

Service Manual

Production Mixer
WJ-MX12



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Panasonic

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SPECIFICATIONS

Source Input:	×2 (SOURCE 1 and SOURCE 2)
Video Input:	1.0 Vp-p/75 ohms or high impedance loop-through, PAL composite signal, BNC connectors
S-Video Input:	Y signal; 1 Vp-p, C signal; 0.3 Vp-p, 75 ohms, Mini DIN 4 pin connector
Audio Input:	—10 dBV/15 kohms, pin jacks (Left and Right)
External Camera Input:	1.0 Vp-p/75 ohms CCIR or PAL composite signal, BNC connector × 1
Sync Output:	1.0 Vp-p/75 ohms, composite sync, BNC connector × 1
Recording Output:	×2 (REC OUT 1 and REC OUT 2)
Video Output:	1.0 Vp-p/75 ohms, PAL composite signal, BNC connectors
S-Video Output:	Y signal; 1 Vp-p, C signal; 0.3 Vp-p, 75 ohms, Mini DIN 4 pin connector
Audio Output:	—8 dBV/1 kohms, pin jacks (Left and Right)
Preview Video Output:	1.0 Vp-p/75 ohms, PAL composite signal, BNC connector × 1
External Sound Input:	
MIC Input (mono):	—60dB/600 ohms, unbalanced, tip-ring-sleeve type phono jack × 1
AUX Input:	—10 dBV/15 kohms, pin jacks (Left and Right)
Headphone Output:	—30 dB/8 ohms, (8 ohms — 100 ohms), tip-ring-sleeve type phono jack × 1
Character (TITLE) Input:	10-pin connector × 1 for optional Character Generator WV-KB12
Effects	
Video:	Still, Strobe, Mosaic, Nega, Paint, Mix, Wipe, Superimpose, Fade-in/out
Audio:	Mix, Fade
Back Colours:	White, Yellow, Cyan, Green, Magenta, Red, Blue, Black
Wipe Patterns:	Circle and Square with positioning, and 15 additional patterns without positioning
Wipe Positioner:	Built-in Joystick Positioner
Others:	Auto Take, Auto Fade, Memory
Input Video Frequency Range:	Sync: 15.625 kHz ±300 Hz, SC: 4.433619 MHz ±40 Hz
Frequency Response:	5 MHz (-3 dB) (Y/C in — Y/C out), 20 — 20 kHz (-3 dB) (Audio)
Resolution:	S-Video Input/Output; Typical 500 TV lines, Composite Video Input/Output; 300 TV lines, Composite Video Input/S-Video Output; 400 TV lines, S-Video Input/Composite Video Output; 300 TV lines
Gain:	Unity (Video)
Signal-to-noise Ratio:	Video 1: 46 dB (Composite), 48 dB (S-Video) Video 2: 48 dB (Composite), 55 dB (S-Video)
Differential Gain:	Audio: 56 dB
Differential Phase:	±5% (S-Video)
Power Source:	±5° (S-Video)
Power Consumption:	240V AC, 50 Hz for WJ-MX12/A and WJ-MX12/B; 220V AC 50 Hz for WJ-MX12/C and WJ-MX12/G
Ambient Temperature:	38 W
Ambient Humidity:	0° — 40° C
Dimensions:	Less than 90%
Weight:	446 (W) x 115 (H) x 357 (D) mm
	5.5kg

Weight and dimensions indicated are approximate.
Specifications are subject to change without notice.

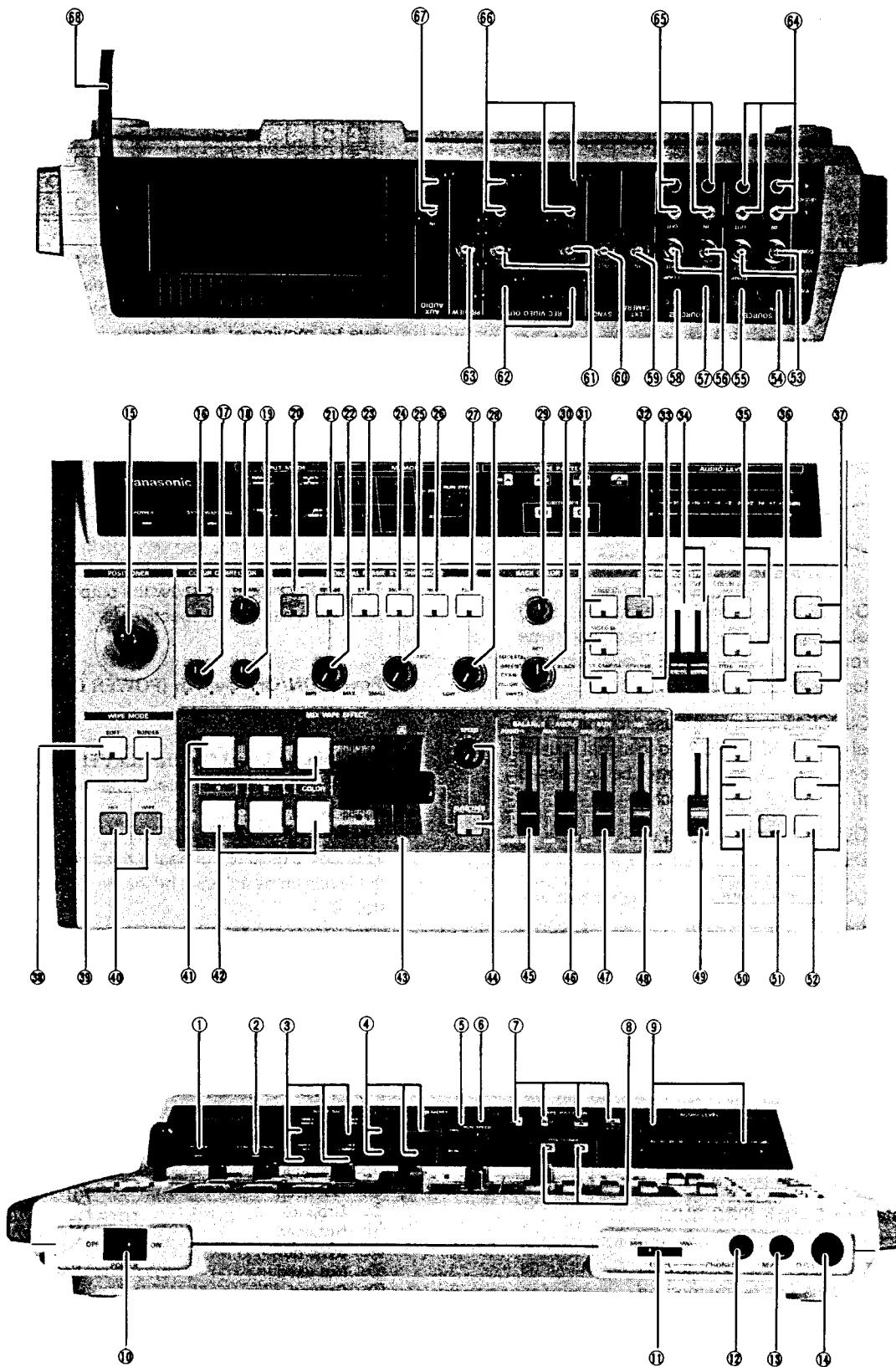
STANDARD ACCESSORIES

- Mounting Base for Character Generator WV-KB12

OPTIONAL ACCESSORIES

- Character Generator WV-KB12

MAJOR OPERATING CONTROLS AND THEIR FUNCTIONS



1. Power Indicator (POWER)

2. Sync Warning Indicator (SYNC WARNING)

This LED indicator shows the sync conditions as follows.

Green: The GEN-LOCK sync mode is selected and the sync generator inside the unit is synchronizing the signal with the VIDEO 2 signal.

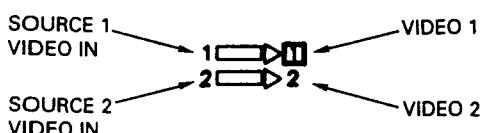
Orange The Internal sync mode is selected and no (**amber**): video signal is supplied to the VIDEO 2 channel.

Red: The synchronization is disturbed or unstable. Even if the VIDEO 2 signal is supplied, the sync generator inside cannot synchronize the signal properly because of noise in the VIDEO 2 signal.

Note: If the indicator colour of the indicator changes, check the SOURCE signal for the VIDEO 2 signal whether the synchronization error still exists.

3. Input Mode Selection Switches (INPUT MODE)

These 4 switches are used to select the input mode as follows:



1 : The SOURCE 1 video signal is used for the VIDEO 1 signal, being passed through the digital frame synchronizer, and the SOURCE 2 video signal is used for the VIDEO 2 signal.

2 : The SOURCE 1 video signal is used for the VIDEO 2 signal and the SOURCE 2 video signal is used for the VIDEO 1 signal, the latter being passed through the digital frame synchronizer.

1 : The SOURCE 1 video signal is used for both the VIDEO 1 and VIDEO 2 signal.

2 : The SOURCE 2 video signal is used for both the VIDEO 1 and VIDEO 2 signal.

Caution: Do not change the setting of these switches during recording, as this may result in synchronization error.

4. Memory Switches (MEMORY 1, 2, 3, 4)

This switch is used to memorize the program or perform the programmable functions.

5. Mode Selection Switch (PRG/RUN)

This switch is used for the programmable functions.

PRG: By pressing the MEMORY switch ④, four kinds of programs can be memorized.

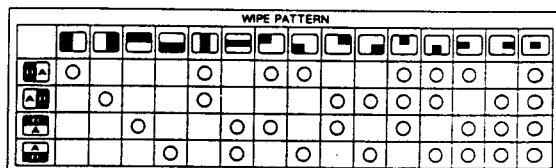
RUN: This position is ready to perform the automatic Effect operation.

6. Run Speed Control (RUN SPEED)

Turning this control, the speed of memory effect can be freely adjusted from approx. 0.05 to 1 second.

7. Wipe Pattern Selection Switches (WIPE PATTERN)

The wipe pattern can be selected as follows.



Through combined use of the four switches on the right, the following wipe patterns can be selected. Please note that positioning in this case is not effective by moving of the Joystick Positioner ⑮.

8. Wipe Pattern Selection Switches (POSITIONER)

These two switches are used to permit the wipe at desired position.

Position of square and circle wipe in this case is done through use of the Joystick Positioner ⑯.

9. Audio Level Indicator (AUDIO LEVEL)

These LED indicators show the output level for the left and right channels, respectively.

10. Power ON/OFF Switch (POWER ON/OFF)

11. Headphone Level Control (LEVEL,MIN/MAX)

This is level control for headphone output.

12. Headphone Jack (PHONES)

This jack is used to connect a headphone and the output level can be adjusted by the Headphone Level Control ⑪.

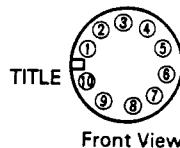
13. Microphone Input Jack (MIC)

This jack is used to connect a microphone with a tip-ring-sleeve or tip-sleeve type phone plug.

14. Title Input Connector (TITLE)

This connector is used to connect the optional Character Generator WV-KB12.

- ①: Character IN
- ②: Not used
- ③: Ground
- ④: Not used
- ⑤: Sync out
- ⑥: Not used
- ⑦: Ground
- ⑧: +9V OUT
- ⑨: Ground
- ⑩: Not used



Caution: When WV-KB12 is used with this unit, the following functions of the WV-KB12 are disabled:

1. Stopwatch display
2. Title colour setting
3. Title page display

15. Joystick Positioner (POSITIONER)

The position of the circle and square wipe patterns as selected using the Wipe Pattern Selection switches ⑧ can be freely set using this joystick.

16. Colour Corrector ON/OFF Switch (ON)

This switch is the Master ON/OFF switch for the colour correction.

Note: The colour corrections are available only for VIDEO 1 as indicated in the box, and not for VIDEO 2.

17. Hue Control (G/R)

The hue of VIDEO 1 can be adjusted using this control when the Colour Corrector ON/OFF switch ⑯ is set to ON position.

Note: This control will not effect when STILL effects.

18. Colour Control (CHROMA)

The colour of VIDEO 1 can be adjusted using this control when the Colour Corrector ON/OFF Switch ⑯ is set to ON position.

Note: This control will not effect when STILL effects.

19. Hue Control (B/Y)

The hue of VIDEO 1 can be adjusted using this control when the Colour Correction ON/OFF Switch ⑯ is set to ON position.

Note: This control will not effect when STILL effects.

20. Digital Effect ON/OFF Switch (ON)

This switch is the Master ON/OFF switch for the digital effects, such as STROBE, STILL, MOSAIC, NEGA and PAINT

Note: The digital effects are available only for VIDEO 1 as indicated in the box, and not for VIDEO 2.

21. Strobe ON/OFF Switch (STROBE)

This switch is used to obtain a strobe effect of the VIDEO 1 picture.

Pressing this switch once, strobe effects are applied to the VIDEO 1 image and the LED indicator in the switch lights. The time interval of the strobe effect can be changed by turning the Strobe Time Interval control ⑩. Adjustment is possible from approx. 0.2 to 2 seconds. To return to a normal picture, press the switch once more. The LED indicator goes out.

22. Strobe Time Interval Control (MIN/MAX)

Turning this control, the time interval of the strobe effect can be freely adjusted from approx. 0.2 to 2 seconds.

23. Still ON/OFF Switch (STILL)

This switch is used to freeze the VIDEO 1 picture. Pressing this switch once, the VIDEO 1 image will freeze and the LED indicator in the switch lights. To return to a 'live' picture, press the switch once more. The LED indicator goes out.

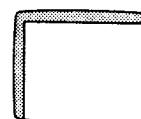
24. Mosaic ON/OFF Switch (MOSAIC)

This switch is used to obtain a mosaic effect of the VIDEO 1 picture.

Pressing this switch once, a mosaic effect is applied to the VIDEO 1 image and the LED indicator in the switch lights. To return to a normal picture, press the switch once more. The LED indicator goes out.

25. Mosaic Size Selection Control (SMALL/LARGE)

The mosaic size can be changed eight steps by using this control.



When the largest mosaic size is chosen with this switch, the mosaic effect may be not performed in the left and top edges.

Note: The above effects is observed in using the under Scan.Monitor TV.

26. Negative ON/OFF Switch (NEGA)

This switch is used to perform automatically the fad-in and out functions.

Switch is ON, negative effect is applied to the VIDEO 1 image and the LED indicator in the switch lights. To return to a normal picture, press the switch once more. The LED indicator goes out.

Note: This function will not effect when either STILL or STROBE effects.

27. Paint ON/OFF Switch (PAINT)

This switch is used to obtain an oil-paint touch effect for the VIDEO 1 picture.

Pressing this switch once, an oil paint touch effect is applied to the VIDEO 1 image and the LED indicator in the switch lights. To return to a normal picture, press the switch once more. The LED indicator goes out.

28. Paint Graduation Selection Control (LOW/HIGH)

The graduation of paint effect can be changed in 6 steps (1 bit to 6 bits).

29. Chroma Level Control (CHROMA)

This control is used to change chroma level of background colour.

30. Back Colour Selection Switch (BACK COLOUR)

This control is used to select the background colour for MIX, WIPE, SUPERIMPOSE and VIDEO FADER operations.

One out of the following eight background colours can be chosen: White, Yellow, Cyan, Green, Magenta, Red, Blue and Black.

31. Source Selection Switches

(SOURCE, VIDEO 1/VIDEO 2/EXT CAMERA)

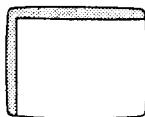
VIDEO 1: The video signal fed to either the SOURCE 1 $\textcircled{1}$ and $\textcircled{2}$ or SOURCE 2 $\textcircled{3}$ and $\textcircled{4}$ connector on the rear panel, as selected by the Input Mode Selection switches $\textcircled{3}$ and the digital frame synchronizer, is selected.

VIDEO 2: The video signal fed to either the SOURCE 1 $\textcircled{5}$ and $\textcircled{6}$ or SOURCE 2 $\textcircled{7}$ and $\textcircled{8}$ connector on the rear panel, as selected by the Input Mode Selection switches $\textcircled{9}$, is selected.

EXT CAMERA: The video signal fed to the EXT CAMERA IN connector $\textcircled{9}$ on the rear panel is selected.

32. Superimpose ON/OFF Switch (ON)

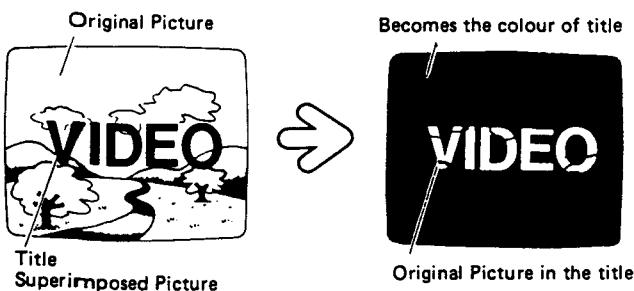
This is the master ON/OFF switch for the superimpose function.



When turn on the superimpose ON/OFF switch, the superimpose effect may be not performed in the left and top edges.

33. Reverse Switch (REVERSE)

This switch is used to select the polarity of the superimposed key signal.



34. Key Level Controls (KEY LEVEL, LOWER, UPPER)

These two controls are used to adjust the luminance level of the key signal for lower level (black) and upper level (white), respectively for clear superimposed pictures.

35. Colour Selection Switches

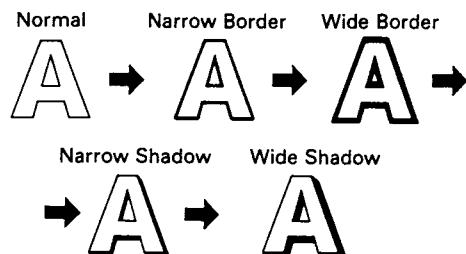
(BACK COLOUR, WHITE)

These 2 switches are used to select the colour of the superimposed titles, either white or the background colour selected by the Back Colour Selection switch $\textcircled{10}$.

36. Title Effect Switch (TITLE EFFECT)

By depressing this switch, the superimposed titles can be changed as follows:

→ Normal → Narrow Border → Wide Border →
→ Narrow Shadow → Wide Shadow →



37. Recording Video Output Selection Switches (REC VIDEO OUT, VIDEO 1/VIDEO 2/EFFECT)

These switches are used to select the output video signal of the REC VIDEO OUT connectors $\textcircled{11}$ and $\textcircled{12}$ on the rear panel as follows.

VIDEO 1: The video signal fed to either the SOURCE 1 $\textcircled{13}$ and $\textcircled{14}$ or SOURCE 2 $\textcircled{15}$ and $\textcircled{16}$ connector on the rear panel, as selected by the Input Mode Selection switches $\textcircled{3}$ and the digital frame synchronizer, is selected

VIDEO 2: The video signal fed to either the SOURCE 1 $\textcircled{17}$ and $\textcircled{18}$ or SOURCE 2 $\textcircled{19}$ and $\textcircled{20}$ connector on the rear panel, as selected by the Input Mode Selection switches $\textcircled{9}$, is selected.

EFFECT: The special effects video signal (superimpose, wipe/mix or fade) is selected.

38. Soft Wipe Switch (SOFT)

This switch is used for changing from normal wipe to soft wipe.

39. Border Wipe Switch (BORDER)

This switch is used for changing from normal wipe to border wipe.

Pressing this switch once, normal wipe changes to this border wipe and the LED indicator in the switch lights. If press this switch again, this border wipe changes to thick border wipe and the LED indicator in the switch still lights. To return to a normal wipe, press the switch once again. The LED indicator goes out.

Note: The colour on the border is a complementary colour of the back colour setting.

- 40. Mix/Wipe Mode Selection Switches (MIX/WIPE)**
These two switches are used to select the Mix or Wipe mode.

41. A-bus Input Selection Switches

These switches are used to select the allocation of the video signal to the A-bus input.

- VIDEO 1:** The video signal fed to either the SOURCE 1 $\textcircled{3}$ and $\textcircled{4}$ or SOURCE 2 $\textcircled{5}$ and $\textcircled{6}$ connector on the rear panel, as selected by the Input Mode Selection switches $\textcircled{3}$ and the digital frame synchronizer, is selected.
- VIDEO 2:** The video signal fed to either the SOURCE 1 $\textcircled{3}$ and $\textcircled{4}$ or SOURCE 2 $\textcircled{5}$ and $\textcircled{6}$ connector on the rear panel, as selected by the Input Mode Selection switches $\textcircled{3}$, is selected.
- BACK COLOUR:** The background colour signal set by the Back Colour Selection switch $\textcircled{10}$ is selected.

**42. B-bus Input Selection Switches
(B VIDEO 1/VIDEO 2/BACK COLOUR)**

These switches are used to select the allocation of the video signal to the B-bus input in addition to the A-bus Input Selection switches $\textcircled{1}$

43. Mix/Wipe Lever (A, B)

In the wipe mode, moving this lever from A to B will increase the portion of the B input, and vice versa.
In the mix mode, video images are switched between A and B.

44. Auto-Take Start Switch (AUTO TAKE) and Speed Control (SPEED)

Turning this control, the speed of auto-take effect can be freely adjusted from approx. 0.2 to 2 seconds.
Press the Auto-Take Start Switch (AUTO TAKE) to start the auto-take function.

45. Balance Control (BALANCE, AUDIO 1/AUDIO 2)

This control is used to balance the mixed audio signal fed to SOURCE 1 (AUDIO 1) input connector and the signal fed to SOURCE 2 (AUDIO 2) input connector on the rear panel.

46. Audio level Control (AUDIO, MAX/MIN)

This is the overall attenuator for the mixed AUDIO 1 and AUDIO 2 sound.

47. Auxiliary Audio Level Control (AUX, MAX/MIN)

This is the input attenuator for the auxiliary audio signal fed to the AUX AUDIO IN connectors $\textcircled{7}$ on the rear panel.

- 48. Microphone Level Control (MIC, MAX/MIN)**
This is the input attenuator for the microphone signal fed to the MIC input jack $\textcircled{1}$.

49. Fade Lever (IN/OUT)

Moving this lever from OUT to IN, fade-in of the sound takes place. Fade-out is accomplished by moving the lever from IN to OUT.

50. Fade Control Switches (VIDEO, TITLE, AUDIO)

These switches are used to select the fade mode as follows.

	VIDEO	TITLE	AUDIO
VIDEO fade	ON	OFF	OFF
TITLE fade	OFF	ON	OFF
AUDIO fade	OFF	OFF	ON
VIDEO & AUDIO fade	ON	OFF	ON
VIDEO & TITLE fade	ON	ON	OFF
TITLE & AUDIO fade	OFF	ON	ON
VIDEO & TITLE & AUDIO fade	ON	ON	ON

**51. Automatic Fade Control Switch
(AUTO FADE)**

This switch is used to perform automatically the fade-in and out functions.
When the Fade Lever $\textcircled{9}$ is positioned at slightly upper from its center position, the fade in function is automatically performed.
When the fade Lever $\textcircled{9}$ is positioned at slightly under from its center position, the fade-out function is automatically performed.

**52. Colour Selection Switches (COLOUR SELECT,
BACK COLOUR/WHITE/BLACK)**

These switches are used to select the colour for the fade-out mode as follows.

BACK COLOUR: The back colour signal set by the Back Colour Selection switch $\textcircled{10}$ is selected.

WHITE: The image will fade out in white.

BLACK: The image will fade out in black.

**53. Source 1 Video Connectors
(SOURCE 1, VIDEO IN/OUT)**

A 1.0 Vp-p/75 ohm composite video signal should be supplied to the input (IN) connector. Connecting coaxial cables with BNC connectors to the output (OUT) connector, the high impedance video loop is automatically selected. At all other times, the terminals are automatically terminated by 75 ohms.

Note:

- (1) If the input video signal does not meet with the PAL colour standard or the CCIR B/W standard video signal, this could cause a disturbance of synchronization.
- (2) In case the S/N ratio of the input signal is very low, this may be reflected in a low-quality picture.
- (3) If the input video signal is very jittery, such as in case of the VTR playback picture, this could cause a disturbance of synchronization or colour.
In case the video signal from the VTR and that of the camera is to be mixed, it is recommended to select the camera signal for the VIDEO 2 signal by the Input Mode Selection switches ③.

**54. Source 1 S-VHS Video Input Connector
(SOURCE 1, Y/C IN)**

The luminance (Y) and chroma (C) signals from S-VHS VTR or colour TV are supplied to this connector.

**55. Source 1 Y/C-Composite Selection Switch
(SOURCE 1, Y/C-COMP)**

This switch selects either Y/C or composite signal to be supplied to source 1

**56. Source 2 Video Connectors
(SOURCE 2, VIDEO IN/OUT)**

The IN connector accepts a 1.0 Vp-p/75 ohm composite video signal.

Connecting coaxial cable with a BNC connector to the OUT connector, the high impedance video loop is automatically selected. At all other times, the terminals are automatically terminated by 75 ohms.

Note:

- (1) If the input video signal does not meet the PAL colour standard or the CCIR B/W standard, this could cause synchronization error.
- (2) In case the S/N ratio of the input signal is very low, this may be reflected in a low-quality picture.
- (3) If the input video signal is very jittery, such as a picture played back on a VTR, synchronization or colour error may appear.
In case the video signal from the VTR and that of the camera is to be mixed, it is recommended to select the camera signal for the VIDEO 2 signal by the Input Mode Selection switches ③.

**57. Source 2 S-VHS Video Input Connector
(SOURCE 2, Y/C IN)**

The luminance (Y) and chroma (C) signals from S-VHS VTR or colour TV are supplied to this connector.

**58. Source 2 Y/C-Composite Selection Switch
(SOURCE 2, Y/C-COMP)**

This switch selects either Y/C or composite signal to be supplied to source 2.

**59. External Camera Input Connector
(EXT CAMERA IN)**

For the key signal in the superimpose mode, this connector accepts a 1.0 Vp-p/75 ohm composite video signal, which is synchronized with the sync output signal provided at the SYNC OUT connector ④.

60. Sync Output Connector (SYNC OUT)

A 1.0 Vp-p/75 ohm negative polarity composite sync signal is provided at this connector for synchronization of an external camera.

**61. Recording Video Output Connectors
(REC VIDEO OUT 1/2)**

A 1.0 Vp-p/75 ohm composite video signal, as selected by the Recording Video Output Selector switches ⑦, is provided at these connectors.

62. Y/C REC Video Output Connector

The luminance (Y) and chroma (C) signals are obtained from these connectors 1 and 2 when composite or Y/C signal is supplied to source 1 or 2.

63. Preview Output Connector (PREVIEW OUT)

A 1.0 Vp-p/75 ohm composite video signal of the EFFECT (all effect) image is provided at this connector.

**64. Source 1 Audio Connectors
(SOURCE 1, AUDIO L/R)**

-10 dBV/15 kohms audio signals for the SOURCE 1 should be supplied to these input (IN) connectors. The input audio signals can be taken out from the output (OUT) connectors with a high impedance loop.

**65. SOURCE 2 Audio Connectors
(SOURCE 2, AUDIO L/R)**

The IN connectors accept a -10 dBV/15 kohms audio signal.

The input audio signals can be taken out from the output (OUT) connectors with a high impedance loop.

66. Recording Audio Output Connectors

-8 dBV/1 kohms audio signals for recording are supplied at these connectors.

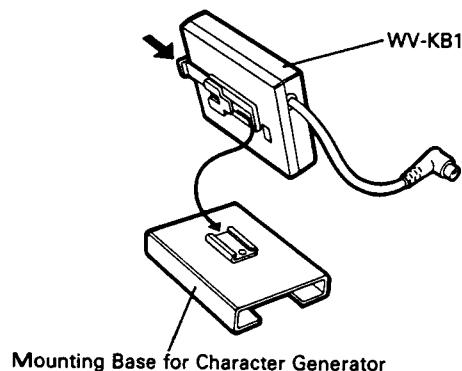
67. Auxiliary Audio Input Connectors (AUX AUDIO IN)

Accept -10 dBV/15 kohms audio signals from an external audio source.

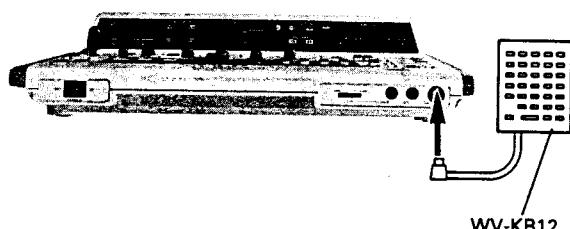
68. Power Cord

Preparing the Character Generator (optional)

- Mount the optional Character Generator WV-KB12 onto the Character Generator mounting base.



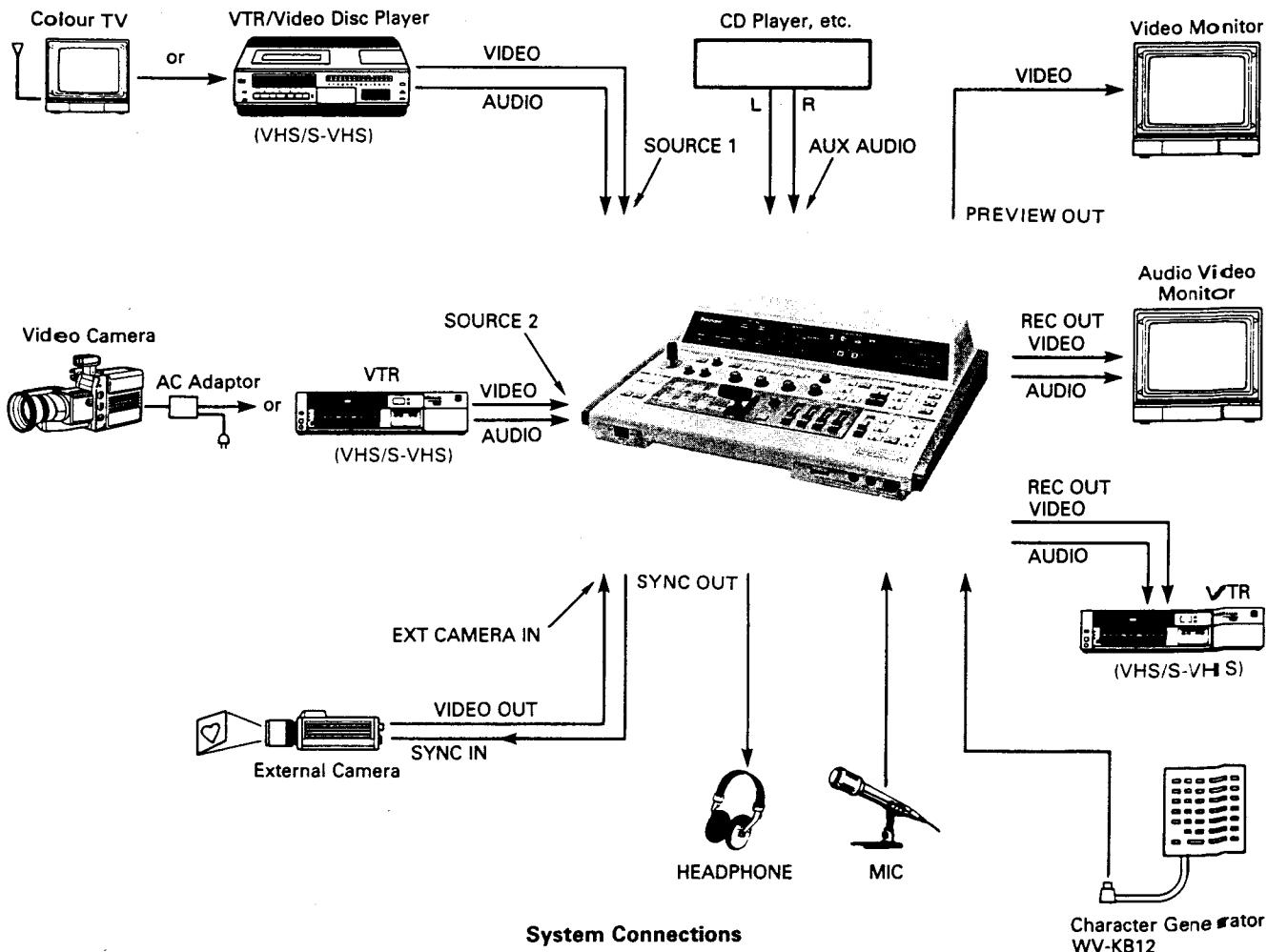
- Connect the cable of the WV-KB12 to the Title Input Connector ⑭.



SYSTEM CONNECTION

Caution: Keep the POWER ON/OFF switch turned OFF while making the connections.

1. Connect the coaxial cable with BNC connectors between the video output of the VTR, Video Disc Player, TV Tuner Output or Video Camera and the SOURCE 1 VIDEO IN connector on the rear panel of the Production Mixer or connect S-video cable (4 pin) between S-VHS VTR and the SOURCE 1 S-VHS Video Input Connector on the rear panel of the Production Mixer. When S-VHS VTR is connected Y/C-composite Selection Switch should be set to Y/C position.
2. Connect the audio cable with pin plugs between the audio output of the VTR (S-VHS VTR), Video Disc Player, TV Tuner Output or Video Camera and the SOURCE 1 AUDIO IN connectors on the rear panel of the Production Mixer.
3. Connect the coaxial cable or S-video cable (4 pin) and audio cable for the SOURCE 2 inputs of the Production Mixer in the same manner as steps 1 and 2 above.
4. Connect the coaxial cable with BNC connectors between the video output of the external camera (B/W or colour camera for superimposing) and the EXT CAMERA IN connector of the Production Mixer.
5. Connect the coaxial cable with BNC connectors between the SYNC IN (GEN LOCK IN) connector on the external camera and the SYNC OUT connector of the Production Mixer.
6. If the Character Generator WV-KB12 (sold separately) is used, connect the 10-pin cable connector of the Character Generator to the TITLE connector of the Production Mixer.
7. If an auxiliary audio source is required, connect the audio cable with pin plugs between the audio output of the audio source (CD Player, Tape Recorder or Record Player) and the AUX IN connectors of the Production Mixer.
8. If necessary, connect the microphone cable with a tip-ring-sleeve type or tip-sleeve type phono plug to the MIC input connector of the Production Mixer.
9. For previewing the image, connect the coaxial cable with BNC connectors between the PREVIEW OUT connector of the Production Mixer and the VIDEO IN connector of a video monitor.
10. For recording, connect the coaxial cables with BNC connectors (S-video cable) between the REC VIDEO OUT connectors of the Production Mixer and the VIDEO IN (S-VHS VIDEO IN) connectors of the VTR (S-VHS) and Video Monitor
11. For recording, connect the audio cable with pin plugs between the REC AUDIO OUT connectors of the production Mixer and the AUDIO IN connectors of the VTR (S-VHS VTR) and Video Monitor.



System Connections

Character Generator
WV-KB12

ADJUSTMENT PROCEDURE

1. Test Equipment Required

- Oscilloscope (Dual trace, Delayed sweep, 50MHz bandwidth)
- Digital voltmeter
- Frequency counter (More than 7 digits)
- Underscanned color video monitor
- Test signal generator (Color bar and Cross hatch signals)
- Waveform monitor
- Vectorscope
- Audio generator

2. Disassembling Procedure for adjustment

- Remove twelve screws holding the bottom cover.
- Remove two side covers holding the bottom and top covers as shown in Fig. 2-1.

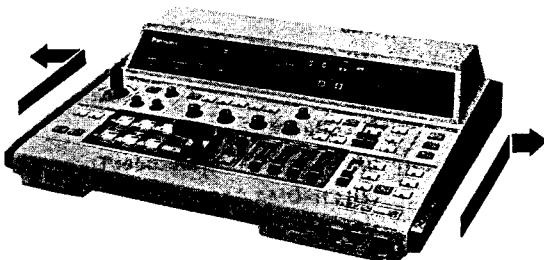


Fig. 2-1

3. Connection

- Connect the coaxial cable between the REC VIDEO OUT 1 connector on the rear panel of WJ-MX12 and the VIDEO IN connector of the waveform monitor.
- Connect the coaxial cable between the other VIDEO IN connector of the waveform monitor and the VIDEO IN connector of the vectorscope.
- Terminate the other VIDEO IN connector of the vectorscope with the 75-ohm terminator.
- Connect the coaxial cable between the VIDEO OUT connector of the waveform monitor and the VIDEO IN connector of the color video monitor.
- Terminate the other VIDEO IN connector of the color video monitor with 75 ohms.

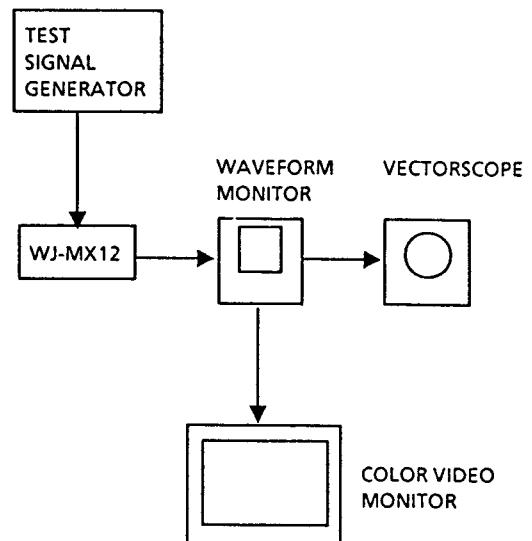


Fig. 3-1

4. Adjustment Procedure

- Refer to LOCATION OF TEST POINTS AND ADJUSTING CONTROLS on page 25 for adjustment.

(1) Automatic Frequency Control (AFC) adjustment

Test points :	TP29 (V1 HD)	Decoder/Encoder board
	TP19 (V2 HD)	Decoder/Encoder board
Adjusts :	VR31 (AFC1)	Decoder/Encoder board
	VR36 (AFC2)	Decoder/Encoder board

- Disconnect the coaxial cable from the SOURCE 1 IN (VIDEO) or SOURCE 2 IN (VIDEO) connector on the rear panel.
- Connect the frequency counter to TP29 on the Decoder/Encoder board.
- Adjust VR31 for $16.667\text{kHz} \pm 50\text{Hz}$.
- Connect the frequency counter to TP19 on the Decoder/Encoder board.
- Adjust VR36 for $16.667\text{kHz} \pm 50\text{Hz}$.

(2) Internal Voltage Controlled Oscillator (VCO INT) adjustment

Test point :	TP5 (VCO)	Decoder/Encoder board
Adjust :	L51 (VCO1)	Decoder/Encoder board

- Keep disconnecting the coaxial cable from the SOURCE 1 IN (VIDEO) or SOURCE 2 IN (VIDEO) connector on the rear panel.
- Connect the digital voltmeter to TP5 on the Decoder/Encoder board.
- Adjust L51 for $2.1\text{V} \pm 0.1\text{V}$.

(3) Internal Subcarrier Frequency (fsc INT, fvcxo1, fvcxo2) adjustment

Test points :	TP16 (SC1)	Decoder/Encoder board
	TP2 (V1 SC)	Decoder/Encoder board
	TP3 (V2 SC)	Decoder/Encoder board
Adjusts :	CT3 (fsc INT)	Decoder/Encoder board
	CT1 (fvcxo1)	Decoder/Encoder board
	CT2 (fvcxo2)	Decoder/Encoder board

- Keep disconnecting the coaxial cable from the SOURCE 1 IN (VIDEO) or SOURCE 2 IN (VIDEO) connector on the rear panel.
- Connect the frequency counter to TP16 on the Decoder/Encoder board.
- Adjust CT3 for $4.433619\text{MHz} \pm 5\text{Hz}$.
- Connect the frequency counter to TP2 on the Decoder/Encoder board.
- Adjust CT1 for $4.433619\text{MHz} \pm 10\text{Hz}$.
- Connect the frequency counter to TP3 on the Decoder/Encoder board.
- Adjust CT2 for $4.433619\text{MHz} \pm 10\text{Hz}$.

(4) Gen-lock Voltage Controlled Oscillator (VCO 1, VCO 2) adjustment

Test point :	TP18 (V1 VCO)	Decoder/Encoder board
Adjust :	L52 (VCO2)	Decoder/Encoder board

- Connect the coaxial cable between the VIDEO OUT connector of the test signal generator and the SOURCE 1 IN (VIDEO) connector on the rear panel of the WJ-MX12.
- Connect the coaxial cable between the VIDEO OUT connector of the SOURCE 1 (VIDEO) connectors on the rear panel of the WJ-MX12 and the SOURCE 2 IN (VIDEO) connector on the rear panel of the WJ-MX12 for looping-through connection.
- Supply the composite color bar signal to the WJ-MX12 from the test signal generator.
- Connect the digital voltmeter to TP18 on the Decoder/Encoder board.
- Adjust L52 for $2.1\text{V} \pm 0.1\text{V}$.

(5) Read & Write Voltage Controlled Oscillator (VCO R, VCO W) adjustment

Test points :	TP2 (W VCO)	Memory board
	TP1 (R VCO)	Memory board
Adjusts :	L7 (VCO W)	Memory board
	L1 (VCO R)	Memory board

- Keep supplying the composite color bar signal to the WJ-MX12 from the test signal generator.

- Connect the digital voltmeter to TP2 on the Memory board.
- Adjust L7 for $2.1\text{V} \pm 0.1\text{V}$.
- Connect the digital voltmeter to TP1 on the Memory board.
- Adjust L1 for $2.1\text{V} \pm 0.1\text{V}$.

(6) CCD Clock Frequency adjustment

Test point :	Pin 6 of IC16	Decoder/Encoder board
Adjust :	CT5 (CCD CLOCK)	Decoder/Encoder board

- Keep supplying the composite color bar signal to the WJ-MX12 from the test signal generator.
- Connect the frequency counter to pin 6 of IC16 on the Decoder/Encoder board.
- Adjust CT5 (CCD CLOCK) for $17.7333\text{MHz} \pm 50\text{Hz}$.

(7) Y/C Separation (Video 1) adjustment

Test points :	TP21 (0H C1)	Decoder/Encoder board
	TP20 (1H C1)	Decoder/Encoder board
	TP26 (Y D/A)	Decoder/Encoder board
	TP22 (2H C1)	Decoder/Encoder board
Adjusts :	VR6	Decoder/Encoder board
	(1H CHROMA GAIN-1)	
	VR7	Decoder/Encoder board
	(1H CHROMA PHASE-1)	
	VR3	Decoder/Encoder board
	(2H CHROMA GAIN-1)	
	VR4	Decoder/Encoder board
	(2H CHROMA PHASE-1)	
	VR2	Decoder/Encoder board
	(Y/C SEPA Y LEVEL-1)	
	VR1	Decoder/Encoder board
	(Y/C SEPA PHASE-1)	
	VR50	Decoder/Encoder board
	(Y/C SEPA BAL-1)	

- Supply the composite color bar signal to the WJ-MX12 from the test signal generator.
- Connect the oscilloscope to TP21 (A channel) and TP20 (B channel).
- Connect the external trigger input of oscilloscope to TP29 (V1 HD) and set the sweep range of oscilloscope to $\text{Hz} \cdot \text{ms}$.
- Set the B channel of oscilloscope to INV (Invert) and ADD mode.
- Adjust VR6 and VR7 so that the waveform level of color bar signal becomes minimum.
- Connect the oscilloscope to TP22 (A channel) and TP26 (B channel).
- Set the oscilloscope to the same mode as in case of the above adjustment procedure.
- Adjust VR3 and VR4 so that the waveform level of color bar signal is less than 50mV.

- Connect the oscilloscope to TP26 on the Decoder/Encoder board.
- Adjust VR2 so that the level of Y signal becomes $1.0V \pm 20mV$. (Fig. 4-1)

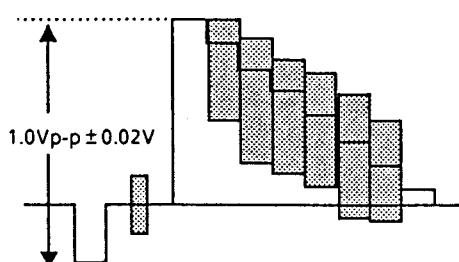


Fig. 4-1

- Adjust VR50 and VR1 so that the carrier on the waveform becomes minimum. (Fig. 4-2)

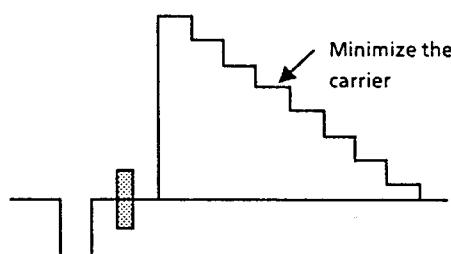


Fig. 4-2

- Repeat adjusting VR2, VR50 and VR1 so that the level of Y signal becomes $1.0V$ and carrier on the waveform becomes minimum.

(8) Y/C Separation (Video 2) adjustment

Test points :	TP24 (0H C2)	Decoder/Encoder board
	TP23 (1H C2)	Decoder/Encoder board
	TP25 (2H C2)	Decoder/Encoder board
	TP27 (Y D/A)	Decoder/Encoder board
Adjusts :	VR16	Decoder/Encoder board
	(1H CHROMA GAIN-2)	
	VR17	Decoder/Encoder board
	(1H CHROMA PHASE-2)	
	VR13	Decoder/Encoder board
	(2H CHROMA GAIN-2)	
	VR14	Decoder/Encoder board
	(2H CHROMA PHASE-2)	
	VR12	Decoder/Encoder board
	(Y/C SEPA Y LEVEL-2)	
	VR11	Decoder/Encoder board
	(Y/C SEPA PHASE-2)	
	VR51	Decoder/Encoder board
	(Y/C SEPA BAL-2)	

- Supply the composite color bar signal to the WJ-MX12 from the test signal generator.

- Connect the oscilloscope to TP24 (A channel) and TP23 (B channel).
- Connect the external trigger input of oscilloscope to TP29 (V1 HD) and set the sweep range of oscilloscope to H rate.
- Set the B channel of oscilloscope to INV (Invert) and ADD mode.
- Adjust VR16 and VR17 so that the waveform level of color bar signal becomes minimum.
- Connect the oscilloscope to TP25 (A channel) and TP23 (B channel).
- Set the oscilloscope to the same mode as in case of the above adjustment procedure.
- Adjust VR13 and VR14 so that the waveform level of color bar signal is less than $50mV$.
- Connect the oscilloscope to TP27 on the Decoder/Encoder board.
- Adjust VR12 so that the level of Y signal becomes $1.0V \pm 20mV$. (Fig. 4-3)

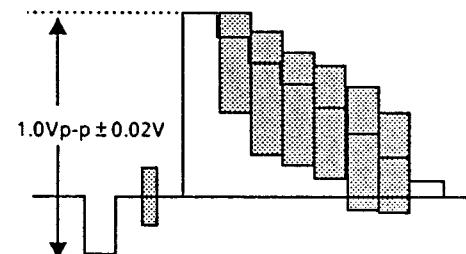


Fig. 4-3

- Adjust VR51 and VR11 so that the carrier on the waveform becomes minimum. (Fig. 4-4)

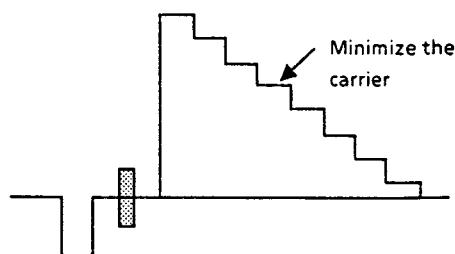


Fig. 4-4

- Repeat adjusting VR12, VR51 and VR11 so that the level of Y signal becomes $1.0V$ and carrier on the waveform becomes minimum.

(9) Burst Gate Width adjustment

Test points : TP1 (SOURCE 1) Decoder/Encoder board
TP4 (SOURCE 2) Decoder/Encoder board
Adjusts : VR8 Decoder/Encoder board
(BURST GATE 1)
VR20 Decoder/Encoder board
(BURST GATE 2)

- Keep supplying the composite color bar signal to the WJ-MX12 from the test signal generator.
- Connect the oscilloscope to TP1 on the Decoder/Encoder board.
- Connect the external trigger input of oscilloscope to TP29 (V1 HD) and set the oscilloscope to H rate and expand the horizontal blanking period.
- Adjust VR8 so that the burst blanking (masking) width becomes $0.5\mu s \pm 0.1\mu s$. (Fig. 4-5)

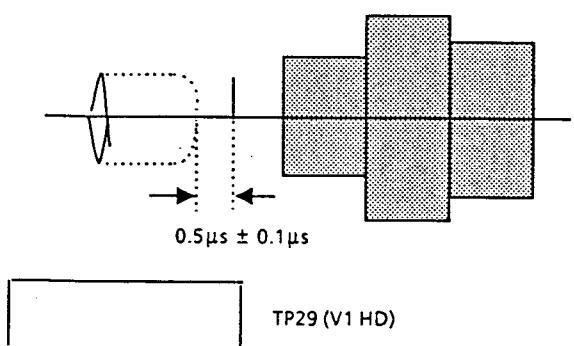


Fig. 4-5

CAUTION : If the TP1 has no chroma signal, set VR9 (CHROMA GAIN 1) to the mechanical center temporarily in order to obtain the chroma signal.

