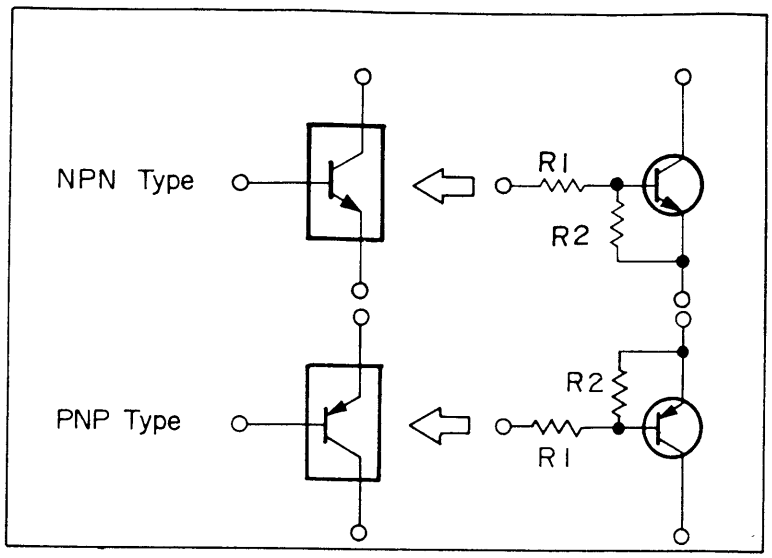
	SEL	:	Select
	SENS	:	Sensor
	SF	:	Source Follower
	SOL	:	Solenoid
	S. R	:	Supply Reel
	S. SENS	:	Start Sensor
	S. SEP	:	Sync Separator
	SW	:	Switch
T	T. E ALM	:	Tape End Alarm
	TP	:	Test Point
	TR	:	Transistor
	TRANS	:	Transformer
	T. REC	:	Timer Record
	T. SW	:	Timer Switch
	T/T	:	Tuner/Timer
	TU	:	Take-up
	TU. R	:	Take-up Reel
U	UL	:	Unloading
V	V	:	Volt
	VCO	:	Voltage Controlled Oscillator
	VLT	:	Violet
	V. PULSE	:	Vertical Pulse
	V. SEL	:	Video Select
	V/T	:	Video/Television
	V/U	:	VHF/UHF
	VXO	:	Variable Crystal Oscillator
W	W	:	Watt
	W/D	:	White and Dark
	WHT	:	White
Y	Y	:	Luminance
	YLW	:	Yellow
Z	–		–

For Service Manuals
MAURITRON SERVICES
8 Cherry Tree Road, Chinnor
Oxfordshire, OX9 4QY.
Tel (01844) 351694
Fax (01844) 352554
email:- sales@mauritron.co.uk

	:	Volt
CO	:	Voltage Controlled Oscillator
LT	:	Violet
. PULSE	:	Vertical Pulse
. SEL	:	Video Select
/T	:	Video/Television
/U	:	VHF/UHF
XO	:	Variable Crystal Oscillator
	:	Watt
/D	:	White and Dark
HT	:	White
	:	Luminance
LW	:	Yellow

4.4 DIGITAL TRANSISTOR

DIGITAL TRANSISTOR



RESISTOR VALUES

JUNCTION	Part NO.	R1 (KΩ)	R2 (KΩ)
PNP	DTA114	10	10
	DTA124	22	22
	DTA144	47	47
	DTA144WF	47	22
	DTA114Y	10	47
	DTA114T	10	OPEN
NPN	DTC114	10	10
	DTC124	22	22
	DTC144	47	47
	DTC144WT	47	22
	DTC114Y	10	47
	DTC143T	4.7	OPEN

Note: The digital transistor is a type that includes built in resistors. It features and small size and high reliability. Both PNP and NPN types are available.

USES: INVERTOR, INTERFACE, DRIVER CIRCUITS.

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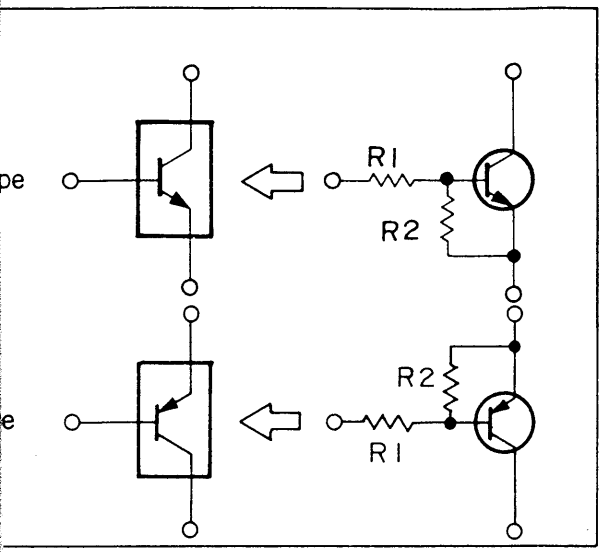
Tel (01844) 351694
Fax (01844) 352554
email:- sales@mauritron.co.uk

DIGITAL TRANSISTOR

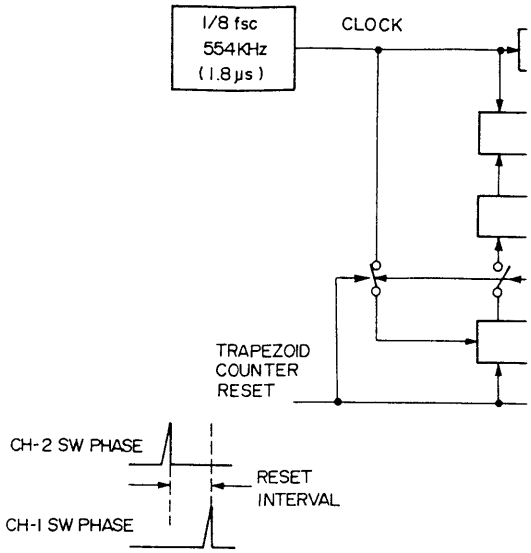


RESISTOR VALUES

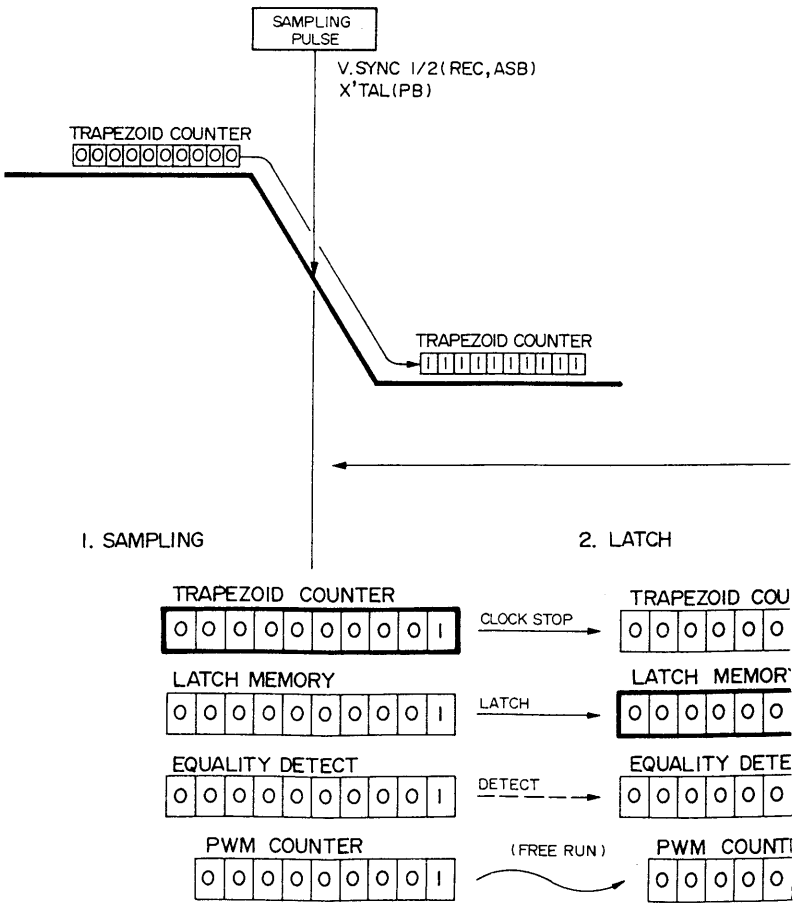
Part NO.	R1 (KΩ)	R2 (KΩ)
DTA114	10	10
DTA124	22	22
DTA144	47	47
DTA144WF	47	22
DTA114Y	10	47
DTA114T	10	OPEN
DTC114	10	10
DTC124	22	22
DTC144	47	47
DTC144WT	47	22
DTC114Y	10	47
DTC143T	4.7	OPEN

al transistor is a type that includes built in resistors.
es and small size and high reliability.
P and NPN types are available.
OR, INTERFACE, DRIVER CIRCUITS.

