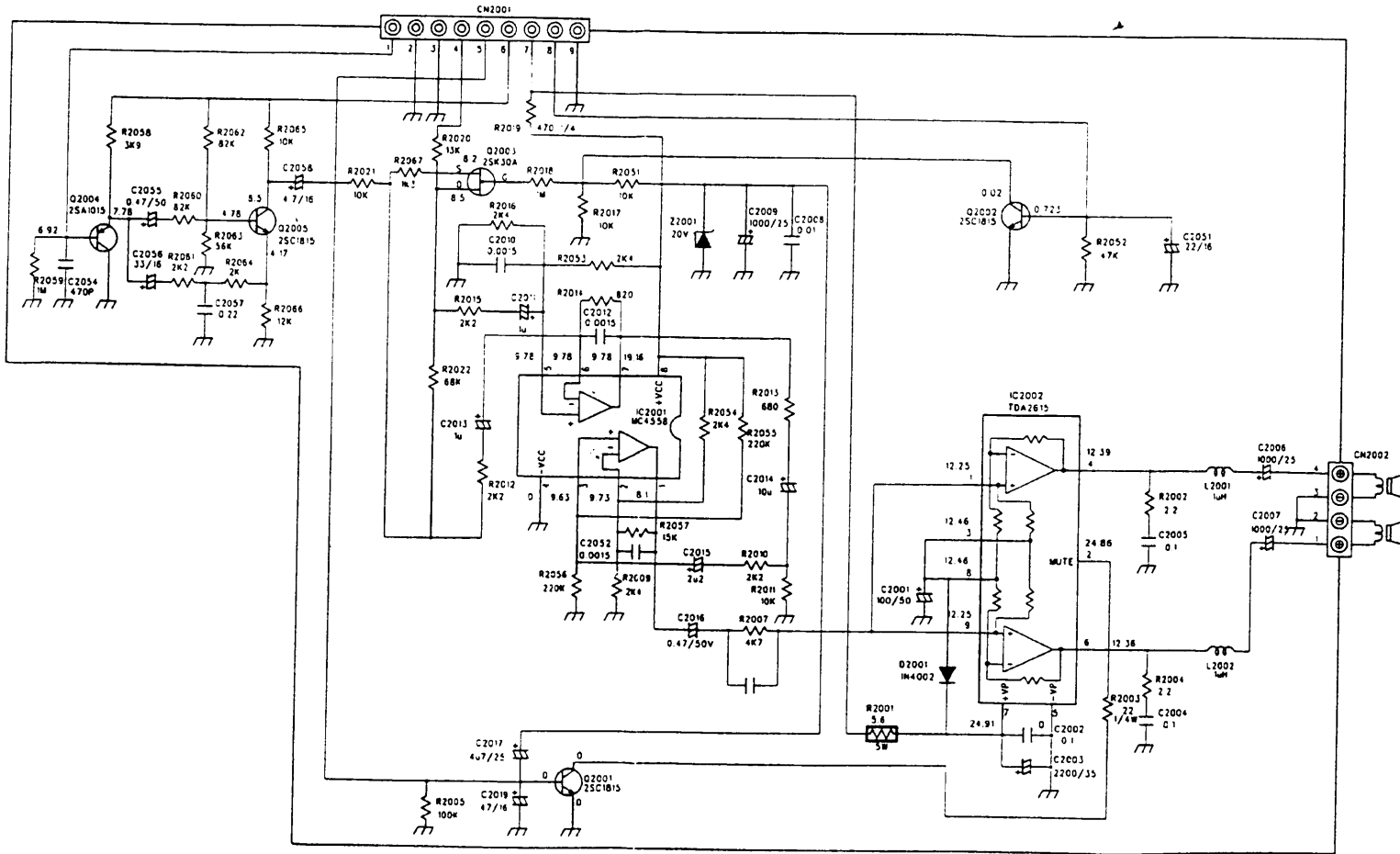


PIF Diagram

Remote Control Diagram



Surround Diagram



LED Diagram