- Connect the oscilloscope to TP4 on the Decoder/Encoder board.
- Connect the external trigger input of oscilloscope to TP19 (V2 HD) and set the oscilloscope to H rate and expand the horizontal blanking period.
- Adjust VR20 so that the burst blanking (masking) width becomes $0.5\mu s \pm 0.1\mu s$.

(10) Sync Gate Width adjustment

Test point : TP30 (SYNC GATE) Decoder/Encoder board
Adjust : VR41 (SYNC GATE) Decoder/Encoder board

- Keep supplying the composite color bar signal to the WJ-MX12 from the test signal generator.
- Connect the oscilloscope to TP30 on the Decoder/Encoder board.

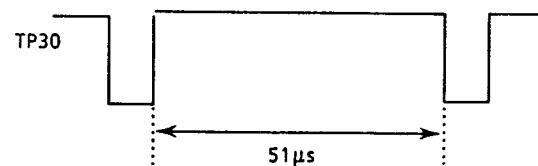


Fig. 4-6

- Press the VIDEO 2 switch on the output selection switches (VIDEO 1 / VIDEO 2 / EFFECT)
- Adjust VR22 so that the sync level becomes $0.3V_{p-p} \pm 0.02V_{p-p}$.

(11) Carrier Balance and Burst adjustment

Test point :	REC VIDEO OUT connector	Rear panel
Adjusts :	VR23	Decoder/Encoder board
	(V1 B-Y CAR. BAL)	
	VR24	Decoder/Encoder board
	(V1 R-Y CAR. BAL)	
	VR21	Decoder/Encoder board
	(V1 R-Y BURST)	
	VR25	Decoder/Encoder board
	(V1 B-Y BURST)	
	VR27	Decoder/Encoder board
	(V2 R-Y CAR. BAL)	
	VR28	Decoder/Encoder board
	(V2 B-Y CAR. BAL)	
	VR26	Decoder/Encoder board
	(V2 B-Y BURST)	
	VR30	Decoder/Encoder board
	(V2 R-Y BURST)	
Observe :	Vectorscope	
	Waveform monitor	

- Disconnect the coaxial cable from the SOURCE 1 IN (VIDEO) or SOURCE 2 IN (VIDEO) connector on the rear panel.
- Press the VIDEO 1 switch on the output selection switches (VIDEO 1 / VIDEO 2 / EFFECT)
- Set the GAIN control of Vectorscope to maximum.
- Adjust VR23 and VR24 so that the vector positions on the center of the vectorscope and the carrier leak of the video signal on the waveform monitor becomes minimum. (Fig. 4-7)

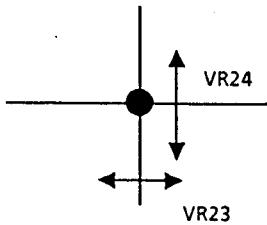


Fig. 4-7

- Set the GAIN control of Vectorscope to the CAL (Calibrated) position.
- Adjust VR21 and VR25 so that the two burst vectors are on the 75% position on the vectorscope and the phase of the two burst vectors becomes 90° . (Fig. 4-8)

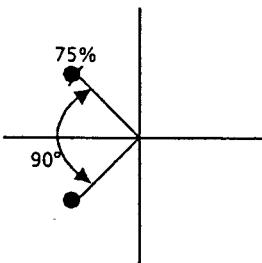


Fig. 4-8

- Repeat adjusting VR23, VR24, VR21 and VR25 so that the two burst vectors position 75% and 90° on the vectorscope and the carrier leak of the video signal on the waveform monitor becomes minimum.
- Press the VIDEO 2 switch on the output selection switches (VIDEO 1 / VIDEO 2 / EFFECT)
- Set the GAIN control of Vectorscope to maximum.
- Adjust VR27 and VR28 so that the vector positions on the center of the vectorscope and the carrier leak of the video signal on the waveform monitor becomes minimum as in case of VIDEO 1 signal.
- Set the GAIN control of Vectorscope to the CAL (Calibrated) position.
- Adjust VR26 and VR30 so that the two burst vectors are on the 75% position on the vectorscope and the phase of the two burst vectors becomes 90° as incase of VIDEO 1 signal.
- Repeat adjusting VR27, VR28, VR26 and VR30 so that the two burst vectors position 75% and 90° on the vectorscope and the carrier leak of the video signal on the waveform monitor becomes minimum.

(12) Pedestal adjustment

Test point : REC VIDEO OUT connector Rear panel
 Adjusts : VR22 (V1 PEDESTAL) Decoder/Encoder board
 VR29 (V2 PEDESTAL) Decoder/Encoder board
 Observe : Waveform monitor

- Connect the coaxial cable between the VIDEO OUT connector of the test signal generator and the SOURCE 1 IN (VIDEO) connector on the rear panel of the WJ-MX12.
- Connect the coaxial cable between the VIDEO OUT connector of the SOURCE 1 (VIDEO) connectors on the rear panel of the WJ-MX12 and the SOURCE 2 IN (VIDEO) connector on the rear panel of the WJ-MX12 for looping-through connection.
- Supply the composite color bar signal to the WJ-MX12 from the test signal generator.
- Press the VIDEO 1 switch on the output selection switches (VIDEO 1 / VIDEO 2 / EFFECT)
- While observing the waveform monitor, adjust VR22 so that the black bar is just touching to the blanking level.

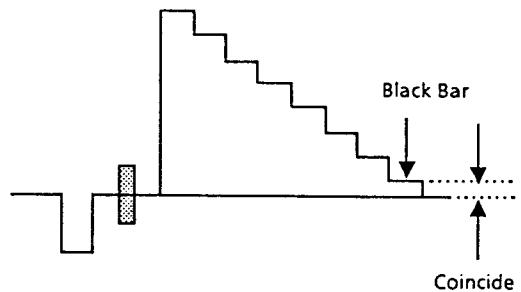


Fig. 4-9

CAUTION: Even if VR22 is turned too much, the black bar will be touched to the blanking level. It therefore should be adjusted for just touching to the blanking level.

- Press the VIDEO 2 switch on the output selection switches (VIDEO 1 / VIDEO 2 / EFFECT)
- While observing the waveform monitor, adjust VR29 so that the black bar is just touching to the blanking level as in case of the VIDEO 1 signal.

(13) Tint adjustment

Test points : TP12 (B - Y A/D)	Decoder/Encoder board
TP9 (V2 B - Y)	Decoder/Encoder board
Adjusts : VR10 (TINT 1)	Decoder/Encoder board
VR18 (TINT 2)	Decoder/Encoder board

- Keep the connection for step (12).
- Supply the composite color bar signal to the WJ-MX12 from the test signal generator.
- Connect the oscilloscope to TP12 on the Decoder/Encoder board.
- Connect the external trigger input of oscilloscope to TP29 (V1 HD) and set the sweep range of oscilloscope to 0.1msec ~ 0.2msec.
- Adjust VR10 so that the level of the two B - Y signals coincide each other. (Fig. 4-10)

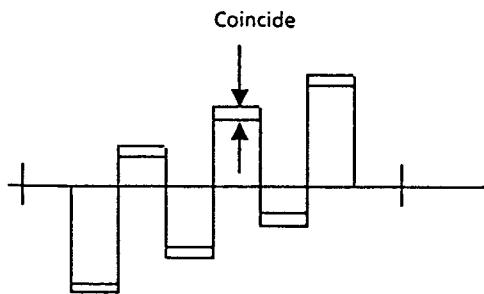


Fig. 4-10

- Connect the oscilloscope to TP9 on the Decoder/Encoder board.
- Adjust VR18 so that the level of the two B-Y signals coincide each other.

(14) Y signal adjustment

Test points : Pin 2 of CN9 (Y A/D) Decoder/Encoder board
 TP11 (V1 Y) Decoder/Encoder board

TP27 (Y D/A) Decoder/Encoder board

REC VIDEO OUT Connector Rear panel

Adjusts : VR34 (Y INPUT GAIN) Decoder/Encoder board

VR47 (Y BIAS) Decoder/Encoder board

VR45 (Y GAIN 1) Decoder/Encoder board

VR40 (Y GAIN 2) Decoder/Encoder board

- Keep the connection for step (13).
- Supply the composite color bar signal to the WJ-MX12 from the test signal generator.
- Connect the oscilloscope to pin 2 of CN9 on the Decoder/Encoder board.
- Connect the external trigger input of oscilloscope to TP29 (V1 HD) and set the sweep range of oscilloscope to H. rate.
- Adjust VR34 so that the level of the Y signal becomes $1.7V_{p-p} \pm 0.05V_{p-p}$. (Fig. 4-11)

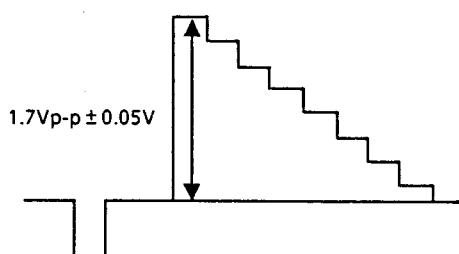


Fig. 4-11

- Connect the oscilloscope to TP11 on the Decoder/Encoder board.
- Adjust VR47 so that the black bar is just touching to the blanking level. (Fig. 4-12)

CAUTION: Even if VR47 is turned too much, the black bar will be touched to the blanking level. It

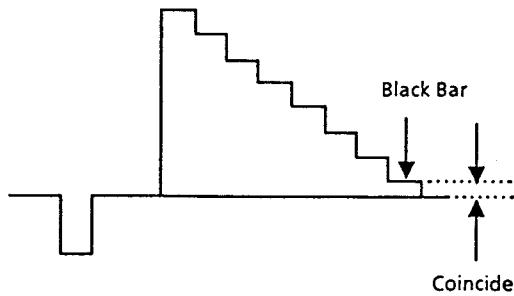


Fig. 4-12

therefore should be adjusted for just touching to the blanking level.

- Press the VIDEO 1 switch on the output selection switches (VIDEO 1 / VIDEO 2 / EFFECT)
- While observing the waveform monitor, adjust VR45 so that the Y signal (White Bar) level becomes $0.7V_{p-p} \pm 0.02V_{p-p}$. (Fig. 4-13)

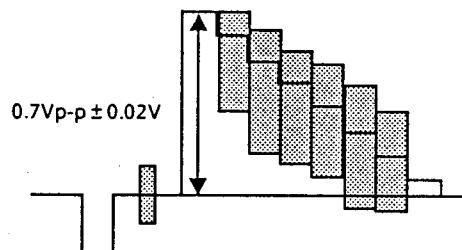


Fig. 4-13

- Press the VIDEO 2 switch on the output selection switches (VIDEO 1 / VIDEO 2 / EFFECT)
- While observing the waveform monitor, adjust VR40 so that the Y signal (White Bar) level becomes $0.7V_{p-p} \pm 0.02V_{p-p}$ as in case of the VIDEO 1 signal. (Fig. 4-17)
- Press the EFFECT switch on the output selection switches (VIDEO 1 / VIDEO 2 / EFFECT)
- Press the horizontal wipe (WIPE) switch on the WIPE Pattern selection switches.
- Press the WIPE switch on the WIPE / MIX selection switches.
- Press the VIDEO 1 switch on the A-bus selection switches and the VIDEO 2 switch on the B-bus selection switches.
- While operating the Wipe / Mix Lever, confirm that the Y signal (White Bar) levels of VIDEO 1 and VIDEO 2 are same or within $\pm 5\%$. If not, fine-adjust VR29 (V2 PEDESTAL) and VR40 (Y GAIN 2).

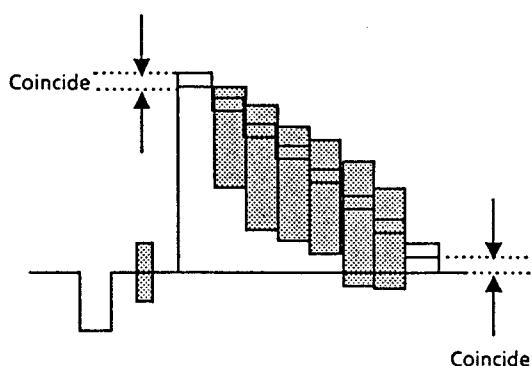


Fig. 4-14

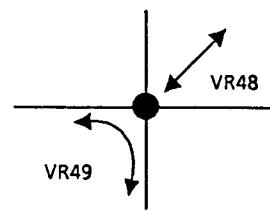


Fig. 4-16

- Set the GAIN control of Vectorscope to the CAL position and the display mode selection switch (PAL / NTSC) to NTSC mode.
- Adjust VR44 and VR46 so that the all vectors fall into their respective boxes.

(15) Chroma signal adjustment

Test points : Pin 6 of CN9	Decoder/Encoder board
(R - Y A/D)	
REC VIDEO OUT Connector	Rear panel
Adjusts :	
VR9	Decoder/Encoder board
(CHROMA GAIN 1)	
VR48	Decoder/Encoder board
(CHROMA BIAS)	
VR49 (R - Y BIAS)	Decoder/Encoder board
VR44 (R - Y GAIN 1)	Decoder/Encoder board
VR46 (B - Y GAIN 1)	Decoder/Encoder board
VR19	Decoder/Encoder board
(CHROMA GAIN 2)	
VR38 (B - Y GAIN 2)	Decoder/Encoder board

- Keep the connection for step (12).
- Supply the composite color bar signal to the WJ-MX12 from the test signal generator.
- Connect the oscilloscope to pin 6 of CN9 on the Decoder/Encoder board.
- Connect the external trigger input of oscilloscope to TP29 (V1 HD) and set the sweep range of oscilloscope to H. rate.
- Adjust VR9 so that the R - Y signal level becomes $1.4V_{p-p} \pm 0.05V_{p-p}$. (Fig. 4-15)

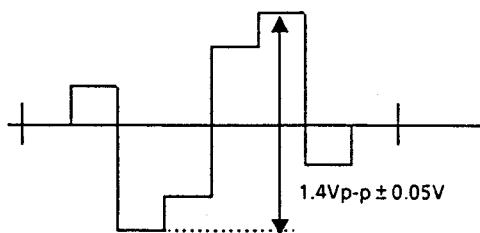


Fig. 4-15

- Press the VIDEO 1 switch on the output selection switches.
- Set the GAIN control of Vectorscope to maximum.
- Adjust VR48 and VR49 so that the vector positions on the center of the vectorscope and the carrier leak of the video signal on the waveform monitor becomes minimum. (Fig. 4-16)

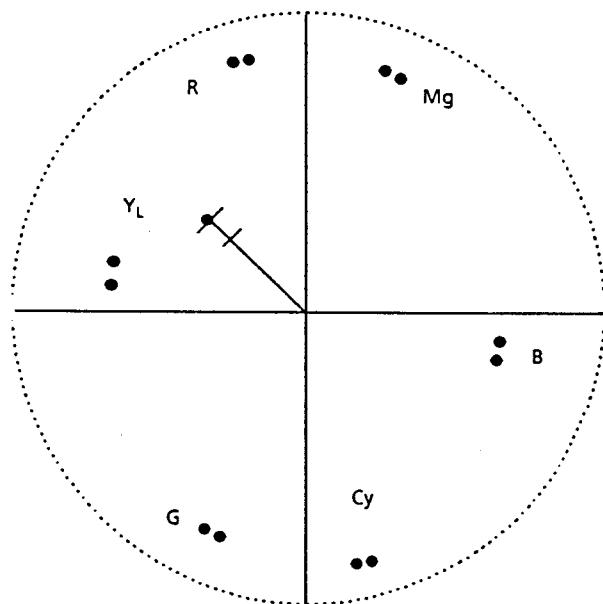


Fig. 4-17

CAUTION: If the all vectors can not be in the boxes, adjust VR44 and VR46 for following specifications while observing the center of two vectors for each color.

COLOR	SATURATION	HUE
Red	$\pm 1\%$	$\pm 3^\circ$
Magenta	$\pm 5\%$	$\pm 3^\circ$
Yellow	$\pm 1\%$	$\pm 5^\circ$
Blue	$\pm 5\%$	$\pm 5^\circ$
Green	$\pm 5\%$	$\pm 5^\circ$
Cyan	$\pm 5\%$	$\pm 5^\circ$

- Press the VIDEO 2 switch on the output selection switches.

- Adjust VR19 and VR38 so that the all vectors fall into their respective boxes.

CAUTION: If the all vectors can not be in the boxes, adjust VR19 and VR38 for following specifications while observing the center of two vectors for each color.

COLOR	SATURATION	HUE
Red	$\pm 1\%$	$\pm 3^\circ$
Magenta	$\pm 5\%$	$\pm 3^\circ$
Yellow	$\pm 2\%$	$\pm 5^\circ$
Blue	$\pm 5\%$	$\pm 5^\circ$
Green	$\pm 5\%$	$\pm 5^\circ$
Cyan	$\pm 5\%$	$\pm 5^\circ$

CAUTION: While alternately pressing the VIDEO 1 and VIDEO 2 switches on the output selection switches, confirm that the saturation difference between VIDEO 1 and VIDEO 2 signals on the vectorscope is within 5%. If not, fine-adjust VR19 (CHROMA GAIN 2) and VR38 (B-Y GAIN 2).

(16) Horizontal Wipe adjustment

Test points :	TP4 (H.PARA)	Control board
	TP5 (H.I SAW)	Control board
	TP6 (H.SAW)	Control board
	TP7 (H.TRI)	Control board
Adjusts :	VR10 (H.TRI BAL)	Control board
	VR11 (H.TRI GAIN)	Control board
	VR12 (H.SAW GAIN)	Control board
	VR13 (H.SAW DC)	Control board
	VR14 (H.PARA GAIN)	Control board
	VR29 (H.TRI SLOPE)	Control board

- Disconnect the coaxial cable from the SOURCE 1 IN (VIDEO) or SOURCE 2 IN (VIDEO) connector on the rear panel.
- Press the wipe pattern selection switch other than circle and square wipe.
- Connect the oscilloscope to TP7 on the Control board.
- Set the oscilloscope to H rate.
- Adjust VR10 so that the pulse duty becomes 50%. (The duty a and b become equal.) (Fig. 4-17)

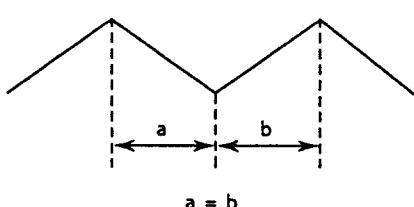


Fig. 4-17

- Adjust VR29 so that the offset of the end of triangle waveform becomes $0 \text{ V} \pm 0.01 \text{ V}$.

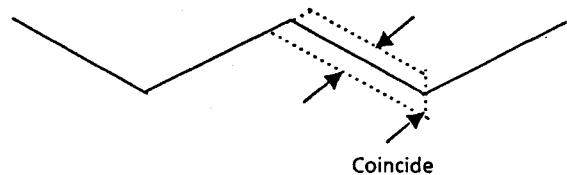


Fig. 4-18

- Adjust VR11 so that the peak level of triangle waveform becomes $2 \text{ V} \pm 0.05 \text{ V}$. (Fig. 4-19)

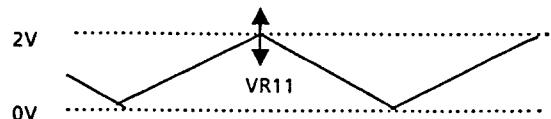


Fig. 4-19

- Connect the oscilloscope to TP6 on the Control board.
- Adjust VR12 so that the peak level of sawtooth waveform becomes 2 V p-p . (Fig. 4-20)

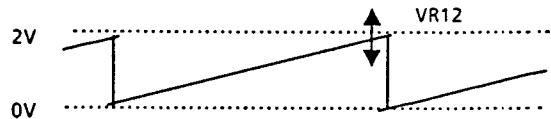


Fig. 4-20

- Connect the oscilloscope to TP5 and TP6 on the Control board.
- Set the oscilloscope to DC position.
- Adjust VR13 so that the lower level of sawtooth waveform at TP5 and TP6 becomes equal. (Fig. 4-21)

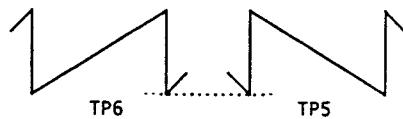


Fig. 4-21

- Connect the oscilloscope to TP4 on the Control board.
- Adjust VR14 so that the amplitude of parabola waveform becomes 2 Vp-p . (Fig. 4-22)

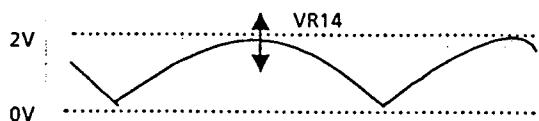


Fig. 4-22

(17) Vertical Wipe adjustment

Test points :	TP11 (V.PARA)	Control board
	TP12 (VI SAW)	Control board
	TP13 (V.SAW)	Control board
	TP14 (V.TRI)	Control board
Adjusts :	VR18 (V.TRI BAL)	Control board
	VR20 (V.SAW GAIN)	Control board
	VR21 (V.SAW DC)	Control board
	VR22 (V.PARA GAIN)	Control board
	VR27 (V.TRI SLOPE)	Control board

- Disconnect the coaxial cable from the SOURCE 1 IN (VIDEO) or SOURCE 2 IN (VIDEO) connector on the rear panel.
- Press the wipe pattern selection switch other than circle and square wipe.
- Connect the oscilloscope to TP4 on the Control board.
- Set the oscilloscope to V rate.
- Adjust VR18 so that the pulse duty becomes 50% (The duty a and b become equal) (Fig. 4-23)

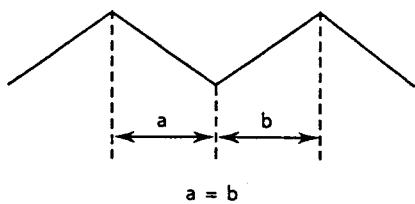


Fig. 4-23

- Connect the oscilloscope to TP14 on the Control board.
- Adjust VR27 so that the offset of the end of triangle waveform becomes $0\text{ V} \pm 0.01\text{V}$. (Fig. 4-24)

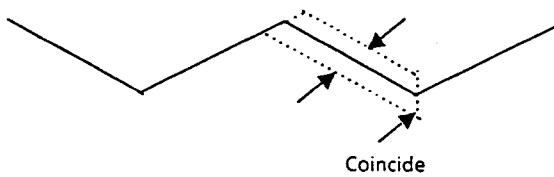


Fig. 4-24

- Connect the oscilloscope to TP13 on the Control board.
- Adjust VR20 so that the peak level of sawtooth waveform becomes 2V p-p. (Fig. 4-25)
- Connect the oscilloscope to TP12 and TP13 on the Control board.

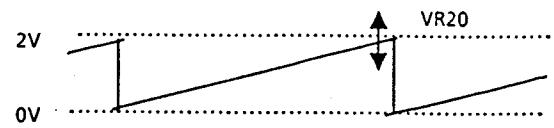


Fig. 4-25

- Adjust VR21 so that the lower level of sawtooth waveform at TP12 and TP13 becomes equal. (Fig. 4-26)

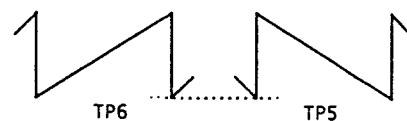


Fig. 4-26

- Connect the oscilloscope to TP11 on the Control board.
- Adjust VR22 so that the peak level of parabola waveform becomes 2V p-p. (Fig. 4-27)

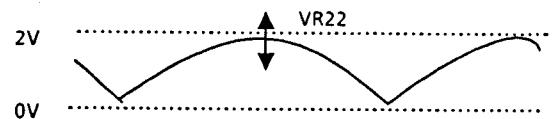


Fig. 4-27

(18) Symmetry adjustment

Observe :	Color Video Monitor	
Adjust :	VR15 (Symmetry)	Control board
	VR14 (H. PARE GAIN)	Control board

- Connect the coaxial cable between the VIDEO OUT connector of the test signal generator and the SOURCE 1 IN (VIDEO) connector on the rear panel of the WJ-MX12.
- Connect the coaxial cable between the VIDEO OUT connector of the SOURCE 1 (VIDEO) connectors on the rear panel of the WJ-MX12 and the SOURCE 2 IN (VIDEO) connector on the rear panel of the WJ-MX12 for looping-through connection.
- Press the EFFECT switch on the output selection switches (VIDEO 1 / VIDEO 2 / EFFECT).
- Press the CIRCLE WIPE switch on the Wipe Pattern selection switches.
- Press the WIPE switch on the Wipe / Mix selection switches.
- Press the VIDEO 1 switch on the A-bus selection switches on the Wipe / Mix section.
- Press the BACK COLOR switch on the B-bus selection switches on the Wipe / Mix section.
- Supply the crosshutch signal to the WJ-MX12 from the test signal generator.
- Adjust WIPE / MIX lever so that the circle becomes as shown in the figure.

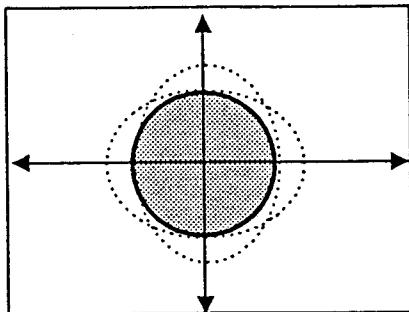


Fig. 4-28

- Adjust VR15 so that the circle becomes as true circle as possible.
- Press the BORDER WIPE switch and select the thin border wipe.
- Adjust VR14 so that the 2 boxes of crosshatch signal becomes border color and 3 boxes of crosshatch signal becomes doughnut pattern, when adjusting the WIPE/MIX lever. (Fig. 4-29)

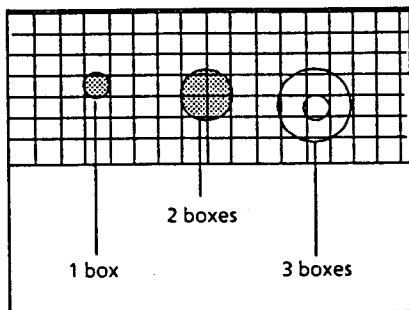


Fig. 4-29

(19) Border offset adjustment

Observe : Color Video Monitor

Adjust : VR23 (BORDER OFFSET) Control board

- Keep the connection for step (18).
- Set the joystick lever of the positioner so that the circle positions in the center of the screen.
- Adjust WIPE/MIX lever so that the horizontal and vertical size of the circle becomes equal to 4 boxes of the crosshatch signal.
- Adjust VR23 so that the circle edges of A and B channels are hidden by the border circle.

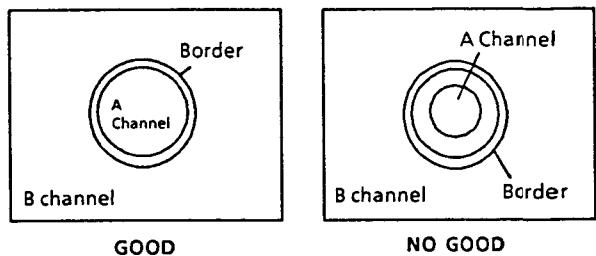


Fig. 4-30

(20) Centering Fine-adjustment

Observe : Color Video Monitor

Adjust : VR9 (H.CENT-2)	Control board
VR17 (V.CENT-2)	Control board
VR8 (H.CENT-1)	Control board
VR16 (V.CENT-1)	Control board
VR25 (H.POSITION)	Control board
VR26 (V.POSITION)	Control board

- Keep the connection for step (18).
- Press the EFFECT switch on the output selection switches (VIDEO 1 / VIDEO 2 / EFFECT)
- Press the SQUARE WIPE switch on the Wipe Pattern selection switches.
- Press the WIPE switch on the Wipe / Mix selection switches.
- Press the VIDEO 1 switch on the A-bus selection switches on the Wipe / Mix section.
- Press the BACK COLOR switch on the B-bus selection switches on the Wipe / Mix section.
- Supply the crosshatch signal to the WJ-MX12 from the test signal generator.
- Adjust WIPE / MIX lever so that the square becomes as shown in the figure.

- Adjust VR9 so that the horizontal variable range of positioner becomes $A = B$ as shown in the figure.

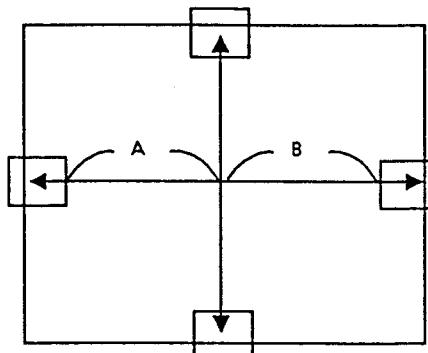


Fig. 4-31

- Adjust VR17 so that the vertical variable range of positioner becomes $C = D$ as shown in the figure.

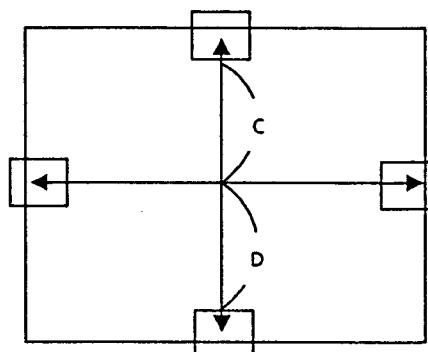


Fig. 4-32

- Set the Joystick lever of the positioner so that the square positions in the center of the screen.
- Adjust WIPE / MIX lever so that the horizontal size of the square becomes equal to 4 boxes of the crosshutch signal.
- Adjust VR19 so that the vertical size of the square becomes equal to 3 boxes of the crosshutch signal as shown in the figure.

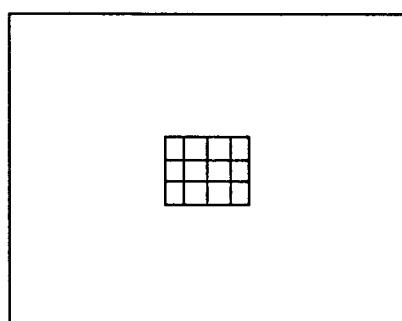


Fig. 4-33

- Press the **Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ** switches on the Wipe Pattern selection switches for the square wipe and confirm that the positioner is disabled.
- Adjust WIPE / MIX lever so that the horizontal size of the square becomes equal to 4 boxes and the vertical size of

the square becomes equal to 3 boxes of the crosshutch signal.

- Adjust VR8 so that the horizontal center of the square becomes the center ($\pm 2\%$) of the crosshutch signal as shown in the figure

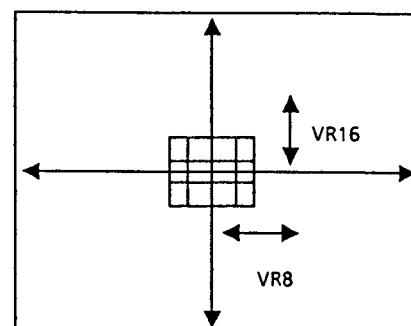


Fig. 4-34

- Adjust VR16 so that the vertical center of the square becomes the center ($\pm 2\%$) of the crosshutch signal as shown in the figure
- Press the **Ⓐ** switch on the Wipe Pattern selection switches for the vertical wipe and confirm that the positioner is disabled.

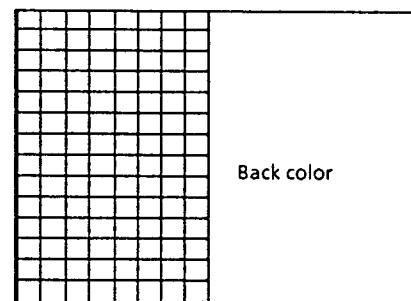


Fig. 4-35

- Adjust WIPE / MIX lever so that the wipe edge (vertical line) positions on the center of the crosshutch signal as shown in the figure
- Press the **Ⓑ** switch on the Wipe Pattern selection switches.
- Press the **Ⓒ** switch on the Wipe Pattern selection switches for the vertical wipe and confirm that the positioner is disabled.
- Adjust VR25 so that the horizontal center of the wipe edge becomes the center ($\pm 2\%$) of the crosshutch signal as shown in the figure.

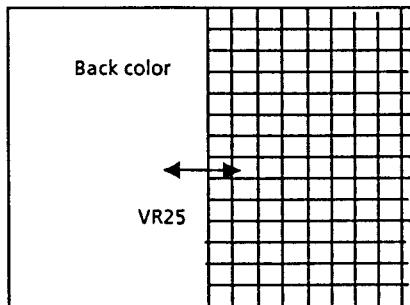


Fig. 4-36

- Press the switch on the Wipe Pattern selection switches for the horizontal wipe and confirm that the positioner is disabled.

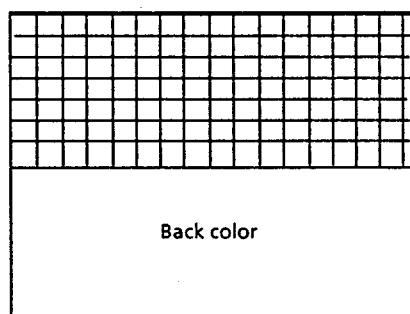


Fig. 4-37

- Adjust WIPE / MIX lever so that the wipe edge (horizontal line) positions on the center of the crosshatch signal as shown in the figure.
- Press the switch on the Wipe Pattern selection switches for the horizontal wipe and confirm that the positioner is disabled.
- Adjust VR26 so that the vertical center of the wipe edge becomes the center ($\pm 2\%$) of the crosshatch signal as shown in the figure.

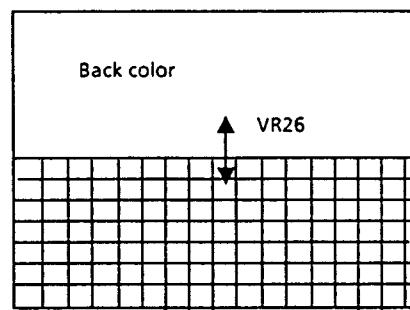


Fig. 4-38

(21) Phase Difference adjustment

Observe : Vectorscope	
Adjust : CT4(V1 CHROMA PHASE)	Decoder/Encoder board
VR21 (V1 R-Y BURST)	Decoder/Encoder board
VR25 (V1 B-Y BURST)	Decoder/Encoder board
VR44 (R - Y GAIN 1)	Decoder/Encoder board
VR46 (B - Y GAIN 1)	Decoder/Encoder board
VR43 (V2 H.PHASE)	Decoder/Encoder board

- Connect the coaxial cable between the VIDEO OUT connector of the test signal generator and the SOURCE 1 IN (VIDEO) connector on the rear panel of the WJ-MX12.
- Press the EFFECT switch on the output selection switches (VIDEO 1/VIDEO 2/EFFECT).
- Press the switch on the input selection switches (/ /).
- Press the Horizontal wipe switch on the Wipe Pattern selection switches.
- Press the WIPE switch on the Wipe / Mix selection switches.
- Press the VIDEO 1 switches for both the A-bus and B-bus selection switches on the Wipe / Mix section.
- Adjust WIPE / MIX lever so that the wipe edge (horizontal line) positions on the center of the picture.

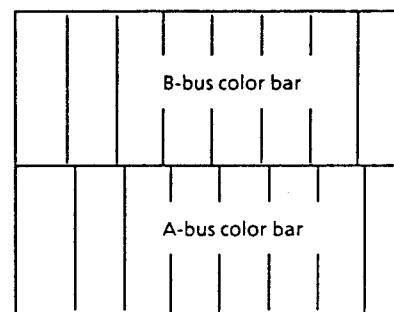


Fig. 4-39

- Adjust CT4 so that the phase of all vectors for A-bus coincide with that of B-bus or average of phase difference between A-bus and B-bus color bar vectors becomes minimum.
- Set the GAIN control of Vectorscope to the CAL position and the display mode selection switch (PAL / NTSC) to PAL mode.

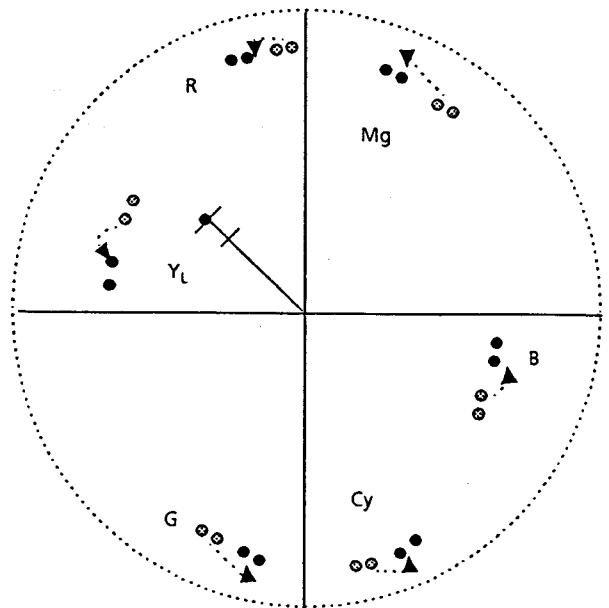


Fig. 4-40

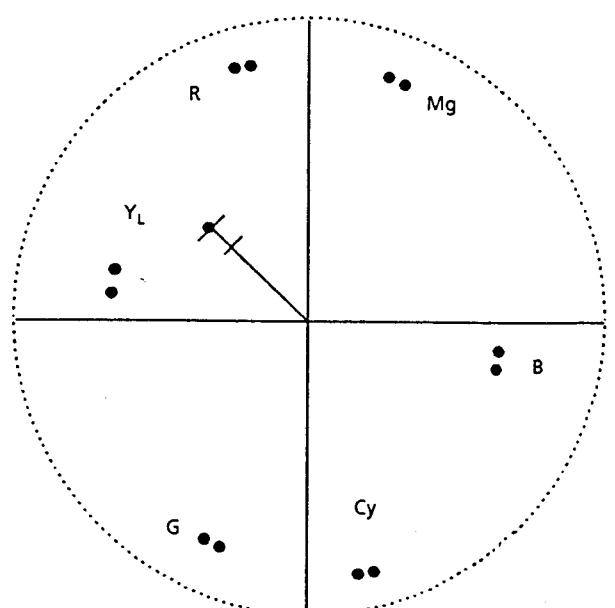


Fig. 4-42

- Fine-adjust VR21 and VR25 so that the two burst vectors are on the 75% position on the vectorscope and the phase of the two burst vectors becomes 90°.

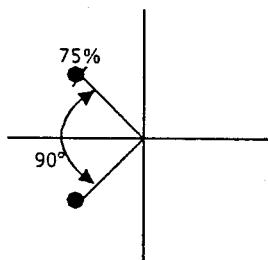


Fig. 4-41

- Set the display mode selection switch (PAL / NTSC) to NTSC mode.
- Fine-adjust VR44 and VR46 so that the all vectors fall into their respective boxes.

CAUTION: If the all vectors can not be in the boxes, adjust VR44 and VR46 for following specifications while observing the center of two vectors for each color.

COLOR	SATURATION	HUE
Red	± 1%	± 3°
Magenta	± 5%	± 3°
Yellow	± 1%	± 5°
Blue	± 5%	± 5°
Green	± 5%	± 5°
Cyan	± 5%	± 5°

- Adjust VR43 so that the vertical line of color bar signals coincide (within ± 2%) each other on the center of the picture.

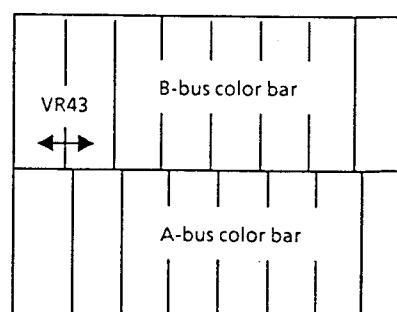


Fig. 4-43

(22) Effect adjustment

Test points :	TP6 (EFFECT C)	Mixer board
	TP5 (EFFECT Y)	Mixer board
Adjusts :	VR16 (EFFECT C GAIN)	Mixer board
	VR14 (EFFECT BAL)	Mixer board
	VR12 (EFFECT Y GAIN)	Mixer board

- Connect the coaxial cable between the VIDEO OUT connector of the test signal generator and the SOURCE 1 IN (VIDEO) connector on the rear panel of the WJ-MX12.
- Press the WIPE switch on the Wipe/Mix selection switches.
- Press the VIDEO 1 switches for both the A-bus and B-bus selection switches on the Wipe/Mix section.
- Set WIPE/MIX lever to A-bus position (upper side).
- Connect the oscilloscope to TP6 on the Mixer board.
- Adjust VR16 so that the burst level becomes $0.3V_{p-p} \pm 0.02V_{p-p}$.

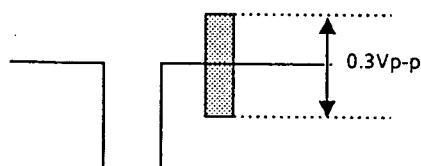


Fig. 4-44

- Press the BACK COLOR switch for both the A-bus and B-bus selection switches on the Wipe/Mix section.
- Set the COLOR SELECTION SWITCH to BLACK color.
- Press the switch on the Wipe Pattern selection switches for the vertical wipe.
- Adjust WIPE/MIX lever so that the wipe edge (vertical line) positions on the center of the monitor screen.
- Connect the oscilloscope to TP5 on the Mixer board.
- Adjust VR14 so that the black level of the A-bus and B-bus becomes equal.
- Press the VIDEO 1 switch for A-bus selection switch on the Wipe/Mix section.
- Set WIPE MIX lever to A-bus position (upper side).
- Connect the oscilloscope to TP5 on the Mixer board.
- Adjust VR12 so that the Y signal level becomes $1.0V_{p-p} \pm 0.02V_{p-p}$.

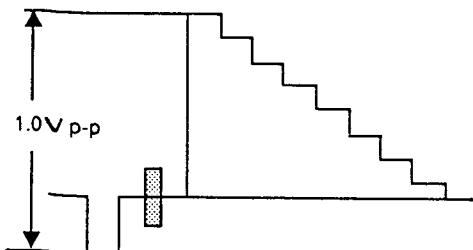


Fig. 4-45

(23) Fade adjustment

Test point :	REC VIDEO OUT connector	Rear panel
Adjusts :	VR18 (FADE C GAIN)	Mixer board
	VR15 (FADE Y BAL)	Mixer board
	VR13 (FADE Y GAIN)	Mixer board

- Connect the coaxial cable between the VIDEO OUT connector of the test signal generator and the SOURCE 1 IN (VIDEO) connector on the rear panel of the WJ-MX12.
- Press the WIPE switch on the Wipe/Mix selection switches.
- Press the EFFECT switch on the output selection switches.
- Press the VIDEO 1 switches for both the A-bus and B-bus selection switches on the Wipe/Mix section.
- Set the WIPE/MIX lever to A-bus position (upper side).
- Set the FADE lever to IN position (upper side).
- Adjust VR18 so that the burst level becomes $0.3V_{p-p} \pm 0.02V_{p-p}$.

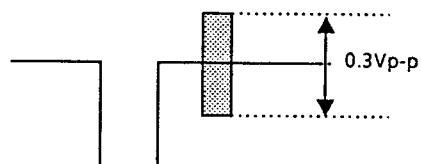


Fig. 4-46

- Confirm that the FADE control switches are not selected.
- Set the FADE Lever from IN to OUT, and adjust VR15 so that the pedestal level of the FADE IN and FADE OUT becomes equal.
- Set the FADE lever to IN position (upper side).
- Adjust VR13 so that the Y signal level becomes $1.0V_{p-p} \pm 0.02V_{p-p}$.

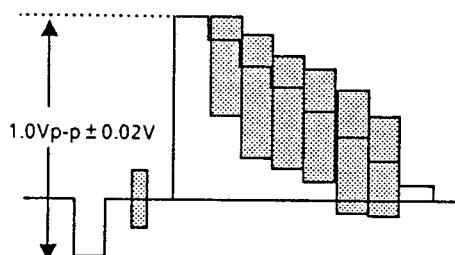


Fig. 4-47

(24) Back color adjustment

Test point : REC VIDEO OUT connector Res panel
Adjusts : VR21 (B/C CHROMA GAIN) Mixer board
 VR20 (FADE B/C CHROMA PHASE)
 Mixer board
 VR2 (B/C CHROMA PHASE) Mixer board

- Disconnect the coaxial cable between the VIDEO OUT connector of the test signal generator and the SOURCE 1 IN (VIDEO) connector on the rear panel of the WJ-MX12.
- Press the EFFECT switch on the output selection switches.
- Press the WIPE switch on the Wipe/Mix selection switches.
- Press the BACK COLOR switches for the A-bus selection switch on the Wipe/Mix section.
- Set the WIPE/MIX lever to the A (A-bus) position all way up.
- Select the BACK COLOR switch to RED color.
- Turn the CHROMA LEVEL control on the front panel to maximum.
- Adjust VR21 and VR2 so that the red vector falls into its respective box.

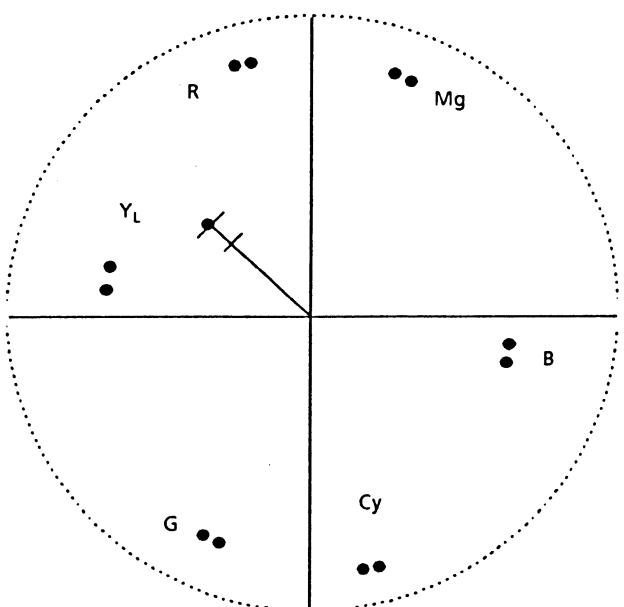


Fig. 4-48

- Press the VIDEO and BACK COLOR switches on the Fade Control section.
- Set the Fade Lever to OUT position.
- Select the BACK COLOR switch to RED position.
- Adjust VR20 so that the red vector falls into its respective box on the vectorscope.

(24) Masking adjustment

Observe : Waveform monitor or Oscilloscope
Adjust : VR2 (H.MASK WIDTH) Control board
 VR1 (V.MASK WIDTH) Control board

- Disconnect the coaxial cable between the VIDEO OUT connector of the test signal generator and the SOURCE 1 IN (VIDEO) connector on the rear panel of the WJ-MX12.
- Press the EFFECT switch on the output selection switches (VIDEO 1 / VIDEO 2 / EFFECT).
- Press the ON (Superimpose) switch on the SUPERIMPOSE selection.
- Set the KEY LEVEL controls on the SUPERIMPOSE selection to the LOW end for the LOWER control and the HIGH end for the UPPER control.
- Press the WHITE switch on the SUPERIMPOSE selection in order to set the entire picture to white.
- Observe the waveform monitor or connect the oscilloscope to the REC VIDEO OUT connector.
- Connect the external trigger input of oscilloscope to TP6 (V1 HD) and set the sweep range of oscilloscope to H. rate.
- Turn VR2 fully counterclockwise first and then turn it back slowly and stop it where the white video signal is cut (masked) $1.5 \mu\text{s} \pm 0.1\mu\text{s}$.

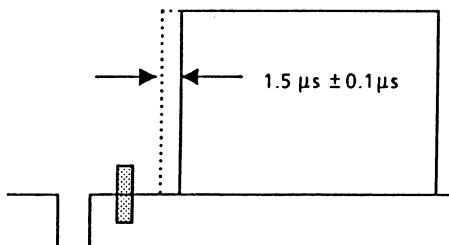


Fig. 4-49

- Observe the vertical waveform on the waveform monitor or the oscilloscope.
- Turn VR1 fully clockwise first and then turn it back slowly and stop it at where the white video signal is cut (masked) $6H \pm 1H$.