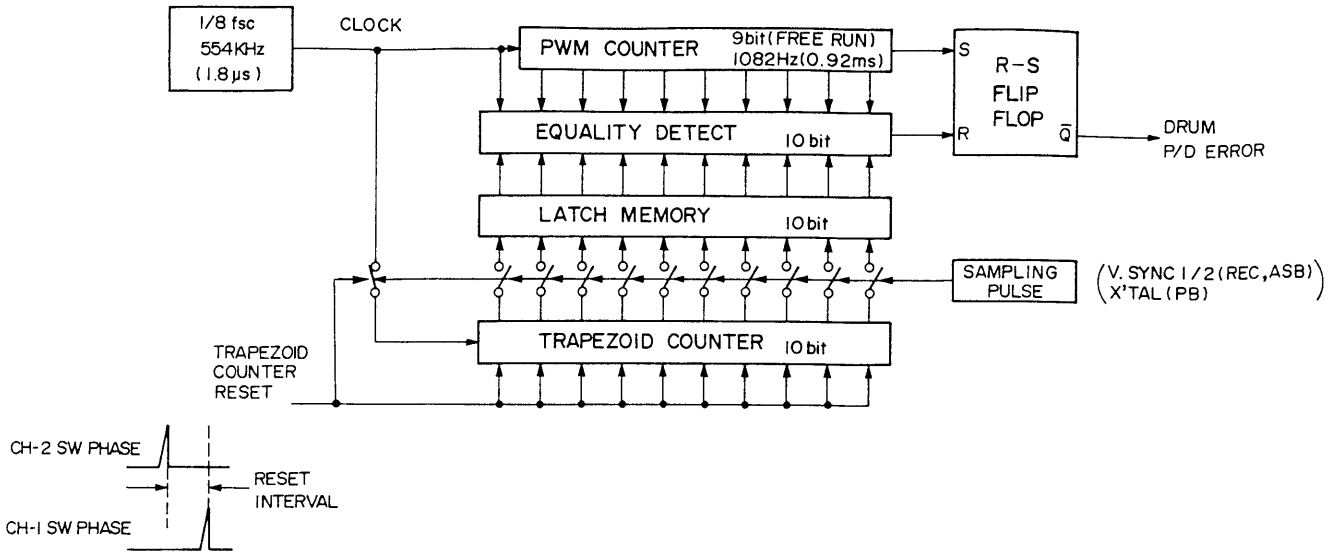
DRUM PHASE DETECT



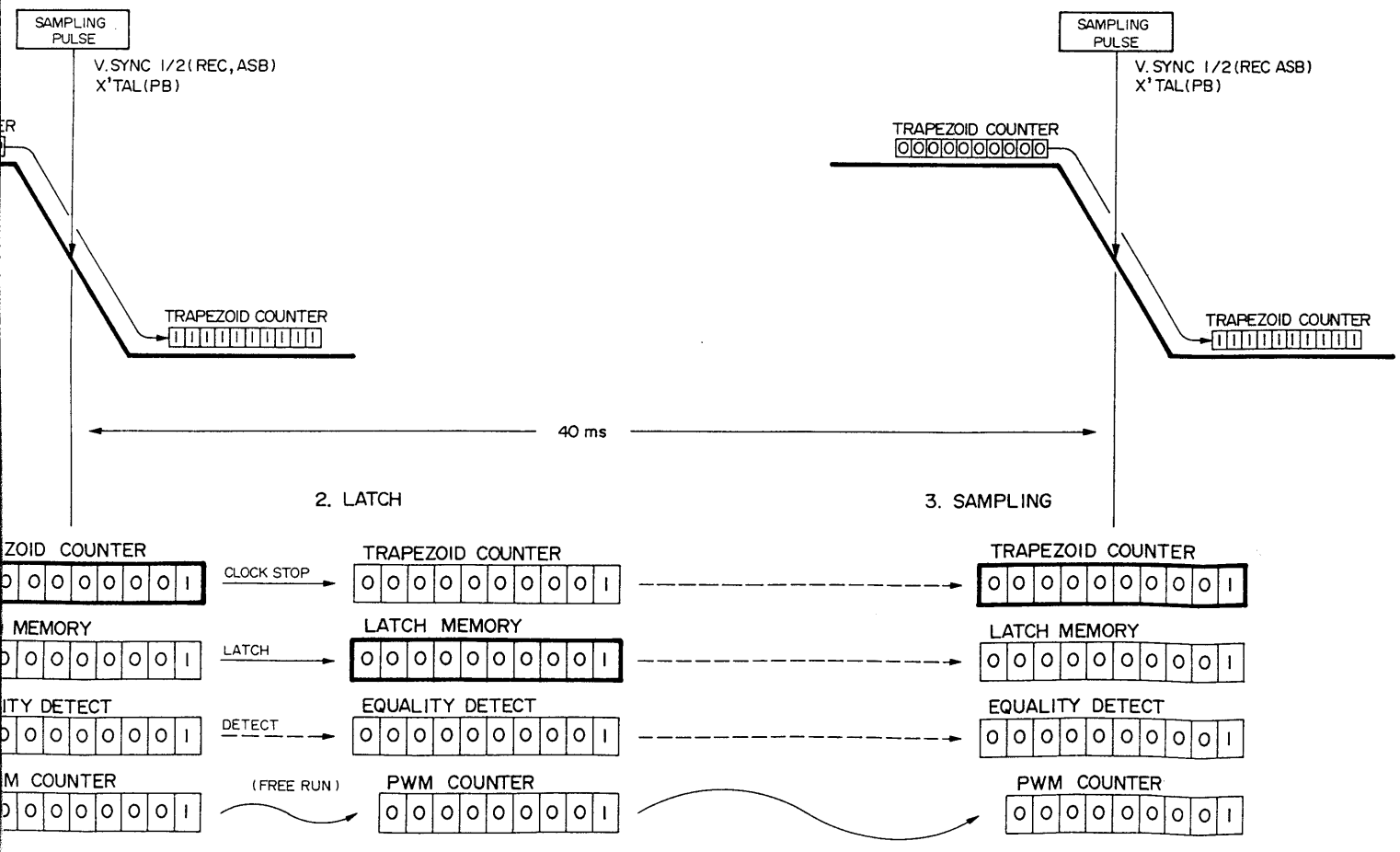
DRUM PHASE DETECT SYS

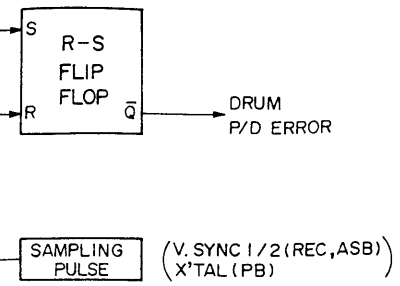


DRUM PHASE DETECTOR BLOCK DIAGRAM

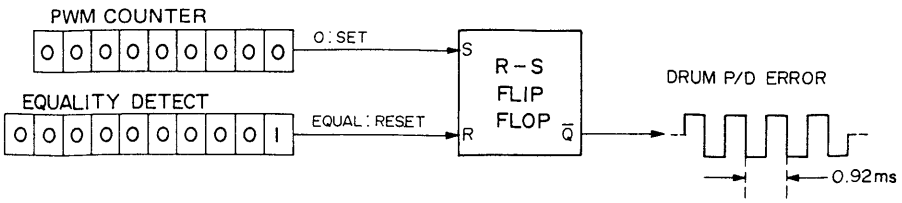


DRUM PHASE DETECT SYSTEM (NORMAL STATE)