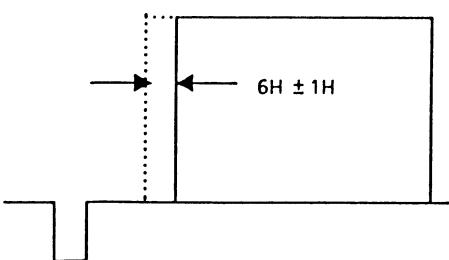


Fig. 4-50

LOCATION OF TEST POINTS AND ADJUSTING CONTROLS

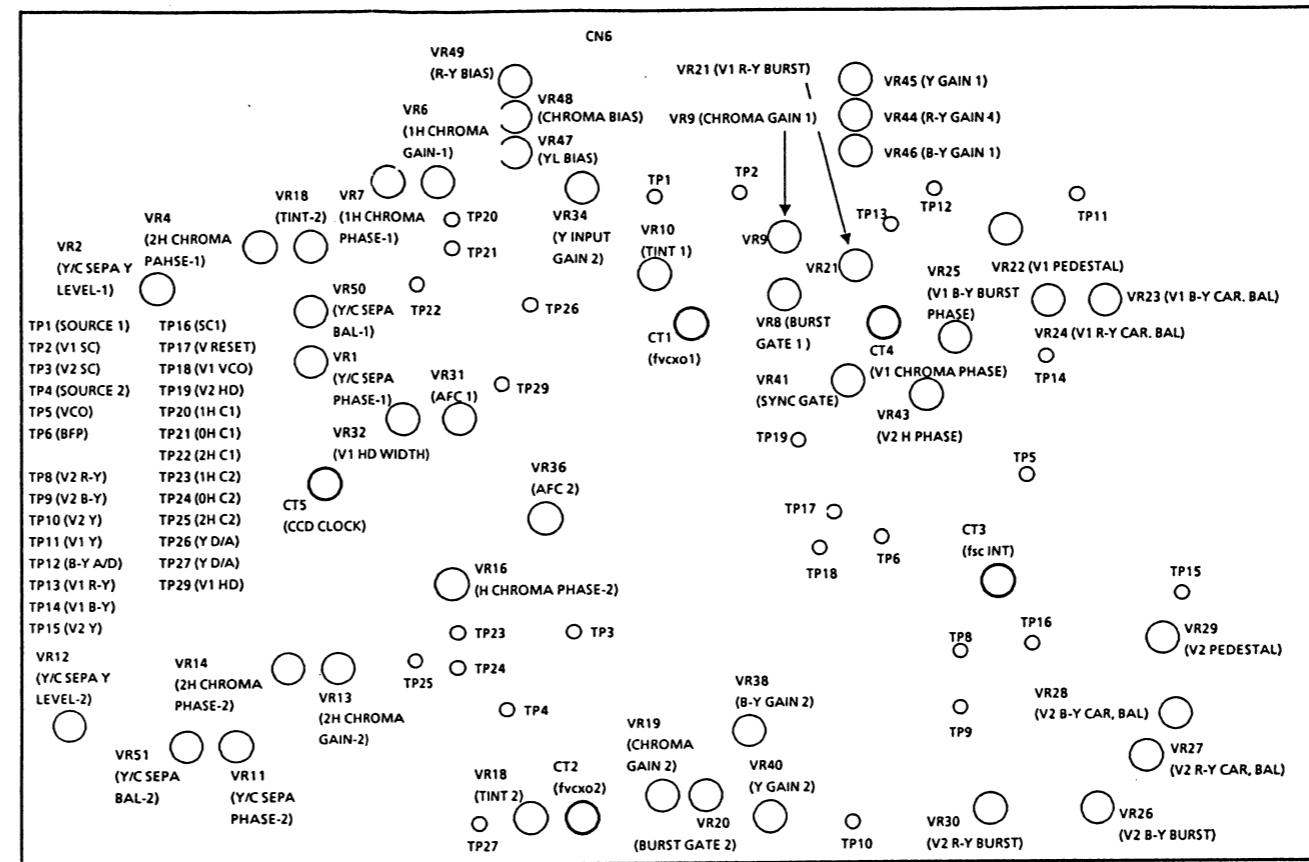
(25) Audio adjustment

Test points : REC AUDIO OUT connectors

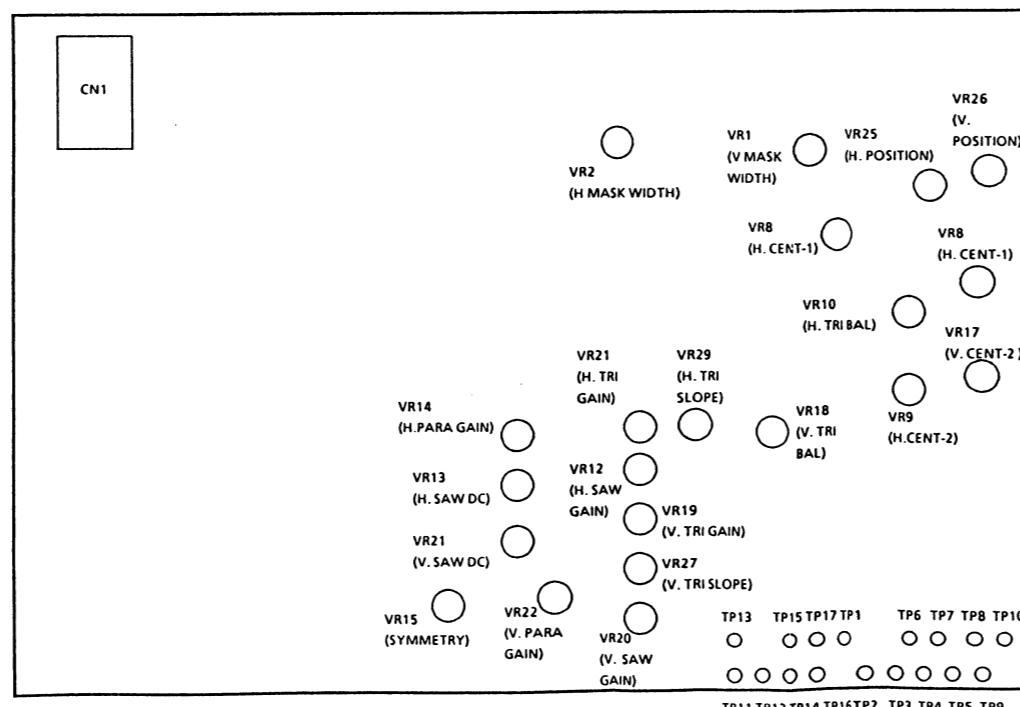
Adjust : VR17 (L/R BALANCE) Mixer board
 VR6 (LEFT METER PRESET) Mixer board
 VR7 (RIGHT METER PRESET) Mixer board

- Connect the audio cable(s) with pin connectors (RCA connectors) between the output terminal or connector of the low frequency test signal generator and the SOURCE 1 AUDIO L and R INPUT connectors of WJ-MX12.
- Disconnect the audio cable(s) from the SOURCE 2 AUDIO L and R INPUT connectors of WJ-MX12.
- Supply the 1 kHz, -10dB (316mV rms) sinewave signal to the SOURCE 1 AUDIO L and R INPUT connectors of WJ-MX12 from the test signal generator.
- Set the AUDIO BALANCE control (AUDIO 1 / AUDIO 2) to the AUDIO 1 end.
- Set the AUDIO level control (MAX / MIN) to the MAX end.
- Connect the 2 probes of oscilloscope to the REC AUDIO OUT L and R connectors.
- Set the polarity of channel 2 of the oscilloscope to the INVERTED position and ADDED (CH1 and CH2) position in order to display the L-R signal.
- Adjust VR17 for 0 mV ± 5 mV.
- Set the AUDIO level control (MAX / MIN) so that the REC AUDIO OUT L level becomes -8dB (398mV rms).
- After confirming that all LEDs for left channel are lit on by turning VR6 fully counterclockwise, turn VR6 clockwise slowly and stop it at where the red LED for +2 point is off and LEDs from 0 point and lower are lit on.
- After confirming that all LEDs for right channel are lit on by turning VR7 fully counterclockwise, turn VR7 clockwise slowly and stop it at where the red LED for +2 point is off and LEDs from 0 point and lower are lit on.

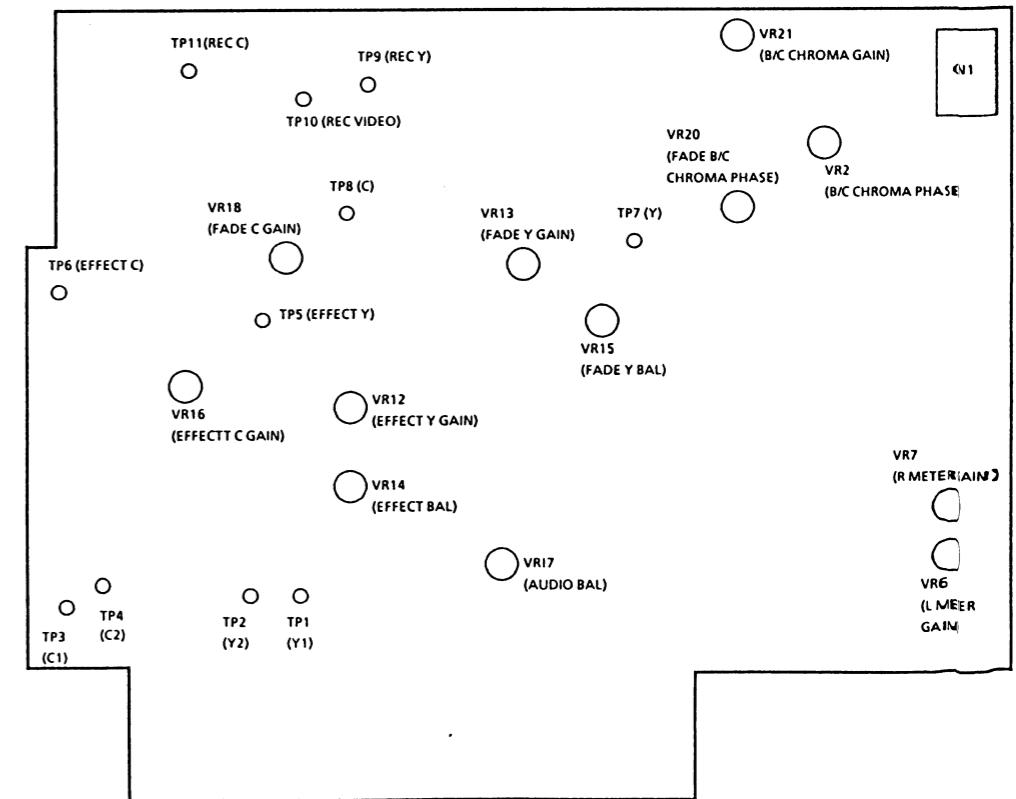
DECODER/ENCODER BOARD



CONTROL BOARD



MIXER BOARD



CHIP COMPONENTS

1. Chip Transistor

The transistor number is indicated on the top surface of the chip transistor using two alphabet letters or one numerical and two alphabet letters.



Appearance and Symbols



	1	2	3
MA28/28W/28T	-	Anode	Cathode
MA151K/152K	-	Anode	Cathode
MA151A/152A	-	Cathode	Anode
MA151WK/MA152WK	Anode	Anode	Cathode
MA151WA/MA152WA	Cathode	Cathode	Anode
MA153	Cathode	Anode	Common

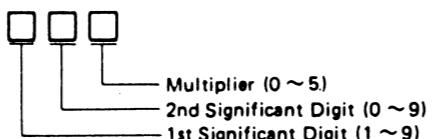
Numerical Value

Letter	Value	Letter	Value
A	10	N	33
B	11	P	36
C	12	O	39
D	13	R	43
E	15	S	47
F	16	T	51
G	18	U	56
H	20	V	62
J	22	W	68
K	24	X	75
L	27	Y	82
M	30	Z	91

* Letters I and O are not used

3. Chip Resistor

The resistor value is indicated on the bottom surface of the chip resistor using three digit numbers.



EXAMPLE:

$$330 \rightarrow 33 \times 10^0 = 33 \text{ ohms}$$

$$561 \rightarrow 56 \times 10^1 = 560 \text{ ohms}$$

$$123 \rightarrow 12 \times 10^3 = 12 \text{ kohms}$$

Note: Zero ohm resistor (jumper chip) is colored red or green.

4. Chip Capacitor

The capacitive value of replacement chip capacitors is indicated on the bottom surface. Original parts do not have value indication.

If the capacitive value is less than 100 pF, the value will be indicated by one or two digit number expressing the capacity directly in pF.

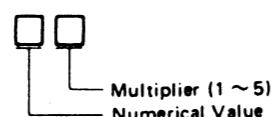
EXAMPLE:

$$0.5 \rightarrow 0.5 \text{ pF} \quad 2.5 \rightarrow 2.5 \text{ pF}$$

$$75 \rightarrow 0.75 \text{ pF} \quad 33 \rightarrow 33 \text{ pF}$$

$$1 \rightarrow 1 \text{ pF} \quad 82 \rightarrow 82 \text{ pF}$$

If the capacitive value is 100 pF or greater, the value will be indicated by an alpha-numeric code. The letter precedes the number and expresses a numerical value to be multiplied by the number which follows.



EXAMPLE:

$$A1 \rightarrow 10 \times 10^1 = 100 \text{ pF}$$

$$N2 \rightarrow 33 \times 10^2 = 3300 \text{ pF}$$

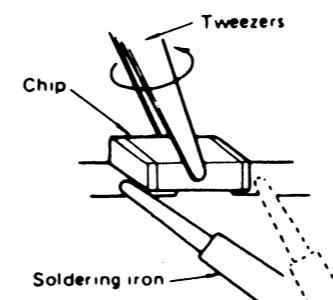
$$S3 \rightarrow 47 \times 10^3 = 47000 \text{ pF}$$

5. Precautions in replacing the chip component

1. Make sure that the unit is turned OFF when replacing the chip.
2. Use tweezers to prevent any damage to the chip surface.
3. Do not re-use the chips after removal.
4. Do not rub the electrode of chips.
5. Do not subject the chips to excessive stress.
6. It is recommended that a pencil-type soldering iron to be used.
7. The solder whose diameter is less than 0.5 mm is recommended.
8. Do not heat the chip beyond 3 seconds.
9. Maintain temperature control under 260°C (500°F) when soldering.

5-1 Removal (Transistor, Diode, Resistor and Capacitor)

1. Add the solder to both ends of the chip (three leads for chip transistor).
 2. While attaching the soldering iron to both ends of the chip (three leads for chip transistor) as shown below, remove the chip by turning it with tweezers.
- Note: Be careful not to damage other chips

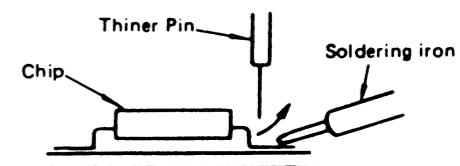


5-2 Removal (IC)

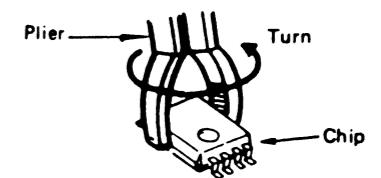
1. Add the solder wick and solder iron to each lead of the IC and remove solder.



2. Add the solder iron to each lead of the IC and lift each lead of the IC using thinner pin.

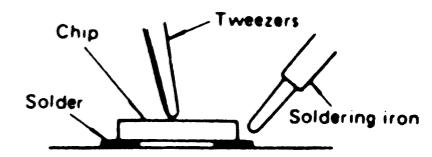


3. Remove IC turning it with plier.

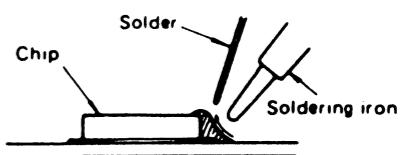


5-3 Mounting

1. Place the solder thinly on the chip mounting foil.
2. Solder the chip temporarily while holding the chip with the tweezers



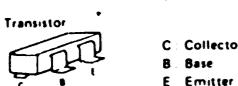
3. Solder both ends of chip (three leads for chip transistor)



Example

WQ → 2SD602 – Q
YQ → 2SD601 – Q
1BS → 2SB814 – S

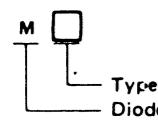
Appearance and Symbols



	1	2	3
Except 2SK199	Drain	Source	Gate
2SK199	Gate	Drain	Source

2. Chip Diode

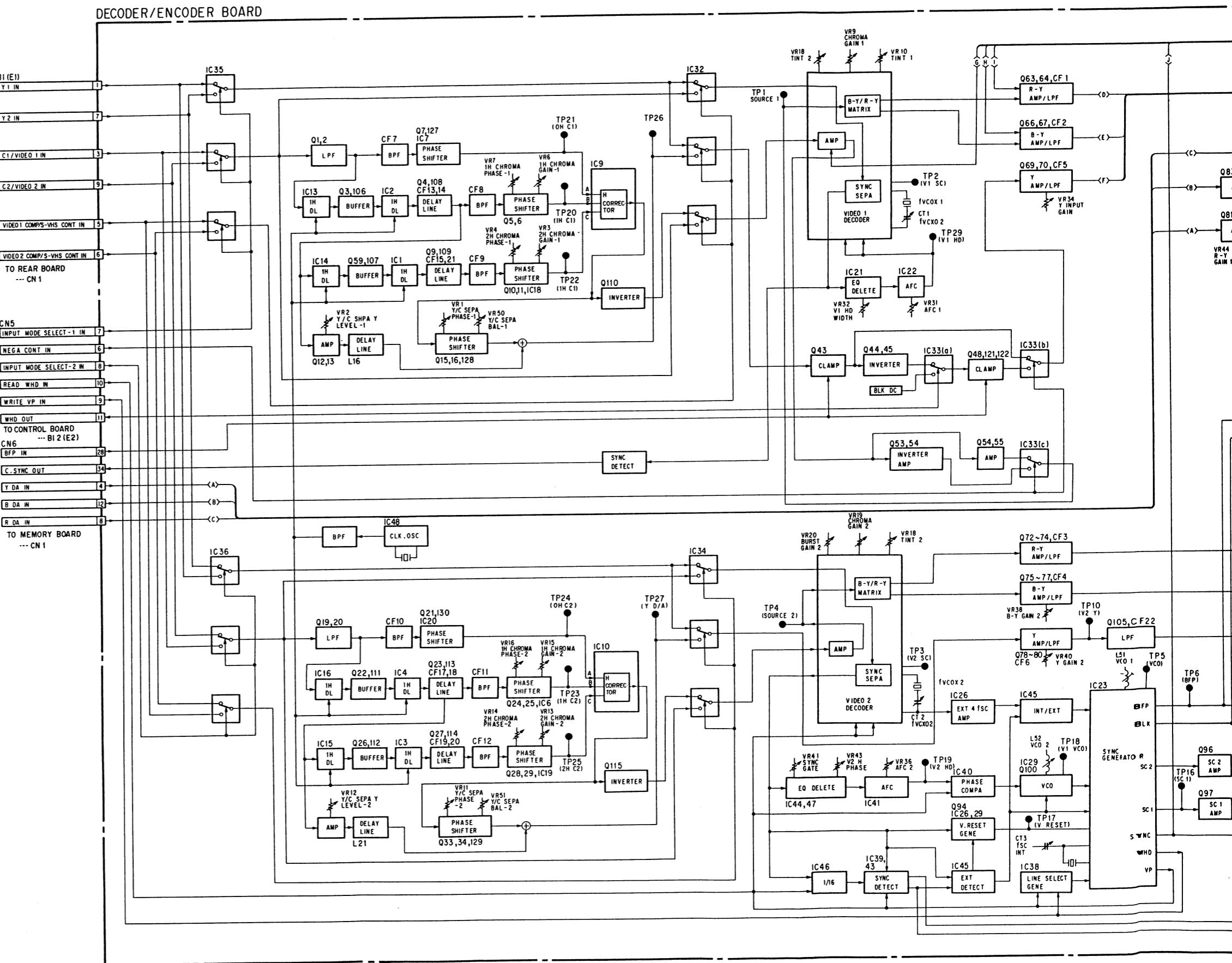
The diode number is indicated on the top surface of the chip diode using Two alphabet letters.



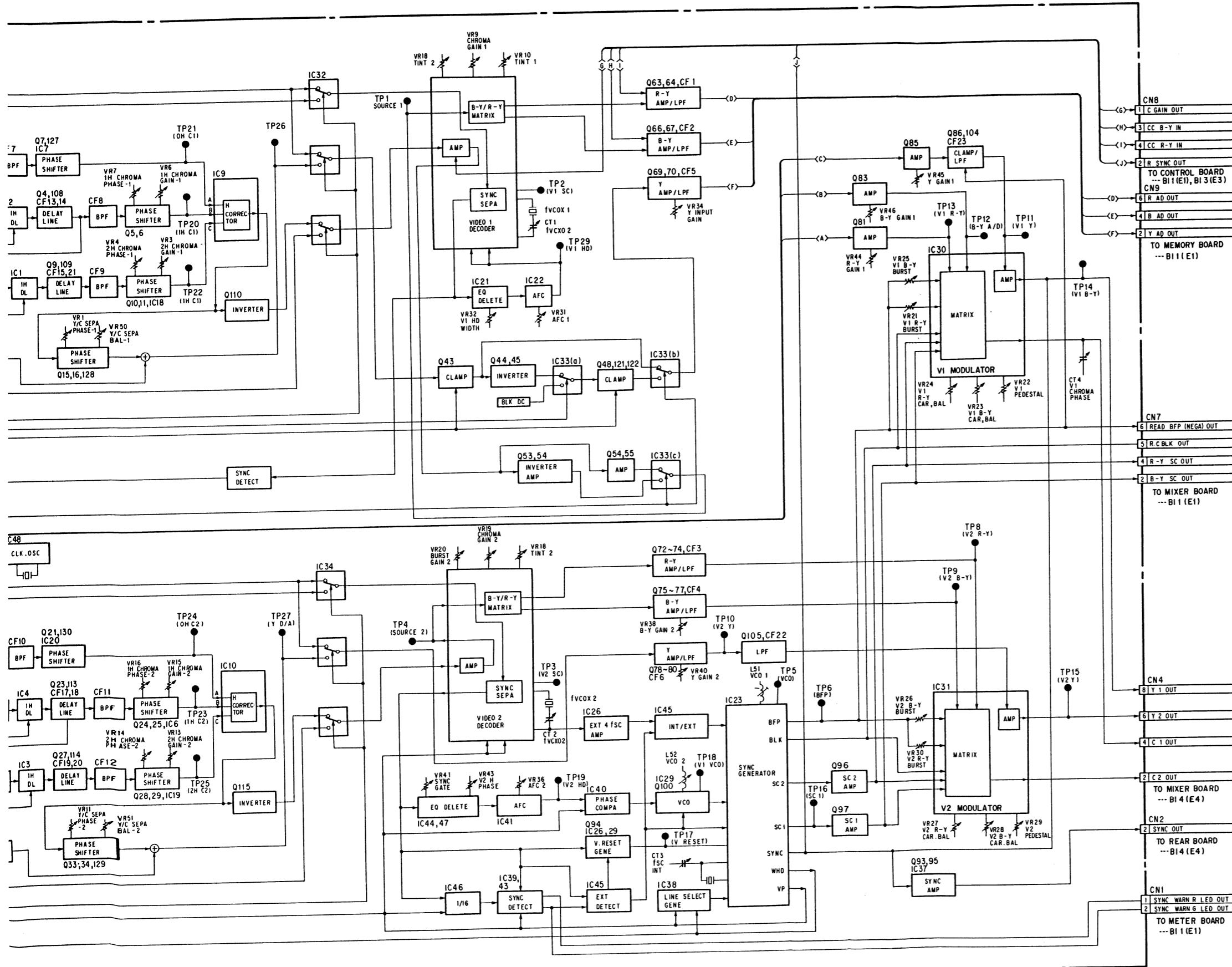
Diode Number

Letter	Diode No.	Letter	Diode No.
MA	MA151A	MI	MA152K
MB	MA152A	MK	MA28W-B
MC	MA153	ML	MA28T-A
MD	MA28-A	MN	MA151WA
ME	MA28-B	MO	MA152WA
MF	MA28W-A	MT	MA151WK
MH	MA151K	MU	MA152WK

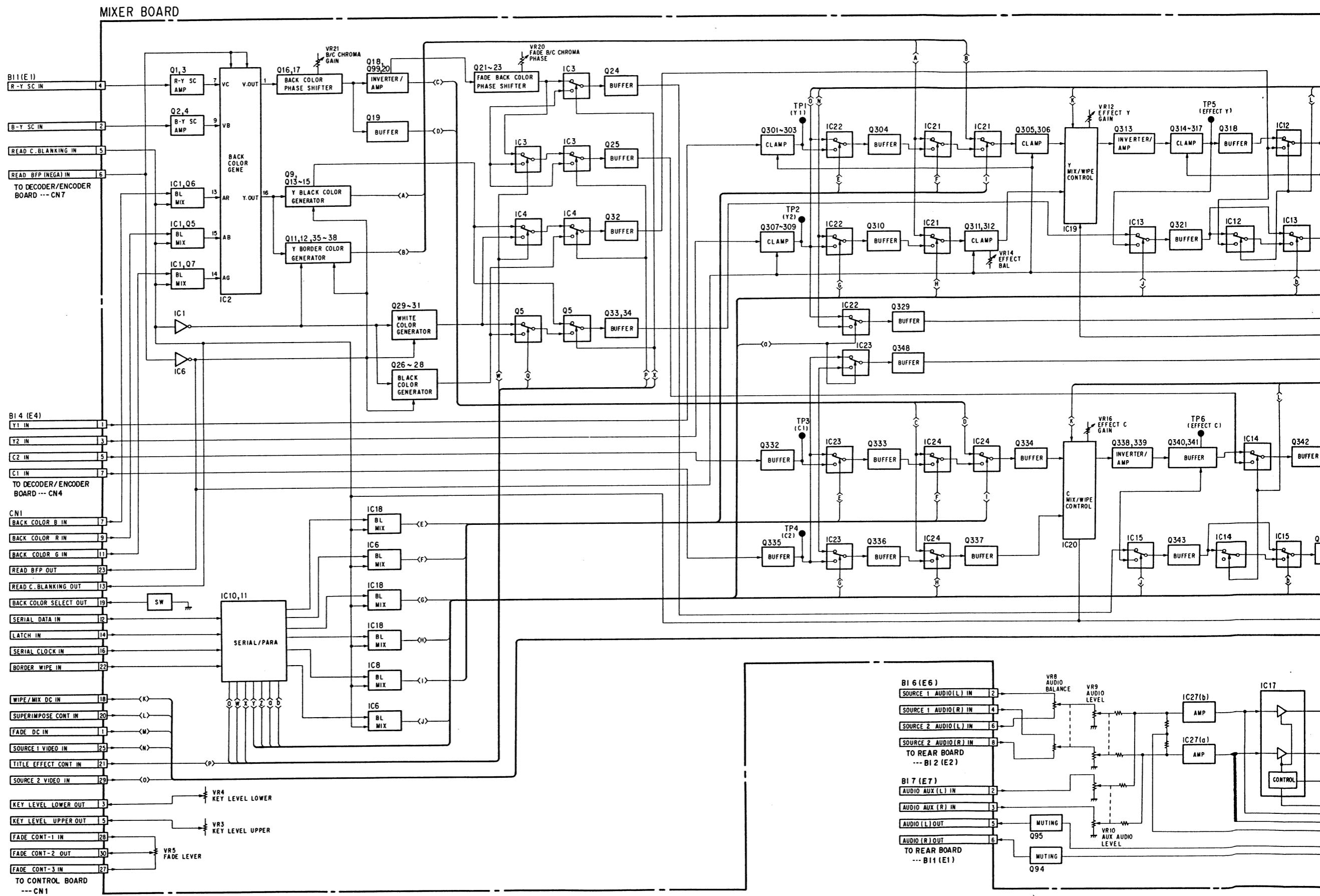
BLOCK DIAGRAM OF DECODER/ENCODER BOARD



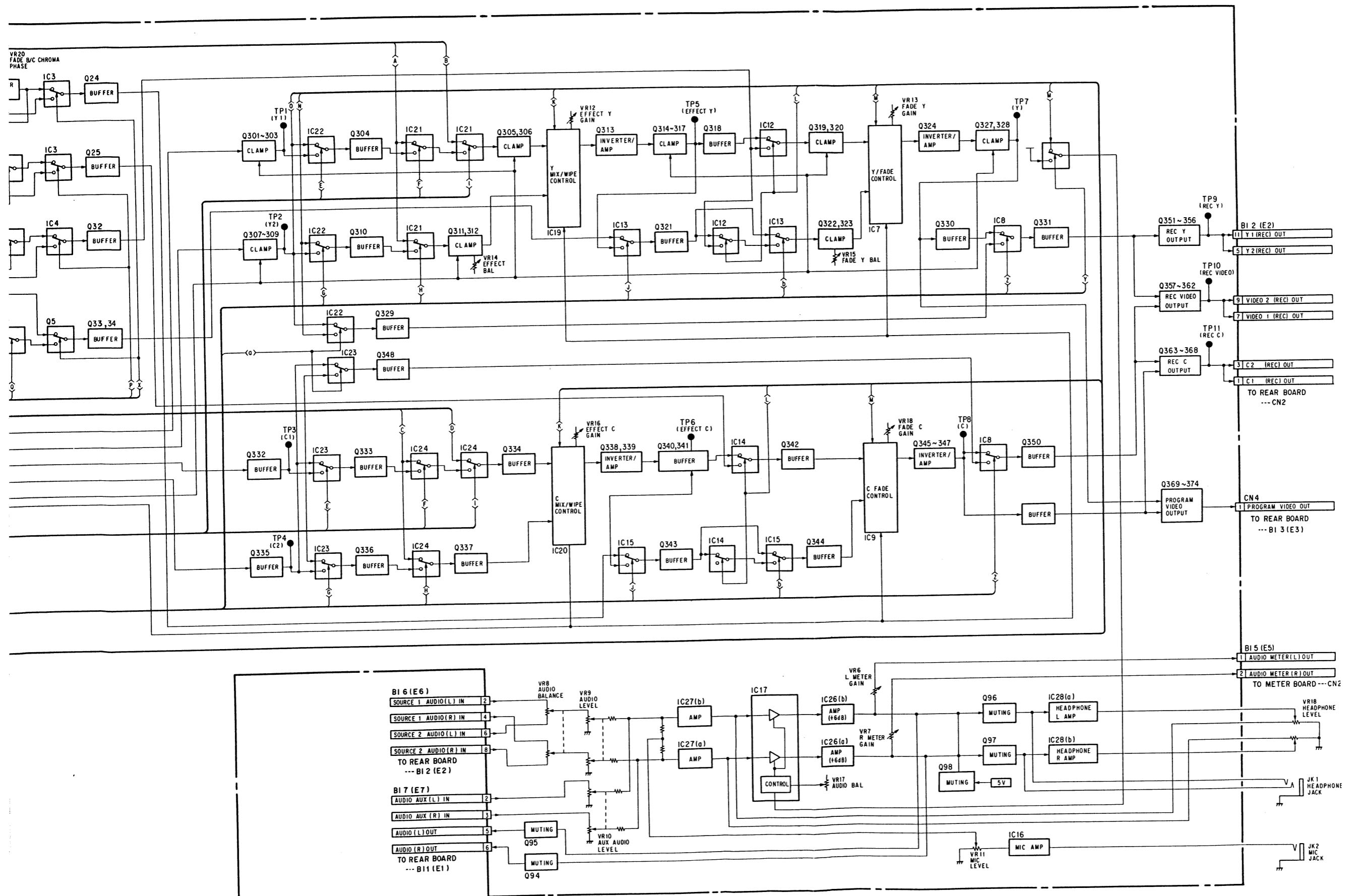
BLOCK DIAGRAM OF DECODER/ENCODER BOARD



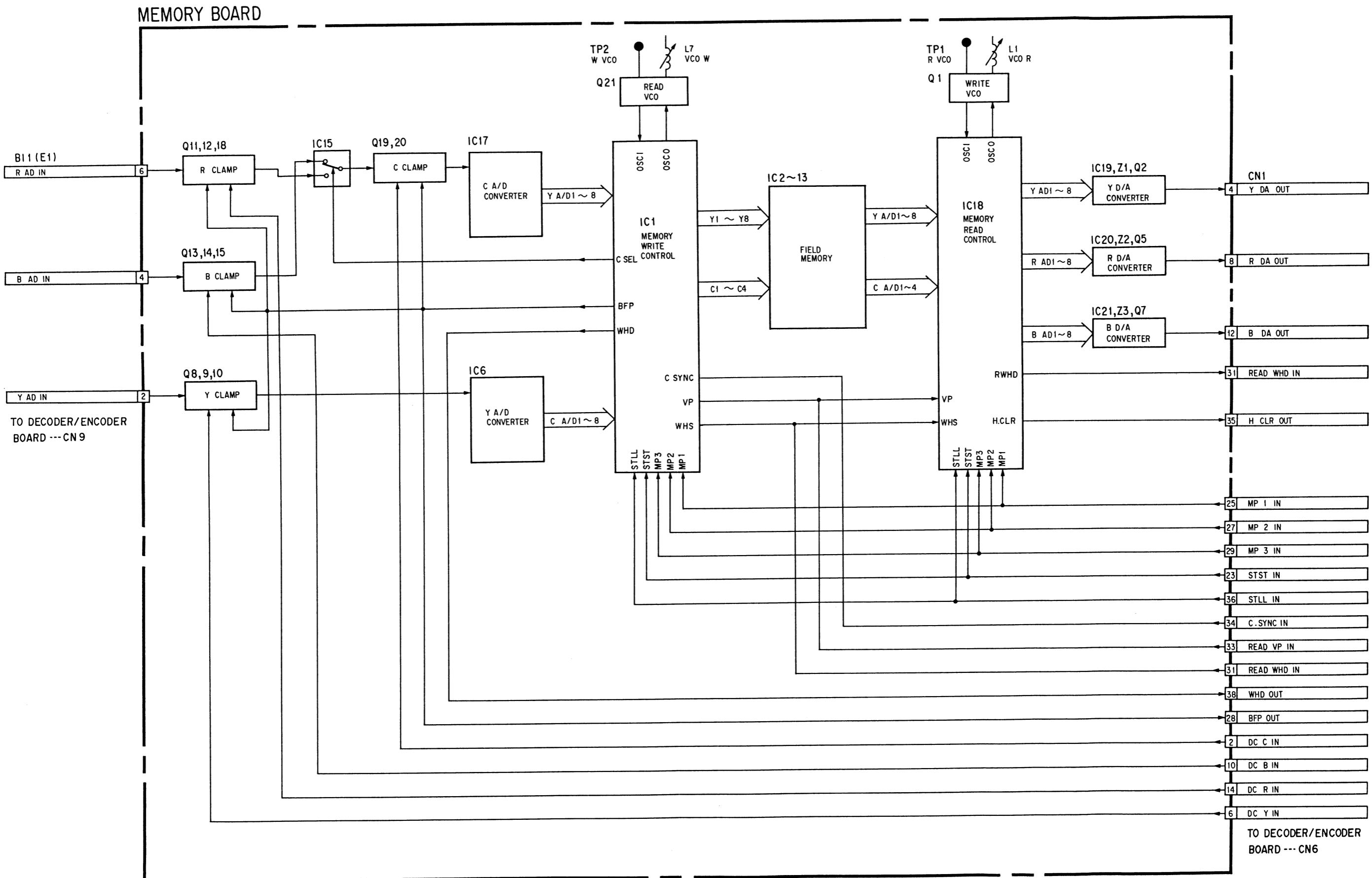
BLOCK DIAGRAM OF MIXER BOARD



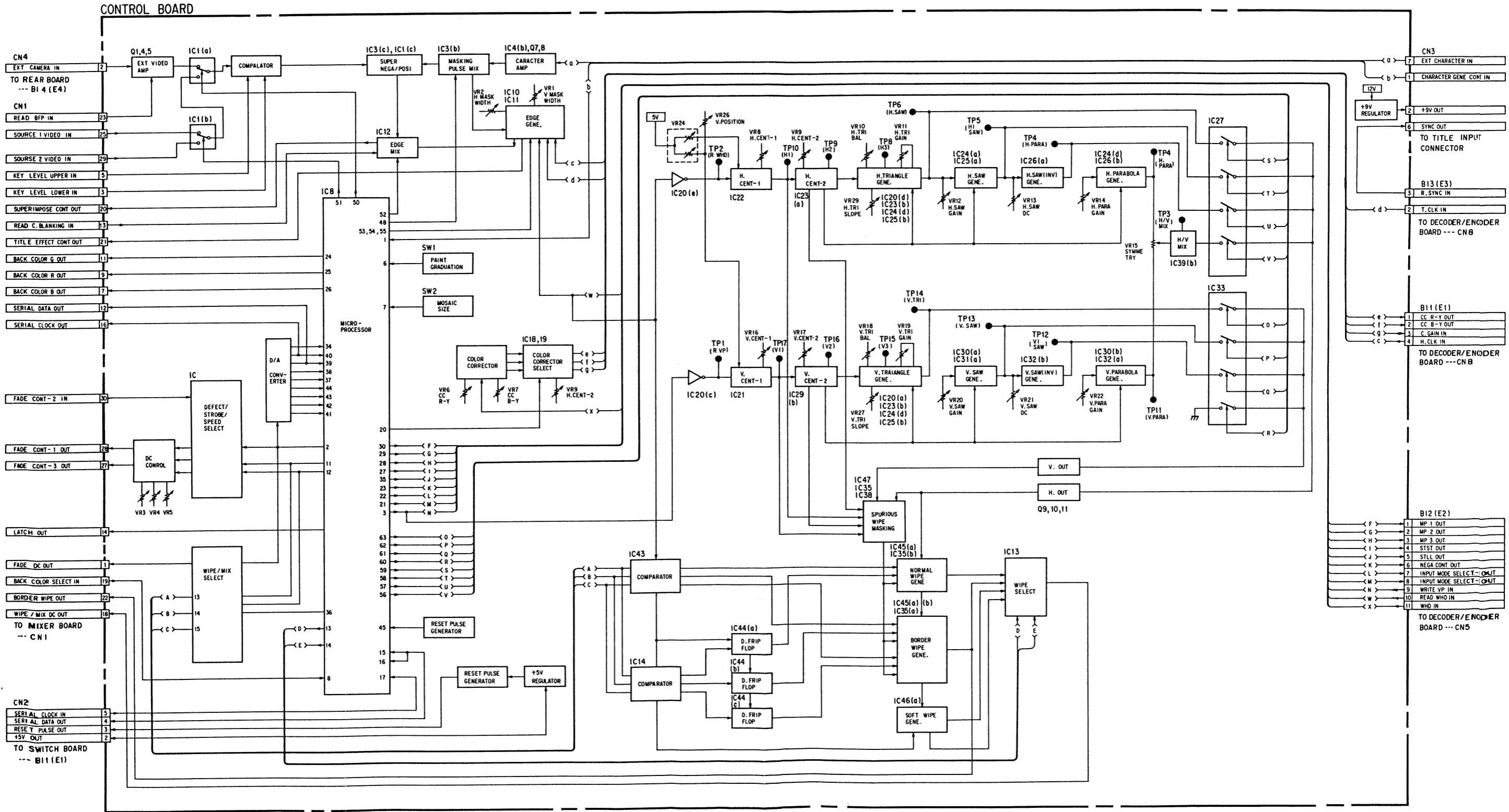
BLOCK DIAGRAM OF MIXER BOARD



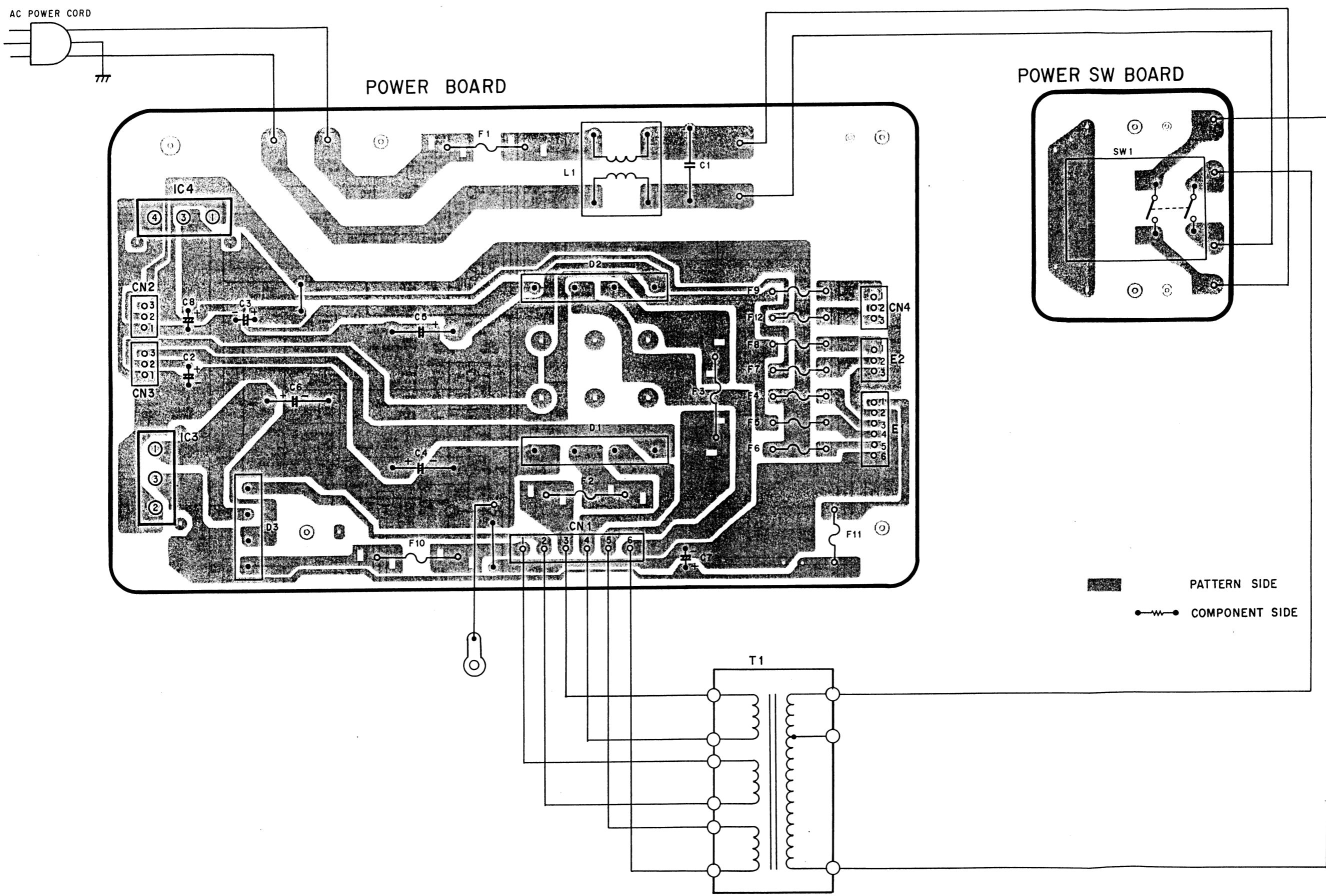
BLOCK DIAGRAM OF MEMORY BOARD



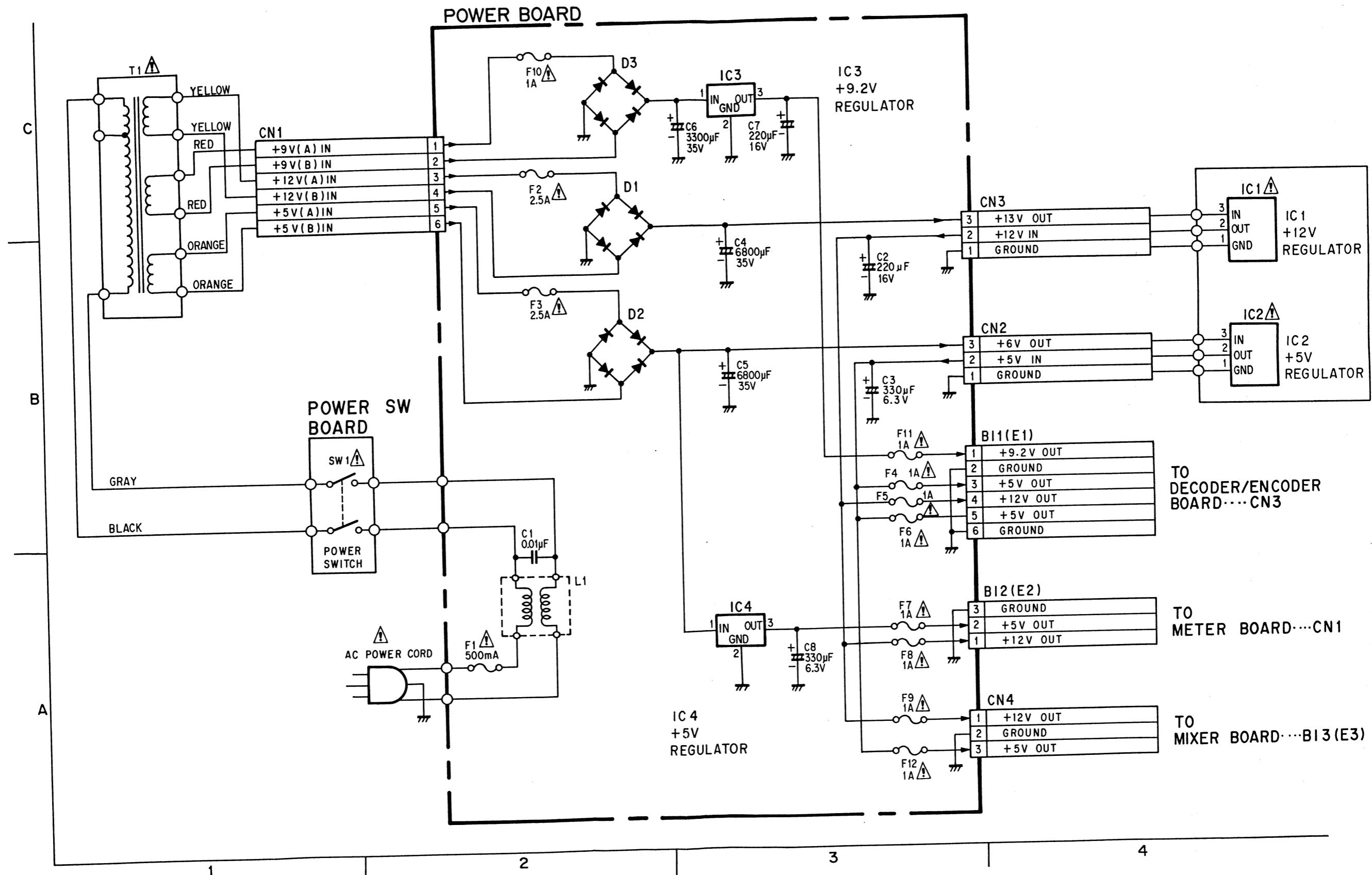
BLOCK DIAGRAM OF CONTROL BOARD



CONDUCTOR VIEW OF POWER BOARD



SCHEMATIC DIAGRAM OF POWER BOARD



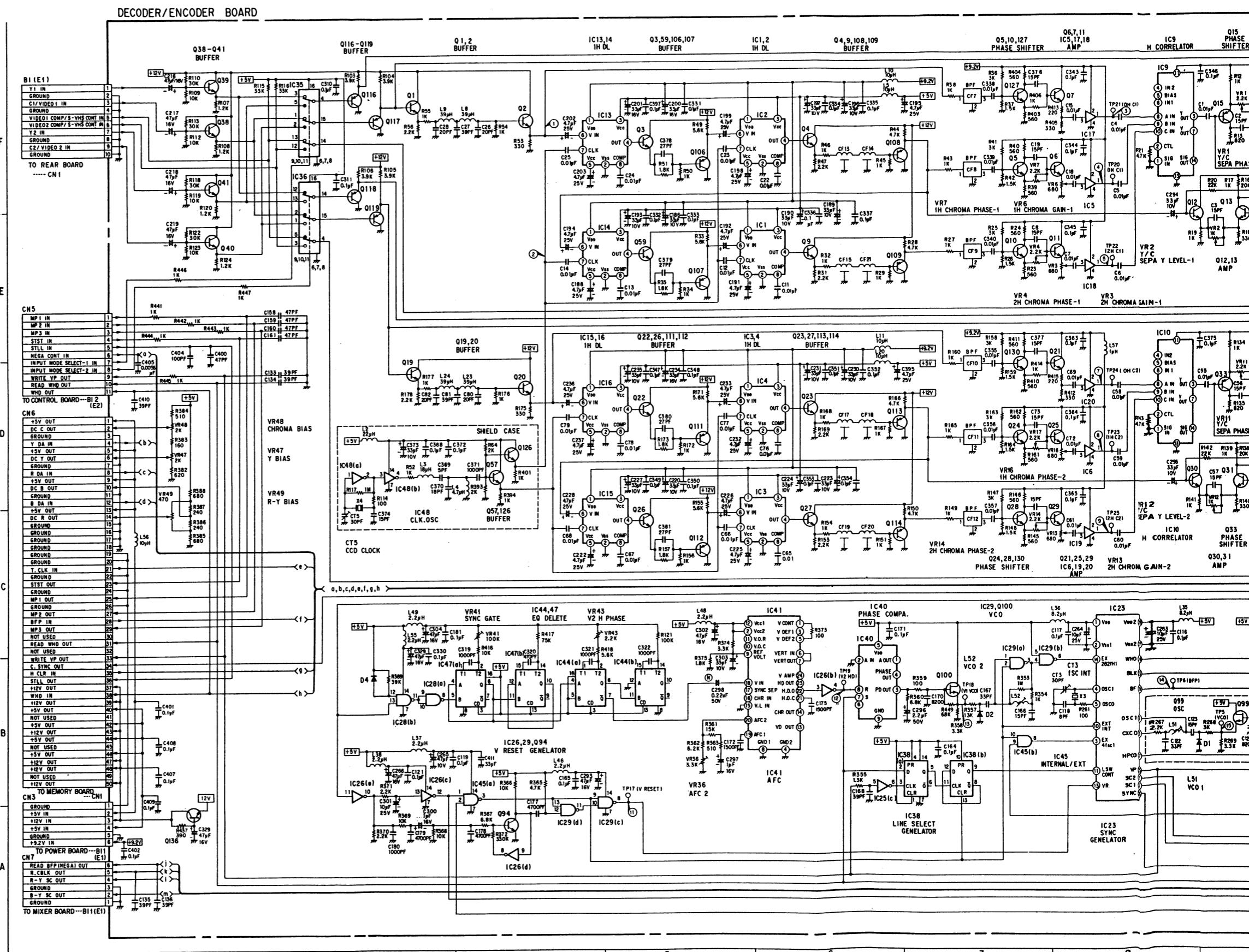
	IC1	IC2	IC3	IC4
Pin 1	0	0	0	0
2	11.9	4.9	9.0	0
3	18.8	10.7	16.0	10.8

PRODUCT SAFETY NOTICE
COMPONENT IDENTIFIED WITH THE "▲" MARK HAVE THE SPECIAL
CHARACTERISTICS FOR SAFETY.
WHEN SERVICING ANY OF THESE COMPONENTS, IT IS ESSENTIAL THAT
ONLY MANUFACTURER'S SPECIFIED PARTS BE USED

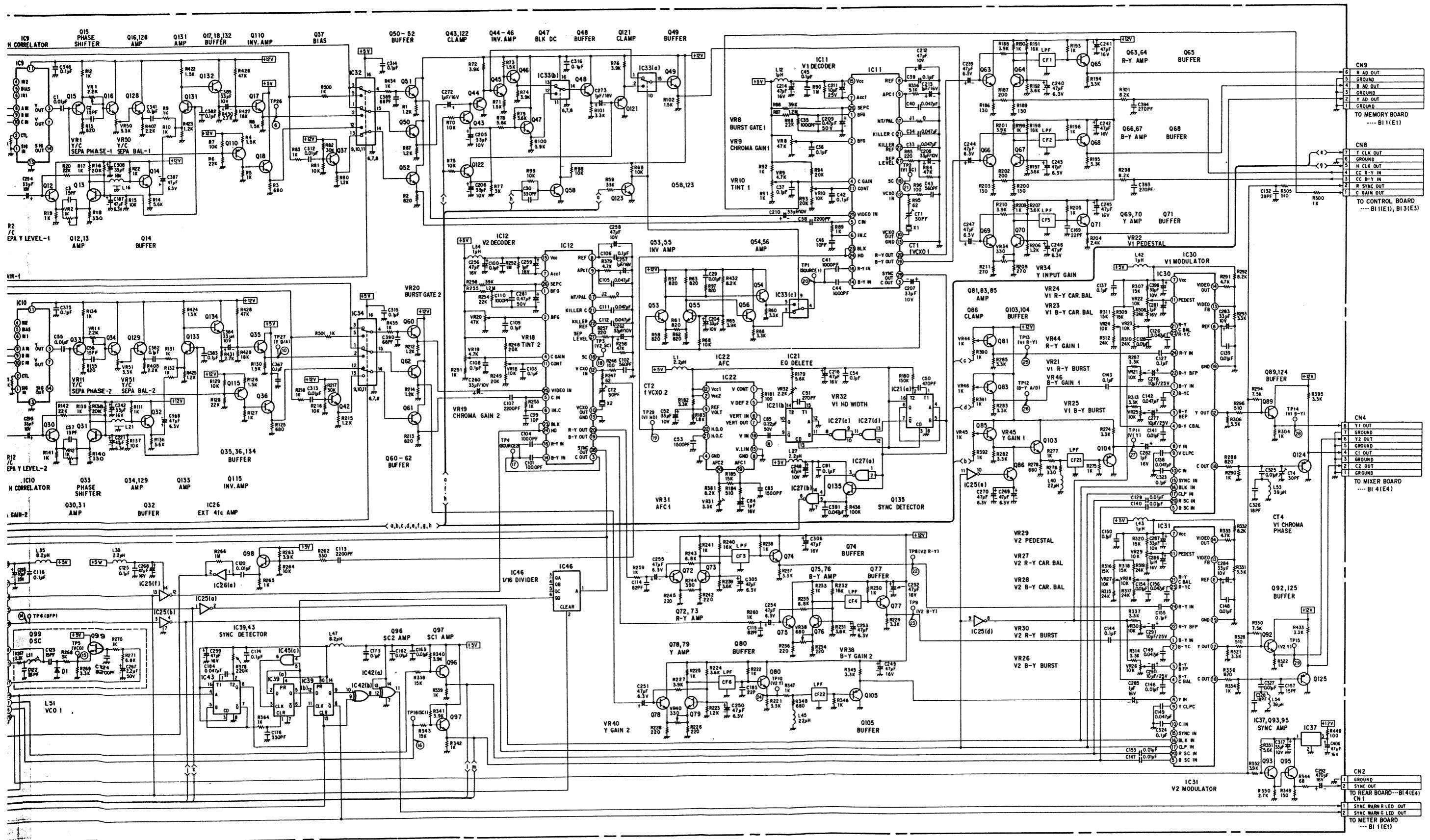
SCHEMATIC DIAGRAM OF DE

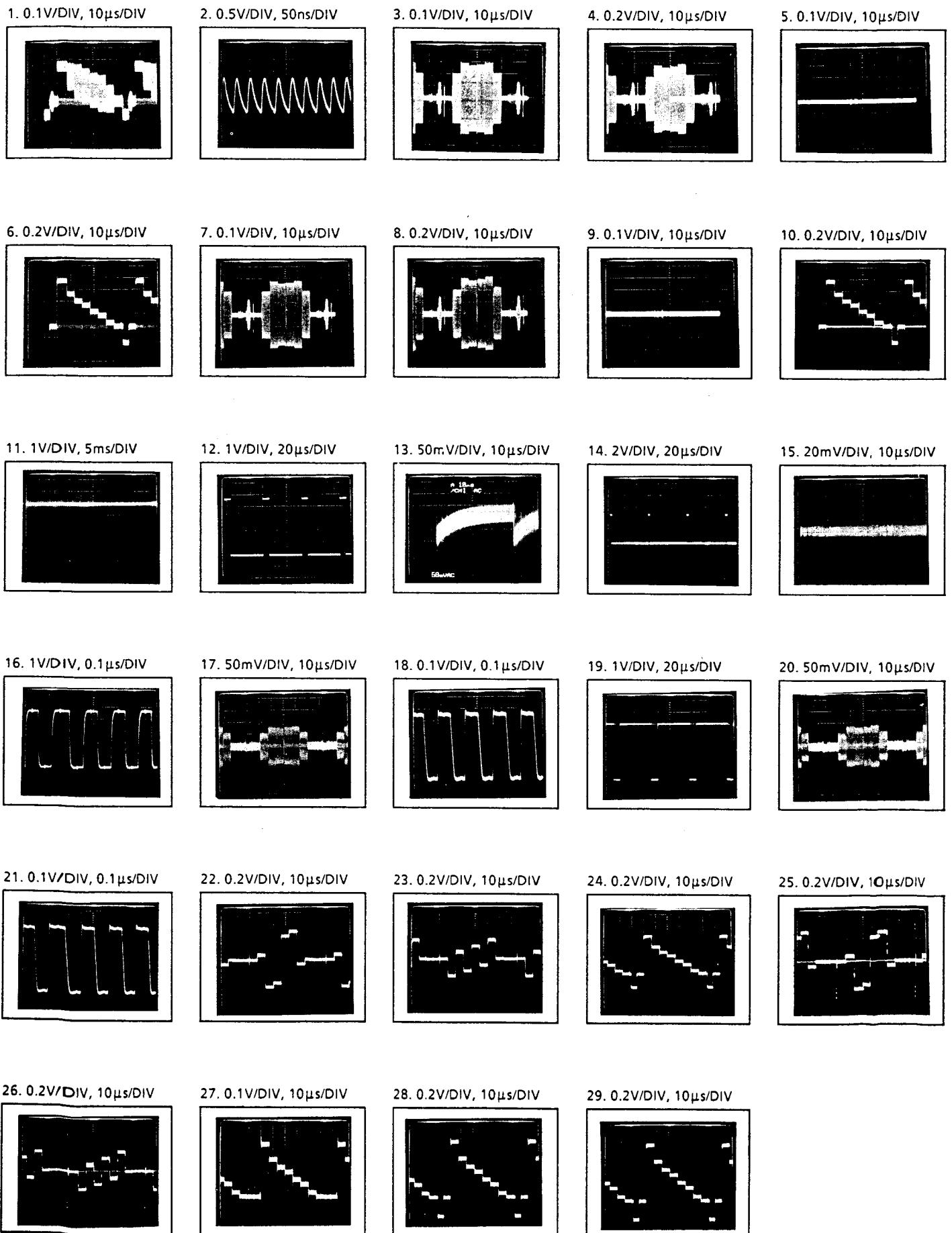
<Address Information>

DECODER/ENCODER BOARD	Q26	C5	Q104	D16
IC1 E5,E6	Q27	C6	Q105	B14
IC2 F5,F6	Q28	C7	Q106	F5
IC3 C5,6,D5,6	Q29	C8	Q107	E5
IC4 D5,D6	Q30	D9	Q108	F7
IC5 F8	Q31	D9	Q109	E7
IC6 D8	Q32	D9	Q110	F10
IC9 F8	Q33	D9	Q111	D5
IC10 D8,E8	Q34	D9	Q112	C5
IC11 E14,15,F14,15	Q35	D10	Q113	D7
IC12 D12,13,E12,13	Q36	D10	Q114	C6
IC13 F4,F5	Q37	F11	Q115	D10
IC14 E4,E5	Q38	F2	Q116	F3
IC15 C4,5,D4,5	Q39	F2	Q117	F3
IC16 D4,5	Q40	E2	Q118	F3
IC17 F8	Q41	F2	Q119	E3
IC18 E8	Q42	D11	Q121	F13
IC19 C8	Q43	F12	Q122	F12
IC20 D8	Q44	F12	Q123	E13
IC21 D14,15	Q45	F12	Q124	C18
IC22 C13,14,D13,14	Q46	F12	Q125	B18
IC23 B8,C8	Q47	F12	Q126	D4
IC25 B6,9,10,15,C15	Q48	F13	Q127	F7
IC26 A4,B3,6,C10	Q49	F13	Q128	F9
IC27 C14,D14,15	Q50	F11	Q129	D9
IC28 B3	Q51	F11	Q130	D7
IC29 B4,5,8,C7	Q52	F11	Q131	F10
IC30 C~E17	Q53	D13	Q132	F10
IC31 A~C17	Q54	D14	Q133	D10
IC32 F11	Q55	D13	Q134	D10
IC33 E14,F12,13	Q56	D14	Q135	C14
IC34 D11	Q57	D4	Q136	A2
IC35 F3	Q58	E12	D1	B9
IC36 E3,F3	Q59	E5	D2	B7
IC37 A18	Q60	D11	D4	B3
IC38 B7	Q61	D11		
IC39 B10,11	Q62	D11		
IC40 B6,C6	Q63	F15		
IC41 B5,6,C5,6	Q64	F16		
IC42 B11	Q65	F16		
IC43 B10	Q66	F15		
IC44 B4,B5	Q67	F16		
IC45 B4,7,10	Q68	F16		
IC46 B12,C12	Q69	E15		
IC47 B4	Q70	E16		
IC48 D3	Q71	E16		
Q1 F3	Q72	C13		
Q2 F4	Q73	C13		
Q3 F5	Q74	C14		
Q4 F6	Q75	B14		
Q5 F7	Q76	B14		
Q6 F8	Q77	B15		
Q7 F8	Q78	B13		
Q9 E6	Q79	B13		
Q10 E7	Q80	B14		
Q11 E8	Q81	D16		
Q12 E8	Q83	D16		
Q13 E9	Q85	D16		
Q14 E9	Q86	C16		
Q15 F9	Q89	D18		
Q16 F9	Q92	B18		
Q17 F10	Q93	A18		
Q18 F10	Q94	A4		
Q19 D3	Q95	A18		
Q20 D4	Q96	B11		
Q21 D8	Q97	B11		
Q22 D5	Q98	C10		
Q23 D6	Q99	B9		
Q24 D7	Q100	B7		
Q25 D8	Q103	D16		



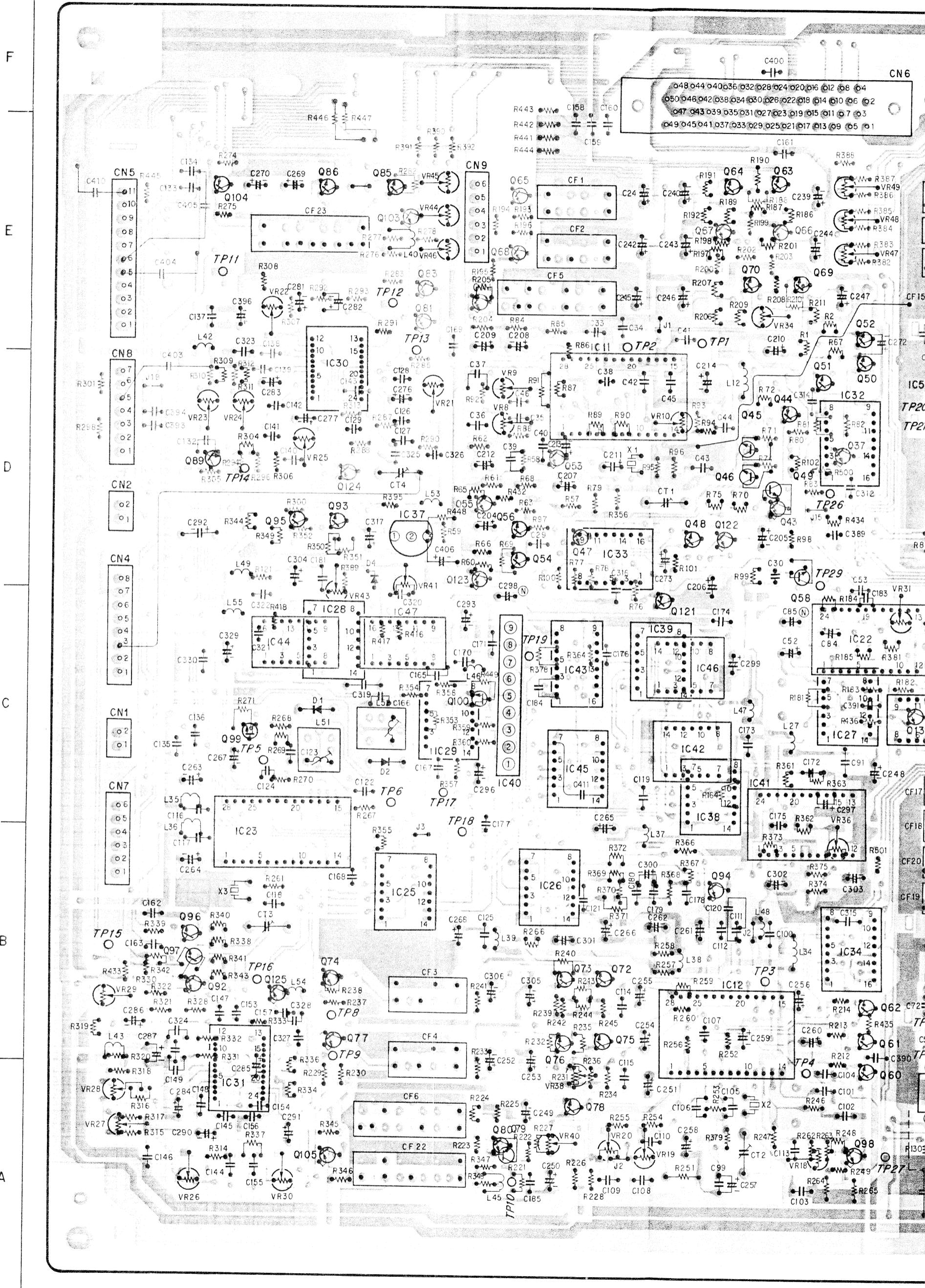
AM OF DECODER/ENCODER BOARD



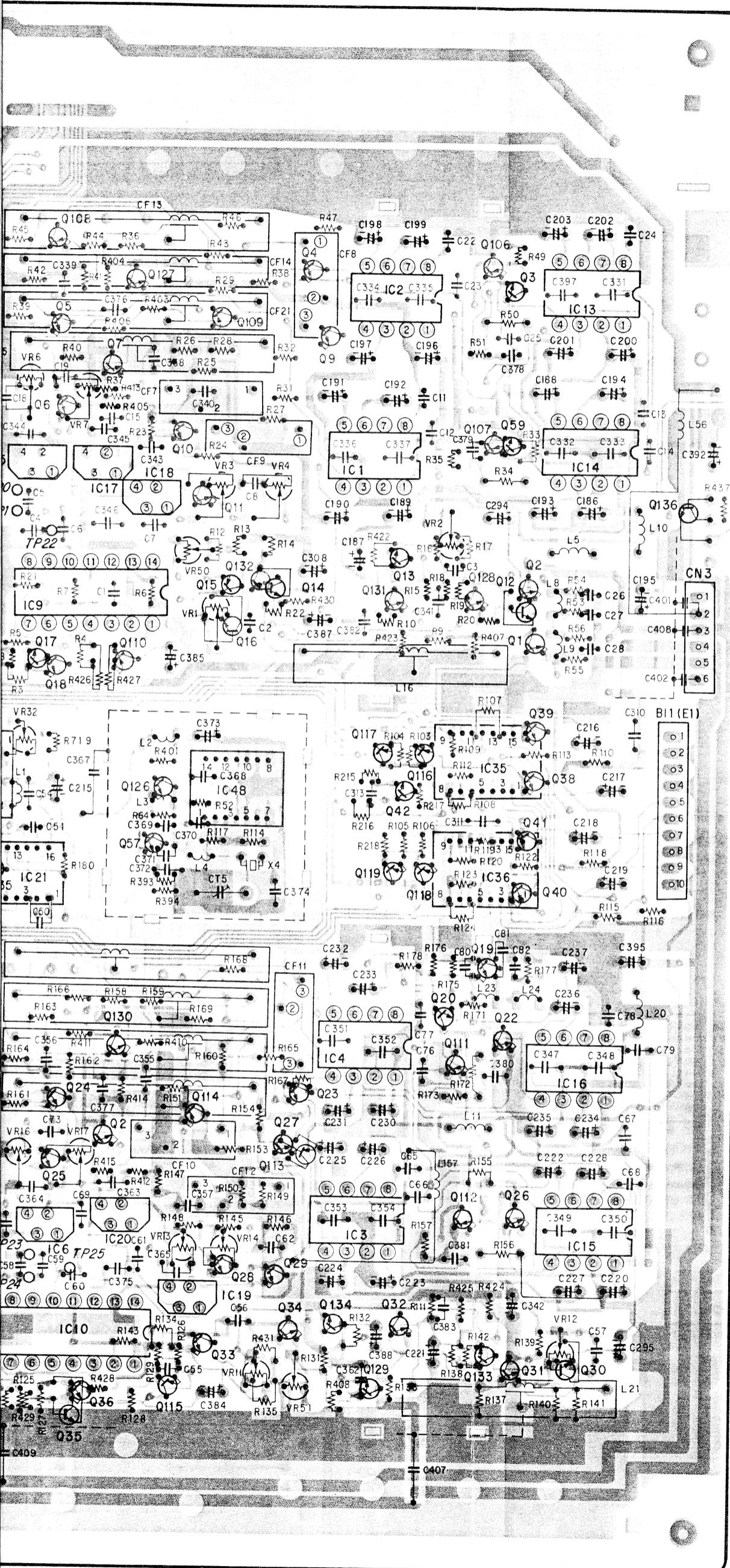


CONDUCTOR VIEW OF D

DECODER / ENCODER BOARD



DECODER/ENCODER BOARD



<Address Information>

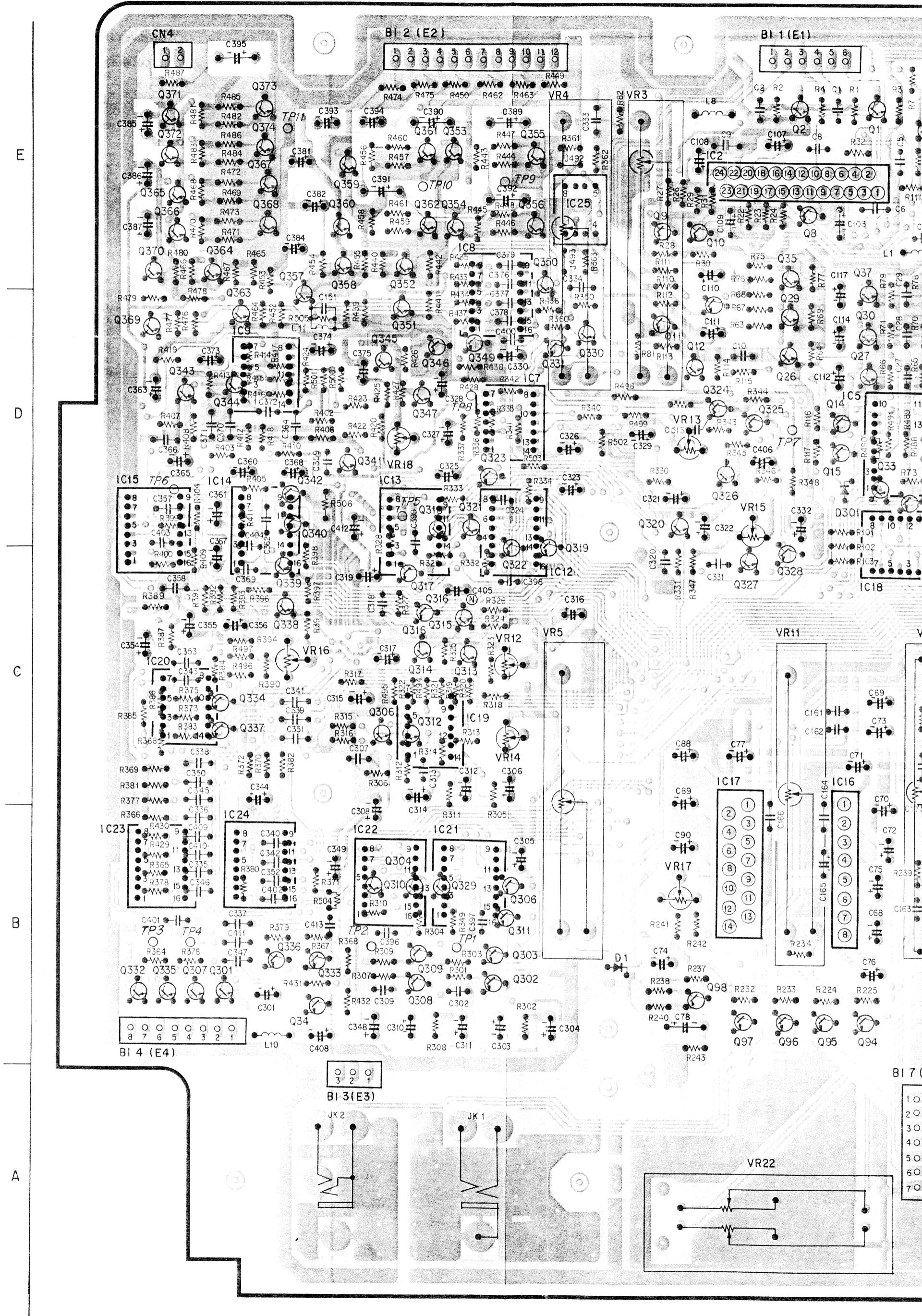
DECODER/ENCODER BOARD

IC1	D5,D6	Q48	D3
IC2	E6	Q49	D4
IC3	B5,B6	Q50	D4
IC4	B5,B6	Q51	D4
IC5	D4	Q52	E4
IC6	B4,B5	Q53	D3
IC9	D4,D5	Q54	D3
IC10	A4,A5	Q55	D2
IC11	D3,E3	Q56	D3
IC12	B3,B4	Q57	C5
IC13	E6	Q58	D4
IC14	D6	Q59	D6
IC15	B6	Q60	A4
IC16	B6	Q61	B4
IC17	D5	Q62	B4
IC18	D5	Q63	E4
IC19	B5	Q64	E3
IC20	B5	Q65	E3
IC21	C4	Q66	E4
IC22	C4,D4	Q67	E3
IC23	B1,2,C1,2	Q68	E3
IC25	B2	Q69	E4
IC26	B3	Q70	E4
IC27	C4	Q71	E2
IC28	C2	Q72	B3
IC29	D2	Q73	B3
IC30	D2	Q74	B2
IC31	A1,B1	Q75	B3
IC32	D4	Q76	B3
IC33	D3	Q77	B2
IC34	B4	Q78	A3
IC35	C6	Q79	A3
IC36	C6	Q80	A3
IC37	D2	Q81	E2
IC38	C3	Q83	E2
IC39	C3	Q85	E2
IC40	C3	Q86	E2
IC41	B4,C4	Q89	D1
IC42	C3	Q92	B2
IC43	C3	Q93	D2
IC44	C2	Q94	B3
IC45	C3	Q95	D2
IC46	C3	Q96	B1
IC47	C2	Q97	B1
IC48	C5	Q98	A4
Q1	D6	Q99	C1
Q2	D6	Q100	C2
Q3	E6	Q103	E2
Q4	E5	Q104	E1
Q5	E5	Q105	A2
Q6	E5	Q106	E6
Q7	E5	Q107	E6
Q9	E5	Q108	E5
Q10	E5	Q109	E5
Q11	D5	Q110	D5
Q12	D6	Q111	B6
Q13	D6	Q112	B6
Q14	D5	Q113	B5
Q15	D5	Q114	B5
Q16	D5	Q115	A5
Q17	D4	Q116	C6
Q18	D4,D5	Q117	C6
Q19	C6	Q118	C6
Q20	B6	Q119	C6
Q21		Q121	C3
Q22	B6	Q122	D3
Q23	B5	Q123	D2
Q24	B4	Q124	D2
Q25	B4	Q125	B2
Q26	B6	Q126	C5
Q27	B5	Q127	E5
Q28	B5	Q128	D6
Q29	B5	Q129	A6
Q30	A6	Q130	B5
Q31	A6	Q131	D6
Q32	A6	Q132	D5
Q33	A5	Q133	A6
Q34	A5	Q134	A5
Q35	A5	Q135	C4
Q36	A5	Q136	D7
Q37	D4	D1	C2
Q38	C6	D2	C2
Q39	D6	D4	D2
Q40	C6		
Q41	C6		
Q42	C6		
Q43	D4		
Q44	D4		
Q45	D4		
Q46	D4		
Q47	D3		

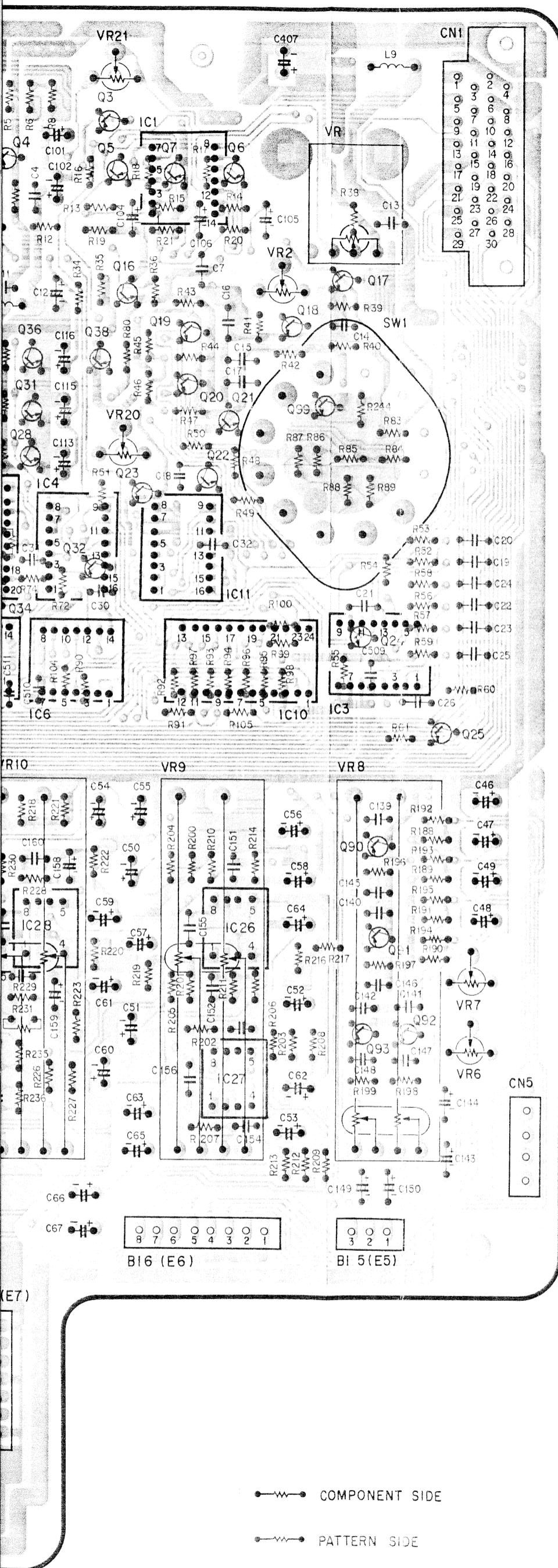
COMPONENT SIDE

•—• PATTERN SIDE

MIXER BOARD



F MIXER BOARD



<Address Information >

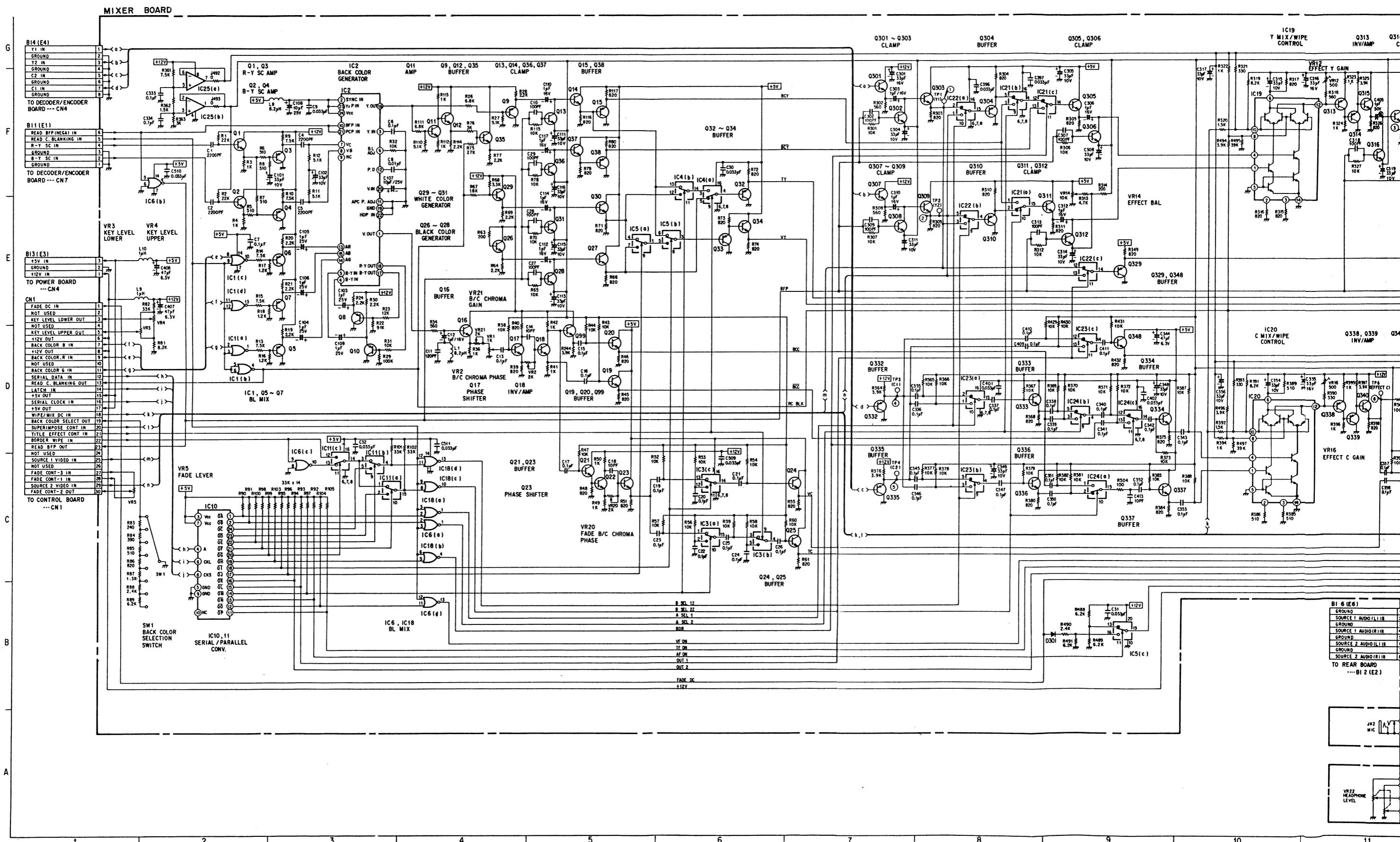
MIXER BOARD

IC1	E4,E5	Q29	D3	Q337	C1
IC2	E3,E4	Q30	D4	Q338	C1,C2
IC3	D5	Q31	D4	Q339	C1,C2
IC4	D4	Q32	D4	Q340	D2
IC5	D4	Q33	D4	Q341	D2
IC6	D4	Q34	D4	Q342	D2
IC7	D2	Q35	E3	Q343	D1
IC8	D2,E2	Q36	D4,E4	Q344	D1
IC9	D1	Q37	D4,E4	Q345	D2
IC10	D5	Q38	D4,E4	Q346	D2
IC11	D4,D5	Q90	C5	Q347	D2
IC12	C2,D2	Q91	C5	Q348	B2
IC13	C2,D2	Q92	B5	Q349	D2
IC14	C1,D1	Q93	B5	Q350	D3
IC15	C1,D1	Q94	B4	Q351	D2
IC16	B4	Q95	B4	Q352	E2
IC17	B3	Q96	B3	Q353	E2
IC18	D4	Q97	B3	Q354	E2
IC19	C2	Q98	B3	Q355	E3
IC20	C1	Q99	D5	Q356	E3
IC21	B2	Q301	B1	Q357	D2
IC22	B2	Q302	B2	Q358	E2
IC23	B1	Q303	B2	Q359	E2
IC24	B1	Q304	B2	Q360	E2
IC25	E3	Q305	B2	Q361	E2
IC26	C5	Q306	C2	Q362	E2
IC27	B5	Q307	B1	Q363	D1
IC28	C4	Q308	B2	Q364	E1
Q1	E4	Q309	B2	Q365	E1
Q2	E4	Q310	B2	Q366	E1
Q3	E4	Q311	B2	Q367	E1
Q4	E4	Q312	C2	Q368	E1
Q5	E4	Q313	C2	Q369	D1
Q6	E5	Q314	C2	Q370	E1
Q7	E5	Q315	C2	Q371	E1
Q8	E3	Q316	C2	Q372	E1
Q9	E3	Q317	C2	Q373	E1
Q10	E3	Q318	D2	Q374	E1
Q11	D3	Q319	D2	D1	B3
Q12	D3	Q320	D3	D301	D4
Q13	D3	Q321	D2		
Q14	D4	Q322	D2		
Q15	D4	Q323	D2		
Q16	E4	Q324	D3		
Q17	E5	Q325	D3		
Q18	E5	Q326	D3		
Q19	E5	Q327	C3		
Q20	D5	Q328	C3		
Q21	D5	Q329	B2		
Q22	D5	Q330	D3		
Q23	D4	Q331	D3		
Q24	D5	Q332	B1		
Q25	C5	Q333	B2		
Q26	D3	Q334	C1		
Q27	D4	Q335	B1		
Q28	D4	Q336	B1		

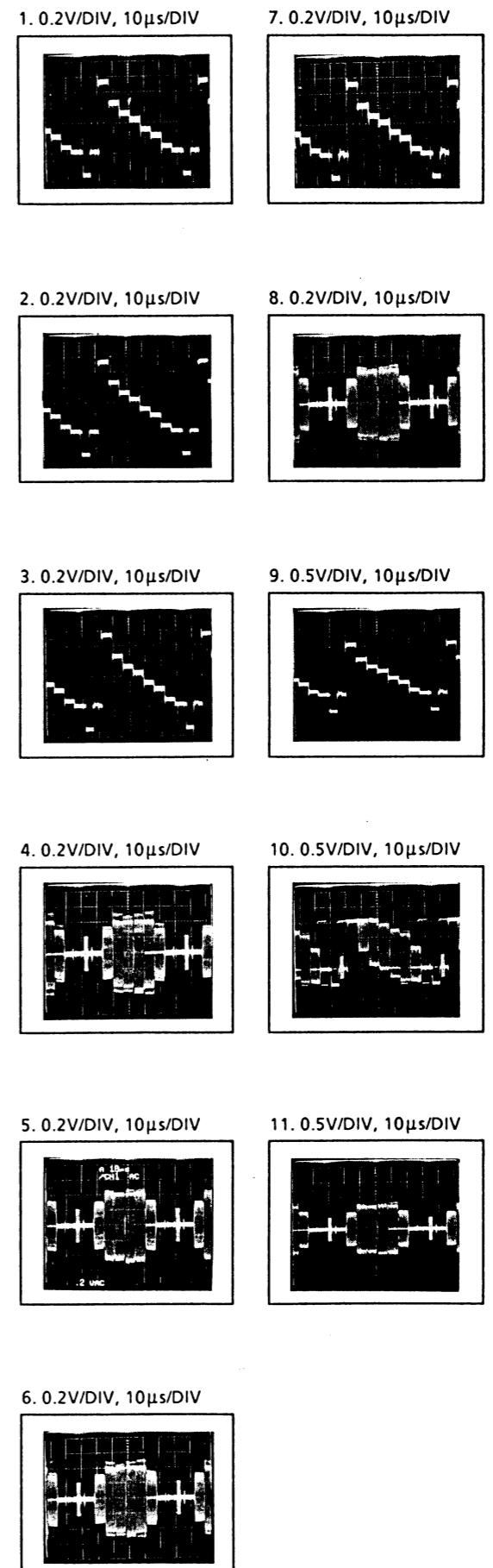
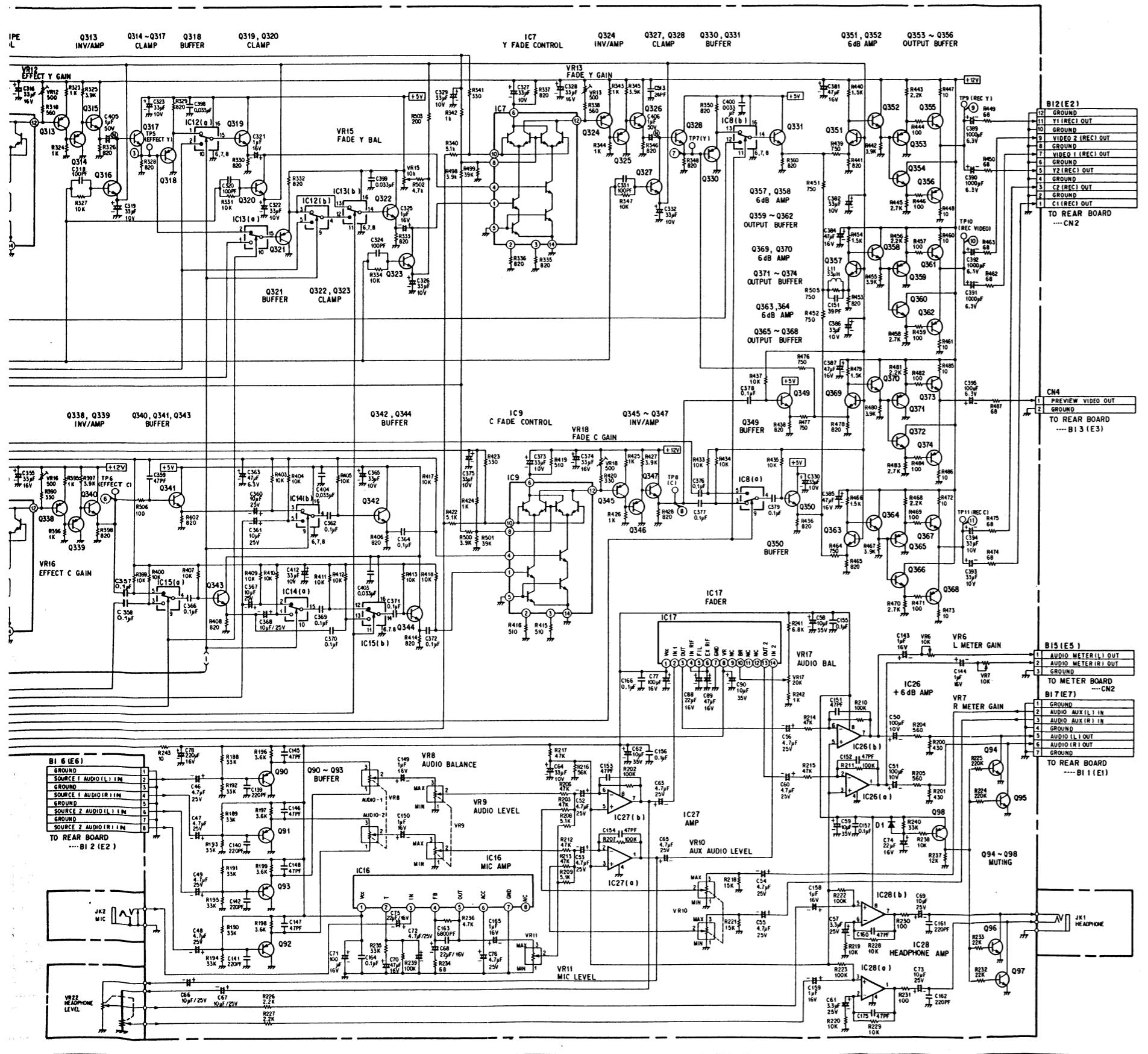
Pin	IC21	IC22	IC23	IC24	IC25	IC26	IC27	IC28
1							2.9	6.2
2							2.9	6.2
3							2.9	6.2
4							0	0
5							4.3	6.2
6							4.3	6.2
7							4.4	6.2
8							11.7	11.3

B	C	E	B	C	E	B	C	E	
Q1	2.6	11.7	1.9	Q31	3.5	2.9	2.9	3.6	3.0
2	2.6	11.7	1.8	32	2.3	0	2.9	9.2	1.8
3	1.9	0	2.6	33	2.3	0	3.0	1.8	0
4	1.8	0	2.6	34	2.9	4.8	2.2	3.5	2.9
5	0.7	0	1.3	35	9.6	11.7	9.0	9.6	11.7
6	0.7	0	1.3	36	3.5	2.9	2.9	2.3	0
7	0.7	0	1.3	37	2.9	4.8	2.3	2.3	4.8
8	2.9	0	3.6	38	2.9	4.8	2.3	2.9	4.8
9	1.1	0	1.8	39	5.7	0	6.4	3.5	2.9
10	3.0	0	3.6	40	5.7	0	6.4	2.3	3.0
11	1.0	11.2	0.5	41	5.7	0	6.4	3.6	3.0
12	11.2	11.7	10.5	42	5.7	0	6.4	9.2	1.8
13	3.5	2.9	2.9	43	0	0	0	1.8	2.4
14	2.9	4.8	2.3	44	0	0	0	2.4	11.7
15	1.2	0.7	0	45	0	0	0	2.4	11.7
16	1.9	11.7	1.4	46	0	1.2	0	3.5	2.9
17	2.8	9.5	2.2	47	0	1.2	0	2.9	4.8
18	2.2	9.8	1.6	48	11.3	0	11.3	2.3	0
19	2.8	4.8	2.2	49	9.8	11.7	9.1	2.3	0
20	2.3	4.8	2.2	50	0	11.7	0	2.9	4.8
21	2.8	11.7	2.2	51	3.5	2.9	2.9	0	1.6
22	2.2	10.1	1.6	52	2.9	4.8	2.3	2.8	2.1
23	1.6	4.8	1.0	53	2.9	4.8	2.3	2.8	4.8
24	2.8	4.8	2.2	54	0.9	0	1.6	0	0
25	2.8	4.8	2.2	55	3.5	2.9	2.9	2.8	4.8
26	11.7	11.7	11.0	56	0	11.7	0	2.8	4.8
27	2.9	4.8	2.3	57	3.5	2.9	2.9	9.4	1.6
28	3.5	2.9	2.9	58	0	11.7	0	10.0	0
29	10.6	11.7	10.0	59	2.9	4.8	2.3	1.6	0
30				60				2.8	4.8

SCHEMATIC DIAGRAM OF



AGRAM OF MIXER BOARD



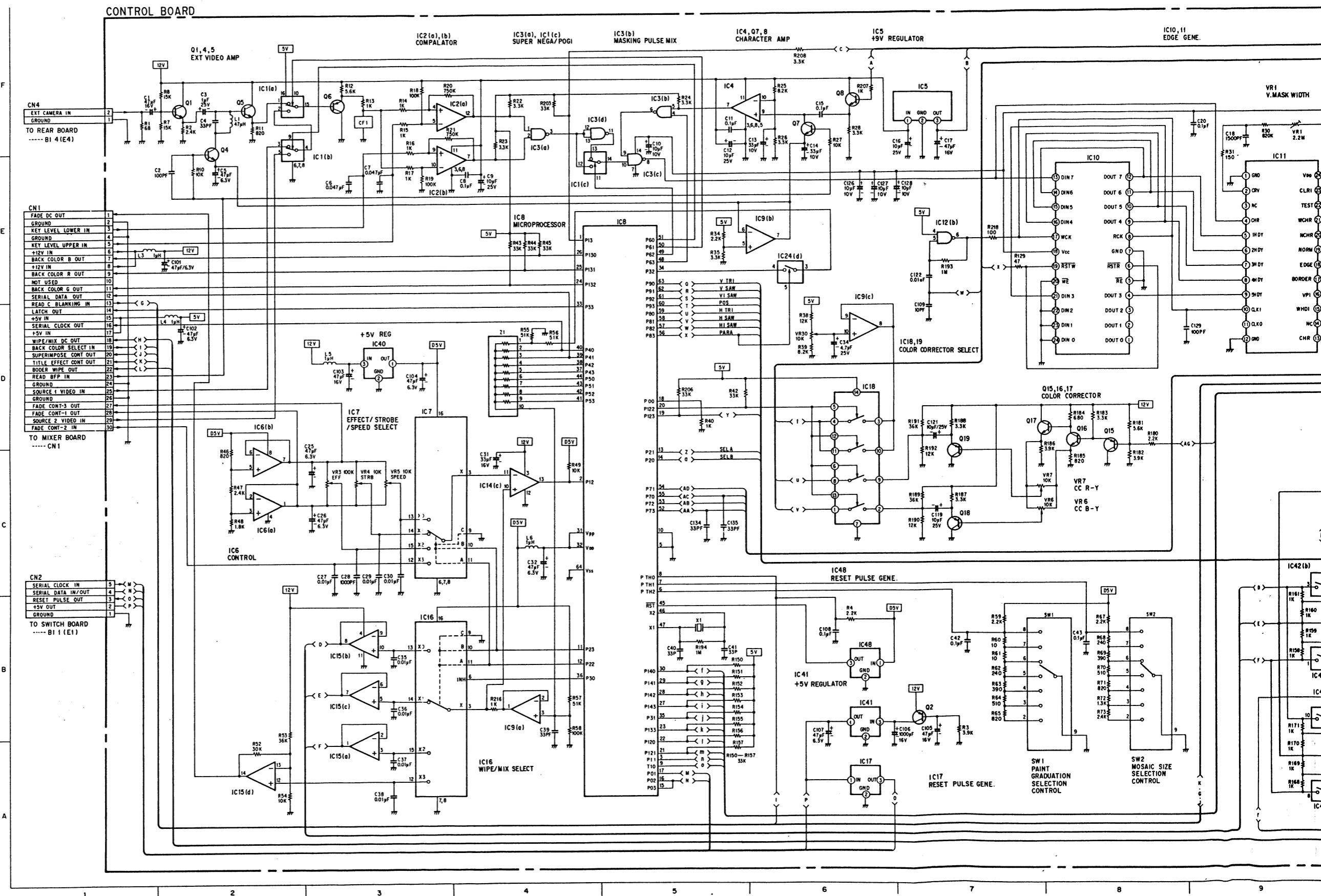
<Address Information>	
MIXER BOARD	
IC1	D2,E2
IC2	E3,F3
IC3	C6
IC4	E6,F6
IC5	E5,6,89
IC6	F2,B4,C3,4
IC7	E14,F14
IC8	D15,F15
IC9	C14,D14
IC10	B2,C2
IC11	C3,D3
IC12	F12
IC13	E12,F13
IC14	C12,D12
IC15	C11,C13
IC16	B13,B14
IC17	C14,C15
IC18	C4
IC19	E10,F10,11
IC20	C10,D10,11
IC21	E8,F8,9
IC22	E8,9,F8,9
IC23	C8,D8
IC24	C9,D9
IC25	F2
IC26	B16
IC27	B14
IC28	A16
Q1	F2
Q2	E2
Q3	F3
Q4	E3
Q5	D3
Q6	E3
Q7	E3
Q8	E3
Q9	F4
Q10	D3
Q11	F4
Q12	F4
Q13	F5
Q14	F5
Q15	F5
Q16	D4
Q17	D4
Q18	D5
Q19	D5
Q20	D5
Q21	C5
Q22	C5
Q23	C5
Q24	C7
Q25	C7
Q26	E4
Q27	E5
Q28	E4
Q29	E4
Q30	E5
Q31	E5
Q32	E6
Q33	E6
Q34	E6
Q35	F4
Q36	F5
Q37	F5
Q38	F5
Q39	E5
Q40	D11
Q41	D11
Q42	D13
Q43	C12
Q44	C13
Q45	D14
Q46	D14
Q47	D14
Q48	D9
Q49	E15
Q50	D15
Q51	F16
Q52	F16
Q53	F16
Q54	F16
Q55	F16
Q56	F16
Q57	E16
Q58	E16
Q59	E16
Q60	E16
Q61	E16
Q62	E16
Q63	E16
Q64	E16
Q65	E16
Q66	E16
Q67	E16
Q68	E16
Q69	E16
Q70	E16
Q71	E16
Q72	E16
Q73	E16
Q74	E16
Q75	E16
Q76	E16
Q77	E16
Q78	E16
Q79	E16
Q80	E16
Q81	E16
Q82	E16
Q83	E16
Q84	E16
Q85	E16
Q86	E16
Q87	E16
Q88	E16
Q89	E16
Q90	E16
Q91	E16
Q92	E16
Q93	E16
Q94	E16
Q95	E16
Q96	E16
Q97	E17
Q98	E16
Q99	E16
D1	B16
D2	D5