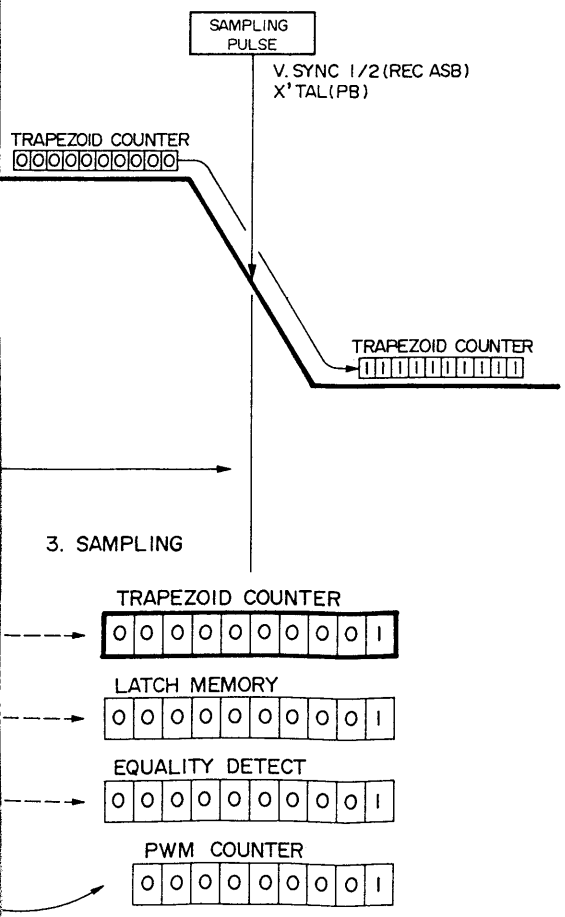


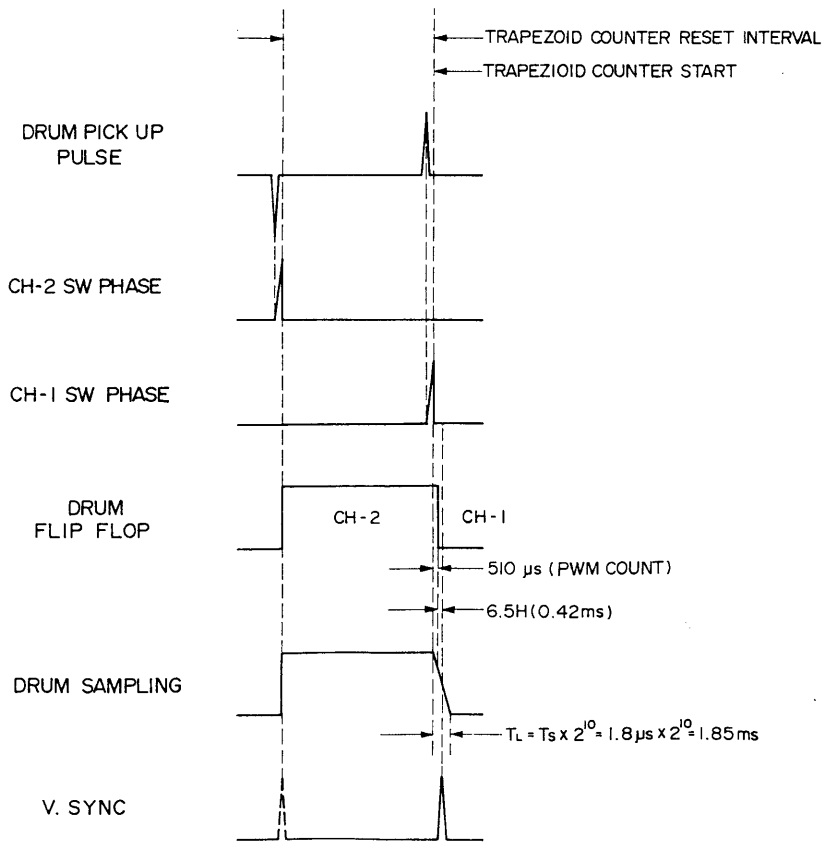


WAVEFORM



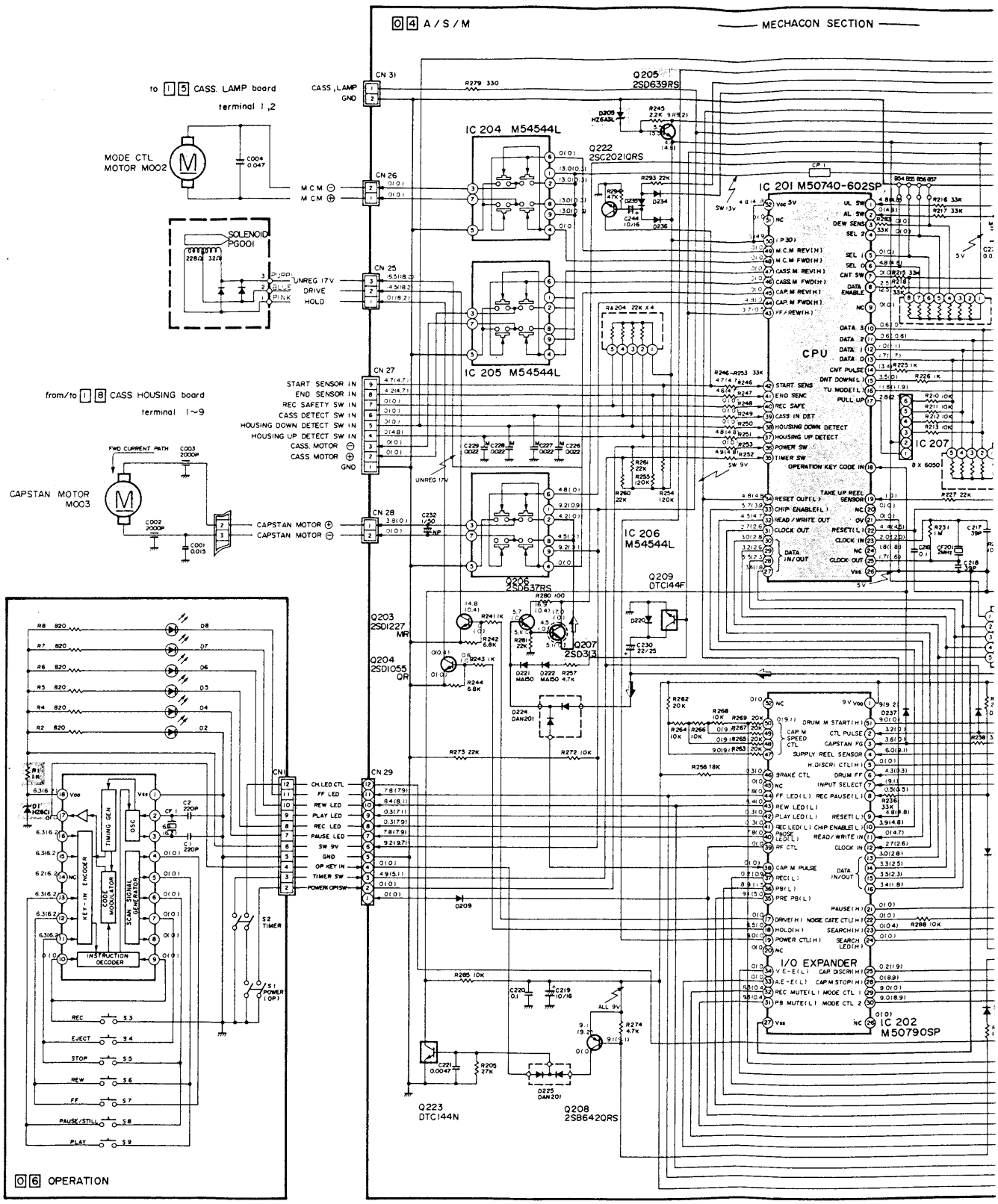
TIMING CHART



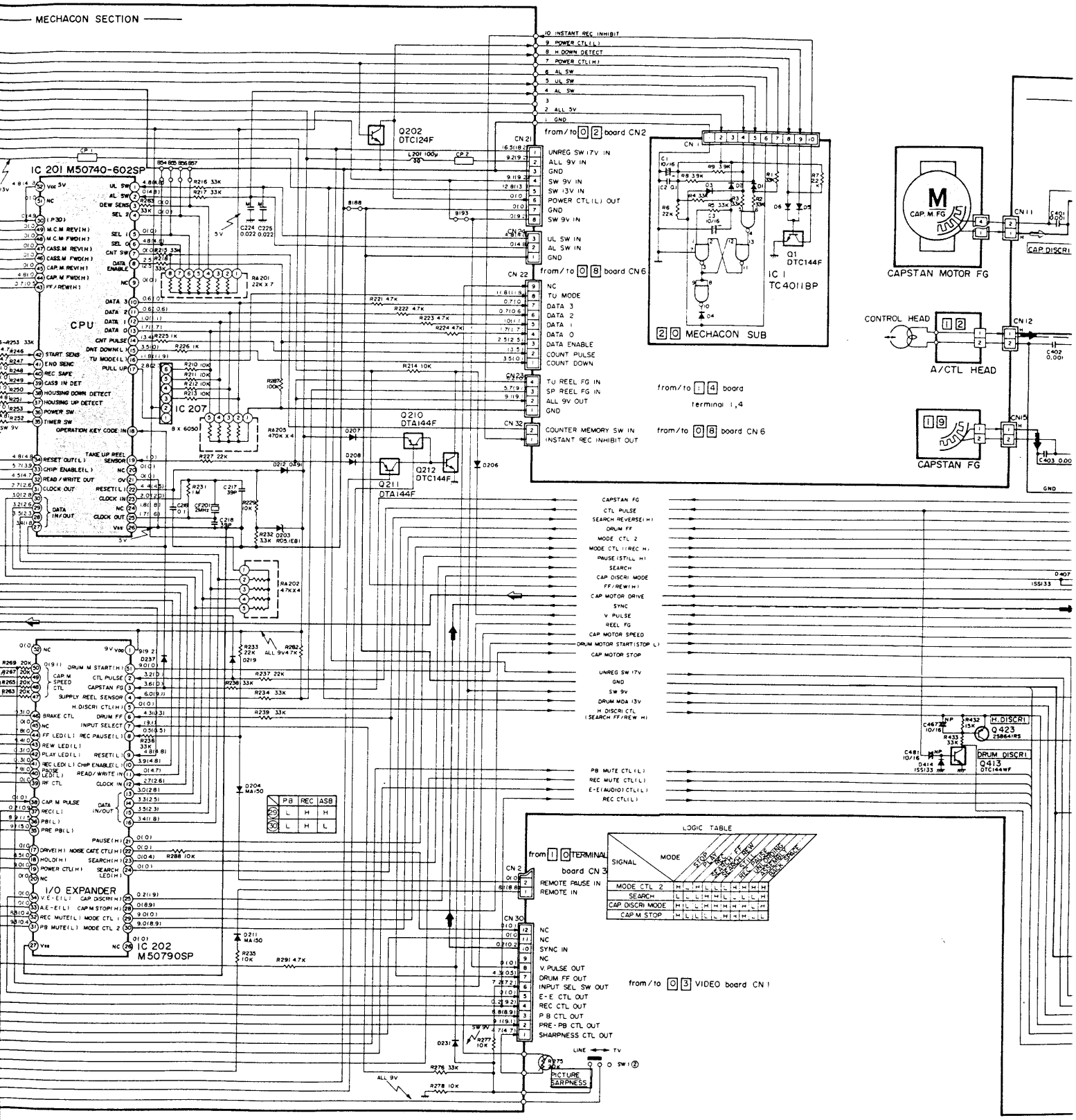


4.6 SCHEMATIC AND CIRCUIT BOARD DIAGRAMS

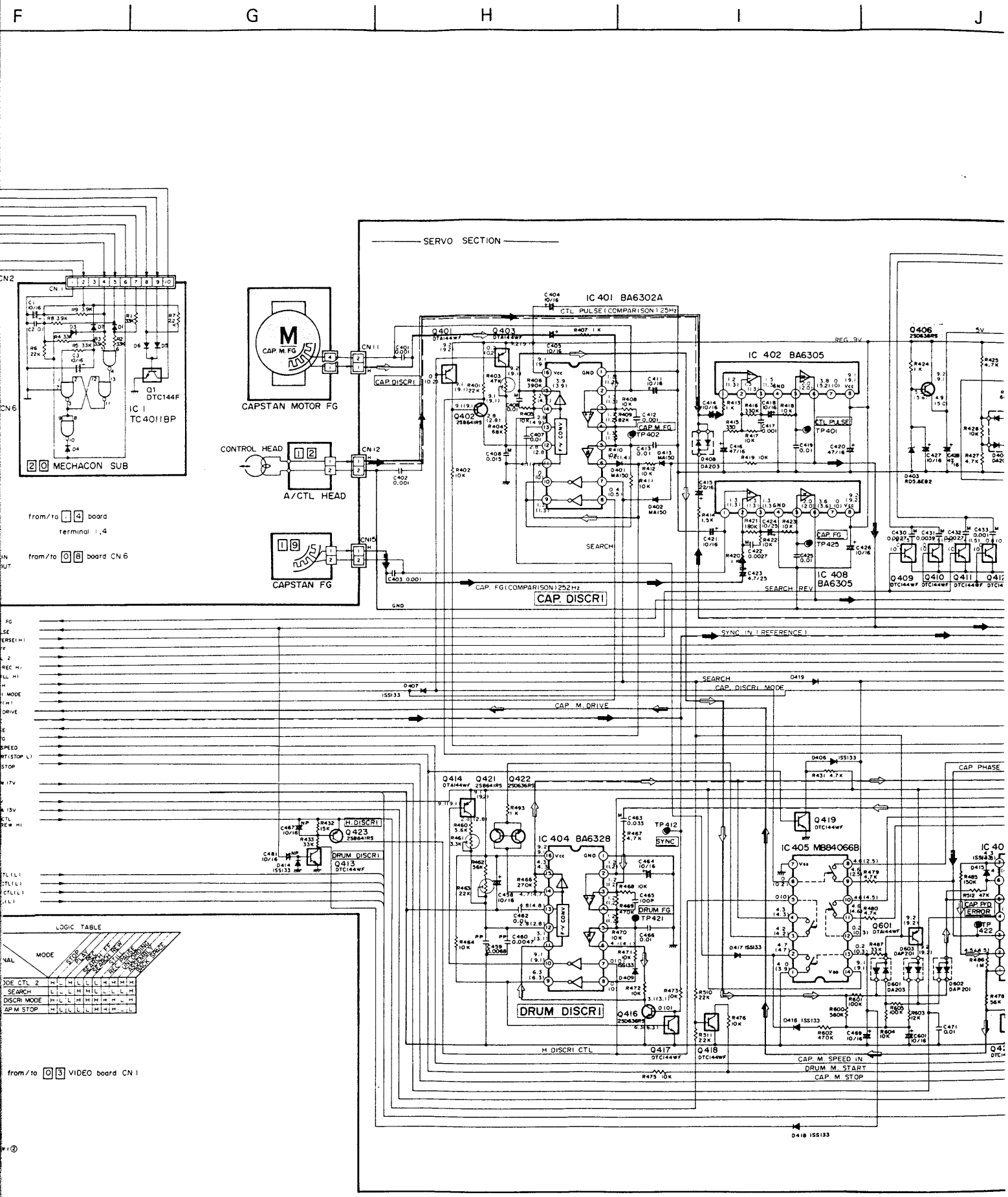
4.6.1 Audio/Servo/Mechacon, Operation, Mechacon sub circuit (A/C head, Head conn. board)



head, Head conn. board)

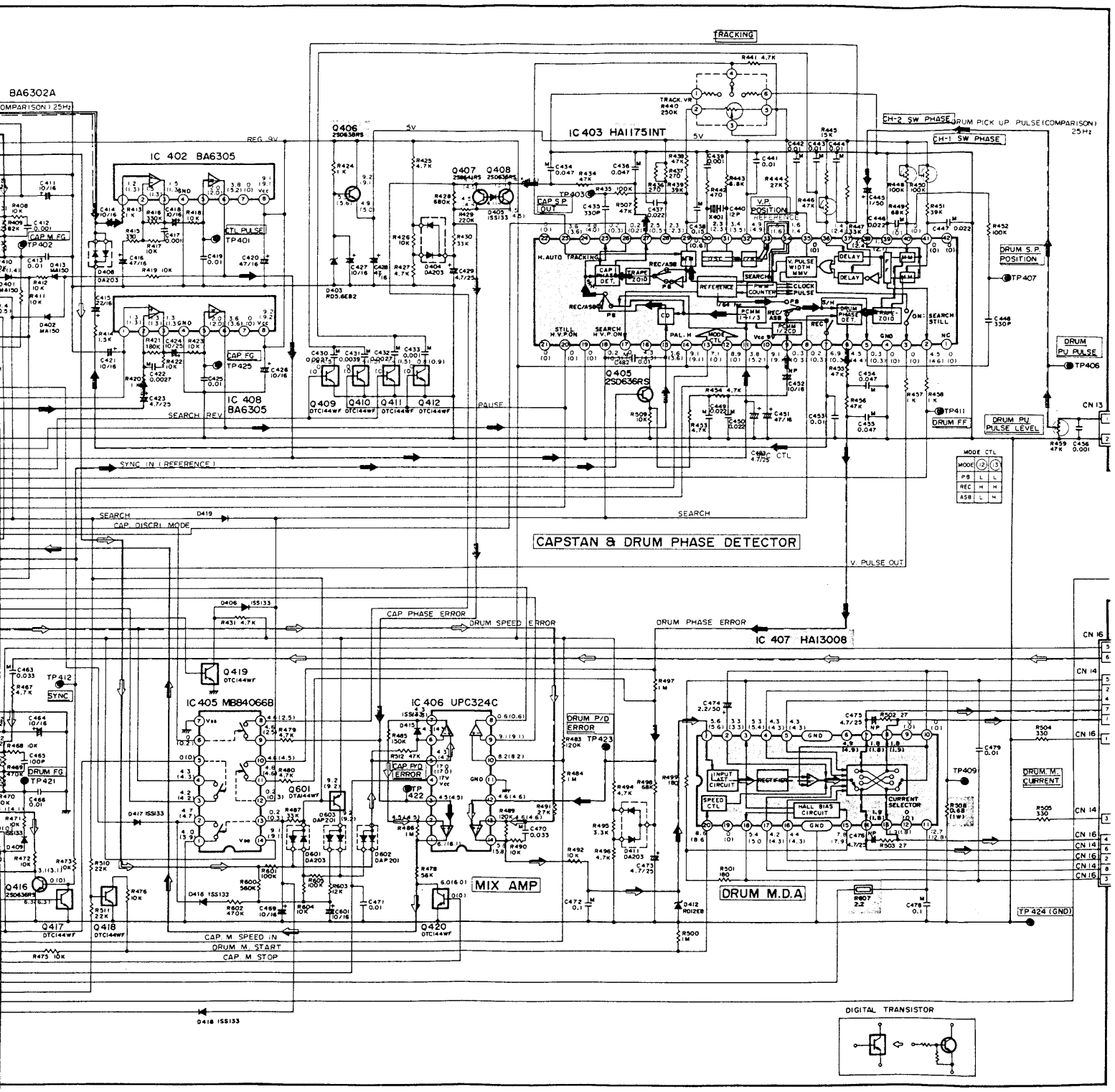


Note: Unless otherwise specified.
1. All diodes are 1SS133.



Note: Unless otherwise specified

1. All resistance values are in ohms (1/ W)
2. All inductance values are in μH
3. All capacitance values are in μF
4. Voltages are DC-measured with a digital voltmeter during recording mode
5. Where voltage differs between recordin playback is shown in parentheses
6. Shaded ( ) parts are critical for safe part numbers



(1/ W)

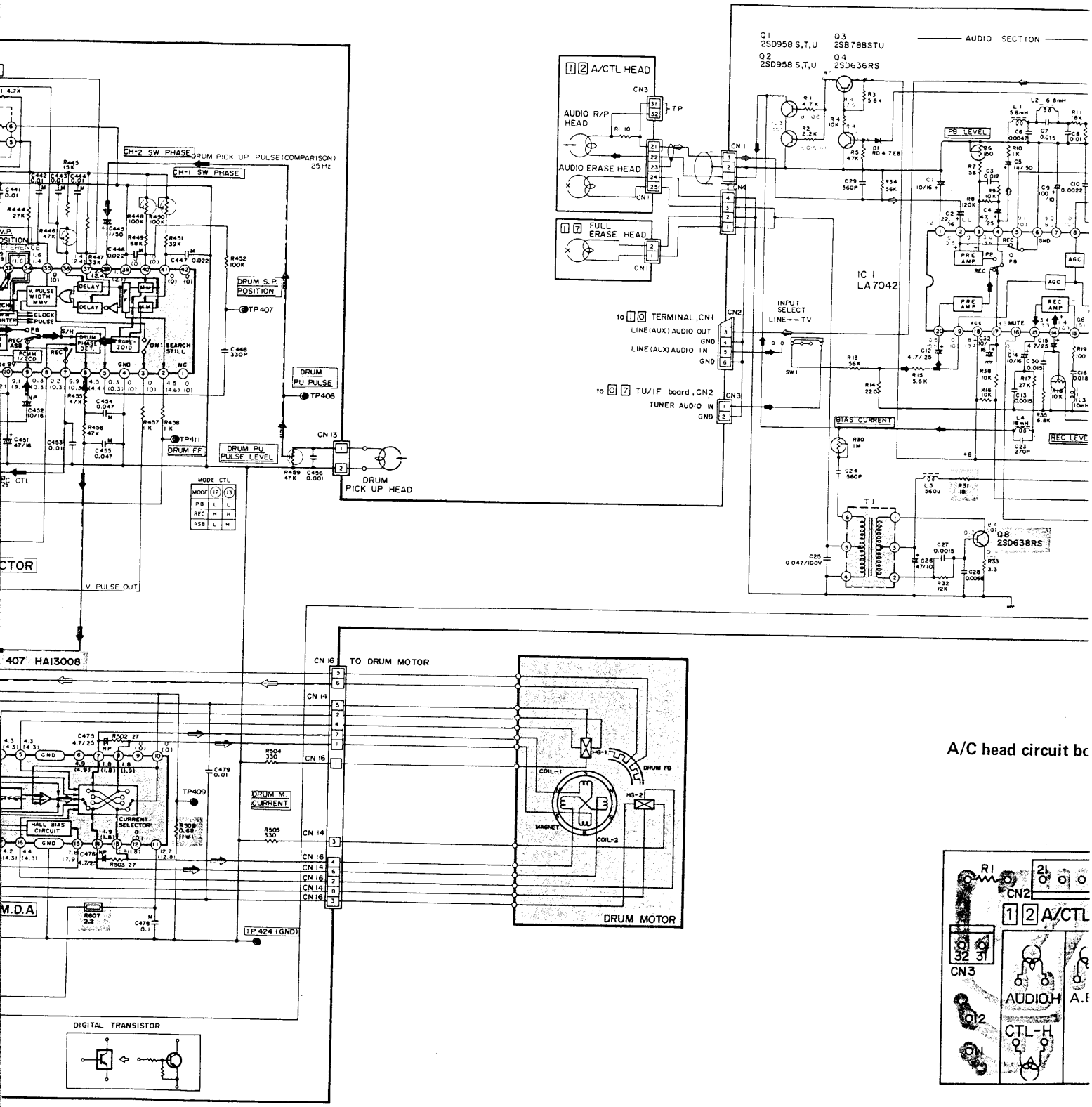
a digital voltmeter during recording mode

5. Where voltage differs between recording and playback, the voltage during playback is shown in parentheses
6. Shaded ( ) parts are critical for safety Replace only with specified part numbers

CAPSTAN PHASE ERROR
CAPSTAN SPEED ERROR
CAPSTAN ERROR
DRUM PHASE ERROR
DRUM SPEED ERROR
DRUM ERROR

MODES / CONTROL SIGNAL	DRUM SERVO		CAP
	RECORDING	PLAYBACK	RECORD
REFERENCE SIGNAL	V. SYNC	X' TAL	X' TAL
COMPARISON SIGNAL	DRUM PU PULSE	DRUM PU PULSE	CAPSTAN

AUDIO, SERV
(KEY TO ABBRE

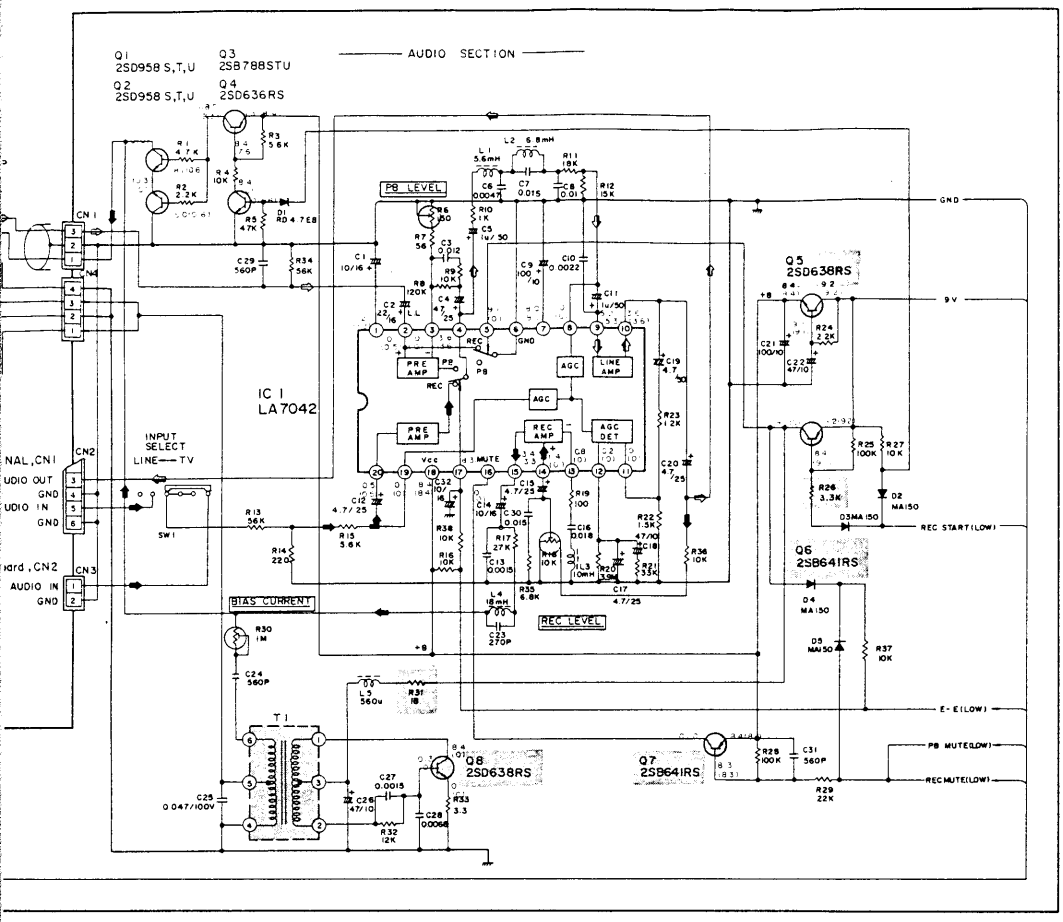


A/C head circuit bc

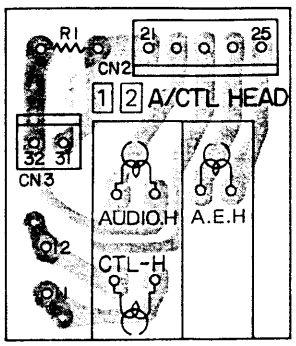
ASE ERROR
EED ERROR
ROR
E ERROR
D ERROR
R

MODES / CONTROL SIGNAL	DRUM SERVO		CAPSTAN SERVO	
	RECORDING	PLAYBACK	RECORDING	PLAYBACK
REFERENCE SIGNAL	V. SYNC	X' TAL	X' TAL	X' TAL
COMPARISON SIGNAL	DRUM PU PULSE	DRUM PU PULSE	CAPSTAN FG	CTL PULSE

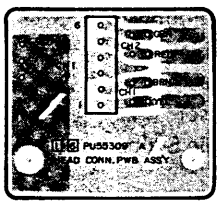
4-6 AUDIO, SERVO, MECHACON CIRCUITS & BC
(KEY TO ABBREVIATIONS, DIGITAL & DRU



A/C head circuit board



Head conn. circuit board



4.6.2 Main waveforms of servo and audio circuit

Servo circuit

TP402 Cap. M. FG 1.1Vp-p 880Hz	IC401 ⑪ Cap. M. F-V Conv. In 8Vp-p 880Hz	IC401 ⑮ Cap. M. F-V Conv. out 4VDC	TP401 PB CTL pulse 8.5Vp-p 25Hz	TP425 Capstan FG 0.9Vp-p 250Hz
TP411 Drum F.F 7Vp-p 25Hz	IC403 ③ V. pulse out 7Vp-p	IC403 ⑤ Drum sampling pulse out 9Vp-p	IC403 ⑥ Drum P/D error 7.5Vp-p	IC403 ⑦ Rec CTL 8Vp-p 25Hz
IC403 ⑨ Sync in 0.5Vp-p	IC403 ⑪ CTL pulse in 6Vp-p 25Hz	IC403 ⑮ Cap. FG in 7Vp-p 250Hz	IC403 ㉕ Cap. sampling pulse out 8Vp-p	TP403 Cap. sampling Pulse position
IC403 ㉗ Cap. P/D error 7Vp-p	IC403 ㉙ Tracking MMV 2.5Vp-p	IC403 ㉚ Osc in 0.45Vp-p 4.43MHz	IC403 ㉞ 1/8 f_{sc} in 2.8Vp-p 0.55MHz	IC403 ㉟ V. pulse width MM 2.5Vp-p
IC403 ㊱ V. pulse MMV (Neg.) 4.5Vp-p	IC403 ㊲ V. pulse MMV (Pos.) 4.5Vp-p	IC403 ㊵ CH-2 sw PHASE MMV 2.5Vp-p	IC403 ㊶ CH-1 sw PHASE MMV 2.5Vp-p	TP407 Drum sampling position
TP406 Drum pick up pulse 2Vp-p 25Hz	TP421 Drum FG 1.8Vp-p 1.6kHz	IC404 ⑪ Drum F-V Conv. In 6.2Vp-p 1.6kHz	IC404 ⑮ Drum F-V conv. out 4.5VDC	TP412 Sync 1.7Vp-p
TP422 Cap. Error 4.6Vp-p	IC406 ① Cap. M. Drive 0.7VDC	TP423 Drum Error 4.6VDC	IC407 ① Drum MDA in 5.6VDC	IC407 ⑦ ⑧ ⑬ ⑭ Drum MDA out 6.2 Vp-p
Q207 E Cap. M. Drive Amp Out 5VDC				