SCHEMATIC DIAGRAM O

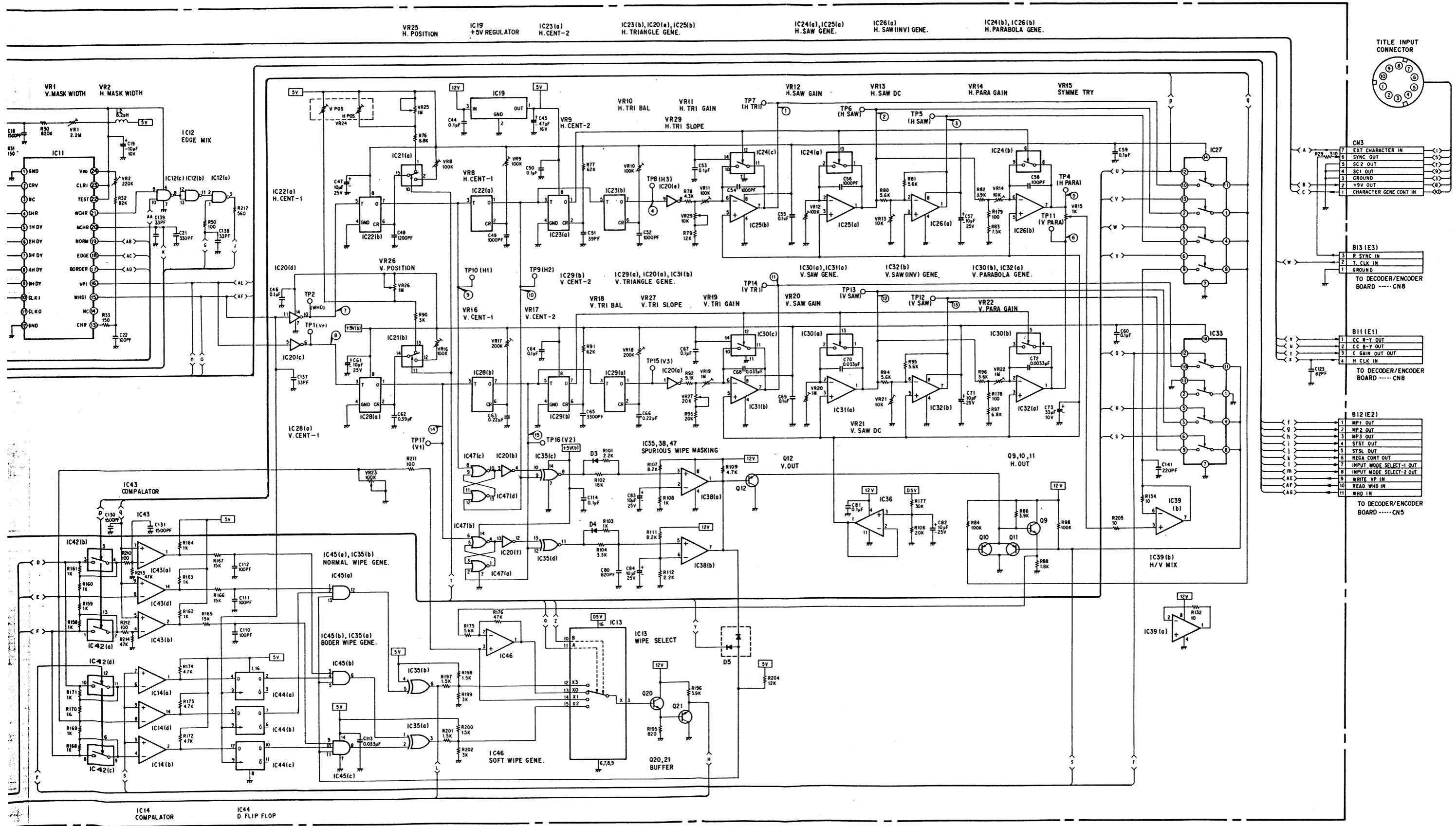
<Address Information>

CONTROL BOARD

IC1	E2~5,F2,3
IC2	E3,4,F3,4
IC3	F4,5,E5
IC4	F5,F6
IC5	F7
IC6	C2
IC7	C3,4,D3,4
IC8	A~E5
IC9	B4,D6,E6
IC10	D8,E8
IC11	D9,E9
IC12	E7,E10
IC13	A13,B13
IC14	A10,B10,C4
IC15	A2,3,B3
IC16	A3,4,B3,4
IC17	A6
IC18	C6,D6
IC19	F12
IC20	D11,14,C12,E14
IC21	D12,E12
IC22	E11,E12
IC23	E13
IC24	E6,E14~16
IC25	E14,E15
IC26	E15E16
IC27	E17
IC28	D11,D12
IC29	D13
IC30	D14~16
IC31	D14,D15
IC32	D15,D16
IC33	C17,D17
IC35	A12,B12,C13
IC36	C15
IC38	C14
IC39	B17,C17
IC40	D3
IC41	B6
IC42	A9,B9,C9
IC43	B10,C10
IC44	A10,11,B10,11
IC45	A11,B11
IC46	B12
IC47	C12
IC48	B6
Q1	F2
Q2	B7
Q4	E2,F2
Q5	F2
Q6	F6
Q7	F6
Q8	F6
Q9	C16
Q10	C16
Q11	C16
Q12	C14
Q15	D8
Q16	D8
Q17	D8
Q18	C7
Q19	C7
Q20	B13
Q21	B14
D3	C13
D4	C13
D5	B14



WIRING DIAGRAM OF CONTROL BOARD



<Address Information>

CONTROL BOARD

IC1	D2	IC36	A3,A4
IC2	D3	IC38	B3
IC3	D4	IC39	A2
IC4	D4	IC40	C1
IC5	D4	IC41	D4
IC6	B2	IC42	B2
IC7	C2	IC43	B2
IC8	B3~5,C3~5	IC44	A1
IC9	C3,4	IC45	A1
IC10	D5,6	IC46	A2
IC11	D5,6	IC47	A6
IC12	D5	IC48	C1
IC13	A2,A3	Q1	D2
IC14	B1	Q2	D4
IC15	B2,B3	Q4	D2
IC16	A2,3,B2,3	Q5	D2
IC17	D5	Q6	D2
IC18	C4	Q7	D4
IC19	A6	Q8	D4
IC20	A6	Q9	C5
IC21	C6	Q10	C5
IC22	B6	Q11	C6
IC23	B6	Q12	B3
IC24	A5,B5	Q15	C5
IC25	B5	Q16	C5
IC26	A4,B4	Q17	C5
IC27	B5	Q18	C5
IC28	B6	Q19	C4
IC29	B6	Q20	C2
IC30	A5	Q21	D2
IC31	A5	Q21	B4
IC32	A4	D4	B4
IC33	C6	D5	B3
IC35	A6		

	IC8	IC8
Pin 1	4.7	Pin 33
2	0	34
3	0	35
4	0	36
5	0	37
6	4.9	38
7	4.9	39
8	0	40
9	0	41
10	0	42
11	0	43
12	0	44
13	0	45
14	0	46
15	0	47
16	0	48
17	0	49
18	0	50
19	0	51
20	0	52
21	0	53
22	0	54
23	0	55
24	0	56
25	0	57
26	0	58
27	0	59
28	0	60
29	0	61
30	0	62
31	4.9	63
32	4.9	64
33		0

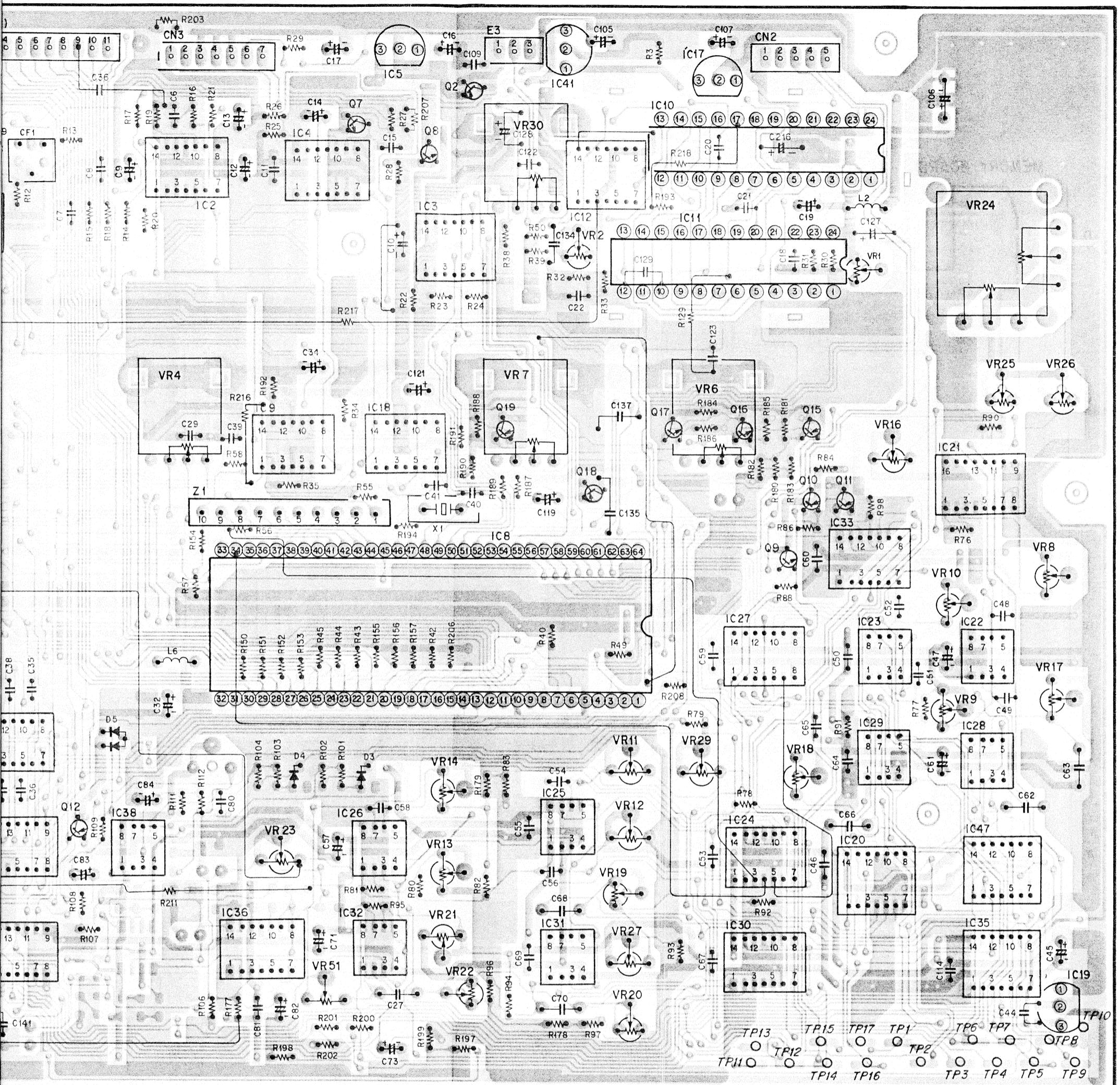
	IC1	IC2	IC3	IC4	IC5	IC6	IC7	IC9
Pin 1	2.3	0	4.8	0	8.9	1.8	0	2.0
2	2.3	0	0.2	0	0	1.8	0	2.0
3	2.3	0	4.8	0	11.6	1.8	1.8	2.0
4	2.3	2.9	0	0	0	0	0	11.7
5	2.3	2.8	0.2	0	0	4.2	0	2.9
6	0	0	4.9	0	0	4.2	0	2.9
7	0	0.2	0	0.2	0	4.2	0	2.9
8	0	0	0	0	0	5.0	0	1.5
9	0	2.6	4.8	2.9	0	0	1.5	
10	0	2.9	4.8	3.4	0	0	1.5	
11	0	11.7	0	11.7	0	0	0	
12	4.8	4.8	4.8	0	0	4.2	0.2	
13	0	0	4.9	0	0	1.8	0.2	
14	4.9	0	4.8	0	0	1.8	10.6	
15	2.3					1.8		
16	4.8					5.0		

	IC13	IC14	IC15	IC16	IC17	IC18	IC19	IC20
Pin 1	0	4.8	2.0	0	5.0	1.3	4.9	0
2	0	4.9	20.0	0	0	2.9	0	5.0
3	4.0	11.7	0.4	2.0	4.9	1.5	11.6	5.0
4	0	2.1	11.7	0	0	0.7	0	
5	0	5.5	0.4	0	0	0	0	
6	0	2.1	1.9	0	0	0	5.0	
7	0	5.5	1.8	0	0	0	0	
8	0	2.2	2.0	0	0	1.3	5.0	
9	0	5.5	1.9	0	0	2.9	0	
10	0	2.0	2.0	0	0	1.5	5.0	
11	0	1.8	0	0	0	0.7	1.5	
12	4.0	0	0.4	0.3	0	0	0	
13	4.0	0	2.2	2.0	0	0	5.0	
14	1.9	4.8	1.2	0.4	0	4.8	5.0	
15	1.9			0.4				
16	5.0			5.0				

	IC21	IC22	IC23	IC24	IC25	IC26	IC27	IC28	IC29	IC30
Pin 1	5.0	0	0	4.2	4.3	1.8	5.5	0	0	4.2
2	0.1	0.1	0.1	0	0	2.0	4.2	0.2	0.1	0.1
3	0	0	0	0	2.0	2.0	1.8	5.0	0	2.6
4	0	0	0	0	0	0	5.5	0	0	1.3
5	0	5.0	0	0	2.0	2.0	0	0	0	0
6	0	0.2	0.1	0	4.0	2.8	0	0.1	0.1	0
7	0	0	0	0	1.3	1.3	0	0	0	0
8	0	5.0	5.0	1.3	5.0	5.0	5.5	5.0	5.0	0
9	0			2.8			1.3			0
10	0			4.0			1.3			3.9
11	0			1.3			5.5			1.3
12	0.2			0			0			0
13	4.9			0			0			0
14	0.2			5.0			5.0			5.0
15	0.2									
16	5.0									

	IC31	IC32	IC33	IC35	IC36	IC38	IC39	IC40
Pin 1	4.2	1.3	0	0	2.0	0.1	1.3	4.9
2	0.1	2.6	0.2	0	2.0	1.3	1.3	0
3	2.0	2.0	4.2	0	2.0	0	1.3	11.6
4	0	0	5.5	4.8	11.7	0	0	
5	2.0	2.0	0	0	0.2	0	1.3	
6	3.9	2.0	0	5.0	10.6	2.4	1.3	
7	1.3	1.7	0	0	10.6	0.1	1.3	
8	5.0	5.0	5.5	0	10.6	11.7	11.7	
9				1.7	0	0.2		
10		</						

VIEW OF CONTROL BOARD



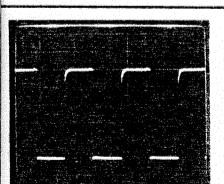
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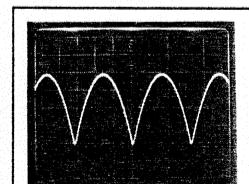
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6

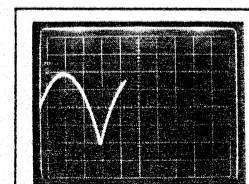
1. 1V/DIV, 20μs/DIV



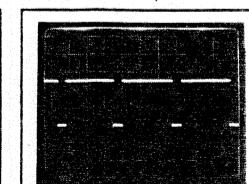
5. 0.5V/DIV, 20μs/DIV



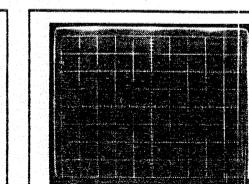
6. 0.5V/DIV, 5ms/DIV



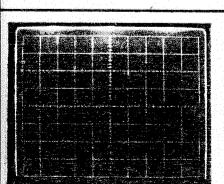
7. 2V/DIV, 20μs/DIV



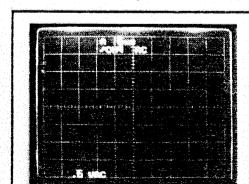
8. 0.1V/DIV, 5ms/DIV



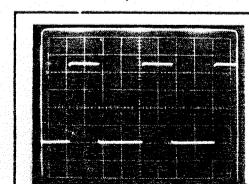
2. 0.5V/DIV, 5ms/DIV



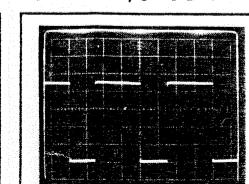
13. 0.5V/DIV, 5ms/DIV



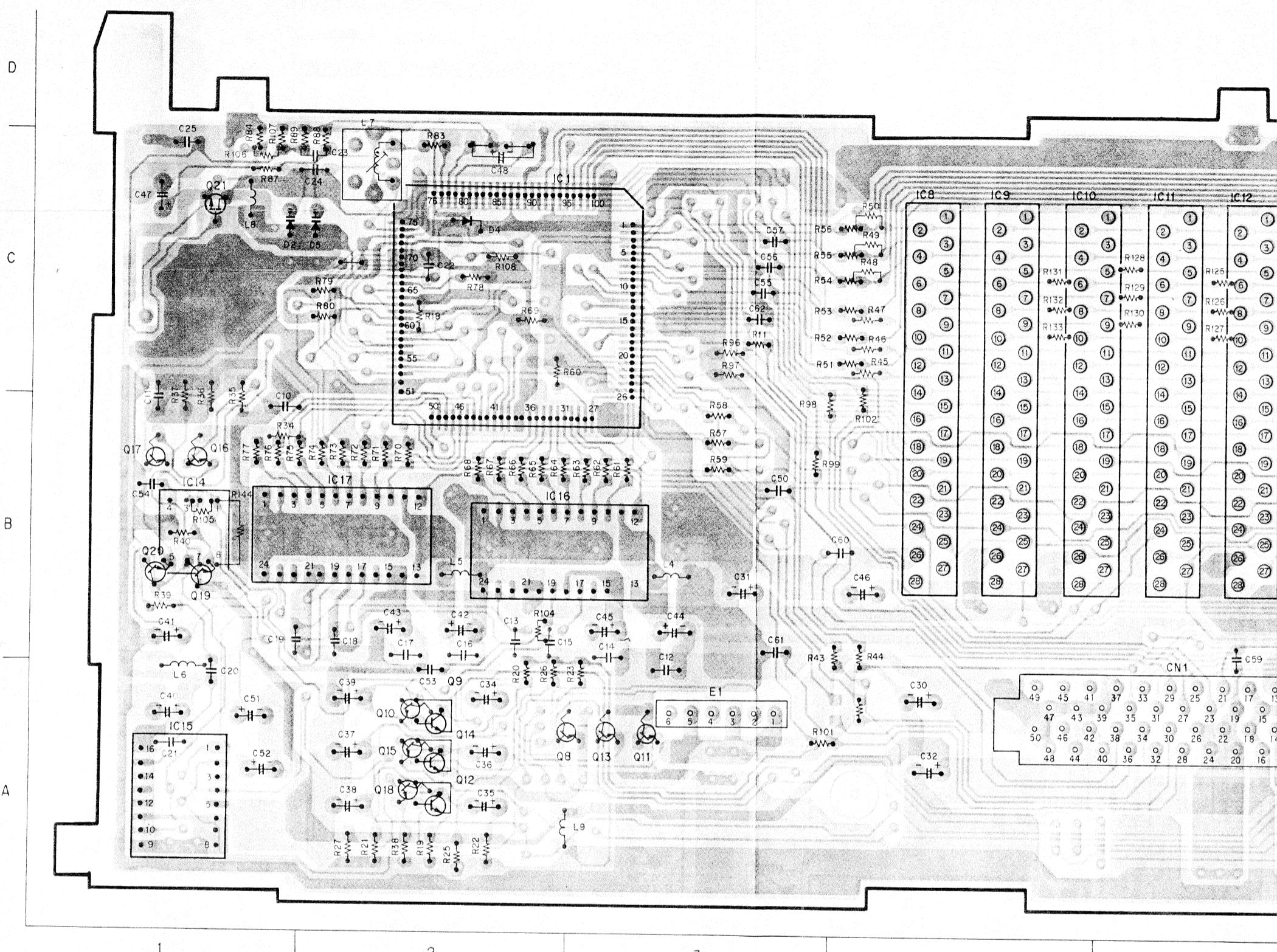
14. 1V/DIV, 5ms/DIV



15. 1V/DIV, 5ms/DIV



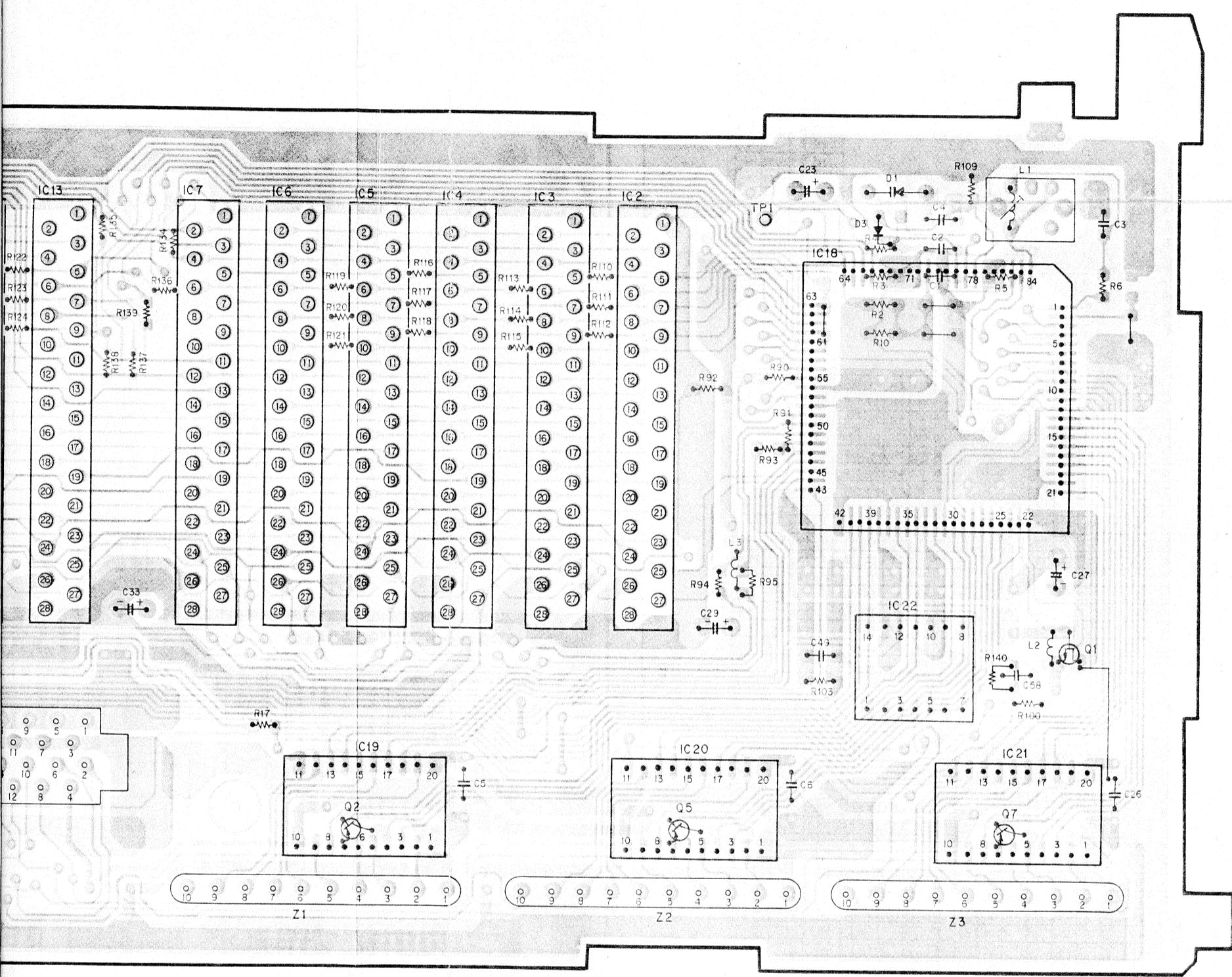
MEMORY BOARD



<Address Information>

MEMORY BOARD	Q1	B9
IC1 C2,C3	Q2	A6
IC2 B7,C7	Q5	A8
IC3 B7,C7	Q7	A9
IC4 B7,C7	Q8	A3
IC5 B6,7,C6,7	Q9	A2
IC6 B6,C6	Q10	A2
IC7 B6,C6	Q11	A3
IC8 B4,C4	Q12	A2
IC9 B4,C4	Q13	A3
IC10 B4,5,C4,5	Q14	A2
IC11 B5,C5	Q15	A2
IC12 B5,C5	Q16	B1
IC13 B5,C5	Q17	B1
IC14 B1	Q18	A2
IC15 A1	Q19	B1
IC16 B2,B3	Q20	B1
IC17 B1,B2	Q21	C1
IC18 B8,9,C8,9	D1	C8
IC19 A6,A7	D2	C2
IC20 A7,A8	D3	C8
IC21 A9	D4	C2
IC22 B8	D5	C2

MEMORY BOARD



6

7

8

9

•W• COMPONENT SIDE

•W• PATTERN SIDE

INTERMEDIATE PATTERN

SCHEMATIC DIAGRAM OF

MEMORY BOARD

<Address Information>

MEMORY BOARD

IC1	A~F5
IC2	B13,C13
IC3	B11,12,C11,12
IC4	B10,C10
IC5	B9,C9
IC6	B8,C8
IC7	B6,7,C6,7
IC8	D6,7,E6,7
IC9	D8,E8
IC10	D9,E9
IC11	D10,E10
IC12	D11,12,E11,12
IC13	D13,E13
IC14	C3,D3
IC15	A3,C3
IC16	B4,C4
IC17	C4,D4
IC18	A~F14
IC19	E15,16,F15,16
IC20	D15,16,E15,16
IC21	C15,16,D15,16
IC22	B15,C15
Q1	E14
Q2	F17
Q5	E17
Q7	D17
Q8	B2
Q9	A2
Q10	B2
Q11	C2
Q12	C2
Q13	B2
Q14	B2
Q15	B2
Q16	D3
Q17	C3
Q18	C2
Q19	C3
Q20	B3
Q21	E4
D1	E14
D2	E4
D3	C14
D4	E4
D5	E4

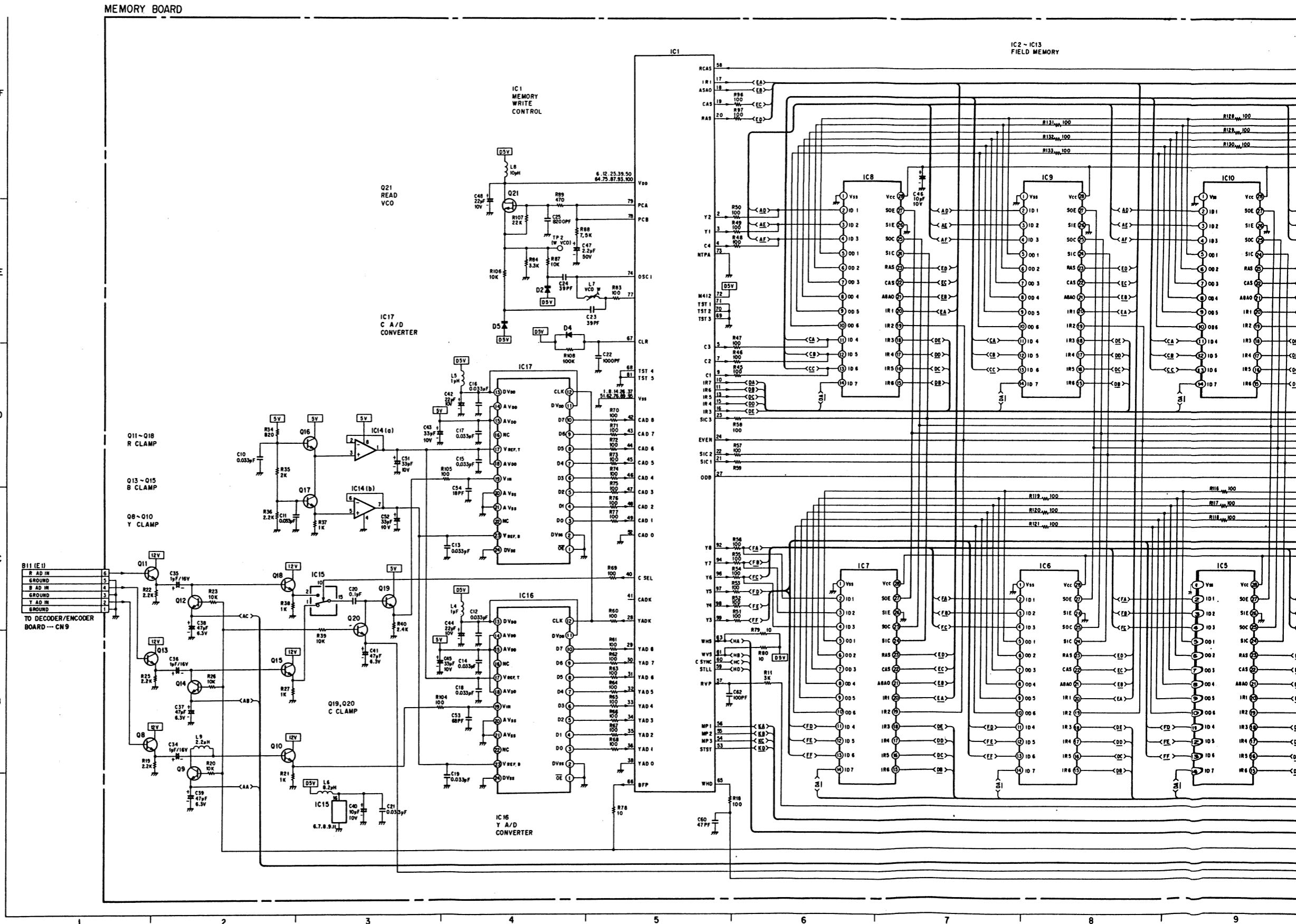
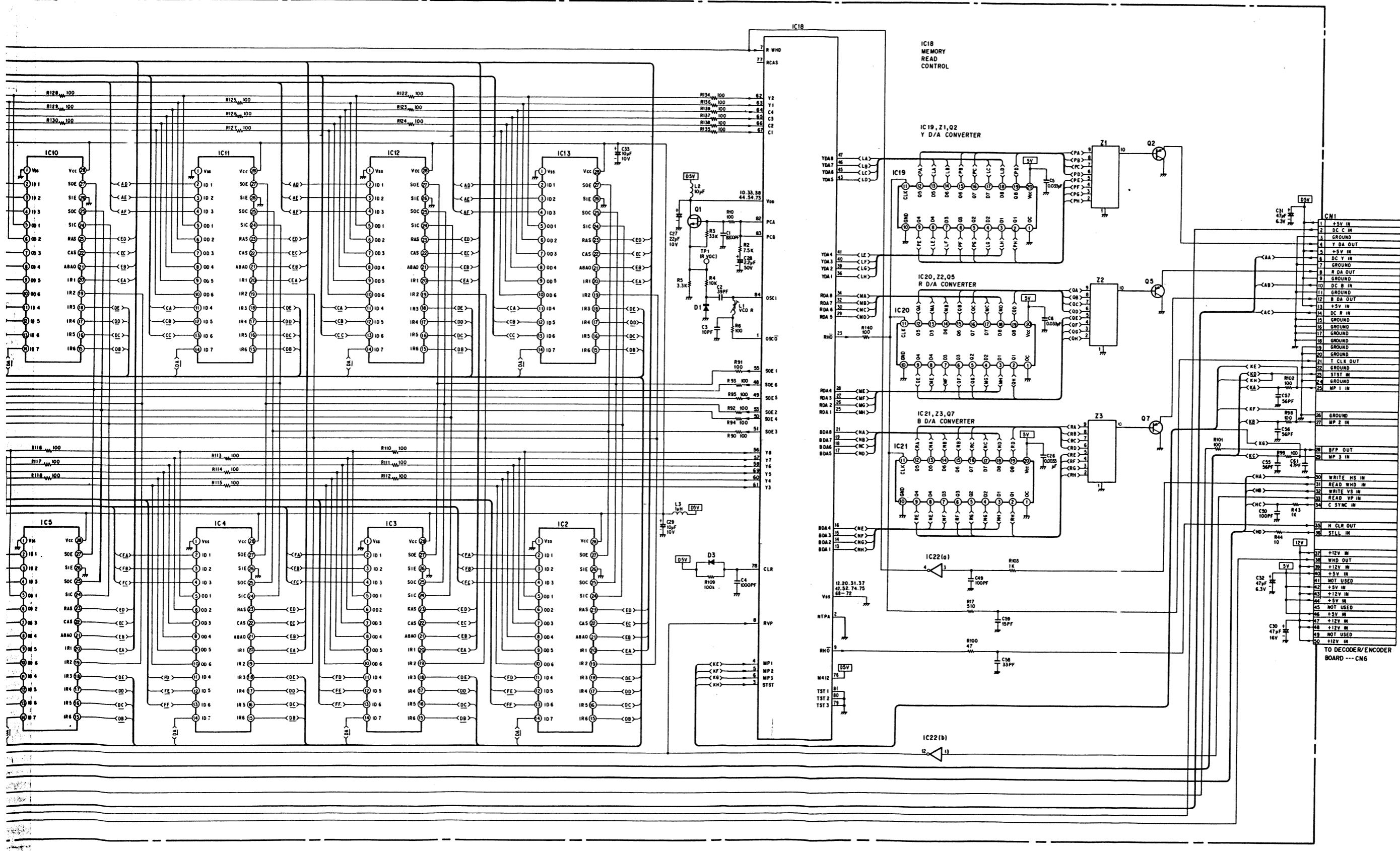
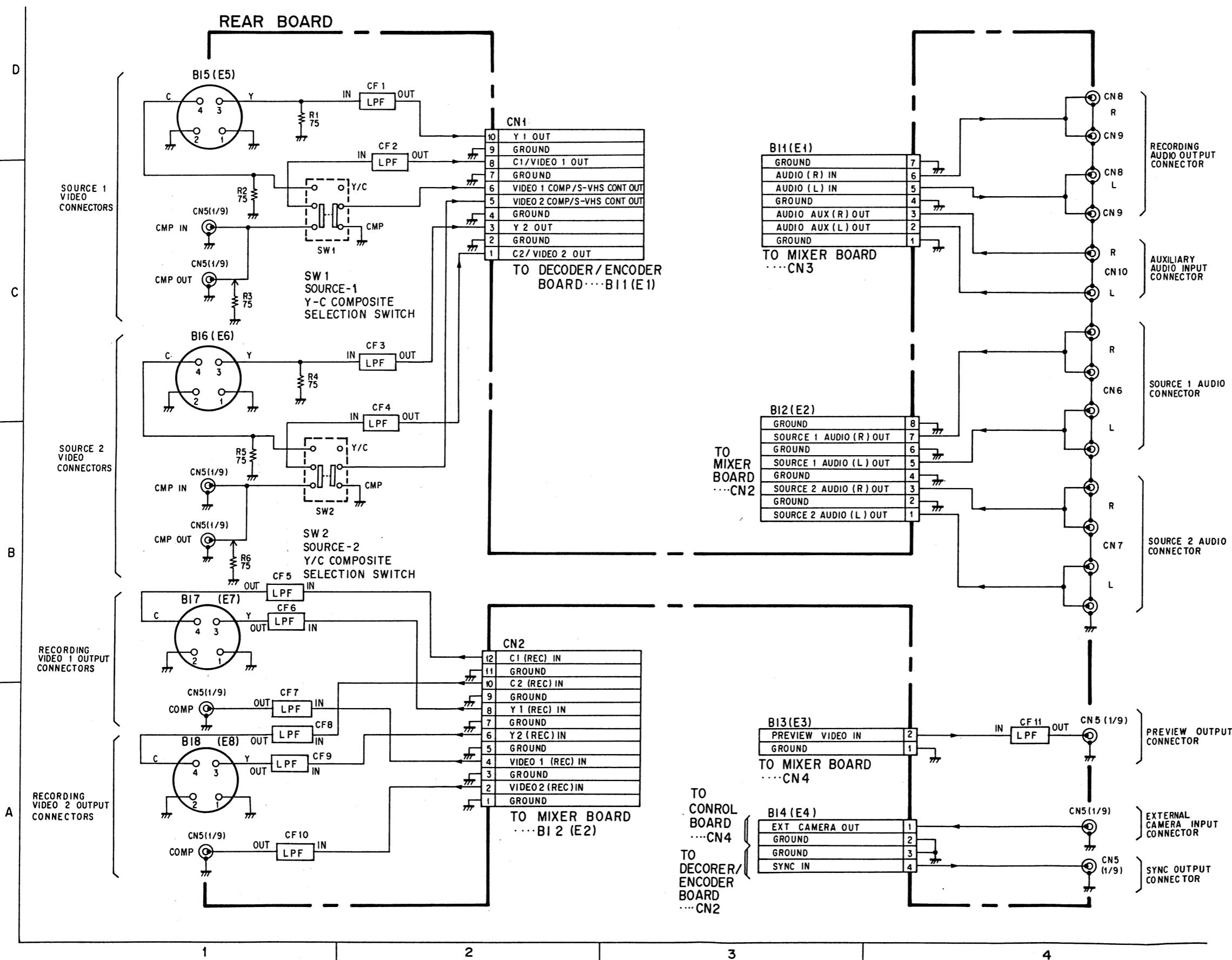


DIAGRAM OF MEMORY BOARD

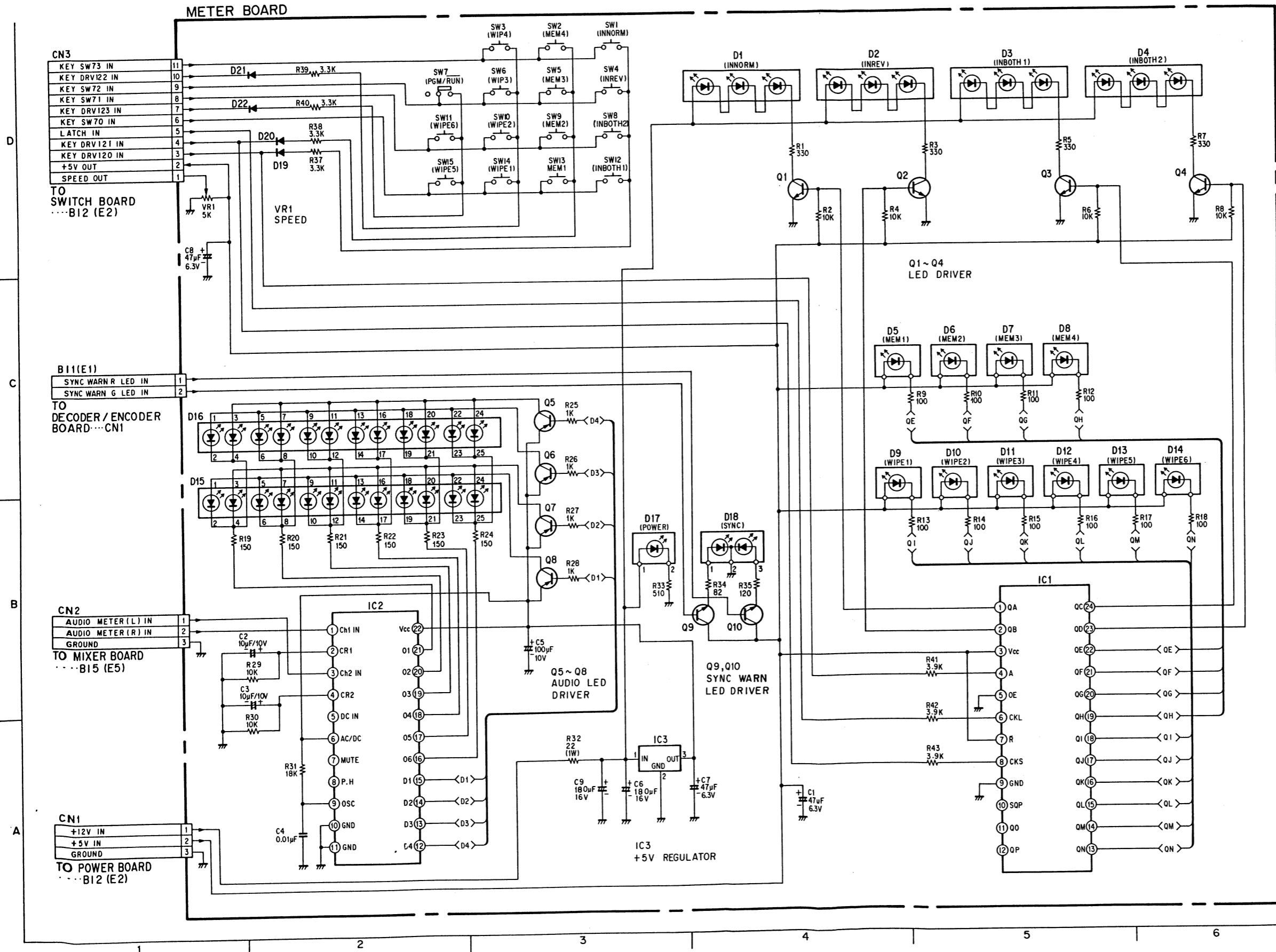


SCHEMATIC DIAGRAM OF REAR BOARD



SCHEMATIC DIAGRAM OF METER BOARD

<Address Information>



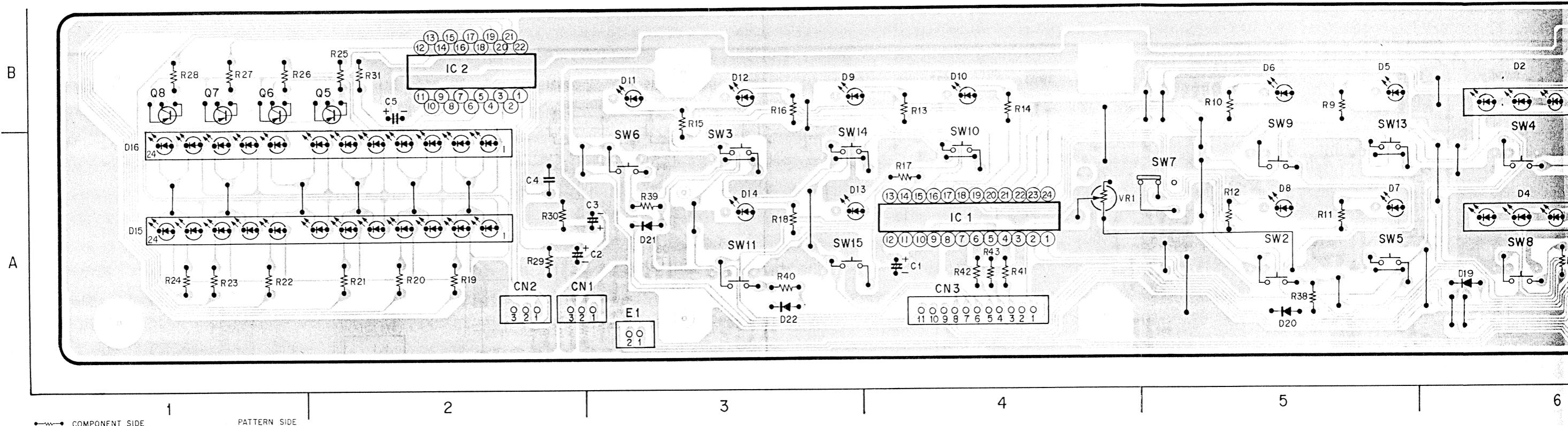
METER BOARD		
IC1	A5,B5	
IC2	A2,B2	
IC3	A3	
Q1	D4	
Q2	D5	
Q3	D5	
Q4	D6	
Q5	C3	
Q6	C3	
Q7	B3	
Q8	B3	
Q9	B4	
Q10	B4	
D1	D4	
D2	D4,D5	
D3	D5	
D4	D5,D6	
D5	C4	
D6	C5	
D7	C5	
D8	C5	
D9	C4	
D10	C5	
D11	C5	
D12	C5	
D13	C5,C6	
D14	C6	
D15	B1~3,C1~3	
D16	C1~3	
D17	B3	
D18	D4	
D19	D2	
D20	D2	
D21	D2	
D22	D2	

Pin	IC1	IC2	IC3
1	0	2.0	10.7
2	0	0	0
3	4.8	2.0	4.9
4	3.6	0	
5	0	0	
6	4.9	4.9	
7	4.8	0	
8	3.6	0	
9	0	2.5	
10	0	0	
11	0	0	
12	0	3.7	
13	3.3	3.7	
14	3.3	3.7	
15	3.3	3.7	
16	3.3	3.3	
17	0.1	3.3	
18	3.3	3.3	
19	3.3	3.3	
20	3.3	3.3	
21	3.3	3.3	
22	3.3	4.8	
23	0		
24	0.6		

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
B	0	0	0.6	0	4.7	4.7	4.7	4.7	1.3	0
C	6.4	6.4	0	6.4	3.1	3.2	3.2	3.1	4.8	1.8
E	0	0	0	0	4.9	4.9	4.9	4.9	1.0	0