Audio circuit

CN2 ⑤ Audio in 1kHz -20dB (220mVp-p)
IC1 ⑩ Line Amp out 1kHz 0dB (2.2Vp-p)
T1 ⑤ ⑥ Bias Osc 68kHz 200Vp-p
CN1 ① REC Audio 9Vp-p
CN2 ③ Audio out 1kHz 0dB (2.2Vp-p)

in waveforms of servo and audio circuit

Servo circuit

2 FG 880Hz	IC401 ⑪ Cap. M. F-V Conv. In 8Vp-p 880Hz	IC401 ⑮ Cap. M. F-V Conv. out 4VDC	TP401 PB CTL pulse 8.5Vp-p 25Hz	TP425 Capstan FG 0.9Vp-p 250Hz
1 F.F 25Hz	IC403 ③ V. pulse out 7Vp-p	IC403 ⑤ Drum sampling pulse out 9Vp-p	IC403 ⑥ Drum P/D error 7.5Vp-p	IC403 ⑦ Rec CTL 8Vp-p 25Hz
⑨ in -p	IC403 ⑪ CTL pulse in 6Vp-p 25Hz	IC403 ⑮ Cap. FG in 7Vp-p 250Hz	IC403 ㉕ Cap. sampling pulse out 8Vp-p	TP403 Cap. sampling Pulse position
㉗ error -p	IC403 ㉙ Tracking MMV 2.5Vp-p	IC403 ㉚ Osc in 0.45Vp-p 4.43MHz	IC403 ㉞ 1/8 f_{sc} in 2.8Vp-p 0.55MHz	IC403 ㉟ V. pulse width MM 2.5Vp-p
㊱ MMV .) -p	IC403 ㊲ V. pulse MMV (Pos.) 4.5Vp-p	IC403 ㊵ CH-2 sw PHASE MMV 2.5Vp-p	IC403 ㊶ CH-1 sw PHASE MMV 2.5Vp-p	TP407 Drum sampling position
06 ck up e 25Hz	TP421 Drum FG 1.8Vp-p 1.6kHz	IC404 ⑪ Drum F-V Conv. In 6.2Vp-p 1.6kHz	IC404 ⑮ Drum F-V conv. out 4.5VDC	TP412 Sync 1.7Vp-p
22 rror -p	IC406 ① Cap. M. Drive 0.7VDC	TP423 Drum Error 4.6VDC	IC407 ① Drum MDA in 5.6VDC	IC407 ⑦ ⑧ ⑬ ⑭ Drum MDA out 6.2 Vp-p
E Drive Out C				

Audio circuit

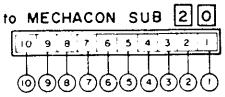
CN2 ⑤ Audio in 1kHz -20dB (220mVp-p)
IC1 ⑩ Line Amp out 1kHz 0dB (2.2Vp-p)
T1 ⑤ ⑥ Bias Osc 68kHz 200Vp-p
CN1 ① REC Audio 9Vp-p
CN2 ③ Audio out 1kHz 0dB (2.2Vp-p)

4-7 A/S/M. OPE. BOARDS (VIDEO, TERMINAL CIRCU

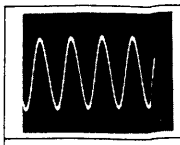
D E F G

4.6.3 Audi

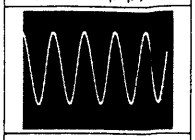
to MECHACON SUB 20 Board



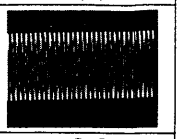
Audio circuit



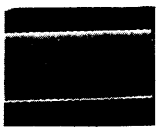
CN2 ⑤
Audio in
1kHz -20dB
(220mVp-p)



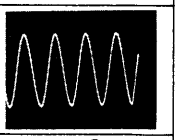
IC1 ⑩
Line Amp out
1kHz 0dB
(2.2Vp-p)



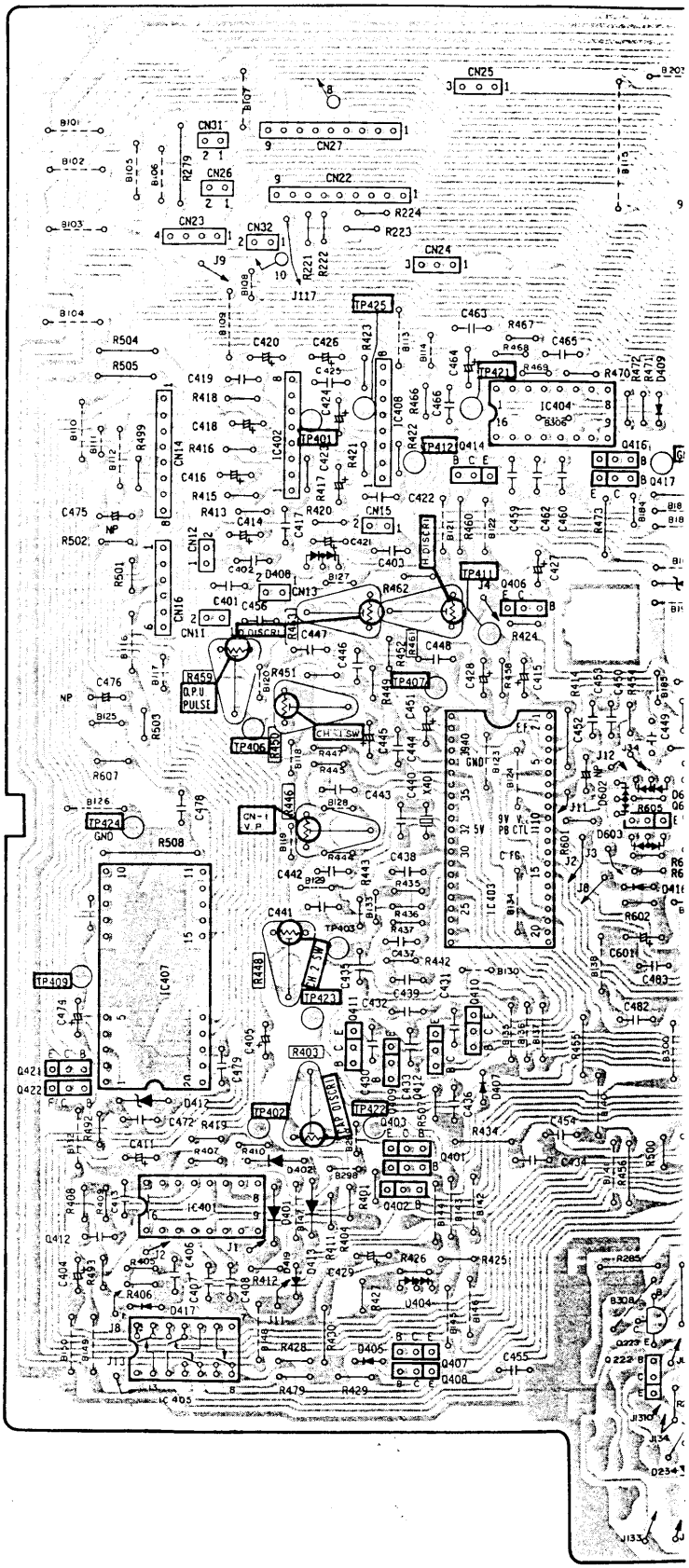
T1 ⑤⑥
Bias Osc
68kHz 200Vp-p



CN1 ①
REC Audio
9Vp-p

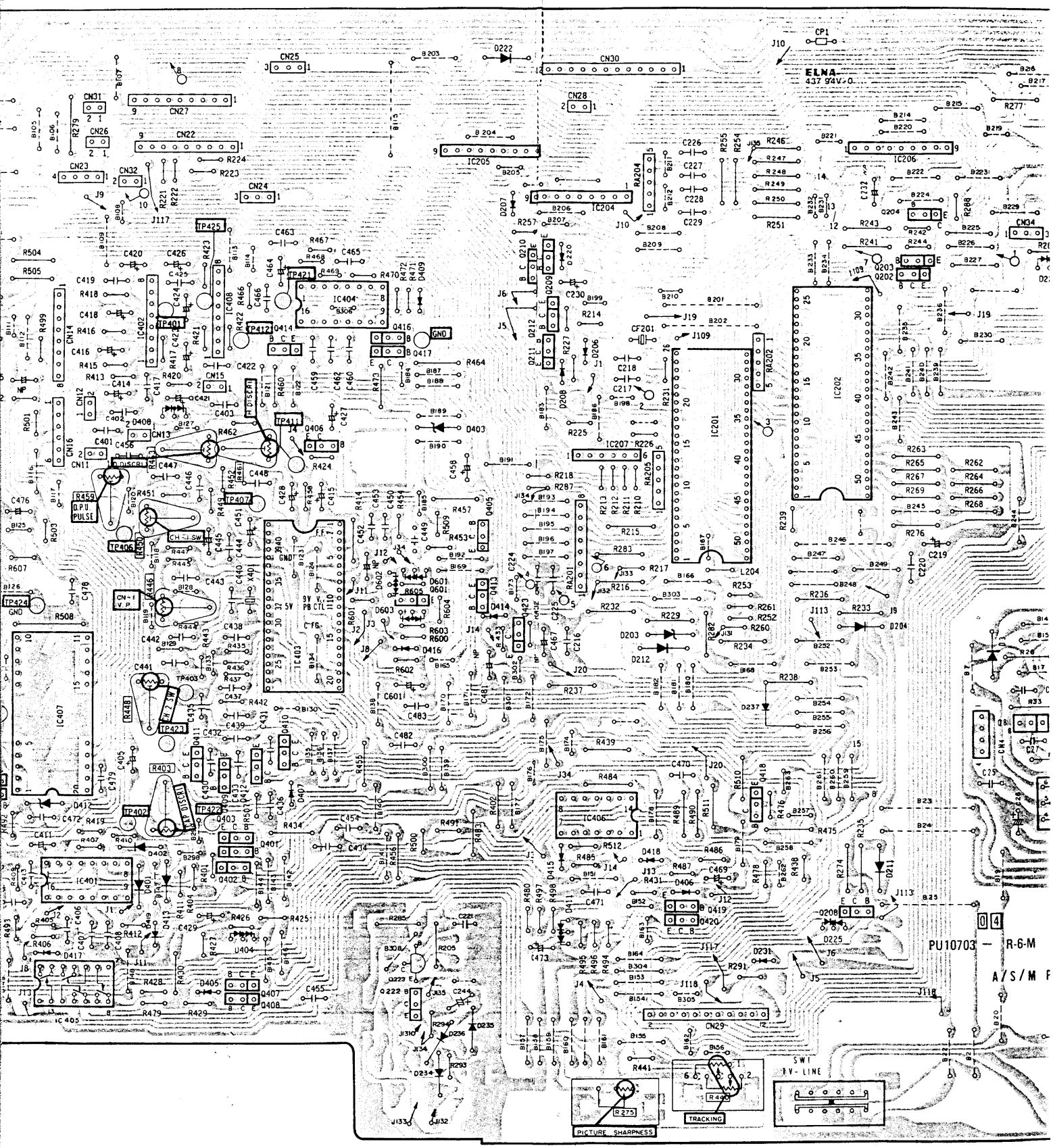


CN2 ③
Audio out
1kHz 0dB
(2.2Vp-p)



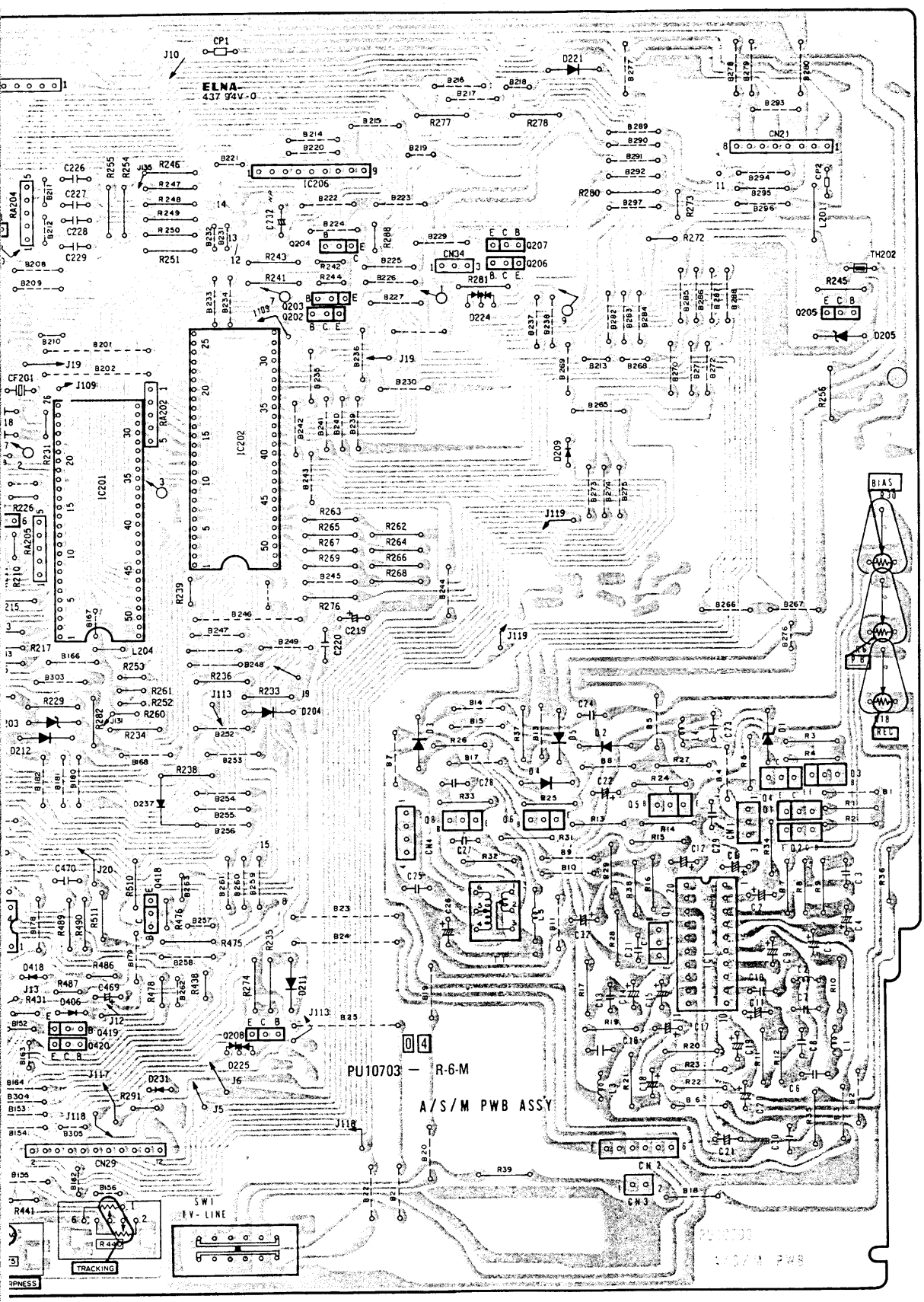
ECHACON SUB 2 0 Board

4.6.3 Audio/Servo/Mechacon circuit board

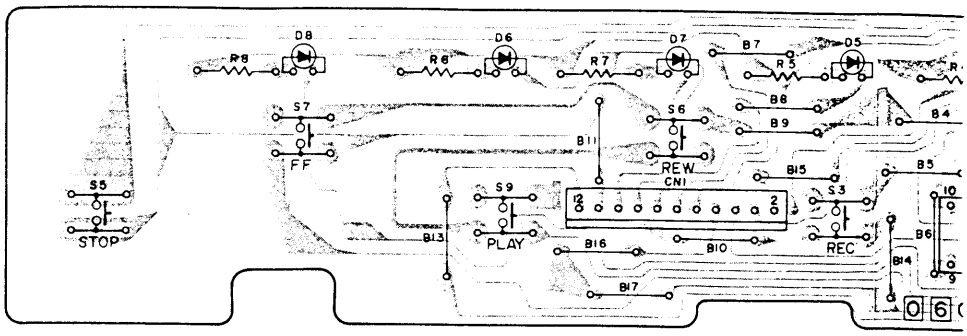


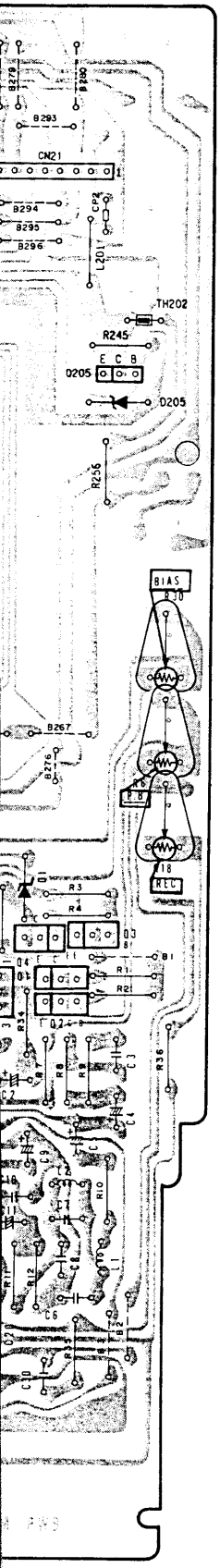
uit board

4.6.