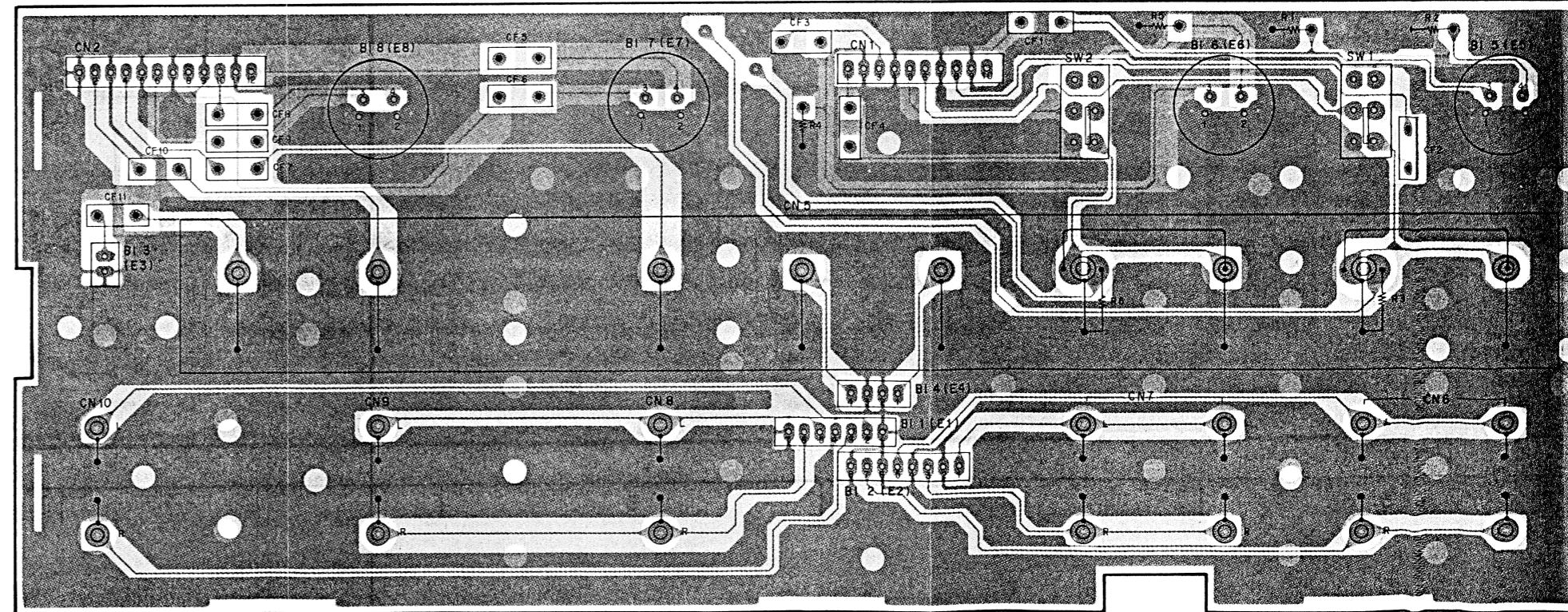
CONDUCTOR VIEW OF METER BOARD

METER BOARD



CONDUCTOR VIEW OF REAR BOARD

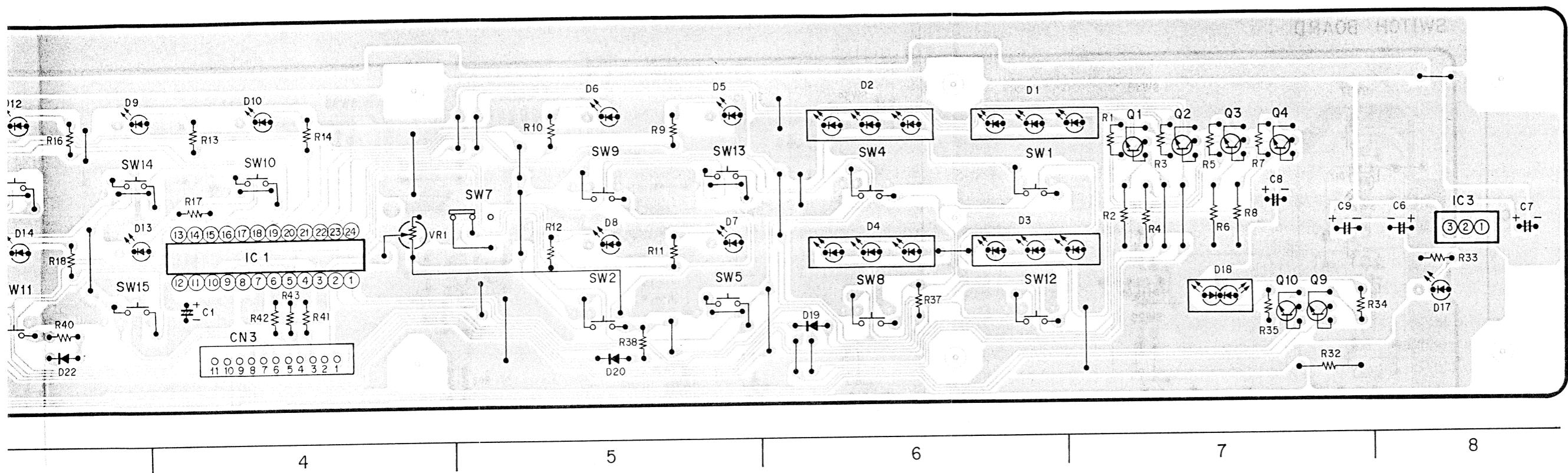
REAR BOARD



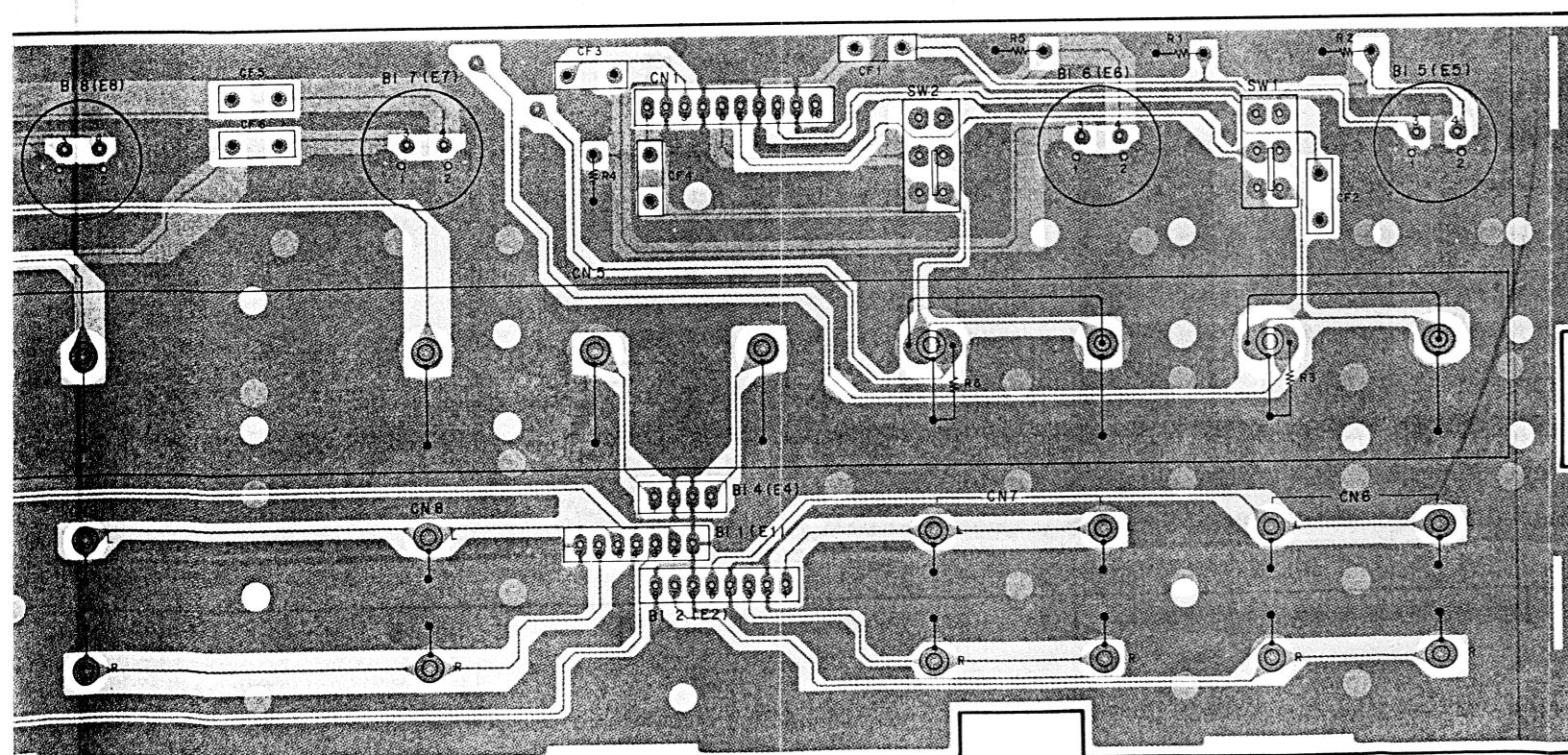
<Address Information>

METER BOARD	
IC1	A4
IC2	B2
IC3	A8
Q1	B7
Q2	B7
Q3	B7
Q4	B7
Q5	B2
Q6	B1
Q7	B1
Q8	B1
Q9	A7
Q10	A7
D1	B6
D2	B6
D3	A6
D4	A6
D5	B5
D6	B5
D7	A5
D8	A5
D9	B3
D10	B4
D11	B3
D12	B3
D13	A3
D14	A3
D15	A1,A2
D16	A1,A2
D17	A8
D18	A7
D19	A6
D20	A5
D21	A3
D22	A3

CONDUCTOR VIEW OF METER BOARD



CONDUCTOR VIEW OF REAR BOARD



CONDUCTOR VIEW OF SWITCH BOARD

<Address Information>

SWITCH BOARD

IC1 B7
IC2 B6,B7

Q1 C4
Q2 C4

Q3 C4
Q4 C4

Q5 C6
Q6 C6

Q7 C6
Q8 C6

Q9 B5
Q10 A6

Q11 A6
Q12 A6

Q13 A6
Q14 B4

Q15 B7
Q16 B7

Q17 B7
Q18 B7

Q19 A7
Q20 B7

D1 C6
D2 C6

D3 C3
D4 C2

D5 C5
D6 C6

D7 C3
D8 C2

D9 C5
D10 B6

D11 B3
D12 B2

D13 C5
D14 A6

D15 C3
D16 B3

D17 C1
D18 C1

D19 B1
D20 B2

D21 B8
D24 A1

D25 B8
D28 B1

D29 A8
D32 A1

D33 A8
D34 C8

D35 A5
D36 A1

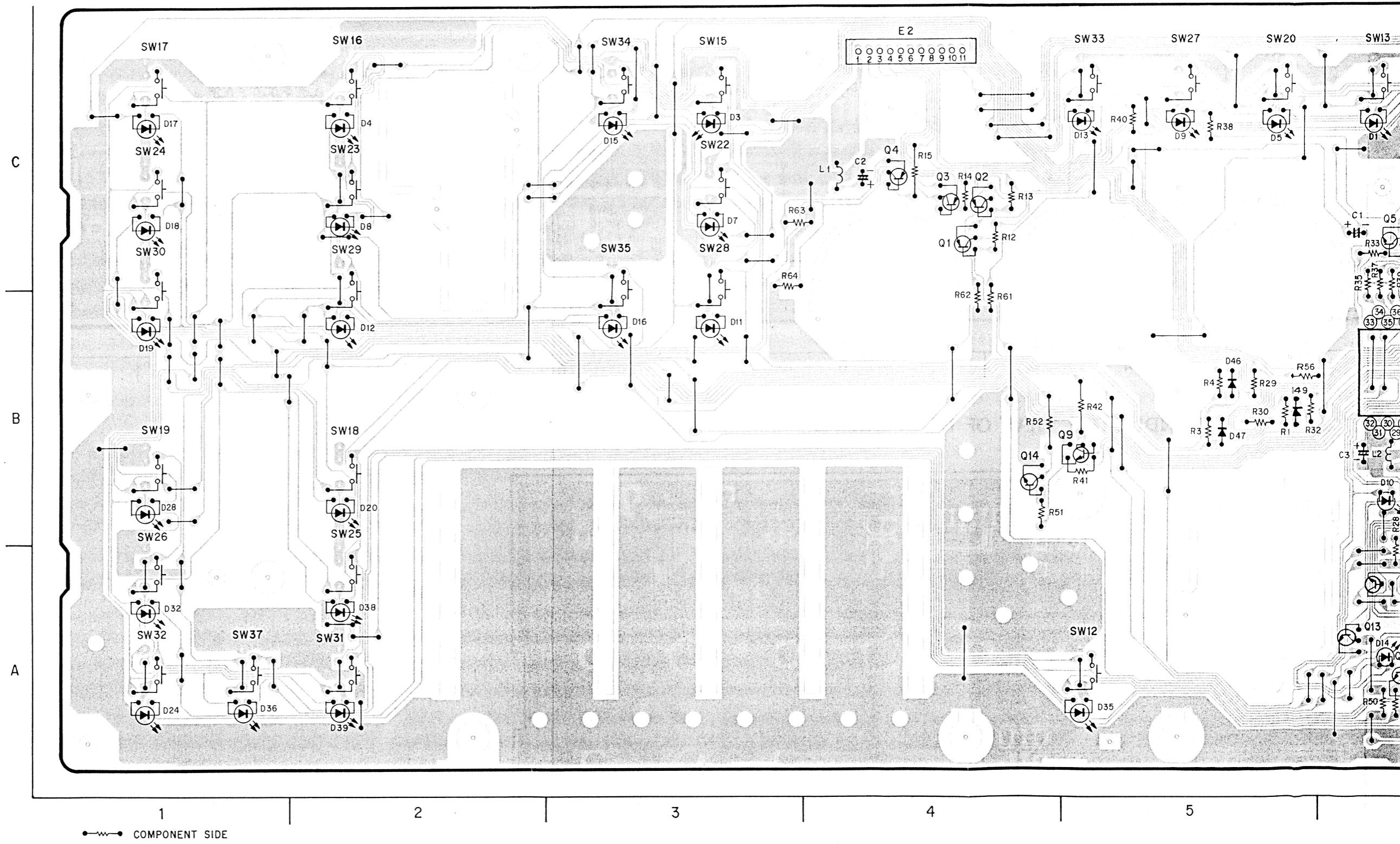
D37 A1
D38 A2

D39 A2
D46 B5

D47 B5
D48 C6

D49 B5

SWITCH BOARD

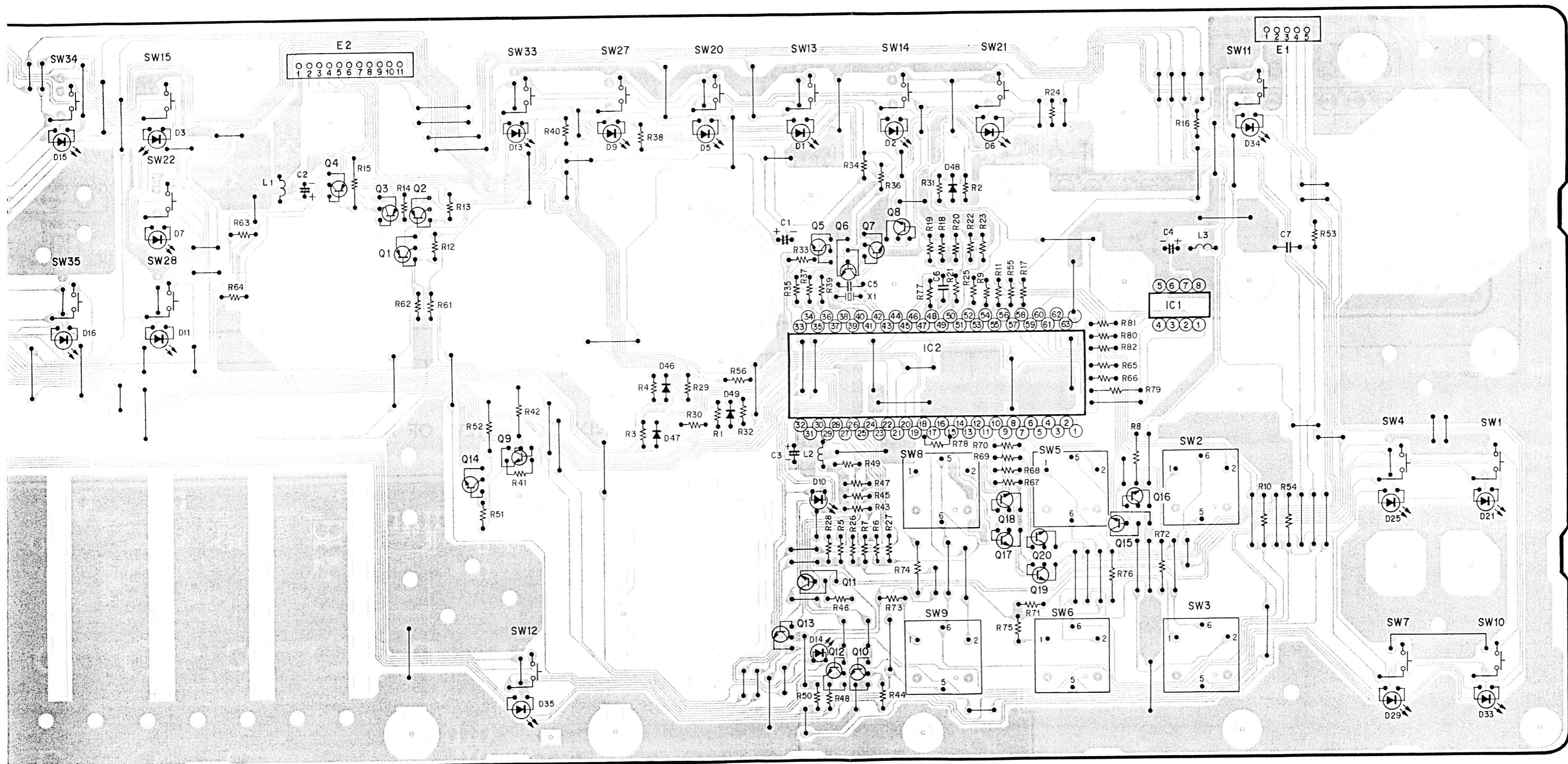


COMPONENT SIDE

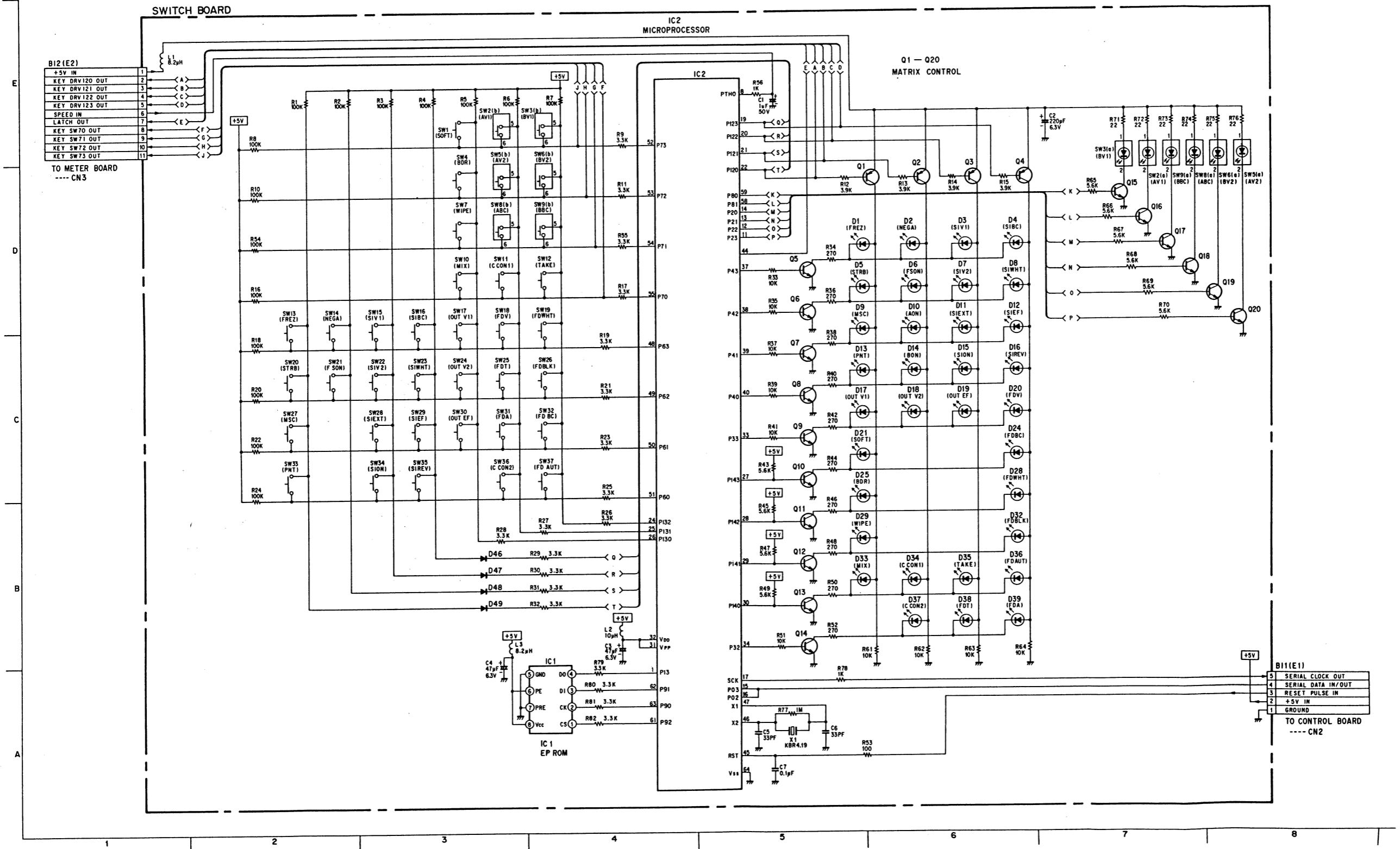


PATTERN SIDE

CONDUCTOR VIEW OF SWITCH BOARD



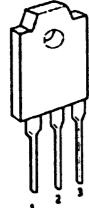
SCHEMATIC DIAGRAM OF SWITCH BOARD



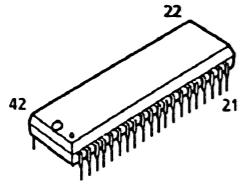
<Address Information>	
SWITCH BOARD	
IC1	A4
IC2	A~E4,A~E5
Q1	D6
Q2	D6
Q3	D6
Q4	D6
Q5	D5
Q6	D5
Q7	C5
Q8	C5
Q9	C5
Q10	C5
Q11	B5
Q12	B5
Q13	B5
Q14	B5
Q15	D7
Q16	D7
Q17	D7
Q18	D7
Q19	D8
Q20	D8
D1	D5,D6
D2	D6
D3	D6
D4	D6
D5	D5,D6
D6	D6
D7	D6
D8	D6
D9	D5,D6
D10	D6
D11	D6
D12	D6
D13	C5,C6
D14	C6
D15	C6
D16	C6
D17	C5,C6
D18	C6
D19	C6
D20	C6
D21	C5,C6
D24	C6
D25	B5,B6
D28	C6
D32	B5,B6
D33	B6
D34	B6
D35	B6
D36	B6
D37	B6
D38	B6
D39	B6
D40	B3
D47	B3
D48	B3
D49	B3

APPEARANCE OF IC, TRANSISTOR AND DIODE

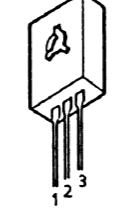
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YWSI3922V
YWSI3122V



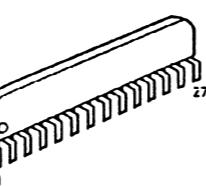
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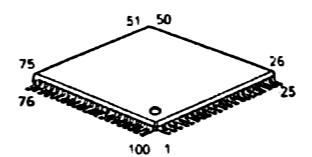
AN78N05



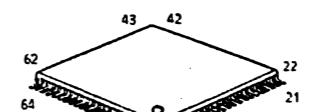
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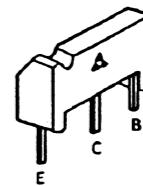
MN53060LVQ1



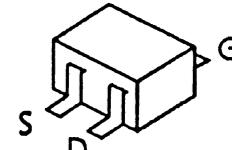
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2SD636-Q
2SB641-QR



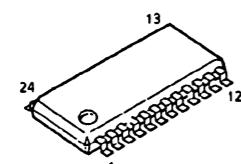
2SK198-Q



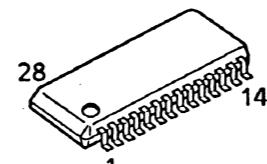
AN607P
AN608P



YWCXD1175M
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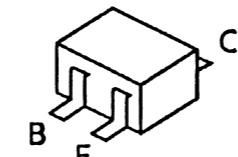
AN2510S
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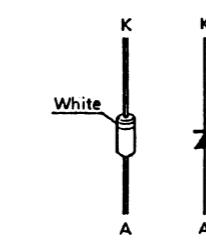
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AN78L05
AN78L09



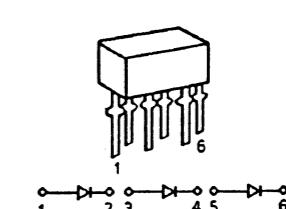
2SA1022-C
2SD602-QRS
2SB709-QRS
2SD1030RST



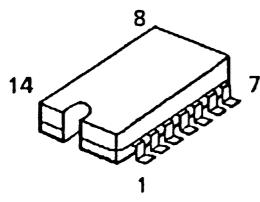
MA165



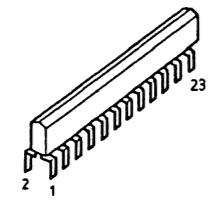
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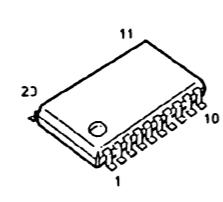
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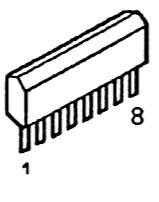
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YWMC74HC374F
YWSC49069F



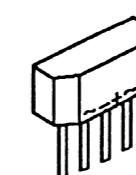
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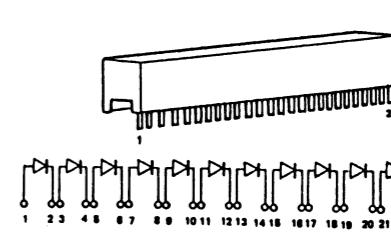
YWLT9002ND



YWRB150F

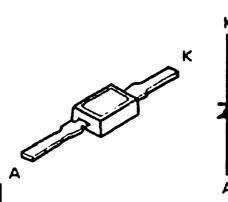


YWGL112F13

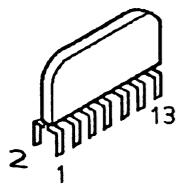


1 : Anode
2 : Cathode
3 : NC

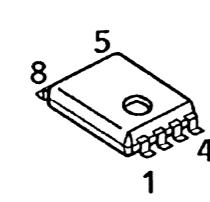
15V153



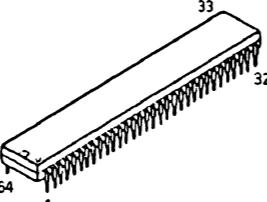
YWM51523AL



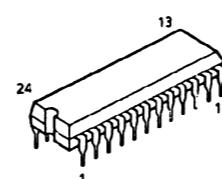
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NJM2903M
NJM4560M
YWM5216FP
NJM4559M
NJM3414M



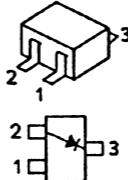
NJM2902M
NJM319M
NJM1496M
YWM74HC02F
YWM74HC74F
YWM74HC00F
YWM74HC04F
YWM74HCU04F
YWM74HC393F



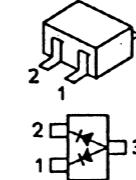
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YWPD65005232
YWPD41102C1S



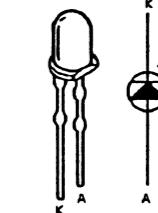
MA151K



MA151WA



YWGL3HD44



YWMC74HC175F
YLWNJU4051M
MN74HC4053S
YWNJU4053M
MN4528BS
MC74HC4053F

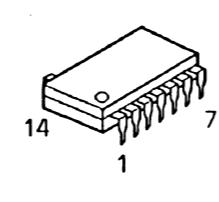
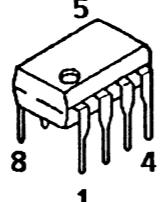
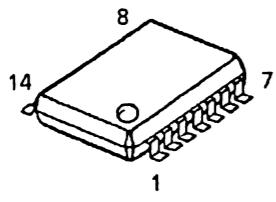
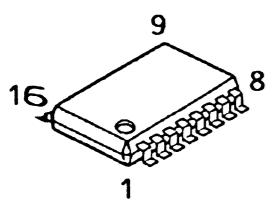
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MC74HC4066F

YWM74HC11F
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YWM74HCU04F

YWM74HC393F

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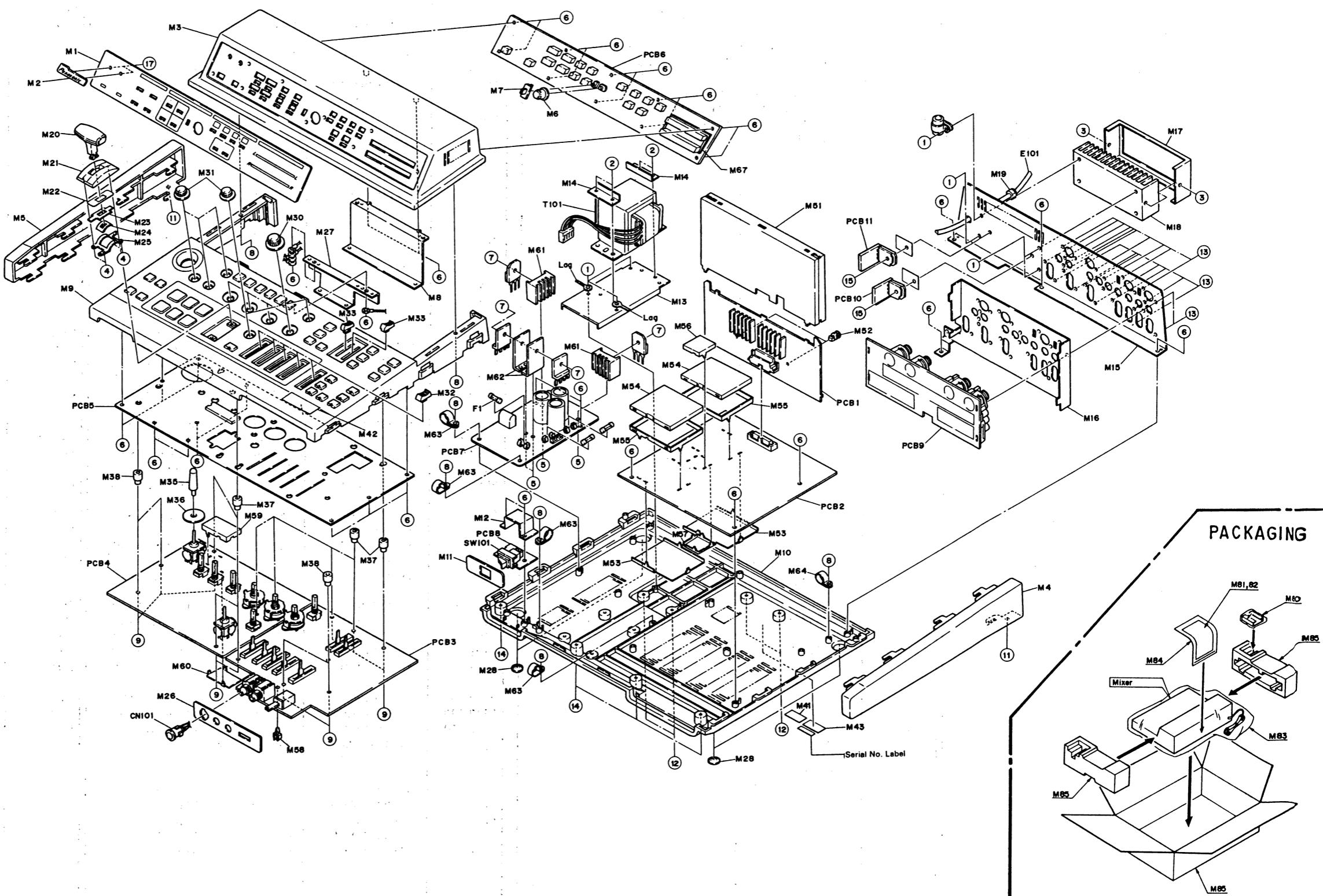
YWGX22013



EXPLODED VIEW

○ Numbers show Screws

No.	Screws	Description
①	XSB3 + 6FX	Binding Head Screws
②	XSB4 + 6FX	Binding Head Screws
③	XSB3 + 6FXK	Binding Head Black Screws
④	XTB2 + 5CFX	Binding Head Tapping Screws
⑤	XTB3 + 6FFX	Binding Head Tapping Screws
⑥	XTB3 + 8CFX	Binding Head Tapping Screws
⑦	XTB3 + 10FFX	Binding Head Tapping Screws
⑧	XTB3 + 12CFX	Binding Head Tapping Screws
⑨	XTB3 + 18CFX	Binding Head Tapping Screws
⑩	XTB3 + 8FXK	Binding Head Tapping Black Screws
⑪	XTB3 + 8CFXK	Binding Head Tapping Black Screws
⑫	XTB3 + 8FFXK	Binding Head Tapping Black Screws
⑬	XTB3 + 10CFXK	Binding Head Tapping Black Screws
⑭	XTB3 + 14CFXK	Binding Head Tapping Black Screws
⑮	XYM3 + F10FX	Machine Screw and Washer Assembly
⑯	XSS3 + 8FX	Flush Head Machine Screws
⑰	XNG2EFX	Hexagon Head Nuts



REPLACEMENT PARTS LIST

Important Notice

1. Components identified by "▲" mark have special characteristics important for safety.

When replacing any of these components, use only manufacturer's specified parts.

2. Printed circuit board assembly with mark (NLA) is no longer available after production discontinuation of the complete set.

REF.NO.	PART NO.	DESCRIPTION
MISCELLANEOUS		

T101 ▲	YWHMX12E220V YWHMX12E240V	Power Transformer for WJ-MX12/B,C Power Transformer for WJ-MX12/A,G
E101 ▲	YWACJ450/A YWACJ450/B YWACJ450/C YWACJ450/G	AC Power Cord for WJ-MX12/A AC Power Cord for WJ-MX12/B AC Power Cord for WJ-MX12/C AC Power Cord for WJ-MX12/G
M1	YVV5WA1071A2	Display Panel
M2	YVV7PA0082A3	Badge
M3	YVV9AA0606AN	Meter Case Ass'y
M4	YVV5JA0074A2	Grip
M5	YVV5JA0075A2	Grip
M6	YVV5RA0274A3	Knob
M7	YVV5RA0277A4	Knob
M8	YVV3BA0068A3	Supporting Angle
M9	YVV9AA0633AN	Upper Case Ass'y
M10	YVV5KA0990A1	Bottom Case
M11	YVV5WA1074A4	Power Switch Panel
M12	YVV2VA0042A4	Barrier
M13	YVV2SA1603A3	Mounting Angle
M14	YVV2SA1205A4	Mounting Angle
M15	YVV5EA0835A2	Mounting Angle for Board
M16	YVV2HA0837A4	Shield Parts
M17	YVV7DA0247A3	Heat Sink Lever
M18	YVV7DA0248A3	Heat Sink
M19	YWSR6W1	Cord Clamp
M20	YVV9AA0634AN	Wipe/Mix Lever Assy
M21	YVV5WA1072A3	Wipe/Mix Panel
M22	YVV2VA0037A4	Barrier
M23	YVV4JA0312A4	Spring
M24	YVV2EA0151A4	Guide
M25	YVV2CA0300A4	Hold Plate
M26	YVV5WA1073A4	Mic Jack Panel
M27	YVV3BA0067A3	Supporting Angle
M28	YVV5LA0036B4	Rubber Foot
M30	YVV5RA0273B3	Knob A
M31	YVV5RA0279C3	Knob
M32	YVV5RA0275A3	Sled Knob A
M33	YVV5RA0276A3	Sled Knob B
M35	YVV4RA0087A4	Stick Lever
M36	YVV2VA0038A4	Barrier
M37	YVV2NA0311A3	Spacer

REF.NO.	PART NO.	DESCRIPTION
MEMORY BOARD		
PCB1 (NLA)	YWKYKYM12E1A	Printed Circuit Board Assy
IC1	MN53060LVQ1	IC
IC2-13	YWM5M4C500L	IC
IC14	NJM2904M	IC
IC15	MC74HC4053F	IC
IC16,17	YWCXD1175M	IC
IC18	MN53030LVR1	IC
IC19-21	YWMC74HC374F	IC
IC22	YWMC74HC04F	IC
Q1	2SK198-Q	FET

REF.NO.	PART NO.	DESCRIPTION	REF.NO.	PART NO.	DESCRIPTION
Q2,5	2SB709-QRS	Transistor	C10-19	YF400333KKT	Ceramic 0.033 μF
Q7	2SB709-QRS	Transistor	C20	YF400104FZT	Ceramic 0.1 μF
Q8-20	2SD601-RS	Transistor	C21	YF400333XKT	Ceramic 0.033 μF
Q21	2SK198-Q	FET	C22	YF400102XKT	Ceramic 1000 pF
D1,2	1SV153	Diode	C23,24	YF400390CHJT	Ceramic 39 pF
D3,4	MA151K	Diode	C25	YF400822XKT	Ceramic 8200 pF
D5	1SV153	Diode	C26	YF400333XKT	Ceramic 0.033 μF
R2	YF2116752JT	Carbon 7.5K ohms 1/16W	C27	ECSF1AE226	Tantalum 22 μF 10V
R3	YF2116333GT	Carbon 33K ohms 1/16W	C28	ECEA1HKS2R2	Electrolytic 2.2 μF 50V
R4	YF2116103JT	Carbon 10K ohms 1/16W	C29	ECSF1AE106	Tantalum 10 μF 10V
R5	YF2116332JT	Carbon 3.3K ohms 1/16W	C30	ECEA1CKS470	Electrolytic 47 μF 16V
R6,10	YF2116101JT	Carbon 100 ohms 1/16W	C31,32	ECEA0JKS470I	Electrolytic 47 μF 6.3V (KS)
R11	YF2116302GT	Carbon 3K ohms 1/16W	C33	ECSF1AE106	Tantalum 10 μF 10V
R17	YF2116511JT	Carbon 510 ohms 1/16W	C34-36	ECSF1CE105	Tantalum 1 μF 10V
R18	YF2116101JT	Carbon 100 ohms 1/16W	C37-39	ECEA0JKS470I	Electrolytic 47 μF 6.3V (KS)
R19	YF2116222GT	Carbon 2.2K ohms 1/16W	C40	ECSF1AE106	Tantalum 10 μF 10V
R20	YF2116103JT	Carbon 10K ohms 1/16W	C41	ECEA0JKS470I	Electrolytic 47 μF 6.3V (KS)
R21	YF2116102GT	Carbon 1K ohms 1/16W	C42	ECSF1AE226	Tantalum 22 μF 10V
R22	YF2116222GT	Carbon 2.2K ohms 1/16W	C43	ECEA1AKS330	Electrolytic 33 μF 10V
R23	YF2116103JT	Carbon 10K ohms 1/16W	C44	ECSF1AE226	Electrolytic 22 μF 10V
R25	YF2116222GT	Carbon 2.2K ohms 1/16W	C45	ECEA1AKS330	Electrolytic 33 μF 10V
R26	YF2116103JT	Carbon 10K ohms 1/16W	C46	ECSF1AE106	Electrolytic 10 μF 10V
R27	YF2116102GT	Carbon 1K ohms 1/16W	C47	ECEA1HKS2R2	Electrolytic 2.2 μF 50V
R34	YF2116821GT	Carbon 820 ohms 1/16W	C48	ECSF1AE226	Electrolytic 22 μF 10V
R35	YF2116202JT	Carbon 2K ohms 1/16W	C49,50	YF400101CHJT	Ceramic 100 pF
R36	YF2116222GT	Carbon 2.2K ohms 1/16W	C51,52	ECEA1AKS330	Electrolytic 33 μF 10V
R37,38	YF2116102GT	Carbon 1K ohms 1/16W	C53	YF400680CHJT	Ceramic 68 pF CH
R39	YF2116103JT	Carbon 10K ohms 1/16W	C54	YF400180CHJT	Ceramic 18 pF
R40	YF2116242JT	Carbon 2.4K ohms 1/16W	C55-57	YF400560CHJT	Ceramic 56 pF
R43	YF2116102GT	Carbon 1K ohms 1/16W	C58	YF400330CHJT	Ceramic 33 pF
R44	YF2116100JT	Carbon 10 ohms 1/16W	C59	YF400150CHJT	Ceramic 15 pF
R45-77	YF2116101JT	Carbon 100 ohms 1/16W	C60,61	YF400470CHJT	Ceramic 47 pF
R78-80	YF2116100JT	Carbon 10 ohms 1/16W	C62	YF400101CHJT	Ceramic 100 pF
R83	YF2116101JT	Carbon 100 ohms 1/16W	L1	YWS5LE0465	Coil
R84	YF2116332JT	Carbon 3.3K ohms 1/16W	L2	ELJFA100KF	Coil
R87	YF2116103JT	Carbon 10K ohms 1/16W	L3-5	ELJFA1R0MB	Coil
R88	YF2116752JT	Carbon 7.5K ohms 1/16W	L6	ELJFA8R2KF	Coil
R89	YF2116471JT	Carbon 470 ohms 1/16W	L7	YWS5LE0465	Coil
R90-99	YF2116101JT	Carbon 100 ohms 1/16W	L8	ELJFA100KF	Coil
R100	YF2116470JT	Carbon 47 ohms 1/16W	L9	ELJFA2R2KF	Coil
R101,102	YF2116101JT	Carbon 100 ohms 1/16W	J1,8	YF21160R00T	Jumper Resistor
R103	YF2116102GT	Carbon 1K ohms 1/16W	J9,82	YF21160R00T	Jumper Resistor
R104,105	YF2116101JT	Carbon 100 ohms 1/16W	J85,86	YF21160R00T	Jumper Resistor
R106	YF2116103JT	Carbon 10K ohms 1/16W	TP1,2	YW32BM7R5	Test-pin
R107	YF2116223JT	Carbon 22K ohms 1/16W	CN1	FCN215Q050G0	Connector
R108,109	YF2116104JT	Carbon 100K ohms 1/16W	E1	YFCD20ACCAP	Insulator Cap
R110-138	ERJ3GEYJ101	Carbon 100 ohms 1/16W	M51	YVW2HA0833B2	Shield Parts
R139,140	YF2116101JT	Carbon 100 ohms 1/16W	M52	YW2J08	Support
Z1	YWRKM10L681F	Block Resistor			
Z2,3	YWRKM10L152F	Block Resistor			
C1	YF400822XKT	Ceramic 8200 pF			
C2	YF400390CHJT	Ceramic 39 pF			
C3	YF400100CHDT	Ceramic 10 pF			
C4	YF400102XKT	Ceramic 1000 pF			
C5,6	YF400333XKT	Ceramic 0.033 μF			