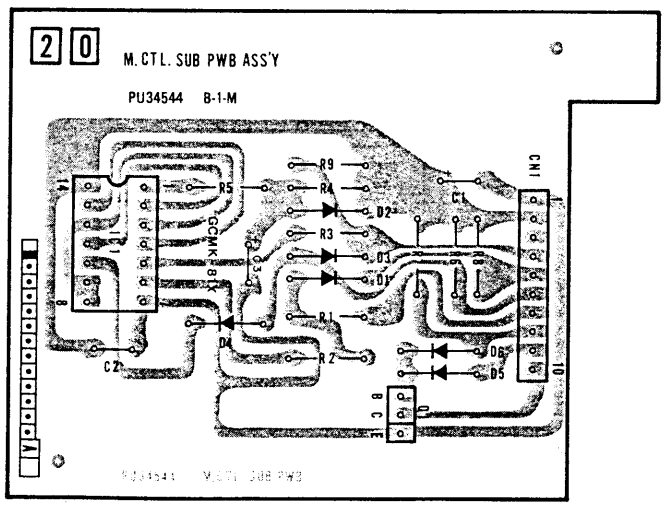

ELNA
437 94V-0
PU10703 — R-6-M
A/S/M PWB ASSY
BIAS
REC
TRACKING
SW1
EV-LINE

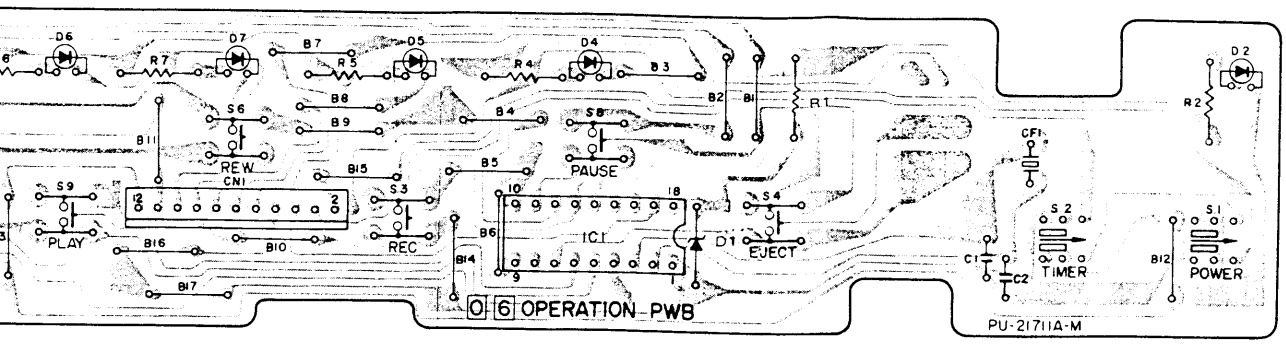
4.6.4 Operation circuit board





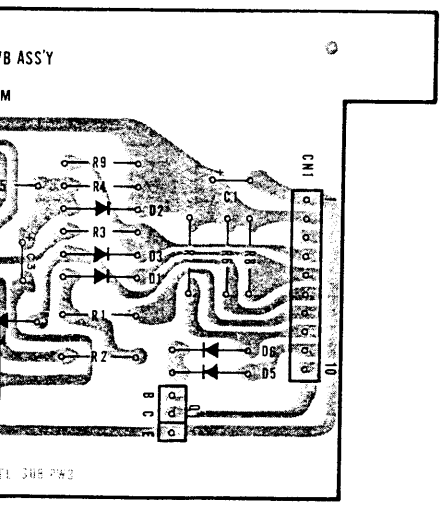
4.6.5 Mechacon sub circuit board

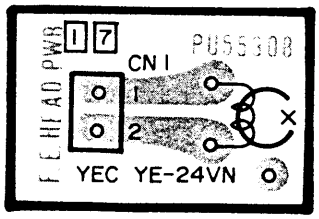




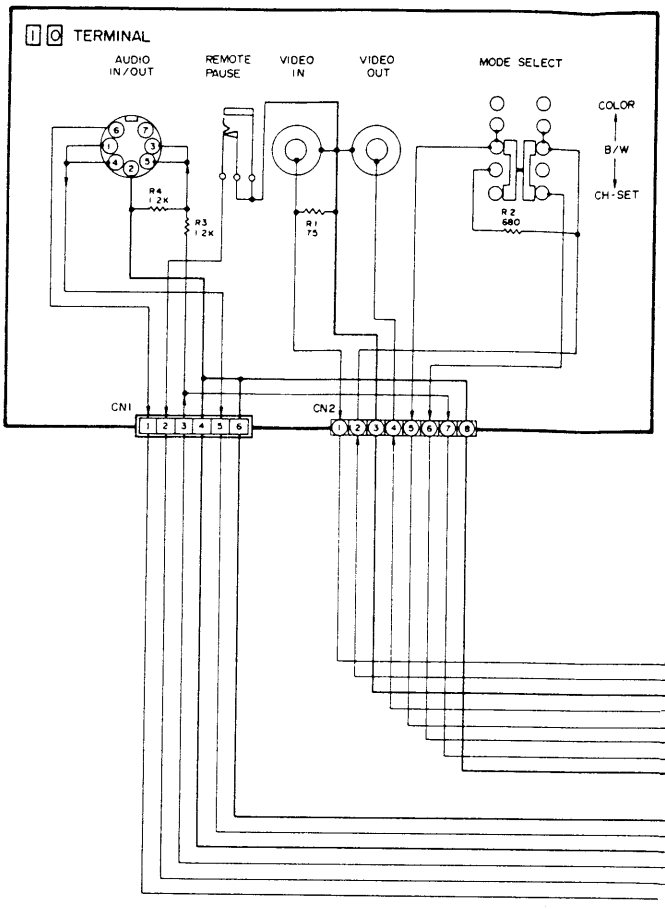
cuit board

4.6.6 Full erase circuit board

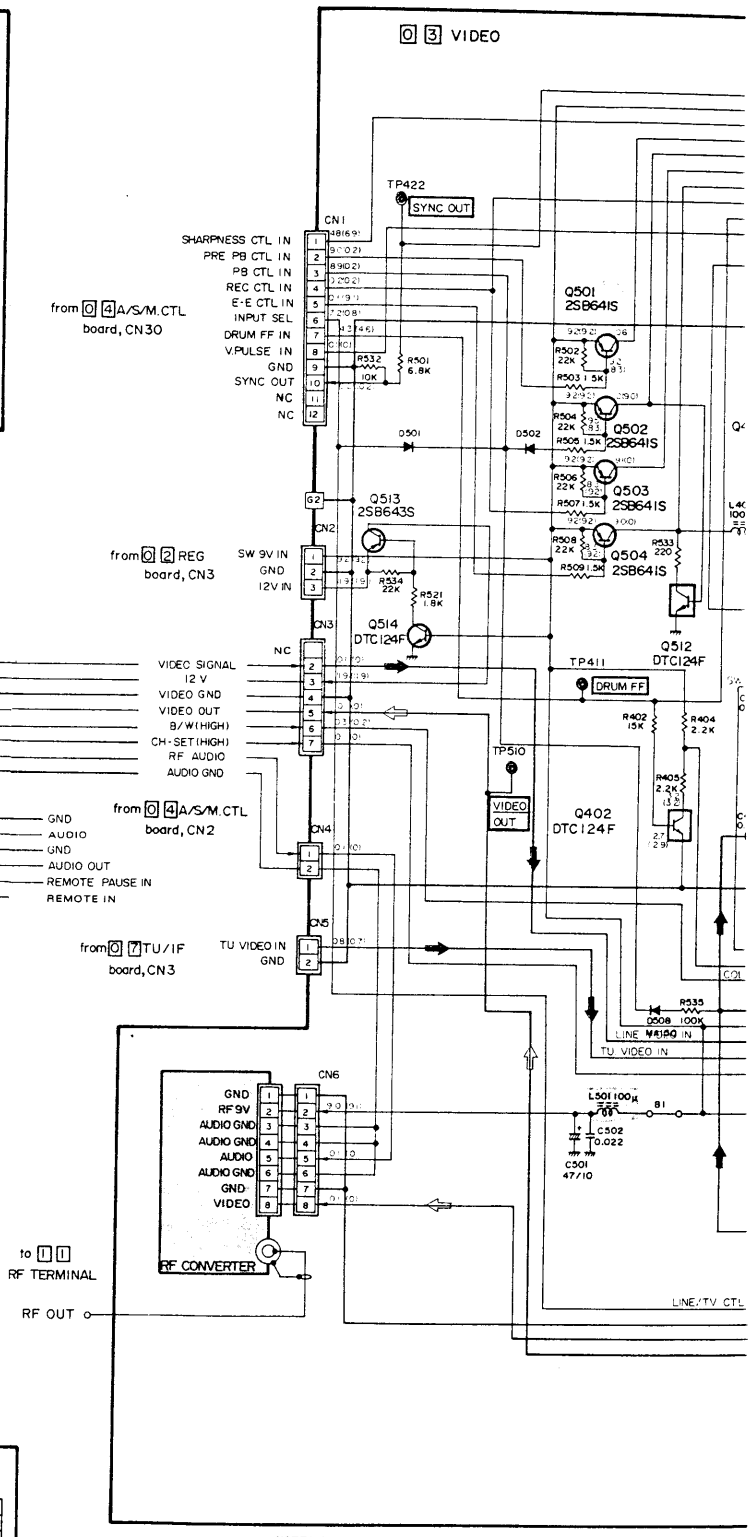




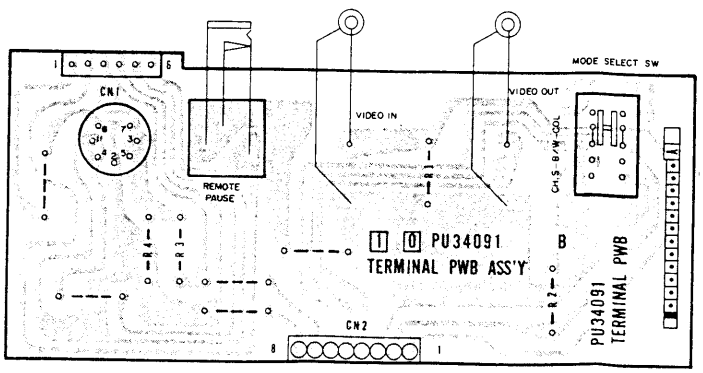
4.6.7 Terminal circuit



4.6.9 Video ci



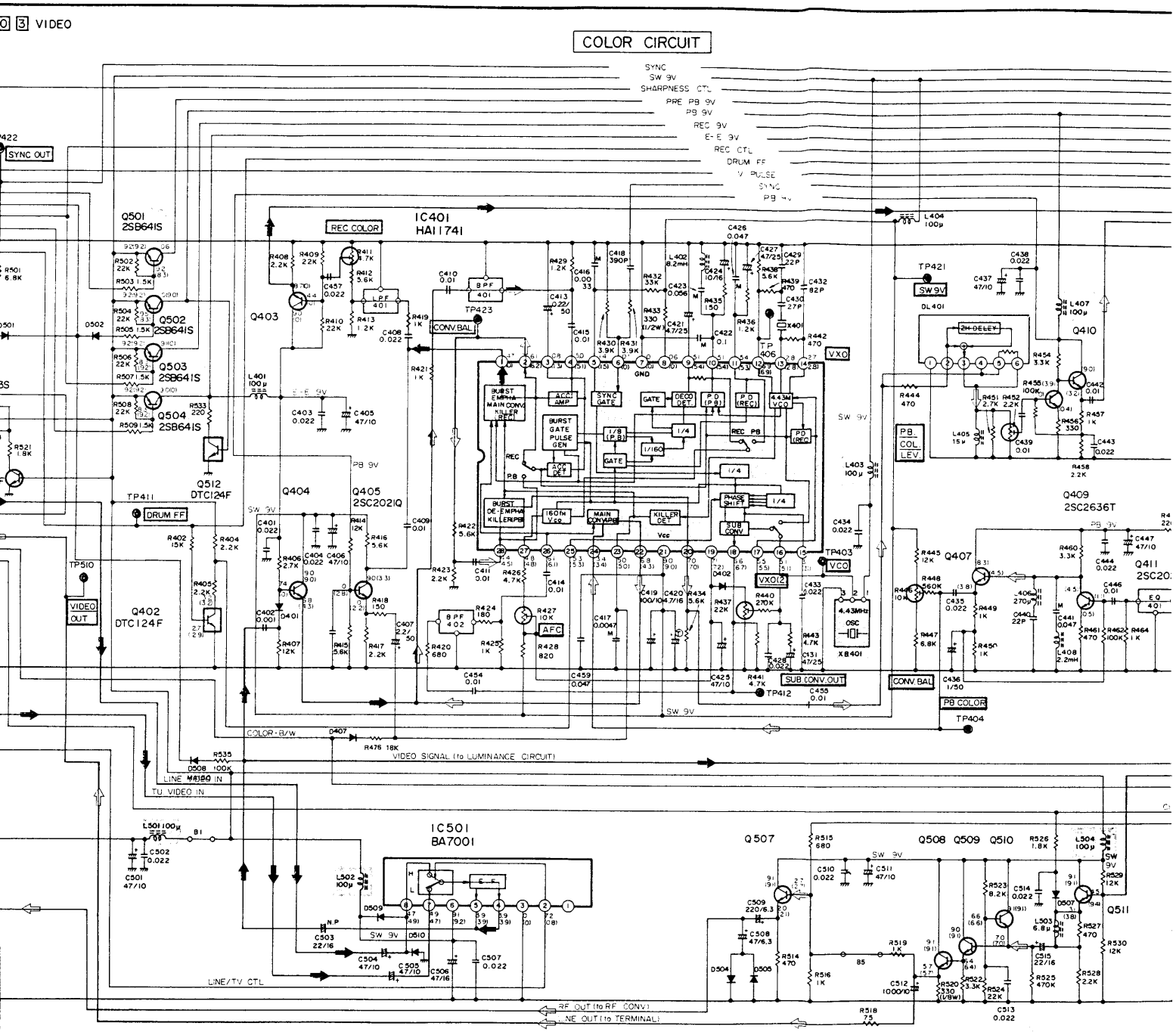
4.6.8 Terminal circuit board



NOTE: Unless otherwise specified

1. All resistance values are in ohms.(1/ W)
2. All inductance values are in μH.
3. All capacitance values are in μF.
4. Voltages are DC-measured with a digital voltmeter during recording mode.
5. Where voltage differs between recording and playback, the voltage during playback is shown in parentheses.
6. Shaded( ) parts are critical for safety. Replace only with specified part numbers.
7. All transistors are 2SC2021Q,R,S.
8. All diodes are 1SS133

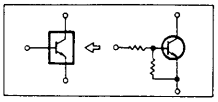
4.6.9 Video circuit



e specified
values are in ohms.(1/ W)
e values are in μH.
ce values are in μF.
DC-measured with a digital voltmeter during recording mode.
a differs between recording and playback, the voltage during
hown in parentheses.
parts are critical for safety. Replace only with specified