REF.NO.	PART NO.	DESCRIPTION	REF.NO.	PART NO.	DESCRIPTION
DECODER/ENCODER BOARD					
PCB2 (NLA)	YWKZMX12E1A	Printed Circuit Board Assy	R2	YF2116821GT	Carbon 820 ohms 1/16W
IC1-4	YWMSM6871RS	IC	R3	YF2116681JT	Carbon 680 ohms 1/16W
IC5,6	AN607P	IC	R4	YF2116152JT	Carbon 1.5K ohms 1/16W
IC9,10	YWCX22013	IC	R5	YF2116102GT	Carbon 1K ohms 1/16W
IC11,12	YWM51271FP	IC	R6	YF2116223JT	Carbon 22K ohms 1/16W
IC13-16	YWMSM6871RS	IC	R7	YF2116103JT	Carbon 10K ohms 1/16W
IC17-20	AN608P	IC	R8	YF2116152JT	Carbon 1.5K ohms 1/16W
IC21	MN4528BS	IC	R9,10	YF2116102GT	Carbon 1K ohms 1/16W
IC22	AN2510S	IC	R12	YF2116102GT	Carbon 1K ohms 1/16W
IC23	MN676021PPS	IC	R13	YF2116821GT	Carbon 820 ohms 1/16W
IC25,26	YWMC74HCU04F	IC	R14	YF2116562JT	Carbon 5.6K ohms 1/16W
IC27-29	YWMC74HC00F	IC	R15	YF2116103JT	Carbon 10K ohms 1/16W
IC30,31	YWM51272FP	IC	R16	YF2116203JT	Carbon 20K ohms 1/16W
IC32	MC74HC4053F	IC	R17	YF2116102GT	Carbon 1K ohms 1/16W
IC33	YWNJU4053M	IC	R18	YF2116331JT	Carbon 330 ohms 1/16W
IC34-36	MC74HC4053F	IC	R19	YF2116102GT	Carbon 1K ohms 1/16W
IC37	AN78L05	IC	R20	YF2116223JT	Carbon 22K ohms 1/16W
IC38,39	YWMC74HC74F	IC	R21	YF2116472GT	Carbon 4.7K ohms 1/16W
IC40	TC5081AP	IC	R22	YF2116102GT	Carbon 1K ohms 1/16W
IC41	AN2510S	IC	R23,24	YF2116561JT	Carbon 560 ohms 1/16W
IC42	-MC74HC86F	IC	R25	YF2116302GT	Carbon 3K ohms 1/16W
IC43,44	MN4528BS	IC	R26	YF2116152JT	Carbon 1.5K ohms 1/16W
IC45	YWMC74HC08F	IC	R27	YF2116102GT	Carbon 1K ohms 1/16W
IC46	YWMC74HC393F	IC	R28	YF2116472GT	Carbon 4.7K ohms 1/16W
IC47	MN4528BS	IC	R29	YF2116102GT	Carbon 1K ohms 1/16W
IC48	YWMC74HC04F	IC	R31	YF2116222GT	Carbon 2.2K ohms 1/16W
Q1-7	2SD601-RS	Transistor	R32	YF2116102GT	Carbon 1K ohms 1/16W
Q9-14	2SD601-RS	Transistor	R33	YF2116562JT	Carbon 5.6K ohms 1/16W
Q15	2SB709-QRS	Transistor	R34	ERSA39J102	Solid Resistor 1K ohms
Q16-32	2SD601-RS	Transistor	R35	ERDS2TJ182	Carbon 1.8K ohms 1/4W
Q33	2SB709-QRS	Transistor	R36	YF2116302GT	Carbon 3K ohms 1/16W
Q34-43	2SD601-RS	Transistor	R37	YF2116152JT	Carbon 1.5K ohms 1/16W
Q44	2SB709-QRS	Transistor	R38	YF2116102GT	Carbon 1K ohms 1/16W
Q45-81	2SD601-RS	Transistor	R39,40	YF2116561JT	Carbon 560 ohms 1/16W
Q83,85	2SD601-RS	Transistor	R41	YF2116302GT	Carbon 3K ohms 1/16W
Q86,89	2SD601-RS	Transistor	R42	YF2116152JT	Carbon 1.5K ohms 1/16W
Q92-94	2SD601-RS	Transistor	R43	YF2116102GT	Carbon 1K ohms 1/16W
Q95	2SD602-QRS	Transistor	R44	YF2116472GT	Carbon 4.7K ohms 1/16W
Q96-98	2SC2404-CD	Transistor	R45,46	YF2116102GT	Carbon 1K ohms 1/16W
Q99,100	2SK198-Q	FET	R47	YF2116222GT	Carbon 2.2K ohms 1/16W
Q103	2SD601-RS	Transistor	R49	YF2116562JT	Carbon 5.6K ohms 1/16W
Q104-119	2SB709-QRS	Transistor	R50	ERSA39J102	Solid Resistor 1K ohms
Q121	2SB709-QRS	Transistor	R51	ERDS2TJ182	Carbon 1.8K ohms 1/4W
Q122,123	2SD601-RS	Transistor	R52	YF2116102GT	Carbon 1K ohms 1/16W
Q124,125	2SB709-QRS	Transistor	R53	YF2116331JT	Carbon 330 ohms 1/16W
Q126-135	2SD601-RS	Transistor	R54,55	YF2116102GT	Carbon 1K ohms 1/16W
Q136	2SD973-QRS	Transistor	R56	YF2116222GT	Carbon 2.2K ohms 1/16W
D1,2	1SV153	Diode	R57,58	YF2116821GT	Carbon 820 ohms 1/16W
D4	MA151K	Diode	R59	YF2116333GT	Carbon 33K ohms 1/16W
R1	YF2116122JT	Carbon	R60	YF2116332JT	Carbon 3.3K ohms 1/16W
		1.2K ohms 1/16W	R61-63	YF2116821GT	Carbon 820 ohms 1/16W
			R64	YF2116202JT	Carbon 2K ohms 1/16W
			R65	YF2116392JT	Carbon 3.9K ohms 1/16W
			R66	YF2116332JT	Carbon 3.3K ohms 1/16W
			R67	YF2116122JT	Carbon 1.2K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION		REF.NO.	PART NO.	DESCRIPTION	
R68-70	YF2116103JT	Carbon	10K ohms 1/16W	R134	YF2116102GT	Carbon	1K ohms 1/16W
R71	YWR1220P152D	Metal	1.5K ohms	R135	YF2116821GT	Carbon	820 ohms 1/16W
R72	YF2116392JT	Carbon	3.9K ohms 1/16W	R136	YF2116562JT	Carbon	5.6K ohms 1/16W
R73	YWR1220P152D	Metal	1.5K ohms	R137	YF2116103JT	Carbon	10K ohms 1/16W
R74	YF2116392JT	Carbon	3.9K ohms 1/16W	R138	YF2116203JT	Carbon	20K ohms 1/16W
R75	YF2116103JT	Carbon	10K ohms 1/16W	R139	YF2116102GT	Carbon	1K ohms 1/16W
R76	YF2116392JT	Carbon	3.9K ohms 1/16W	R140	YF2116311JT	Carbon	330 ohms 1/16W
R77	YWR1220P302D	Metal	3K ohms	R141	YF2116102GT	Carbon	1K ohms 1/16W
R78	YWR1220P562D	Metal	5.6K ohms	R142	YF2116223JT	Carbon	22K ohms 1/16W
R79	YWR1220P362D	Metal	3.6K ohms	R143	YF2116472GT	Carbon	4.7K ohms 1/16W
R80	YF2116122JT	Carbon	1.2K ohms 1/16W	R145,146	YF2116561JT	Carbon	560 ohms 1/16W
R81	YF2116103JT	Carbon	10K ohms 1/16W	R147	YF2116302GT	Carbon	3K ohms 1/16W
R82	YF2116303GT	Carbon	30K ohms 1/16W	R148	YF2116152JT	Carbon	1.5K ohms 1/16W
R83	YF2116102GT	Carbon	1K ohms 1/16W	R149	YF2116102GT	Carbon	1K ohms 1/16W
R84	YF2116473GT	Carbon	47K ohms 1/16W	R150	YF2116472GT	Carbon	4.7K ohms 1/16W
R85	YF2116221JT	Carbon	220 ohms 1/16W	R151	YF2116102GT	Carbon	1K ohms 1/16W
R86	YF2116393GT	Carbon	39K ohms 1/16W	R153	YF2116222GT	Carbon	2.2K ohms 1/16W
R87	YF2116125JT	Carbon	1.2M ohms 1/16W	R154	YF2116102GT	Carbon	1K ohms 1/16W
R88	YF2116223JT	Carbon	22K ohms 1/16W	R155	YF2116562JT	Carbon	5.6K ohms 1/16W
R89	YF2116102GT	Carbon	1K ohms 1/16W	R156	ERSA39J102	Solid Resistor	1K ohms
R90	YW2116105JT	Carbon	1M ohms 1/16W	R157	ERDS2TJ182	Carbon	1.8K ohms 1/4W
R91	ERSA33J102	Carbon	1K ohms	R158	YF2116302GT	Carbon	3K ohms 1/16W
R92	YF2116102GT	Carbon	1K ohms 1/16W	R159	YF2116152JT	Carbon	1.5K ohms 1/16W
R93,94	YF2116203JT	Carbon	20K ohms 1/16W	R160	YF2116102GT	Carbon	1K ohms 1/16W
R95	YW2116620JT	Carbon	62 ohms 1/16W	R161,162	YF2116561JT	Carbon	560 ohms 1/16W
R96	YF2116101JT	Carbon	100 ohms 1/16W	R163	YF2116302GT	Carbon	3K ohms 1/16W
R97	YF2116821GT	Carbon	820 ohms 1/16W	R164	YF2116152JT	Carbon	1.5K ohms 1/16W
R98,99	YF2116103JT	Carbon	10K ohms 1/16W	R165	YF2116102GT	Carbon	1K ohms 1/16W
R100	YF2116392JT	Carbon	3.9K ohms 1/16W	R166	YF2116472GT	Carbon	4.7K ohms 1/16W
R101	YF2116332JT	Carbon	3.3K ohms 1/16W	R167,168	YF2116102GT	Carbon	1K ohms 1/16W
R102	YF2116152JT	Carbon	1.5K ohms 1/16W	R169	YF2116222GT	Carbon	2.2K ohms 1/16W
R103-106	YF2116392JT	Carbon	3.9K ohms 1/16W	R171	YF2116562JT	Carbon	5.6K ohms 1/16W
R107,108	YF2116122JT	Carbon	1.2K ohms 1/16W	R172	ERSA39J102	Solid Resistor	1K ohms
R109	YF2116103JT	Carbon	10K ohms 1/16W	R173	ERDS2TJ182	Carbon	1.8K ohms 1/4W
R110	YF2116303GT	Carbon	30K ohms 1/16W	R175	YF2116331JT	Carbon	330 ohms 1/16W
R111	YF2116102GT	Carbon	1K ohms 1/16W	R176,177	YF2116102GT	Carbon	1K ohms 1/16W
R112	YF2116103JT	Carbon	10K ohms 1/16W	R178	YF2116222GT	Carbon	2.2K ohms 1/16W
R113	YF2116303GT	Carbon	30K ohms 1/16W	R179	YF2116562JT	Carbon	5.6K ohms 1/16W
R114	YF2116101JT	Carbon	100 ohms 1/16W	R180	YF2116154JT	Carbon	150K ohms 1/16W
R115,116	YF2116333GT	Carbon	33K ohms 1/16W	R181	YF2116101JT	Carbon	100 ohms 1/16W
R117	YW2116105JT	Carbon	1M ohms 1/16W	R182	YF2116332JT	Carbon	3.3K ohms 1/16W
R118	YF2116303GT	Carbon	30K ohms 1/16W	R183	YW2116182JT	Carbon	1.8K ohms 1/16W
R119	YF2116103JT	Carbon	10K ohms 1/16W	R184	YF2116511JT	Carbon	510 ohms 1/16W
R120	YF2116122JT	Carbon	1.2K ohms 1/16W	R185	YF2116153JT	Carbon	15K ohms 1/16W
R121	YF2116104JT	Carbon	100K ohms 1/16W	R186	YF2116131JT	Carbon	130 ohms 1/16W
R122	YF2116303GT	Carbon	30K ohms 1/16W	R187	YF2116201JT	Carbon	200 ohms 1/16W
R123	YF2116103JT	Carbon	10K ohms 1/16W	R188	YF2116392JT	Carbon	3.9K ohms 1/16W
R124	YF2116122JT	Carbon	1.2K ohms 1/16W	R189	YF2116131JT	Carbon	130 ohms 1/16W
R125	YF2116681JT	Carbon	680 ohms 1/16W	R190	YF2116102GT	Carbon	1K ohms 1/16W
R126	YF2116152JT	Carbon	1.5K ohms 1/16W	R191	YF2116163JT	Carbon	16K ohms 1/16W
R127	YF2116102GT	Carbon	1K ohms 1/16W	R192	YF2116362JT	Carbon	3.6K ohms 1/16W
R128	YF2116223JT	Carbon	22K ohms 1/16W	R193	YF2116102GT	Carbon	1K ohms 1/16W
R129	YF2116103JT	Carbon	10K ohms 1/16W	R194,195	YF2116332JT	Carbon	3.3K ohms 1/16W
R130	YF2116152JT	Carbon	1.5K ohms 1/16W	R196	YF2116102GT	Carbon	1K ohms 1/16W
R131,132	YF2116102GT	Carbon	1K ohms 1/16W	R197	YF2116362JT	Carbon	3.6K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION		REF.NO.	PART NO.	DESCRIPTION	
R198	YF2116163JT	Carbon	16K ohms 1/16W	R258	YF2116473GT	Carbon	47K ohms 1/16W
R199	YF2116102GT	Carbon	1K ohms 1/16W	R259,260	YF2116102GT	Carbon	1K ohms 1/16W
R200	YF2116131JT	Carbon	130 ohms 1/16W	R261	YF2116101JT	Carbon	100 ohms 1/16W
R201	YF2116392JT	Carbon	3.9K ohms 1/16W	R262	YF2116313JT	Carbon	330 ohms 1/16W
R202	YF2116201JT	Carbon	200 ohms 1/16W	R263	YF2116392JT	Carbon	3.9K ohms 1/16W
R203	YF2116131JT	Carbon	130 ohms 1/16W	R264	YF2116103JT	Carbon	10K ohms 1/16W
R204	YW2116242JT	Carbon	2.4K ohms 1/16W	R265	YF2116102GT	Carbon	1K ohms 1/16W
R205	YF2116102GT	Carbon	1K ohms 1/16W	R266	YW2116105JT	Carbon	1M ohms 1/16W
R206	YF2116122JT	Carbon	1.2K ohms 1/16W	R267	YF2116222GT	Carbon	2.2K ohms 1/16W
R207	YF2116362JT	Carbon	3.6K ohms 1/16W	R268	YF2116302GT	Carbon	3K ohms 1/16W
R208	YF2116102GT	Carbon	1K ohms 1/16W	R269	YF2116332JT	Carbon	3.3K ohms 1/16W
R209	YF2116271JT	Carbon	270 ohms 1/16W	R270	YF2116102GT	Carbon	1K ohms 1/16W
R210	YF2116392JT	Carbon	3.9K ohms 1/16W	R271	YF2116682JT	Carbon	6.8K ohms 1/16W
R211	YF2116271JT	Carbon	270 ohms 1/16W	R274	YF2116332JT	Carbon	3.3K ohms 1/16W
R212	YF2116122JT	Carbon	1.2K ohms 1/16W	R275	YF2116102GT	Carbon	1K ohms 1/16W
R213	YF2116821GT	Carbon	820 ohms 1/16W	R276	YF2116331JT	Carbon	330 ohms 1/16W
R214,215	YF2116122JT	Carbon	1.2K ohms 1/16W	R277	YF2116102GT	Carbon	1K ohms 1/16W
R216	YF2116103JT	Carbon	10K ohms 1/16W	R278	YF2116681JT	Carbon	680 ohms 1/16W
R217	YF2116303GT	Carbon	30K ohms 1/16W	R282,283	YF2116332JT	Carbon	3.3K ohms 1/16W
R218	YF2116102GT	Carbon	1K ohms 1/16W	R285,287	YF2116332JT	Carbon	3.3K ohms 1/16W
R221	YF2116332JT	Carbon	3.3K ohms 1/16W	R288	YF2116821GT	Carbon	820 ohms 1/16W
R222	YF2116102GT	Carbon	1K ohms 1/16W	R290	YF2116102GT	Carbon	1K ohms 1/16W
R223	YF2116122JT	Carbon	1.2K ohms 1/16W	R291	YF2116472GT	Carbon	4.7K ohms 1/16W
R224	YF2116362JT	Carbon	3.6K ohms 1/16W	R292	YF2116822JT	Carbon	8.2K ohms 1/16W
R225	YF2116102GT	Carbon	1K ohms 1/16W	R293	YF2116332JT	Carbon	3.3K ohms 1/16W
R226	YF2116221JT	Carbon	220 ohms 1/16W	R294	YF2116752JT	Carbon	7.5K ohms 1/16W
R227	YF2116392JT	Carbon	3.9K ohms 1/16W	R296	YF2116511JT	Carbon	510 ohms 1/16W
R228	YF2116221JT	Carbon	220 ohms 1/16W	R298	YF2116822JT	Carbon	8.2K ohms 1/16W
R229	YF2116332JT	Carbon	3.3K ohms 1/16W	R300	YF2116102GT	Carbon	1K ohms 1/16W
R230	YF2116102GT	Carbon	1K ohms 1/16W	R301	YF2116822JT	Carbon	8.2K ohms 1/16W
R231	YF2116362JT	Carbon	3.6K ohms 1/16W	R304	YF2116102GT	Carbon	1K ohms 1/16W
R232	YF2116163JT	Carbon	16K ohms 1/16W	R305	YF2116511JT	Carbon	510 ohms 1/16W
R233	YF2116102GT	Carbon	1K ohms 1/16W	R306	YF2116332JT	Carbon	3.3K ohms 1/16W
R234	YF2116221JT	Carbon	220 ohms 1/16W	R307	YF2116153JT	Carbon	15K ohms 1/16W
R235	YF2116682JT	Carbon	6.8K ohms 1/16W	R308	YF2116243JT	Carbon	24K ohms 1/16W
R236	YF2116221JT	Carbon	220 ohms 1/16W	R309	YF2116153JT	Carbon	15K ohms 1/16W
R237	YF2116332JT	Carbon	3.3K ohms 1/16W	R310	YF2116243JT	Carbon	24K ohms 1/16W
R238	YF2116102GT	Carbon	1K ohms 1/16W	R311	YF2116153JT	Carbon	15K ohms 1/16W
R239	YF2116362JT	Carbon	3.6K ohms 1/16W	R312	YF2116243JT	Carbon	24K ohms 1/16W
R240	YF2116163JT	Carbon	16K ohms 1/16W	R313,314	YF2116332JT	Carbon	3.3K ohms 1/16W
R241	YF2116102GT	Carbon	1K ohms 1/16W	R315	YF2116243JT	Carbon	24K ohms 1/16W
R242	YF2116221JT	Carbon	220 ohms 1/16W	R316	YF2116153JT	Carbon	15K ohms 1/16W
R243	YF2116682JT	Carbon	6.8K ohms 1/16W	R317	YF2116243JT	Carbon	24K ohms 1/16W
R244	YF2116391JT	Carbon	390 ohms 1/16W	R318	YF2116153JT	Carbon	15K ohms 1/16W
R245	YF2116221JT	Carbon	220 ohms 1/16W	R319	YF2116243JT	Carbon	24K ohms 1/16W
R246	YF2116101JT	Carbon	100 ohms 1/16W	R320	YF2116153JT	Carbon	15K ohms 1/16W
R247	YW2116620JT	Carbon	62 ohms 1/16W	R321	YF2116332JT	Carbon	3.3K ohms 1/16W
R248,249	YF2116203JT	Carbon	20K ohms 1/16W	R322	YF2116102GT	Carbon	1K ohms 1/16W
R251	ERSA33J102	Carbon	1K ohms	R328	YF2116511JT	Carbon	510 ohms 1/16W
R252	YW2116105JT	Carbon	1M ohms 1/16W	R330	YF2116752JT	Carbon	7.5K ohms 1/16W
R253	YF2116102GT	Carbon	1K ohms 1/16W	R331	YF2116332JT	Carbon	3.3K ohms 1/16W
R254	YF2116223JT	Carbon	22K ohms 1/16W	R332	YF2116822JT	Carbon	8.2K ohms 1/16W
R255	YF2116125JT	Carbon	1.2M ohms 1/16W	R333	YF2116472GT	Carbon	4.7K ohms 1/16W
R256	YF2116393GT	Carbon	39K ohms 1/16W	R334	YF2116102GT	Carbon	1K ohms 1/16W
R257	YF2116221JT	Carbon	220 ohms 1/16W	R336	YF2116821GT	Carbon	820 ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION		REF.NO.	PART NO.	DESCRIPTION	
R337	YF2116332JT	Carbon	3.3K ohms 1/16W	R412	YF2116331JT	Carbon	330 ohms 1/16W
R338	YF2116153JT	Carbon	15K ohms 1/16W	R413	YF2116221JT	Carbon	220 ohms 1/16W
R339	YF2116102GT	Carbon	1K ohms 1/16W	R414	YF2116102GT	Carbon	1K ohms 1/16W
R340,341	YF2116392JT	Carbon	3.9K ohms 1/16W	R415	YF2116221JT	Carbon	220 ohms 1/16W
R342	YF2116102GT	Carbon	1K ohms 1/16W	R416	YF2116103JT	Carbon	10K ohms 1/16W
R343	YF2116153JT	Carbon	15K ohms 1/16W	R417	YF2116753JT	Carbon	75K ohms 1/16W
R344	YF2116680JT	Carbon	68 ohms 1/16W	R418	YF2116562JT	Carbon	5.6K ohms 1/16W
R345	YF2116332JT	Carbon	3.3K ohms 1/16W	R422	YF2116152JT	Carbon	1.5K ohms 1/16W
R346-348	YF2116102GT	Carbon	1K ohms 1/16W	R423	YF2116122JT	Carbon	1.2K ohms 1/16W
R348	YF2116681JT	Carbon	680 ohms 1/16W	R424	YF2116152JT	Carbon	1.5K ohms 1/16W
R349	YF2116151JT	Carbon	150 ohms 1/16W	R425	YF2116122JT	Carbon	1.2K ohms 1/16W
R350	YF2116272JT	Carbon	2.7K ohms 1/16W	R426	YF2116473GT	Carbon	47K ohms 1/16W
R351	YF2116562JT	Carbon	5.6K ohms 1/16W	R427	YF2116183GT	Carbon	18K ohms 1/16W
R352	YF2116392JT	Carbon	3.9K ohms 1/16W	R428	YF2116473GT	Carbon	47K ohms 1/16W
R353	YW2116105JT	Carbon	1M ohms 1/16W	R429	YF2116183GT	Carbon	18K ohms 1/16W
R354	YF2116102GT	Carbon	1K ohms 1/16W	R430,431	YF2116272JT	Carbon	2.7K ohms 1/16W
R355	YF2116132JT	Carbon	1.3K ohms 1/16W	R432	YF2116822JT	Carbon	8.2K ohms 1/16W
R356	YF2116512JT	Carbon	5.1K ohms 1/16W	R433	YF2116332JT	Carbon	3.3K ohms 1/16W
R357	YF2116133GT	Carbon	13K ohms 1/16W	R434,435	YF2116102GT	Carbon	1K ohms 1/16W
R358	YF2116332JT	Carbon	3.3K ohms 1/16W	R436	YF2116104JT	Carbon	100K ohms 1/16W
R359	YF2116101JT	Carbon	100 ohms 1/16W	R437	YF2116391JT	Carbon	390 ohms 1/16W
R360	YF2116682JT	Carbon	6.8K ohms 1/16W	R438	YF2116101JT	Carbon	100 ohms 1/16W
R361	YF2116153JT	Carbon	15K ohms 1/16W	R441-447	YF2116102GT	Carbon	1K ohms 1/16W
R362	YF2116622JT	Carbon	6.2K ohms 1/16W	R448	YF2116101JT	Carbon	100 ohms 1/16W
R363	YF2116511JT	Carbon	510 ohms 1/16W	R449	YF2116683GT	Carbon	68K ohms 1/16W
R364	YF2116102GT	Carbon	1K ohms 1/16W	R500,501	YF2116102GT	Carbon	1K ohms 1/16W
R365	YF2116472GT	Carbon	4.7K ohms 1/16W	VR1	EVM13SW00BE3	Variable Resistor	2.2K ohms
R366	YF2116103JT	Carbon	10K ohms 1/16W	VR2	EVM13SW00B13	Variable Resistor	1K ohms
R367	YF2116682JT	Carbon	6.8K ohms 1/16W	VR3	EVM13SW00BS2	Variable Resistor	680 ohms
R368,369	YF2116103JT	Carbon	10K ohms 1/16W	VR4	EVM13SW00BE3	Variable Resistor	2.2K ohms
R370,371	YF2116222GT	Carbon	2.2K ohms 1/16W	VR6	EVM13SW00BS2	Variable Resistor	680 ohms
R372	YF2116334JT	Carbon	330K ohms 1/16W	VR7	EVM13SW00BE3	Variable Resistor	2.2K ohms
R373	YF2116101JT	Carbon	100 ohms 1/16W	VR8	EVM13SW00BQ4	Variable Resistor	47K ohms
R374	YF2116332JT	Carbon	3.3K ohms 1/16W	VR9	EVM13SW00BQ3	Variable Resistor	4.7K ohms
R375	YW2116182JT	Carbon	1.8K ohms 1/16W	VR10	EVM13SW00B14	Variable Resistor	10K ohms
R378	YF2116224JT	Carbon	220K ohms 1/16W	VR11	EVM13SW00BE3	Variable Resistor	2.2K ohms
R379	YF2116472GT	Carbon	4.7K ohms 1/16W	VR12	EVM13SW00B13	Variable Resistor	1K ohms
R381	YF2116622JT	Carbon	6.2K ohms 1/16W	VR13	EVM13SW00BS2	Variable Resistor	680 ohms
R382	YF2116621JT	Carbon	620 ohms 1/16W	VR14	EVM13SW00BE3	Variable Resistor	2.2K ohms
R383	YF2116161JT	Carbon	160 ohms 1/16W	VR16	EVM13SW00BS2	Variable Resistor	680 ohms
R384	YF2116511JT	Carbon	510 ohms 1/16W	VR17	EVM13SW00BE3	Variable Resistor	2.2K ohms
R385	YF2116681JT	Carbon	680 ohms 1/16W	VR18	EVM13SW00B14	Variable Resistor	10K ohms
R386,387	YF2116241JT	Carbon	240 ohms 1/16W	VR19	EVM13SW00BQ3	Variable Resistor	4.7K ohms
R388	YF2116681JT	Carbon	680 ohms 1/16W	VR20	EVM13SW00BQ4	Variable Resistor	47K ohms
R389	YF2116393GT	Carbon	39K ohms 1/16W	VR21-30	EVM13SW00B14	Variable Resistor	10K ohms
R390-392	YF2116102GT	Carbon	1K ohms 1/16W	VR31	EVM13SW00BY3	Variable Resistor	
R393	YF2116202JT	Carbon	2K ohms 1/16W	VR32	EVM13SW00BE3	Variable Resistor	2.2K ohms
R394	YF2116102GT	Carbon	1K ohms 1/16W	VR34	EVM13SW00BY2	Variable Resistor	330 ohms
R395	YF2116332JT	Carbon	3.3K ohms 1/16W	VR36	EVM13SW00BY3	Variable Resistor	
R401	YF2116102GT	Carbon	1K ohms 1/16W	VR38	EVM13SW00BS2	Variable Resistor	680 ohms
R403,404	YF2116561JT	Carbon	560 ohms 1/16W	VR40	EVM13SW00BY2	Variable Resistor	330 ohms
R405	YF2116331JT	Carbon	330 ohms 1/16W	VR41	EVM13SW00B15	Variable Resistor	100K ohms
R406	YF2116102GT	Carbon	1K ohms 1/16W	VR43	EVM13SW00BE3	Variable Resistor	2.2K ohms
R407,408	YF2116222GT	Carbon	2.2K ohms 1/16W	VR44-46	EVM13SW00B13	Variable Resistor	1K ohms
R410,411	YF2116561JT	Carbon	560 ohms 1/16W	VR47,48	EVM13SW00B23	Variable Resistor	2K ohms

REF.NO.	PART NO.	DESCRIPTION	REF.NO.	PART NO.	DESCRIPTION
VR49	EVM13SW00BQ2	Variable Resistor 470 ohms	C103	YWT316B104MT	Ceramic 0.1 μ F
VR50,51	EVM13SW00BY3	Variable Resistor	C104	YF400102XKT	Ceramic 1000 pF
C1	YF400103XMT	Ceramic 0.01 μ F	C105	YWT316B473MT	Ceramic 0.047 μ F
C2,3	YF400150CHJT	Ceramic 15 pF	C106	YWT316B104MT	Ceramic 0.1 μ F
C4-7	YF400103XMT	Ceramic 0.01 μ F	C107	YF400222XKT	Ceramic 2200 pF
C8	YF400150CHJT	Ceramic 15 pF	C108,109	YWT316B104MT	Ceramic 0.1 μ F
C11-15	YF400103XMT	Ceramic 0.01 μ F	C110	YF400102XKT	Ceramic 1000 pF
C18	YF400103XMT	Ceramic 0.01 μ F	C111,112	YF400473FZT	Ceramic 0.047 μ F
C19	YF400150CHJT	Ceramic 15 pF	C113	YF400222XKT	Ceramic 2200 pF
C22-25	YF400103XMT	Ceramic 0.01 μ F	C114,115	YF400820CHJT	Ceramic 82 pF
C26	YF400200CHJT	Ceramic 20 pF	C116,117	YWT316B104MT	Ceramic 0.1 μ F
C27	YF400390CHJT	Ceramic 39 pF	C118	400080CHDT	Ceramic 8 pF
C28	YF400200CHJT	Ceramic 20 pF	C119	YWT316B104MT	Ceramic 0.1 μ F
C29	YF400103XMT	Ceramic 0.01 μ F	C120	YF400103XMT	Ceramic 0.01 μ F
C30	YF400331CHJT	Ceramic 330 pF	C121	YWT316B104MT	Ceramic 0.1 μ F
C33,34	YF400473FZT	Ceramic 0.047 μ F	C122	YF400330CHJT	Ceramic 33 pF
C35	YF400102XKT	Ceramic 1000 pF	C123	YF400150CHJT	Ceramic 15 pF
C36,37	YWT316B104MT	Ceramic 0.1 μ F	C124	YF400822XKT	Ceramic 8200 pF
C38	YF400222XKT	Ceramic 2200 pF	C125	YWT316B104MT	Ceramic 0.1 μ F
C39	YWT316B104MT	Ceramic 0.1 μ F	C126	YF400473FZT	Ceramic 0.047 μ F
C40	YWT316B473MT	Ceramic 0.047 μ F	C127	YWT316B104MT	Ceramic 0.1 μ F
C41	YF400102XKT	Ceramic 1000 pF	C128,129	YF400103XMT	Ceramic 0.01 μ F
C42	YWT316B104MT	Ceramic 0.1 μ F	C132-136	YF400390CHJT	Ceramic 39 pF
C43	YF400561CHJT	Ceramic 560 pF	C137	YWT316B104MT	Ceramic 0.1 μ F
C44	YF400102XKT	Ceramic 1000 pF	C138	YF400473FZT	Ceramic 0.047 μ F
C45	YWT316B104MT	Ceramic 0.1 μ F	C139-141	YF400103XMT	Ceramic 0.01 μ F
C46	YF400100CHDT	Ceramic 10 pF	C142	YF400473FZT	Ceramic 0.047 μ F
C50	YF400471CHJT	Ceramic 470 pF	C143,144	YWT316B104MT	Ceramic 0.1 μ F
C51	YF400271CHJT	Ceramic 270 pF	C145	YF400473FZT	Ceramic 0.047 μ F
C52	-ECEA1AKS330I	Electrolytic 33 μ F 10V	C146-148	YF400103XMT	Ceramic 0.01 μ F
C53	YF400152XKT	Ceramic 1500 pF	C149	YF400473FZT	Ceramic 0.047 μ F
C54	YWT316B104MT	Ceramic 0.1 μ F	C150	YWT316B104MT	Ceramic 0.1 μ F
C55	YF400103XMT	Ceramic 0.01 μ F	C153,154	YF400103XMT	Ceramic 0.01 μ F
C56,57	YF400150CHJT	Ceramic 15 pF	C155	YWT316B104MT	Ceramic 0.1 μ F
C58-61	YF400103XMT	Ceramic 0.01 μ F	C156	YF400473FZT	Ceramic 0.047 μ F
C62	YF400150CHJT	Ceramic 15 pF	C157	YF400150CHJT	Ceramic 15 pF
C65-69	YF400103XMT	Ceramic 0.01 μ F	C158-161	YF400470CHJT	Ceramic 47 pF
C72	YF400103XMT	Ceramic 0.01 μ F	C162,163	YF400103XMT	Ceramic 0.01 μ F
C73	YF400150CHJT	Ceramic 15 pF	C164,165	YWT316B104MT	Ceramic 0.1 μ F
C76-79	YF400103XMT	Ceramic 0.01 μ F	C166	YF400150CHJT	Ceramic 15 pF
C80	YF400200CHJT	Ceramic 20 pF	C167	YF400330CHJT	Ceramic 33 pF
C81	YF400390CHJT	Ceramic 39 pF	C168	YF400390CHJT	Ceramic 39 pF
C82	YF400200CHJT	Ceramic 20 pF	C169	YF400220CHJT	Ceramic 22 pF
C83	YF400152XKT	Ceramic 1500 pF	C170	YF400822XKT	Ceramic 8200 pF
C84	ECST1CY105ZR	Electrolytic 1 μ F 16V	C171	YWT316B104MT	Ceramic 0.1 μ F
C85	ECEA1HSNR22	Electrolytic 0.22 μ F 50V	C172	YF400152XKT	Ceramic 1500 pF
C91	YWT316B104MT	Ceramic 0.1 μ F	C173,174	YWT316B104MT	Ceramic 0.1 μ F
C99	YF400100CHDT	Ceramic 10 pF	C175	YF400152XKT	Ceramic 1500 pF
C100	YWT316B104MT	Ceramic 0.1 μ F	C176	YF400331CHJT	Ceramic 330 pF
C101	YF400102XKT	Ceramic 1000 pF	C177-179	YF400472XMT	Ceramic 4700 pF
C102	YF400561CHJT	Ceramic 560 pF	C180	YF400102XKT	Ceramic 1000 pF
			C181	YWT316B104MT	Ceramic 0.1 μ F
			C184	YF400473FZT	Ceramic 0.047 μ F
			C185	YF400220CHJT	Ceramic 22 pF
			C186	-ECEA1AKS330I	Electrolytic 33 μ F 10V

REF.NO.	PART NO.	DESCRIPTION	REF.NO.	PART NO.	DESCRIPTION		
C187	ECEA0JKS470	Electrolytic	47 μ F 6.3V (KS)	C281,282	ECST1CY105ZR	Tantalum	1 μ F 16V
C188	ECEA1ES4R7	Electrolytic	4.7 μ F 25V (KS)	C283,284	ECEA1AKS330	Electrolytic	33 μ F 10V
C189,190	ECEA1AKS330	Electrolytic	33 μ F 10V	C285,286	ECST1CY105ZR	Tantalum	1 μ F 16V
C191,192	ECEA1ES4R7	Electrolytic	4.7 μ F 25V (KS)	C287	ECEA1AKS330	Electrolytic	33 μ F 10V
C193	ECEA1AKS330	Electrolytic	33 μ F 10V	C290,291	ECEA1EKS100	Electrolytic	10 μ F 25V
C194,195	ECEA1EKS4R7	Electrolytic	4.7 μ F 25V (KS)	C292	ECEA1CU471	Electrolytic	470 μ F 16V
C196,197	ECEA1AKS330	Electrolytic	33 μ F 10V	C293	ECEA1CKS470	Electrolytic	47 μ F 16V
C198,199	ECEA1EKS4R7	Electrolytic	4.7 μ F 25V (KS)	C294,295	ECEA1AKS330	Electrolytic	33 μ F 10V
C200	ECSF1CE336	Tantalum	33 μ F 16V	C296	ECSF1HE225	Tantalum	2.2 μ F 50V
C201	ECSF1AE336	Tantalum	33 μ F 10V	C297	ECST1CY105ZR	Tantalum	1 μ F 16V
C202,203	ECEA1ES4R7	Electrolytic	4.7 μ F 25V (KS)	C298	ECEA1HSNR22	Electrolytic	0.22 μ F 50V
C204-208	ECEA1AKS330	Electrolytic	33 μ F 10V	C299	ECEA1CKS470	Electrolytic	47 μ F 16V
C209	ECEA1HKS4R47	Electrolytic	0.47 μ F 50V	C300	ECST1CY105ZR	Tantalum	1 μ F 16V
C210	ECEA1AKS330	Electrolytic	33 μ F 10V	C301	ECEA1EKS100	Electrolytic	10 μ F 25V
C211	ECEA1CKS470	Electrolytic	10 μ F 16V	C302	ECEA1CKS470	Electrolytic	47 μ F 16V
C212	ECEA1EKS100	Electrolytic	10 μ F 25V	C303	ECEA1AKS330	Electrolytic	33 μ F 10V
C213	ECEA1CKS470	Electrolytic	47 μ F 16V	C304	ECEA1CKS470	Electrolytic	47 μ F 16V
C214-219	ECST1CY105ZR	Tantalum	1 μ F 16V	C305	ECEA0JKS470	Electrolytic	47 μ F 6.3V (KS)
C220	ECEA1CKS470	Electrolytic	47 μ F 16V	C306	ECEA1CKS470	Electrolytic	47 μ F 16V
C221	ECEA0JKS470	Electrolytic	47 μ F 6.3V (KS)	C307	ECEA1CKS470	Electrolytic	33 μ F 16V
C222	ECEA1ES4R7	Electrolytic	4.7 μ F 25V (KS)	C310,311	YWT316B104MT	Ceramic	0.1 μ F
C223,224	ECEA1AKS330	Electrolytic	33 μ F 10V	C312,313	YF400103XMT	Ceramic	0.01 μ F
C225,226	ECEA1ES4R7	Electrolytic	4.7 μ F 25V (KS)	C314-316	YWT316B104MT	Ceramic	0.1 μ F
C227	ECEA1AKS330	Electrolytic	33 μ F 10V	C317	ECEA1AKS331	Electrolytic	33 μ F 10V
			C319	ECQP1H102JZ	Plastic	1000 pF 50V	
C228,229	ECEA1EKS4R7	Electrolytic	4.7 μ F 25V (KS)	C320	YF400471CHJT	Ceramic	470 pF
C230,231	ECEA1AKS330	Electrolytic	33 μ F 10V	C321,322	YF400102XKT	Ceramic	1000 pF
C232,233	ECEA1EKS4R7	Electrolytic	4.7 μ F 25V (KS)	C323,324	YWT316B104MT	Ceramic	0.1 μ F
C234	ECSF1CE336B1	Tantalum	33 μ F 16V	C325	YF400103XMT	Ceramic	0.01 μ F
C235	ECSF1AE336	Tantalum	33 μ F 10V	C326	YF400180CHJT	Ceramic	18 pF
C236,237	ECEA1EKS4R7	Electrolytic	4.7 μ F 25V (KS)	C327	YF400103XMT	Ceramic	0.01 μ F
C239,240	ECEA0JKS470	Electrolytic	47 μ F 6.3V (KS)	C328	YF400180CHJT	Ceramic	18 pF
C241,242	ECEA1CKS470	Electrolytic	47 μ F 16V	C329	ECEA1CKS470	Electrolytic	47 μ F 16V
C243,244	ECEA0JKS470	Electrolytic	47 μ F 6.3V (KS)	C330-337	YWT316B104MT	Ceramic	0.1 μ F
C245	ECEA1CKS470	Electrolytic	47 μ F 16V	C338-340	YF400103XMT	Ceramic	0.01 μ F
C246,247	ECEA0JKS470	Electrolytic	47 μ F 6.3V (KS)	C341	YWT316B104MT	Ceramic	0.1 μ F
C248,249	ECEA1CKS470	Electrolytic	47 μ F 16V	C342	ECEA1CKS330	Electrolytic	33 μ F 16V
C250,251	ECEA0JKS470	Electrolytic	47 μ F 6.3V (KS)	C343-354	YWT316B104MT	Ceramic	0.1 μ F
C252	ECEA1CKS470	Electrolytic	47 μ F 16V	C355-357	YF400103XMT	Ceramic	0.01 μ F
C253-255	ECEA0JKS470	Electrolytic	47 μ F 6.3V (KS)	C362-368	YWT316B104MT	Ceramic	0.1 μ F
C256	ECEA1CKS470	Electrolytic	47 μ F 16V	C369	YF400050CHDT	Ceramic	5 pF
C257	ECST1CY105ZR	Tantalum	1 μ F 16V	C370	YF400180CHJT	Ceramic	18 pF
C258	ECEA1CKS470	Electrolytic	47 μ F 16V	C371	YF400102XKT	Ceramic	1000 pF
C259	ECST1CY105ZR	Tantalum	1 μ F 16V	C372	YWT316B104MT	Ceramic	0.1 μ F
C260	ECEA1AKS330	Electrolytic	33 μ F 10V	C373	ECEA1AKS330	Electrolytic	33 μ F 10V
C261	ECEA1HKS4R47	Electrolytic	0.47 μ F 50V	C374	YF400150CHJT	Ceramic	15 pF
C262	ECEA1AKS330	Electrolytic	33 μ F 10V	C375	YWT316B104MT	Ceramic	0.1 μ F
C263,264	ECEA1EKS100	Electrolytic	10 μ F 25V	C376,377	YF400150CHJT	Ceramic	15 pF
C265,266	ECEA1CKS470	Electrolytic	47 μ F 16V	C378-381	YF400270CHJT	Ceramic	27 pF
C267	ECSF1HE225	Tantalum	2.2 μ F 50V	C382,383	YWT316B104MT	Ceramic	0.1 μ F
C268	ECEA1CKS470	Electrolytic	47 μ F 16V	C384,385	ECEA1AKS330	Electrolytic	33 μ F 10V
C269,270	ECEA0JKS470	Electrolytic	47 μ F 6.3V (KS)	C387,388	ECEA0JKS470	Electrolytic	47 μ F 6.3V (KS)
C271	ECEA1HKS3R3	Electrolytic	3.3 μ F 50V	C389,390	YF400680CHJT	Ceramic	68 pF CH
C272,273	ECST1CY105ZR	Tantalum	1 μ F 16V	C391	YF400473FZT	Ceramic	0.047 μ F
C276,277	ECEA1EKS100	Electrolytic	10 μ F 25V				

REF.NO.	PART NO.	DESCRIPTION		REF.NO.	PART NO.	DESCRIPTION	
C392	ECEA1CKS470	Electrolytic	47 µF 16V	CN5	YW530141110	11-pin Connector	
C393,394	YF400271CHJT	Ceramic	270 pF	CN6	FCN214J050G0	50-pin Connector	
C395	ECEA1ES4R7	Electrolytic	4.7 µF 25V (KS)	CN7	YW530140610	6-pin Connector	
C396	ECEA1AKS330	Electrolytic	33 µF 10V	CN8	YW530140710	7-pin Connector	
C397	YWT316B104MT	Ceramic	0.1 µF	CN9	YW530140610Y	6-pin Connector	
C400	YF400470CHJT	Ceramic	470 pF	J1-3	YF21160R00T	Jumper Resistor	
C401	YF400104FZT	Ceramic	0.1 µF	J12	YF21160R00T	Jumper Resistor	
C402	YWT316B104MT	Ceramic	0.1 µF	TP1-6	YWRCT2125TPV	Test-pin	
C404	YF400101CHJT	Ceramic	100 pF	TP8-29	YWRCT2125TPV	Test-pin	
C405	YF400562XKT	Ceramic	5600 pF	M53	YWV2HA0828A4	Shield Cover A	
C406	ECEA1CKS470	Electrolytic	47 µF 16V	M54	YWV2HA0829A3	Shield Cover B	
C407	YWT316B104MT	Ceramic	0.1 µF	M55	YWV2HA0830A3	Shield Cover C	
C408,409	YF400104FZT	Ceramic	0.1 µF	M56	YWV2HA0831A4	Shield Cover D	
C410	YF400390CHJT	Ceramic	390 pF	M57	YWV2HA0832A4	Shield Cover E	
CT1-5	YFTZ03R300FR	Trimmer Capacitor	30 pF	MIXER BOARD			
L1	ELJFA2R2KF	Coil	2.2 µH	PCB3 (NLA)	YWJKZMX12E2A	Printed Circuit Board Assy	
L2	ELJFA220KF	Coil	22 µH	IC1	YWMC74HC02F	IC	
L3	ELJFA180KB	Coil	18 µH	IC2	YWBA7230LS	IC	
L4	ELJFA4R7KF	Coil	4.7 µH	IC3	MC74HC4053F	IC	
L5	ELESE100KA	Coil	10 µH	IC4	MN74HC4053S	IC	
L8,9	ELJFA390KB	Coil	39 µH	IC5	YWSC49069F	IC	
L10,11	ELESE100KA	Coil	10 µH	IC6	YWMC74HC02F	IC	
L12	ELESE1R0KA	Coil	1 µH	IC7	NJM1496M	IC	
L16	ELB4S041	Delay Line		IC8	MC74HC4053F	IC	
L20	ELESE100KA	Coil	10 µH	IC9	NJM1496M	IC	
L21	ELB4S041	Delay Line		IC10	-M66311FP	IC	
L23,24	ELJFA390KB	Coil	39 µH	IC11,12	MN74HC4053S	IC	
L27	ELJFA2R2KF	Coil	2.2 µH	IC13-15	MC74HC4053F	IC	
L34	ELESE1R0KA	Coil	1 µH	IC16	YWM51304L	IC	
L35,36	ELJFA8R2KB	Coil	8.2 µH	IC17	YWM51523AL	IC	
L37-39	ELJFA2R2KF	Coil	2.2 µH	IC18	YWMC74HC02F	IC	
L40	ELJFA220KF	Coil	22 µH	IC19,20	NJM1496M	IC	
L42,43	ELJFA1R0KA	Coil	1 µH	IC21-24	MC74HC4053F	IC	
L45	ELJFA220KF	Coil	22 µH	IC25	NJM3414M	IC	
L46	ELJFA2R2KF	Coil	2.2 µH	IC26,27	NJM4559M	IC	
L47	ELJFA8R2KB	Coil	8.2 µH	IC28	YWM5216FP	IC	
L48,49	ELJFA2R2KF	Coil	2.2 µH	Q1,2	2SC2404-CD	Transistor	
L51,52	YWFO51067	Coil		Q3,4	2SA1022-C	Transistor	
L53,54	ELJFA390KB	Coil	39 µH	Q5-10	2SB709-QRS	Transistor	
L55	ELJFA2R2KF	Coil	2.2 µH	Q11-13	2SD601-RS	Transistor	
L56	YWNL32100K	Coil	10 µH	Q14	2SD1030RST	Transistor	
L57	YWNL321R0K	Coil	1 µH	Q15	2SB709-QRS	Transistor	
X1-4	YFMS30917M10	Crystal Oscillator		Q16-26	2SD601-RS	Transistor	
CF1-4	YWYS20466	Filter		Q27	2SD1030RST	Transistor	
CF5,6	YWYS30468	Filter		Q28,29	2SD601-RS	Transistor	
CF7-12	ELB4Q072	Filter		Q30	2SD1030RST	Transistor	
CF13-15	ELB4N046	Filter		Q31	2SD601-RS	Transistor	
CF17-21	ELB4N046	Filter		Q32,33	2SB709-QRS	Transistor	
CF22,23	YWYS30467	Filter		Q34-36	2SD601-RS	Transistor	
CN1	YW530140210	2-pin Connector		Q37	2SD1030RST	Transistor	
CN2	YW530140210Y	Connector					
CN3	YW530140610	6-pin Connector					
CN4	YW530140810	8-pin Connector					

REF.NO.	PART NO.	DESCRIPTION	REF.NO.	PART NO.	DESCRIPTION
Q38,90	2SB709-QRS	Transistor	R19-21	YF2116222GT	Carbon 2.2K ohms 1/16W
Q91-93	2SB709-QRS	Transistor	R22	YF2116913JT	Carbon 91K ohms 1/16W
Q94-97	2SD601-RS	Transistor	R23	YF2116123JT	Carbon 12K ohms 1/16W
Q98	2SB709-QRS	Transistor	R24	YF2116222GT	Carbon 2.2K ohms 1/16W
Q99,301	2SD601-RS	Transistor	R26	YF2116682JT	Carbon 6.8K ohms 1/16W
Q302	2SD601-RS	Transistor	R27	YF2116512JT	Carbon 5.1K ohms 1/16W
Q303	2SD1030RST	Transistor	R28	YF2116222GT	Carbon 2.2K ohms 1/16W
Q304	2SB709-QRS	Transistor	R29	YF2116104JT	Carbon 100K ohms 1/16W
Q305-308	2SD601-RS	Transistor	R30	YF2116222GT	Carbon 2.2K ohms 1/16W
Q309	2SD1030RST	Transistor	R31,32	YF2116103JT	Carbon 10K ohms 1/16W
Q310	2SB709-QRS	Transistor	R34	YF2116561JT	Carbon 560 ohms 1/16W
Q311,312	2SD601-RS	Transistor	R36	YF2116102GT	Carbon 1K ohms 1/16W
Q313,314	2SB709-QRS	Transistor	R38	YF2116103JT	Carbon 10K ohms 1/16W
Q315,316	2SD601-RS	Transistor	R39,40	YF2116821GT	Carbon 820 ohms 1/16W
Q317	2SD1030RST	Transistor	R41,42	YF2116102GT	Carbon 1K ohms 1/16W
Q318	2SB709-QRS	Transistor	R43,44	YF2116103JT	Carbon 10K ohms 1/16W
Q319,320	2SD601-RS	Transistor	R45,46	YF2116821GT	Carbon 820 ohms 1/16W
Q321	2SB709-QRS	Transistor	R47	YF2116103JT	Carbon 10K ohms 1/16W
Q322,323	2SD601-RS	Transistor	R48	YF2116821GT	Carbon 820 ohms 1/16W
Q324,325	2SB709-QRS	Transistor	R49,50	YF2116102GT	Carbon 1K ohms 1/16W
Q326,327	2SD601-RS	Transistor	R51	YF2116821GT	Carbon 820 ohms 1/16W
Q328	2SD1030RST	Transistor	R52-54	YF2116103JT	Carbon 10K ohms 1/16W
Q329,330	2SB709-QRS	Transistor	R55	YF2116821GT	Carbon 820 ohms 1/16W
Q331	2SD601-RS	Transistor	R56-60	YF2116103JT	Carbon 10K ohms 1/16W
Q332	2SB709-QRS	Transistor	R61	YF2116821GT	Carbon 820 ohms 1/16W
Q333,334	2SD601-RS	Transistor	R63	YWR1220P201D	Metal 200 ohms
Q335	2SB709-QRS	Transistor	R64	YF2116222GT	Carbon 2.2K ohms 1/16W
Q336,337	2SD601-RS	Transistor	R65	YF2116103JT	Carbon 10K ohms 1/16W
Q338,339	2SB709-QRS	Transistor	R66	YF2116821GT	Carbon 820 ohms 1/16W
Q340-344	2SD601-RS	Transistor	R67	YWR1220P183D	Metal 18K ohms
Q345,346	2SB709-QRS	Transistor	R68	YWR1220P332D	Metal 3.3K ohms
Q347-352	2SD601-RS	Transistor	R69	YF2116222GT	Carbon 2.2K ohms 1/16W
Q353	2SB709-QRS	Transistor	R70	YF2116103JT	Carbon 10K ohms 1/16W
Q354,355	2SD601-RS	Transistor	R71-74	YF2116821GT	Carbon 820 ohms 1/16W
Q356	2SB709-QRS	Transistor	R75	YF2116273GT	Carbon 27K ohms 1/16W
Q357,358	2SD601-RS	Transistor	R76	YF2116302GT	Carbon 3K ohms 1/16W
Q359	2SB709-QRS	Transistor	R77	YF2116222GT	Carbon 2.2K ohms 1/16W
Q360,361	2SD601-RS	Transistor	R78	YF2116103JT	Carbon 10K ohms 1/16W
Q362	2SB709-QRS	Transistor	R79,80	YF2116821GT	Carbon 820 ohms 1/16W
Q363,364	2SD601-RS	Transistor	R81	YF2116822JT	Carbon 8.2K ohms 1/16W
Q365	2SB709-QRS	Transistor	R82	YF2116333GT	Carbon 33K ohms 1/16W
Q366,367	2SD601-RS	Transistor	R83	YWR1220P241D	Metal 240 ohms
Q368	2SB709-QRS	Transistor	R84	YWR1220P391D	Metal 390 ohms
Q369,370	2SD601-RS	Transistor	R85	YWR1220P511D	Metal 510 ohms
Q371	2SB709-QRS	Transistor	R86	R1220P821D	Metal 820 ohms
Q372,373	2SD601-RS	Transistor	R87	R1220P132D	Metal 1.3K ohms
Q374	2SB709-QRS	Transistor	R88	YWR1220P242D	Metal 2.4K ohms
D1,301	MA151K	Diode	R89	YWR1220P622D	Metal 6.2K ohms
R1,2	YF2116223JT	Carbon	R90-105	YF2116333GT	Carbon 33K ohms 1/16W
R3,4	YF2116102GT	Carbon	R110	YF2116512JT	Carbon 5.1K ohms 1/16W
R5-8	YF2116511JT	Carbon	R111	YF2116682JT	Carbon 6.8K ohms 1/16W
R9,10	YF2116752JT	Carbon	R112,113	YF2116102GT	Carbon 1K ohms 1/16W
R11,12	YF2116512JT	Carbon	R114	YF2116222GT	Carbon 2.2K ohms 1/16W
R13-15	YWR1220P752D	Metal	R115	YF2116103JT	Carbon 10K ohms 1/16W
R16-18	YWR1220P122D	Metal	R116,117	YF2116821GT	Carbon 820 ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION		REF.NO.	PART NO.	DESCRIPTION	
R188-195	YF2116333GT	Carbon	33K ohms 1/16W	R334	YF2116103JT	Carbon	10K ohms 1/16W
R196-199	YF2116362JT	Carbon	3.6K ohms 1/16W	R335,336	R1220P821D	Metal	820 ohms
R200,201	YF2116431JT	Carbon	430 ohms 1/16W	R337	YF2116821GT	Carbon	820 ohms 1/16W
R202	YF2116104JT	Carbon	100K ohms 1/16W	R338	YF2116561JT	Carbon	560 ohms 1/16W
R203	YF2116473GT	Carbon	47K ohms 1/16W	R340	YF2116512JT	Carbon	5.1K ohms 1/16W
R204,205	YF2116561JT	Carbon	560 ohms 1/16W	R341	YF2116331JT	Carbon	330 ohms 1/16W
R206	YF2116473GT	Carbon	47K ohms 1/16W	R342-344	YF2116102GT	Carbon	1K ohms 1/16W
R207	YF2116104JT	Carbon	100K ohms 1/16W	R345	YF2116392JT	Carbon	3.9K ohms 1/16W
R208,209	YF2116512JT	Carbon	5.1K ohms 1/16W	R346	YF2116821GT	Carbon	820 ohms 1/16W
R210,211	YF2116104JT	Carbon	100K ohms 1/16W	R347	YF2116103JT	Carbon	10K ohms 1/16W
R212-215	YF2116473GT	Carbon	47K ohms 1/16W	R348-350	YF2116821GT	Carbon	820 ohms 1/16W
R216	YF2116563JT	Carbon	56K ohms 1/16W	R360	YF2116821GT	Carbon	820 ohms 1/16W
R217	YF2116473GT	Carbon	47K ohms 1/16W	R361	YWR1220P752D	Metal	7.5K ohms
R218	YF2116153JT	Carbon	15K ohms 1/16W	R362	YWR1220P152D	Metal	1.5K ohms
R219,220	YF2116103JT	Carbon	10K ohms 1/16W	R363	YWR1220P302D	Metal	3K ohms
R221	YF2116153JT	Carbon	15K ohms 1/16W	R364	YF2116392JT	Carbon	3.9K ohms 1/16W
R222,223	YF2116104JT	Carbon	100K ohms 1/16W	R365-367	YF2116103JT	Carbon	10K ohms 1/16W
R224,225	YF2116224JT	Carbon	220K ohms 1/16W	R368	YF2116821GT	Carbon	820 ohms 1/16W
R226,227	YF2116222GT	Carbon	2.2K ohms 1/16W	R369-373	YF2116103JT	Carbon	10K ohms 1/16W
R228,229	YF2116103JT	Carbon	10K ohms 1/16W	R375	YF2116821GT	Carbon	820 ohms 1/16W
R230,231	YF2116101JT	Carbon	100 ohms 1/16W	R376	YF2116392JT	Carbon	3.9K ohms 1/16W
R232,233	YF2116223JT	Carbon	22K ohms 1/16W	R377-379	YF2116103JT	Carbon	10K ohms 1/16W
R234	YF2116680JT	Carbon	68 ohms 1/16W	R380	YF2116821GT	Carbon	820 ohms 1/16W
R235	YF2116333GT	Carbon	33K ohms 1/16W	R381-383	YF2116103JT	Carbon	10K ohms 1/16W
R236	YF2116472GT	Carbon	4.7K ohms 1/16W	R384	YF2116821GT	Carbon	820 ohms 1/16W
R237	YF2116123JT	Carbon	12K ohms 1/16W	R385,386	YWR1220P511D	Metal	510 ohms
R238	YF2116103JT	Carbon	10K ohms 1/16W	R387,388	YF2116103JT	Carbon	10K ohms 1/16W
R239	YF2116104JT	Carbon	100K ohms 1/16W	R389	YF2116511JT	Carbon	510 ohms 1/16W
R240	YF2116333GT	Carbon	33K ohms 1/16W	R390	YF2116331JT	Carbon	330 ohms 1/16W
R241	YF2116682JT	Carbon	6.8K ohms 1/16W	R391	YF2116822JT	Carbon	8.2K ohms 1/16W
R242	YF2116102GT	Carbon	1K ohms 1/16W	R392	YF2116152JT	Carbon	1.5K ohms 1/16W
R243	YF2116100JT	Carbon	10 ohms 1/16W	R393	YF2116331JT	Carbon	330 ohms 1/16W
R244	YF2116392JT	Carbon	3.9K ohms 1/16W	R394-396	YF2116102GT	Carbon	1K ohms 1/16W
R301	YF2116103JT	Carbon	10K ohms 1/16W	R397	YF2116392JT	Carbon	3.9K ohms 1/16W
R302	YF2116561JT	Carbon	560 ohms 1/16W	R398	YF2116821GT	Carbon	820 ohms 1/16W
R303-305	YF2116821GT	Carbon	820 ohms 1/16W	R399-401	YF2116103JT	Carbon	10K ohms 1/16W
R306,307	YF2116103JT	Carbon	10K ohms 1/16W	R402	YF2116821GT	Carbon	820 ohms 1/16W
R308	YF2116561JT	Carbon	560 ohms 1/16W	R403-405	YF2116103JT	Carbon	10K ohms 1/16W
R309-311	YF2116821GT	Carbon	820 ohms 1/16W	R406	YF2116821GT	Carbon	820 ohms 1/16W
R312	YF2116103JT	Carbon	10K ohms 1/16W	R407	YF2116103JT	Carbon	10K ohms 1/16W
R313	YF2116472GT	Carbon	4.7K ohms 1/16W	R408	YF2116821GT	Carbon	820 ohms 1/16W
R314	YF2116201JT	Carbon	200 ohms 1/16W	R409-413	YF2116103JT	Carbon	10K ohms 1/16W
R315,316	R1220P821D	Metal	820 ohms	R414	YF2116821GT	Carbon	820 ohms 1/16W
R317	YF2116821GT	Carbon	820 ohms 1/16W	R415,416	YWR1220P511D	Metal	510 ohms
R318	YF2116561JT	Carbon	560 ohms 1/16W	R417,418	YF2116103JT	Carbon	10K ohms 1/16W
R319	YF2116822JT	Carbon	8.2K ohms 1/16W	R419	YF2116511JT	Carbon	510 ohms 1/16W
R320	YF2116152JT	Carbon	1.5K ohms 1/16W	R420	YF2116331JT	Carbon	330 ohms 1/16W
R321	YF2116331JT	Carbon	330 ohms 1/16W	R422	YF2116512JT	Carbon	5.1K ohms 1/16W
R322-324	YF2116102GT	Carbon	1K ohms 1/16W	R423	YF2116331JT	Carbon	330 ohms 1/16W
R325	YF2116392JT	Carbon	3.9K ohms 1/16W	R424-426	YF2116102GT	Carbon	1K ohms 1/16W
R326	YF2116821GT	Carbon	820 ohms 1/16W	R427	YF2116392JT	Carbon	3.9K ohms 1/16W
R327	YF2116103JT	Carbon	10K ohms 1/16W	R428	YF2116821GT	Carbon	820 ohms 1/16W
R328-330	YF2116821GT	Carbon	820 ohms 1/16W	R429-431	YF2116103JT	Carbon	10K ohms 1/16W
R331	YF2116103JT	Carbon	10K ohms 1/16W	R432	YF2116821GT	Carbon	820 ohms 1/16W
R332,333	YF2116821GT	Carbon	820 ohms 1/16W	R433-435	YF2116103JT	Carbon	10K ohms 1/16W

REF.NO.	PART NO.	DESCRIPTION		REF.NO.	PART NO.	DESCRIPTION	
R436	YF2116821GT	Carbon	820 ohms 1/16W	R503	YF2116201JT	Carbon	200 ohms 1/16W
R437	YF2116103JT	Carbon	10K ohms 1/16W	R504	YF2116101JT	Carbon	100 ohms 1/16W
R438	YF2116821GT	Carbon	820 ohms 1/16W	R505	YF2116751JT	Carbon	750 ohms 1/16W
R439	YF2116751JT	Carbon	750 ohms 1/16W	R506	YF2116101JT	Carbon	100 ohms 1/16W
R440	YF2116152JT	Carbon	1.5K ohms 1/16W	VR1	YWRK11K102B	Variable Resistor 1K ohms	
R441	YF2116821GT	Carbon	820 ohms 1/16W	VR2	EVNDXAA03B23	Variable Resistor	2K ohms
R442	YF2116392JT	Carbon	3.9K ohms 1/16W	VR3-5	YWRS301103BL	Variable Resistor	10K ohms
R443	YF2116222GT	Carbon	2.2K ohms 1/16W	VR6,7	EVNDXAA03B14	Variable Resistor	10K ohms
R444	YF2116101JT	Carbon	100 ohms 1/16W	VR8	YWRS302503BL	Variable Resistor	50K ohms
R445	YF2116272JT	Carbon	2.7K ohms 1/16W	VR9,10	YWRS302503AL	Variable Resistor	50K ohms
R446	YF2116101JT	Carbon	100 ohms 1/16W	VR11	YWRS301503AL	Variable Resistor	50K ohms
R447,448	YF2116100JT	Carbon	10 ohms 1/16W	VR12,13	EVNDXAA03B52	Variable Resistor	500 ohms
R449,450	YF2116680JT	Carbon	68 ohms 1/16W	VR14,15	EVNDXAA03B14	Variable Resistor	10K ohms
R451,452	YF2116751JT	Carbon	750 ohms 1/16W	VR16	EVNDXAA03B52	Variable Resistor	500 ohms
R453	YF2116821GT	Carbon	820 ohms 1/16W	VR17	EVNDXAA03B24	Variable Resistor	20K ohms
R454	YF2116152JT	Carbon	1.5K ohms 1/16W	VR18	EVNDXAA03B52	Variable Resistor	500 ohms
R455	YF2116392JT	Carbon	3.9K ohms 1/16W	VR20,21	EVNDXAA03B23	Variable Resistor	2K ohms
R456	YF2116222GT	Carbon	2.2K ohms 1/16W	VR22	YWRS15H250KA	Variable Resistor	50K ohms
R457	YF2116101JT	Carbon	100 ohms 1/16W	C1,2	YF400222XKT	Ceramic	2200 pF
R458	YF2116272JT	Carbon	2.7K ohms 1/16W	C4,5	YF400222XKT	Ceramic	2200 pF
R459	YF2116101JT	Carbon	100 ohms 1/16W	C6,7	YWT316B104MT	Ceramic	0.1 μF
R460,461	YF2116100JT	Carbon	10 ohms 1/16W	C8	YF400103XKT	Ceramic	0.01 μF
R462,463	YF2116680JT	Carbon	68 ohms 1/16W	C9	YWT316B333MT	Ceramic	0.033 μF
R464	YF2116751JT	Carbon	750 ohms 1/16W	C10	YF400101CHJT	Ceramic	100 pF
R465	YF2116821GT	Carbon	820 ohms 1/16W	C11	YF400121CHJT	Ceramic	120 pF
R466	YF2116152JT	Carbon	1.5K ohms 1/16W	C12	ECST1CY105ZR	Tantalum	1 μF 16V
R467	YF2116392JT	Carbon	3.9K ohms 1/16W	C13	YWT316B104MT	Ceramic	0.1 μF
R468	YF2116222GT	Carbon	2.2K ohms 1/16W	C14	YF400100CHDT	Ceramic	10 pF
R469	YF2116101JT	Carbon	100 ohms 1/16W	C15-17	YWT316B104MT	Ceramic	0.1 μF
R470	YF2116272JT	Carbon	2.7K ohms 1/16W	C18	YF400100CHDT	Ceramic	10 pF
R471	YF2116101JT	Carbon	100 ohms 1/16W	C19-26	YWT316B104MT	Ceramic	0.1 μF
R472,473	YF2116100JT	Carbon	10 ohms 1/16W	C27-29	YF400101CHJT	Ceramic	100 pF
R474,475	YF2116680JT	Carbon	68 ohms 1/16W	C30-32	YF400333XKT	Ceramic	0.033 μF
R476,477	YF2116751JT	Carbon	750 ohms 1/16W	C46-49	ECEA1ES4R7	Electrolytic	4.7 μF 25V (KS)
R478	YF2116821GT	Carbon	820 ohms 1/16W	C50,51	ECEA1AKA101	Electrolytic	100 μF 25V
R479	YF2116152JT	Carbon	1.5K ohms 1/16W	C52-56	ECEA1ES4R7	Electrolytic	4.7 μF 25V (KS)
R480	YF2116392JT	Carbon	3.9K ohms 1/16W	C57	ECEA1EKK3R3	Electrolytic	3.3 μF 25V
R481	YF2116222GT	Carbon	2.2K ohms 1/16W	C58,59	ECEA1VKS100	Electrolytic	10 μF 35V
R482	YF2116101JT	Carbon	100 ohms 1/16W	C60	ECEA1ES4R7	Electrolytic	4.7 μF 25V (KS)
R483	YF2116272JT	Carbon	2.7K ohms 1/16W	C61	ECEA1EKK3R3	Electrolytic	3.3 μF 25V
R484	YF2116101JT	Carbon	100 ohms 1/16W	C62	ECEA1VKS100	Electrolytic	10 μF 35V
R485,486	YF2116100JT	Carbon	10 ohms 1/16W	C63	ECEA1ES4R7	Electrolytic	4.7 μF 25V (KS)
R487	YF2116680JT	Carbon	68 ohms 1/16W	C64	ECEA1AKS330	Electrolytic	33 μF 10V
R488,489	YF2116622JT	Carbon	6.2K ohms 1/16W	C65	ECEA1ES4R7	Electrolytic	4.7 μF 25V (KS)
R490	YW2116242JT	Carbon	2.4K ohms 1/16W	C66,67	ECEA1EKS100	Electrolytic	10 μF 25V
R491	YF2116622JT	Carbon	6.2K ohms 1/16W	C68	ECEA1CKS220	Electrolytic	220 μF 16V
R494	YF2116392JT	Carbon	3.9K ohms 1/16W	C69	ECEA1EKS100	Electrolytic	220 μF 16V
R495	YF2116393GT	Carbon	39K ohms 1/16W	C70	ECEA1CKS470	Electrolytic	47 μF 16V
R496	YF2116392JT	Carbon	3.9K ohms 1/16W	C71	ECEA1CKA101	Electrolytic	100 μF 16V
R497	YF2116393GT	Carbon	39K ohms 1/16W	C72	ECEA1ES4R7	Electrolytic	4.7 μF 25V (KS)
R498	YF2116392JT	Carbon	3.9K ohms 1/16W	C73	ECEA1EKS100	Electrolytic	10 μF 25V
R499	YF2116393GT	Carbon	39K ohms 1/16W	C74,75	ECEA1CKS220	Electrolytic	22 μF 16V
R500	YF2116392JT	Carbon	3.9K ohms 1/16W	C76	ECEA1EKS4R7I	Electrolytic	4.7 μF 25V (KS)
R501	YF2116393GT	Carbon	39K ohms 1/16W	C77	ECEA1CKA101	Electrolytic	100 μF 16V
R502	YF2116472GT	Carbon	4.7K ohms 1/16W	C78	ECEA1CU221	Electrolytic	220 μF 16V

REF.NO.	PART NO.	DESCRIPTION		REF.NO.	PART NO.	DESCRIPTION	
C88	ECEA1CKS220	Electrolytic	22 μ F 16V	C333-343	YWT316B104MT	Ceramic	0.1 μ F
C89	ECEA1CKS470	Electrolytic	47 μ F 16V	C344	ECEA0JKS470	Electrolytic	47 μ F 6.3V (KS)
C90	ECEA1VKS100	Electrolytic	10 μ F 35V	C345-347	YWT316B104MT	Ceramic	0.1 μ F
C101,102	ECSF1AE336	Tantalum	33 μ F 10V	C348,349	ECEA1AKS330	Electrolytic	33 μ F 10V
C103-106	ECST1EY105	Tantalum	1 μ F 25V	C350-353	YWT316B104MT	Ceramic	0.1 μ F
C107,108	ECEA1EKS100	Electrolytic	10 μ F 25V	C354	ECEA1AKS330	Electrolytic	33 μ F 10V
C109	ECST1EY105	Tantalum	1 μ F 25V	C355	ECEA1CKS330	Electrolytic	33 μ F 16V
C110	ECSF1CE105	Tantalum	1 μ F 16V	C356	ECEA1AKS330	Electrolytic	33 μ F 10V
C111	ECEA1AKS330	Electrolytic	33 μ F 10V	C357,358	YWT316B104MT	Ceramic	0.1 μ F
C112	ECSF1CE105	Tantalum	1 μ F 16V	C359	YF400470CHJT	Ceramic	47 pF
C113	ECEA1AKS330	Electrolytic	33 μ F 10V	C360,361	ECEA1EKS100	Electrolytic	10 μ F 25V
C114	ECSF1CE105	Electrolytic	1 μ F 16V	C362	YWT316B104MT	Ceramic	0.1 μ F
C115,116	ECEA1AKS330	Electrolytic	33 μ F 10V	C363	ECEA0JKS470	Electrolytic	47 μ F 6.3V (KS)
C117	ECSF1CE105	Tantalum	1 μ F 16V	C364	YWT316B104MT	Ceramic	0.1 μ F
C139-142	YF400221CHJT	Ceramic	220 pF	C365	ECEA1AKS330	Electrolytic	33 μ F 10V
C143,144	ECST1CY105ZR	Tantalum	1 μ F 16V	C366	YWT316B104MT	Ceramic	0.1 μ F
C145-148	YF400470CHJT	Ceramic	47 pF	C367,368	ECEA1EKS100	Electrolytic	10 μ F 25V
C149,150	ECST1CY105ZR	Tantalum	1 μ F 16V	C369-372	YWT316B104MT	Ceramic	0.1 μ F
C151-154	YF400470CHJT	Ceramic	47 pF	C373	ECEA1AKS330	Electrolytic	33 μ F 10V
C155-157	YWT316B104MT	Ceramic	0.1 μ F	C374	ECEA1CKS330	Electrolytic	33 μ F 16V
C158,159	ECST1CY105ZR	Tantalum	1 μ F 16V	C375	ECEA1AKS330	Electrolytic	33 μ F 10V
C160	YF400470CHJT	Ceramic	47 pF	C376-379	YWT316B104MT	Ceramic	0.1 μ F
C161,162	YF400221CHJT	Ceramic	220 pF	C381	ECEA1CKS470	Electrolytic	47 μ F 16V
C163	YF400682XKT	Ceramic	6800 pF	C382	-ECEA1AKS330I	Electrolytic	33 μ F 10V
C164	YWT316B104MT	Ceramic	0.1 μ F	C384,385	ECEA1CKS470	Electrolytic	47 μ F 16V
C165	ECST1CY105ZR	Tantalum	1 μ F 16V	C386	-ECEA1AKS330I	Electrolytic	33 μ F 10V
C166	YWT316B104MT	Ceramic	0.1 μ F	C387	ECEA1CKS470	Electrolytic	47 μ F 16V
C175	YF400470CHJT	Ceramic	47 pF	C389-392	ECEA0JU102	Electrolytic	100O μ F 6.3V
C301	ECEA1CKS330	Electrolytic	33 μ F 16V	C393,394	ECEA1AKS330	Electrolytic	33 μ F 10V
C302	YF400101CHJT	Ceramic	100 pF	C395	ECEA0JU102	Electrolytic	100O μ F 6.3V
C303	ECSF1CE105	Tantalum	1 μ F 16V	C396-404	YF400333XKT	Ceramic	0.033 μ F
C304,305	ECEA1AKS330	Electrolytic	33 μ F 10V	C405,406	ECEA1HSN010	Electrolytic	1 μ F 50V
C306	ECSF1CE105	Tantalum	1 μ F 16V	C407,408	ECEA0JKS470	Electrolytic	47 μ F 6.3V (KS)
C307	YF400101CHJT	Ceramic	100 pF	C409-411	YWT316B104MT	Ceramic	0.1 μ F
C308	ECEA1AKS330	Electrolytic	33 μ F 10V	C412	ECEA1AKS330	Electrolytic	33 μ F 10V
C309	YF400101CHJT	Ceramic	100 pF	C413	YF400100CHDT	Ceramic	10 pF
C310	ECSF1CE105	Tantalum	1 μ F 16V	C509-511	YF400333XKT	Ceramic	0.033 μ F
C311	ECEA1AKS330	Electrolytic	33 μ F 10V	C513	YF400240CHDT	Ceramic	24 pF
C312	ECSF1CE105	Tantalum	1 μ F 16V	C515	YF400390CHDT	Ceramic	39 pF
C313	YF400101CHJT	Ceramic	100 pF	L1,8	ELJFA8R2KB	Coil	8.2 μ H
C314,315	ECEA1AKS330	Electrolytic	33 μ F 10V	L9,10	ELJFA1R0MB	Coil	1 μ H
C316	ECEA1CKS330	Electrolytic	33 μ F 16V	L11	ELESN330KA	Coil	33 μ H
C317	ECEA1AKS330	Electrolytic	33 μ F 10V	SW1	YWSRRM1815L	Rotary Switch	
C318	YF400101CHJT	Ceramic	100 pF	CN1	FCN215Q030G0	30-pin Connector	
C319	ECEA1AKS330	Electrolytic	33 μ F 10V	CN2	YW530150510	5-pin Connector	
C320	YF400101CHJT	Ceramic	100 pF	CN3	EMCS0750ZL	7-pin Connector	
C321	ECSF1CE105	Tantalum	1 μ F 16V	CN4	YW530150210	2-pin Connector	
C322,323	ECEA1AKS330I	Electrolytic	33 μ F 10V	CN5	YW05JQST	5-pin Connector	
C324	YF400101CHJT	Ceramic	100 pF	J492,493	YF21160R00T	Jumper Resistor	
C325	ECSF1CE105	Tantalum	1 μ F 16V	JK1	YWLJ23083090	Jack	
C326,327	ECEA1AKS330I	Electrolytic	33 μ F 10V	JK2	YWLJ23083020	Jack	
C328	ECEA1CKS330	Electrolytic	33 μ F 16V	TP1-11	YWRCT2125TPV	Test-pin	
C329,330	ECEA1AKS330I	Electrolytic	33 μ F 10V	M58	YWMSC1609	Cord Clamp	
C331	YF400101CHJT	Ceramic	100 pF				
C332	ECEA1AKS330I	Electrolytic	33 μ F 10V				

REF.NO.	PART NO.	DESCRIPTION	REF.NO.	PART NO.	DESCRIPTION
CONTROL BOARD					
PCB4 (NLA)	YWJKZMX12E3A	Printed Circuit Board Assy	Q18,19	2SB709-QRS	Transistor
IC1	YWNJU4053M	IC	Q20	2SD601-RS	Transistor
IC2	NJM319M	IC	Q21	2SB709-QRS	Transistor
IC3	YWMC74HC00F	IC	D3,4	MA151K	Diode
IC4	NJM319M	IC	D5	MA151WA	Diode
IC5	AN78L09	IC	R1	YF2116680JT	Carbon
IC6	NJM4560M	IC	R2	YF2116242JT	Carbon
IC7	YWNJU4051M	IC	R3	YF2116392JT	Carbon
IC8	YWPD75108A92	IC	R4	YFR1220P222D	Metal
IC9	NJM2902M	IC	R7,8	YF2116153JT	Carbon
IC10	YWPD41102C1S	IC	R10	YF2116103JT	Carbon
IC11	YWPD65005232	IC	R11	YF2116821GT	Carbon
IC12	YWMC74HC00F	IC	R12	YF2116562JT	Carbon
IC13	YWNJU4051M	IC	R13-17	YF2116102GT	Carbon
IC14	NJM2901M	IC	R18,19	YF2116104JT	Carbon
IC15	YWUPC4064G2	IC	R20,21	YF2116754JT	Carbon
IC16	YWNJU4051M	IC	R22-24	YF2116323JT	Carbon
IC17	MS1951ASL	IC	R25	YF2116822JT	Carbon
IC18	YWNJU4066M	IC	R26	YF2116332JT	Carbon
IC19	AN78L05	IC	R27	YF2116103JT	Carbon
IC20	YWMC74HC04F	IC	R28	YF2116332JT	Carbon
IC21	YWNJU4053M	IC	R29	YF2116511JT	Carbon
IC22,23	BA226AF	IC	R30	YF2116824JT	Carbon
IC24	YWNJU4066M	IC	R31	YF2116151JT	Carbon
IC25,26	NJM4560M	IC	R32	YF2116823JT	Carbon
IC27	YWNJU4066M	IC	R33	YF2116151JT	Carbon
IC28,29	BA226AF	IC	R34	YF2116222GT	Carbon
IC30	YWNJU4066M	IC	R35	YF2116332JT	Carbon
IC31,32	NJM4560M	IC	R38	YF2116123JT	Carbon
IC33	YWNJU4066M	IC	R39	YF2116822JT	Carbon
IC35	-MC74HC86F	IC	R40	YF2116102GT	Carbon
IC36	NJM2902M	IC	R42-45	YF2116333GT	Carbon
IC38	NJM2903M	IC	R46	R1220P821D	Metal
IC39	NJM4560M	IC	R47	YWR1220P242D	Metal
IC40,41	AN78L05	IC	R48	YWR1220P182D	Metal
IC42	MC74HC4066F	IC	R49	YF2116103JT	Carbon
IC43	NJM2901M	IC	R50	YF2116101JT	Carbon
IC44	YWMC74HC175F	IC	R52	YF2116303GT	Carbon
IC45	YWMC74HC11F	IC	R53	YF2116363JT	Carbon
IC46	YWUPC4062G2	IC	R54	YF2116103JT	Carbon
IC47	YWMC74HC02F	IC	R55-57	-R1220P513D	Metal
IC48	M51951ASL	IC	R58	YFR1220P104D	Metal
Q1	2SD601-RS	Transistor	R59	YFR1220P222D	Metal
Q2	2SB709-QRS	Transistor	R60,61	YF2116100JT	Carbon
Q4,5	2SD601-RS	Transistor	R62	YWR1220P241D	Metal
Q6	2SB709-QRS	Transistor	R63	YWR1220P391D	Metal
Q7-9	2SD601-RS	Transistor	R64	YWR1220P511D	Metal
Q10-12	2SB709-QRS	Transistor	R65	R1220P821D	Metal
Q15	2SB709-QRS	Transistor	R67	YFR1220P222D	Metal
Q16,17	2SD601-RS	Transistor	R68	YWR1220P241D	Metal
			R69	YWR1220P391D	Metal
			R70	YWR1220P511D	Metal
			R71	R1220P821D	Metal
			R72	R1220P132D	Metal
			R73	YWR1220P242D	Metal

REF.NO.	PART NO.	DESCRIPTION		REF.NO.	PART NO.	DESCRIPTION	
R76	YF2116682JT	Carbon	6.8K ohms 1/16W	R199	YF2116302GT	Carbon	3K ohms 1/16W
R77	YF2116623JT	Carbon	62K ohms 1/16W	R200,201	YF2116152JT	Carbon	1.5K ohms 1/16W
R78	YF2116432JT	Carbon	4.3K ohms 1/16W	R202	YF2116302GT	Carbon	3K ohms 1/16W
R79	YF2116123JT	Carbon	12K ohms 1/16W	R203	YF2116333GT	Carbon	33K ohms 1/16W
R80,81	YWR1220P562D	Metal	5.6K ohms	R205	YF2116100JT	Carbon	10 ohms 1/16W
R82	YFR1220P392D	Metal	3.9K ohms	R206	YF2116333GT	Carbon	33K ohms 1/16W
R83	YWR1220P752D	Metal	7.5K ohms	R207	YF2116102GT	Carbon	1K ohms 1/16W
R84	YF2116104JT	Carbon	100K ohms 1/16W	R208	YF2116332JT	Carbon	3.3K ohms 1/16W
R86	YF2116392JT	Carbon	3.9K ohms 1/16W	R210-212	YF2116101JT	Carbon	100 ohms 1/16W
R88	YW2116182JT	Carbon	1.8K ohms 1/16W	R213,214	YF2116473GT	Carbon	47K ohms 1/16W
R90	YF2116302GT	Carbon	3K ohms 1/16W	R216	YF2116102GT	Carbon	1K ohms 1/16W
R91	YF2116623JT	Carbon	62K ohms 1/16W	R217	YF2116561JT	Carbon	560 ohms 1/16W
R92	YF2116912GT	Carbon	9.1K ohms 1/16W	R218	YF2116101JT	Carbon	100 ohms 1/16W
R93	YF2116203JT	Carbon	20K ohms 1/16W	R218	YF2116101JT	Carbon	100 ohms 1/16W
R94,95	YWR1220P562D	Metal	5.6K ohms	VR1	YWRH0421C225	Variable Resistor	2.2M ohms
R96	YWR1220P362D	Metal	3.6K ohms	VR2	YWRH0421C224	Variable Resistor	220K ohms
R97	YWR1220P682D	Metal	6.8K ohms	VR3	YWUBJXE104BA	Variable Resistor	100K ohms
R98	YF2116104JT	Carbon	100K ohms 1/16W	VR4-7	YWRK11K103B	Variable Resistor	10K ohms
R101	YF2116222GT	Carbon	2.2K ohms 1/16W	VR8-12	EVNDXAA03B15	Variable Resistor	100K ohms
R102	YF2116183GT	Carbon	18K ohms 1/16W	VR13,14	EVNDXAA03B14	Variable Resistor	10K ohms
R103	YF2116102GT	Carbon	1K ohms 1/16W	VR15	EVNDXAA03B13	Variable Resistor	1K ohms
R104	YF2116332JT	Carbon	3.3K ohms 1/16W	VR16	EVNDXAA03B15	Variable Resistor	100K ohms
R106	YFR1220P203D	Metal	20K ohms	VR17,18	EVNDXAA03B25	Variable Resistor	200K ohms
R107	YF2116822JT	Carbon	8.2K ohms 1/16W	VR19,20	YFH0621A1M	Variable Resistor	1M ohms
R108	YF2116102GT	Carbon	1K ohms 1/16W	VR21	EVNDXAA03B14	Variable Resistor	10K ohms
R109	YF2116472GT	Carbon	4.7K ohms 1/16W	VR22	YFH0621A1M	Variable Resistor	1M ohms
R111	YF2116822JT	Carbon	8.2K ohms 1/16W	VR23	YWRH064FC100K	Variable Resistor	100K ohms
R112	YF2116222GT	Carbon	2.2K ohms 1/16W	VR24	YWVL201104L	Variable Resistor	
R129	YF2116470JT	Carbon	47 ohms 1/16W	VR25,26	YFH0621A1M	Variable Resistor	1M ohms
R132,134	YF2116100JT	Carbon	10 ohms 1/16W	VR27	EVNDXAA03B24	Variable Resistor	20K ohms
R150-157	YF2116333GT	Carbon	33K ohms 1/16W	VR29	EVNDXAA03B14	Variable Resistor	10K ohms
R158-164	YF2116102GT	Carbon	1K ohms 1/16W	VR30	YWRK11K103B	Variable Resistor	10K ohms
R165-167	YF2116153JT	Carbon	15K ohms 1/16W	Z1	YWRKM10L503F	Block Resistor	
R168-171	YF2116102GT	Carbon	1K ohms 1/16W	C1	ECEA1CKS470	Electrolytic	47μF 16V
R172-174	YF2116472GT	Carbon	4.7K ohms 1/16W	C2	YF400101CHJT	Ceramic	10pF
R175	YF2116562JT	Carbon	5.6K ohms 1/16W	C3	ECSF1VE105	Electrolytic	1μF 35V
R176	YF2116473GT	Carbon	47K ohms 1/16W	C4	YF400330CHJT	Ceramic	33pF
R177	YWR1220P303D	Metal	30K ohms	C5	ECEAOJKS470	Electrolytic	47μF 6.3V (KS)
R178,179	YWR1220P101D	Metal	100 ohms	C6,7	YF400473FZT	Ceramic	0.017μF
R180	YF2116222GT	Carbon	2.2K ohms 1/16W	C8	YWT316B104MT	Ceramic	0.1μF
R181	YF2116562JT	Carbon	5.6K ohms 1/16W	C9	ECEA1EKS100	Electrolytic	10μF 25V
R182	YF2116392JT	Carbon	3.9K ohms 1/16W	C10	ECST1AB106	Electrolytic	10μF 10V
R183	YF2116332JT	Carbon	3.3K ohms 1/16W	C11	YWT316B104MT	Ceramic	0.1μF
R184	YF2116681JT	Carbon	680 ohms 1/16W	C12	ECEA1EKS100	Electrolytic	10μF 25V
R185	YF2116821GT	Carbon	820 ohms 1/16W	C13,14	ECEA1AKS330	Electrolytic	33μF 10V
R186	YF2116392JT	Carbon	3.9K ohms 1/16W	C15	YWT316B104MT	Ceramic	0.1μF
R187,188	YF2116332JT	Carbon	3.3K ohms 1/16W	C16	ECEA1EKS100	Electrolytic	10μF 25V
R189	YF2116363JT	Carbon	36K ohms 1/16W	C17	ECEA1CKS470	Electrolytic	47μF 16V
R190	YF2116123JT	Carbon	12K ohms 1/16W	C18	YF400152XKT	Ceramic	150pF
R191	YF2116363JT	Carbon	36K ohms 1/16W	C19	ECSF1AE106	Electrolytic	10μF 16V
R192	YF2116123JT	Carbon	12K ohms 1/16W	C20	YWT316B104MT	Ceramic	0.1μF
R193,194	YW2116105JT	Carbon	1M ohms 1/16W	C21	YF400331SLKT	Ceramic	33pF
R195	YF2116821GT	Carbon	820 ohms 1/16W	C22	YF400101CHJT	Ceramic	100pF
R196	YF2116392JT	Carbon	3.9K ohms 1/16W	C25,26	-ECEA0JKS470I	Electrolytic	47μF 6.3V (KS)
R197,198	YF2116152JT	Carbon	1.5K ohms 1/16W	C27	YF400103XKT	Ceramic	0.01μF

REF.NO.	PART NO.	DESCRIPTION		REF.NO.	PART NO.	DESCRIPTION	
C28	YF400102SLKT	Ceramic	1000 pF SL	C125	YF400101CHJT	Ceramic	100 pF
C29,30	YF400103XKT	Ceramic	0.01 μ F	C126,127	ECST1AC106ZR	Electrolytic	10 μ F 10V
C31	ECEA1CKS330	Electrolytic	33 μ F 16V	C128	ECST1AB106	Electrolytic	10 μ F 10V
C32	ECEA0JKS470	Electrolytic	47 μ F 6.3V (KS)	C129	YF400101CHJT	Ceramic	100 pF
C34	ECEA1EKS4R7	Electrolytic	4.7 μ F 25V (KS)	C130,131	YF400152XKT	Ceramic	1500 pF
C35-38	YF400103XKT	Ceramic	0.01 μ F	C132,133	YF400101CHJT	Ceramic	100 pF
C39-41	YF400330CHJT	Ceramic	33 pF	C134,135	YF400330CHJT	Ceramic	33 pF
C42-44	YF400104FZT	Ceramic	0.1 μ F	C137,139	YF400330CHJT	Ceramic	33 pF
C45	ECEA1CKS470	Electrolytic	47 μ F 16V	C141	YF400221CHJT	Ceramic	220 pF
C46	YWT316B104MT	Ceramic	0.1 μ F	L1	ELESN470KA	Coil	47 μ H
C47	ECEA1EKS100	Electrolytic	10 μ F 25V	L2	ELESN8R2KA	Coil	8.2 μ H
C48	YF400122XKT	Ceramic	1200 pF	L3-6	ELESN1R0KA	Coil	1 μ H
C49	YF400102SLKT	Ceramic	1000 pF SL	SW1	YWSRRM1615L	Rotary Switch	
C50	YWT316B104MT	Ceramic	0.1 μ F	SW2	YWSRRM1815L	Rotary Switch	
C51	YF400390CHJT	Ceramic	39 pF	X1	YWKBR4R19MS	Crystal Oscillator	
C52	YF400102SLKT	Ceramic	1000 pF SL	CF1	YWY5G0382	Filter	
C53	YF400104FZT	Ceramic	0.1 μ F	CN1	FCN215J030G0	30-pin Connector	
C54	YF400102SLKT	Ceramic	1000 pF SL	CN2	YW530150510	5-pin Connector	
C55	YF400104FZT	Ceramic	0.1 μ F	CN3	EMCS0750ZL	7-pin Connector	
C56	YF400102SLKT	Ceramic	1000 pF SL	CN4	YW530150210	2-pin Connector	
C57	ECEA1EKS100	Electrolytic	10 μ F 25V	CN5	X5BXHA1	5-pin Connector	
C58	YF400101CHJT	Ceramic	100 pF	TP1-17	YWRCT2125TPV	Test-pin	
C59,60	YWT316B104MT	Ceramic	0.1 μ F	M59	YWV2HA0834A4	Shield Cover	
C61	ECEA1EKS100	Electrolytic	10 μ F 25V	M60	YWV2HA0835B4	Shield Case	
C62	ECQV1H394JZ	Plastic	0.39 μ F 50V				
C63	ECQV1H224JZ	Plastic	0.22 μ F 50V TF				
C64	YF400104FZT	Ceramic	0.1 μ F				
C65	YF400332XKT	Ceramic	3300 pF				
C66	ECQV1H224JZ	Plastic	0.22 μ F 50V TF				
C67	YF400104FZT	Ceramic	0.1 μ F				
C68	ECQM1H333KZ	Plastic	0.033 μ F 50V	PCB5 (NLA)	YWJKBMX12E1A	Printed Circuit Board Assy	
C69	YWT316B104MT	Ceramic	0.1 μ F	IC1	YWNMC93CS66N	IC	
C70	ECQM1H333KZ	Plastic	0.1 μ F	IC2	YWPD75108A91	IC	
C71	ECEA1EKS100	Electrolytic	10 μ F 25V	Q1-4	2SB641-QR	Transistor	
C72	ECQB1H332JZ	Plastic	3300 pF 50V	Q5-20	2SD636-Q	Transistor	
C73	ECEA1AKS330	Electrolytic	33 μ F 10V	D1-21	YWGL3HD44	LED	
C80	YF400821XKT	Ceramic	820 pF	D24,25	YWGL3HD44	LED	
C81	YF400104FZT	Ceramic	0.1 μ F	D28,29	YWGL3HD44	LED	
C82-84	ECEA1EKS100	Electrolytic	10 μ F 25V	D32-39	YWGL3HD44	LED	
C101	ECEA1CKS470	Electrolytic	47 μ F 16V	D46-49	MA165	Diode	
C102	ECEA0JKS470	Electrolytic	47 μ F 6.3V (KS)	R1-8	ERDS2TJ104	Carbon	100K ohms 1/4W
C103	ECEA1CKS470	Electrolytic	47 μ F 16V	R9	ERDS2TJ332	Carbon	3.3K ohms 1/4W
C104	ECEA0JKS470	Electrolytic	47 μ F 6.3V (KS)	R10	ERDS2TJ104	Carbon	100K ohms 1/4W
C105	ECEA1CKS470	Electrolytic	47 μ F 16V	R11	ERDS2TJ332	Carbon	3.3K ohms 1/4W
C106	ECEA1CS102	Electrolytic	1000 μ F 16V	R12-15	ERDS2TJ392	Carbon	3.9K ohms 1/4W
C107	ECEA0JKS470	Electrolytic	47 F 6.3V (KS)	R16	ERDS2TJ104	Carbon	100K ohms 1/4W
C108	YF400104FZT	Ceramic	0.1 μ F	R17	ERDS2TJ332	Carbon	3.3K ohms 1/4W
C109	YF400100CHDT	Ceramic	10 pF	R18	ERDS2TJ104	Carbon	100K ohms 1/4W
C110-112	YF400101CHJT	Ceramic	100 pF	R19	ERDS2TJ332	Carbon	3.3K ohms 1/4W
C113	YF400333XKT	Ceramic	0.033 μ F	R20	ERDS2TJ104	Carbon	100K ohms 1/4W
C114	YF400104FZT	Ceramic	0.1 μ F	R21	ERDS2TJ332	Carbon	3.3K ohms 1/4W
C116	YF400333XKT	Ceramic	0.033 μ F	R22	ERDS2TJ104	Carbon	100K ohms 1/4W
C119,121	ECEA1EKS100	Electrolytic	10 μ F 25V	R23	ERDS2TJ332	Carbon	3.3K ohms 1/4W
C122	YF400103XKT	Ceramic	0.01 μ F	R24	ERDS2TJ104	Carbon	100K ohms 1/4W
C123	YF400820CHJT	Ceramic	82 pF	R25-32	ERDS2TJ332	Carbon	3.3K ohms 1/4W
			R33	ERDS2TJ103	Carbon	10K ohms 1/4W	

SWITCH BOARD

REF.NO.	PART NO.	DESCRIPTION		REF.NO.	PART NO.	DESCRIPTION	
R34	ERDS2TJ271	Carbon	270 ohms 1/4W	METER BOARD			
R35	ERDS2TJ103	Carbon	10K ohms 1/4W	PCB6 (NLA)	YWJKCMX12E1A	Printed Circuit Board Assy	
R36	ERDS2TJ271	Carbon	270 ohms 1/4W	IC1	YWM66311P	IC	
R37	ERDS2TJ103	Carbon	10K ohms 1/4W	IC2	YWBA6822S	IC	
R38	ERDS2TJ271	Carbon	270 ohms 1/4W	IC3	AN78N05	IC	
R39	ERDS2TJ103	Carbon	10K ohms 1/4W	Q1-4	2SD636-Q	Transistor	
R40	ERDS2TJ271	Carbon	270 ohms 1/4W	Q5-8	2SB641-QR	Transistor	
R41	ERDS2TJ103	Carbon	10K ohms 1/4W	Q9,10	2SD636-Q	Transistor	
R42	ERDS2TJ271	Carbon	270 ohms 1/4W	D1-4	YWLT9230H	Diode	
R43	ERDS2TJ562	Carbon	5.6K ohms 1/4W	D5-14	YWLT9000N	Diode	
R44	ERDS2TJ271	Carbon	270 ohms 1/4W	D15,16	YWGL112F13	Diode	
R45	ERDS2TJ562	Carbon	5.6K ohms 1/4W	D17	YWLT9000D	Diode	
R46	ERDS2TJ271	Carbon	270 ohms 1/4W	D18	YWLT9002ND	Diode	
R47	ERDS2TJ562	Carbon	5.6K ohms 1/4W	D19-22	MA165	Diode	
R48	ERDS2TJ271	Carbon	270 ohms 1/4W	R1	ERDS2TJ331	Carbon	330 ohms 1/4W
R49	ERDS2TJ562	Carbon	5.6K ohms 1/4W	R2	ERDS2TJ103	Carbon	10K ohms 1/4W
R50	ERDS2TJ271	Carbon	270 ohms 1/4W	R3	ERDS2TJ331	Carbon	330 ohms 1/4W
R51	ERDS2TJ103	Carbon	10K ohms 1/4W	R4	ERDS2TJ103	Carbon	10K ohms 1/4W
R52	ERDS2TJ271	Carbon	270 ohms 1/4W	R5	ERDS2TJ331	Carbon	330 ohms 1/4W
R53	ERDS2TJ101	Carbon	100 ohms 1/4W	R6	ERDS2TJ103	Carbon	10K ohms 1/4W
R54	ERDS2TJ104	Carbon	100K ohms 1/4W	R7	ERDS2TJ331	Carbon	330 ohms 1/4W
R55	ERDS2TJ332	Carbon	3.3K ohms 1/4W	R8	ERDS2TJ103	Carbon	10K ohms 1/4W
R56	ERDS2TJ102	Carbon	1K ohms 1/4W	R9-18	ERDS2TJ101	Carbon	330 ohms 1/4W
R61-64	ERDS2TJ103	Carbon	10K ohms 1/4W	R19-24	ERDS2TJ151	Carbon	10K ohms 1/4W
R65-70	ERDS2TJ562	Carbon	5.6K ohms 1/4W	R25-28	ERDS2TJ102	Carbon	1K ohms 1/4W
R71-76	ERDS2TJ220	Carbon	22 ohms 1/4W	R29,30	ERDS2TJ103	Carbon	10K ohms 1/4W
R77	ERDS2TJ105	Carbon	1M ohms 1/4W	R31	ERDS2TJ183	Carbon	18K ohms 1/4W
R78	ERDS2TJ102	Carbon	1K ohms 1/4W	R32	ERG1SJ220	Metal	22 ohms 1W
R79-82	ERDS2TJ332	Carbon	3.3K ohms 1/4W	R33	ERDS2TJ511	Carbon	510 ohms 1/4W
C1	ECEA1HKS010	Electrolytic	1 μ F 50V (KS)	R34	ERDS2TJ820	Carbon	82 ohms 1/4W
C2	ECEA0JKA221	Electrolytic	220 μ F 6.3V	R35	ERDS2TJ121	Carbon	120 ohms 1/4W
C3,4	ECEA0JKS470I	Electrolytic	47 μ F 6.3V (KS)	R37-40	ERDS2TJ332	Carbon	3.3K ohms 1/4W
C5,6	ECCF1H330JC	Ceramic	33 pF 50V	R41-43	ERDS2TJ392	Carbon	3.9K ohms 1/4W
C7	ECQV1H104JZ	Plastic	0.1 μ F 50V (TF)	VR1	YFRK811A5KB	Variable Resistor	5K ohms
L1	ELESN8R2KA	Coil	8.2 μ H	C1	ECEA0JKS470	Electrolytic	47 μ F 6.3V (KS)
L2	ELESN100KA	Coil	10 μ H	C2,3	ECEA1AKK100	Electrolytic	10 μ F 10V
L3	ELESN8R2KA	Coil	8.2 μ H	C4	ECQB1H103JZ	Plastic	0.01 μ F 50V
SW1	EVQQTU05R	Push Switch		C5	ECEA1AU101	Electrolytic	100 μ F 10V
SW2	600A01YP1	Push Switch		C6	ECEA1CFE181	Electrolytic	180 μ F 16V
SW3	600A01GP1	Push Switch		C7,8	ECEA0JKS470	Electrolytic	47 μ F 6.3V (KS)
SW4	EVQQTU05R	Push Switch		C9	ECEA1CFE181	Electrolytic	180 μ F 16V
SW5	600A01YP1	Push Switch		SW1-6	EVQQTU05R	Push Switch	
SW6	600A01GP1	Push Switch		SW7	YWSSS322	Slide Switch	
SW7	EVQQTU05R	Push Switch		SW8-15	EVQQTU05R	Push Switch	
SW8	600A01YP1	Push Switch		CN1	YW530150310Y	3-pin Connector	
SW9	600A01GP1	Push Switch		CN2	YW530150310	3-pin Connector	
SW10-37	EVQQTU05R	Push Switch		CN3	YW530151110	11-pin Connector	
X1	YWKBR4R19MS	Crystal Oscillator		M67	YWV2NA0320A4	Level LED Spacer	

REF.NO.	PART NO.	DESCRIPTION	REF.NO.	PART NO.	DESCRIPTION
POWER BOARD					
PCB7 (NLA) IC3 IC4 D1,2 D3 C1	YWJKBMX12E2A YWSI3922V YWSI3052V YWRBA406B YWRB150F ECQU2A103MN	Printed Circuit Board Assy IC IC Diode Diode Plastic	PCB10 (NLA) IC1 	YWJKDMX12E3A YWSI3122V	Printed Circuit Board Assy IC
12V REGULATOR BOARD					
C2 C3 C4,5 C6 C7	ECA1CFZ221L ECA0JFZ331 EC0S1VG682M EC0S1VG332J ECA1CFZ221L	Electrolytic 220 μ F 16V Electrolytic 330 μ F 6.3V Electrolytic 6800 μ F 35V Electrolytic 3300 μ F 35V Electrolytic 220 μ F 16V	PCB11 (NLA) IC2 	YWJKCMX12E3A YWSI3052V	Printed Circuit Board Assy IC
5V REGULATOR BOARD					
C8 L1 F1  F2,3  F4-9  F10  F11,12  CN1 CN2 CN3	ECA0JFZ331 LF4N501 XBA2C05ET0A XBA2C25ET0A YWSSFR1AF002 YFBET1A250V YWSSFR1AF002 YW86PVH YW530140310 YW530140310R YW530150310Y S-N5057 YWTM028 YFV7DA0045A4 YWV7DA0203A4	Electrolytic 330 μ F 6.3V Coil 500 μ H Current Fuse 0.5 A 250V Current Fuse 2.5 A 250V Current Fuse Current Fuse 6-pin Connector 3-pin Connector 3-pin Connector 3-pin Connector Fuse Holder Test-pin Heat Sink A Heat Sink B	M80 M81 M82 M83 M84 M85	Y WV9AA0472AN Y WV8QA2041AN Y WV7SA0851A4 XZB55X71C1 Y WT20X35C03 Y WV9CA1411AN	Title Mounting Base Assy Operating Instructions Label Polyethylene Bag Polyethylene Bag Packaging Assy
ACCESSORY PARTS/PACKAGING PARTS					
POWER SWITCH BOARD					
PCB8 SW1  TP1	YWJRAMX12J2B YWSER2A01BBM YWTM028	Printed Board Seesaw Switch Test-pin			
REAR BOARD					
PCB9 (NLA) R1-6 SV1,2 CF1-11 CN1 CN2 CN5 CN6,7 CN8-10 TP5-8	YWJKBMX12E3A ERDS2TJ750 ESD32130 YWBL02RN1R62 YW530151010 YW530151210 YW80065A YWT5757DA YWT5756AAC YWM1824	Printed Circuit Board Assy Carbon 75 ohms 1/4W Slide Switch Filter 10-pin Connector 12-pin Connector BNC Connector 2-pin Jack Connector Test-pin			