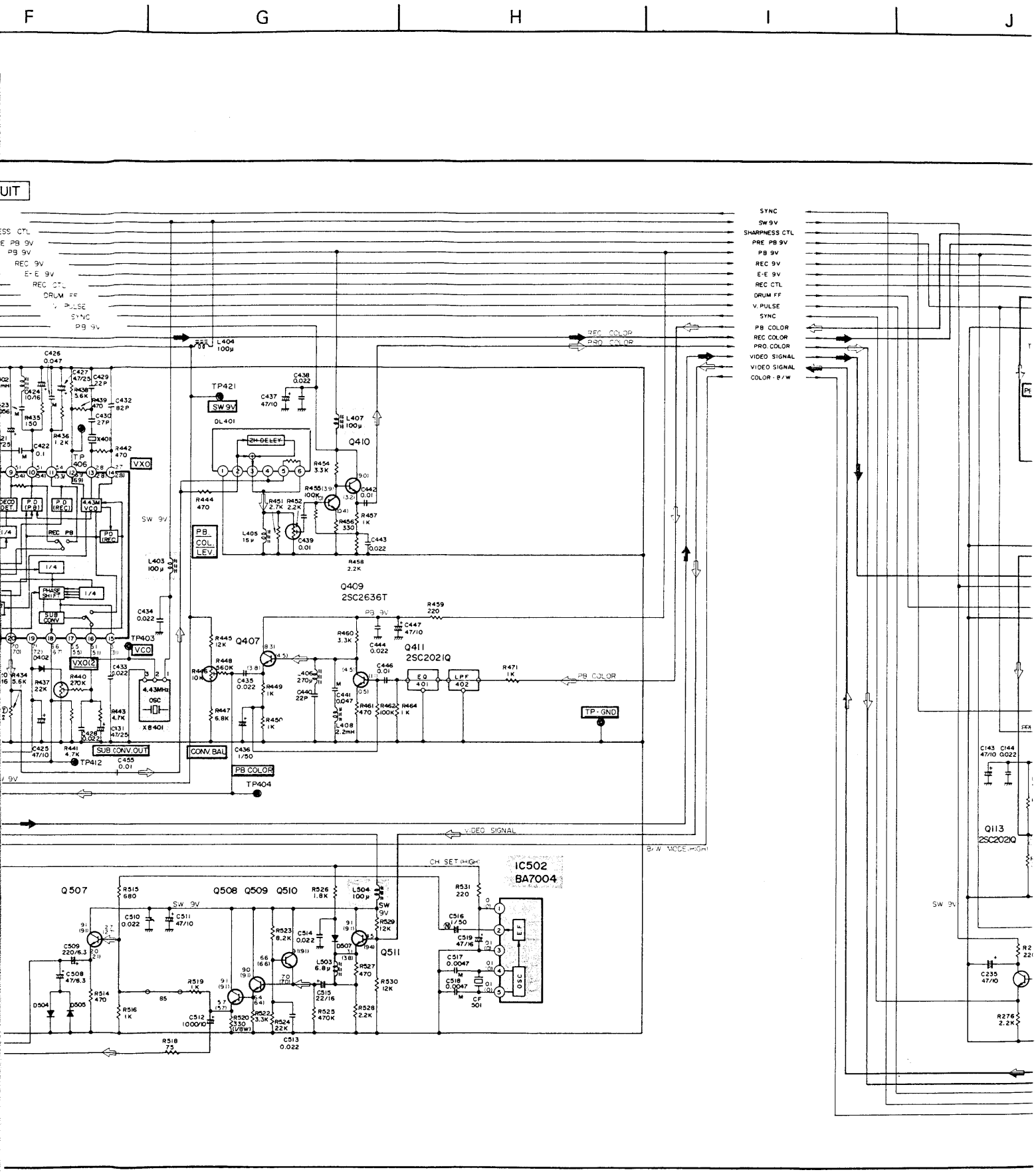
s are 2SC2021Q,R,S.
e 1SS133

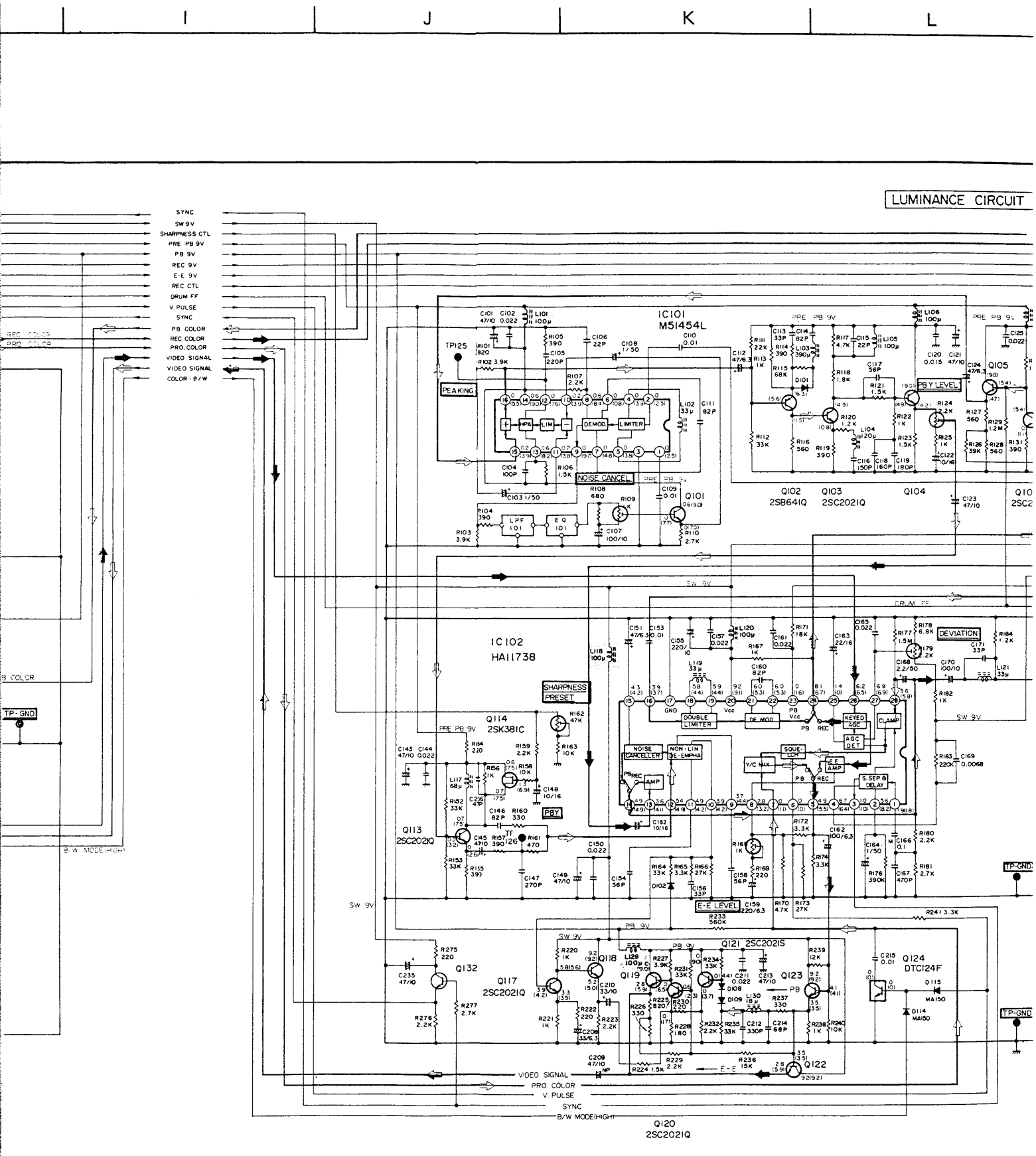
DIGITAL TRANSISTOR



RECORDING SIGNAL PATH
PLAYBACK SIGNAL PATH
REC PLAY SIGNAL PATH

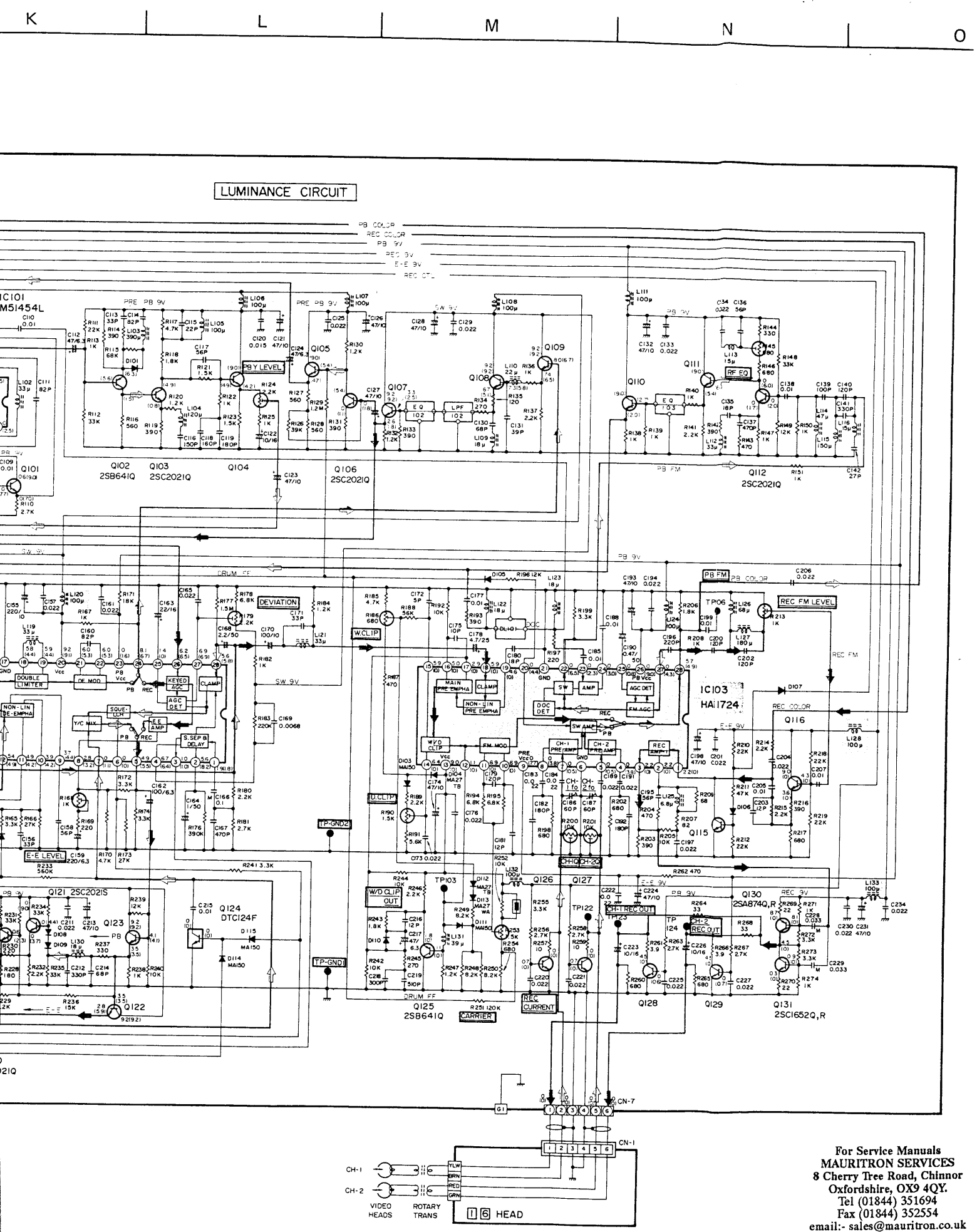
4-8 VIDEO, TERMINAL CIRCUIT (A/S/M. OPE. BOARDS)


F
G
H
I
J
SYNC
SW 9V
SHARPNESS CTL
PRE PB 9V
PB 9V
REC 9V
E-E 9V
REC CTL
DRUM FF
V. PULSE
SYNC
PB COLOR
REC COLOR
PRO. COLOR
VIDEO SIGNAL
VIDEO SIGNAL
COLOR - B/W
REC COLOR
PRO COLOR
TP421
SW 9V
DL401
2H DELEY
Q410
Q409
2SC2636T
Q411
2SC2021Q
Q407
PB COLOR
TP-GND
VCO
TP403
VXO
VXO(2)
4.43MHz
OSC
XB401
SUB CONV.OUT
TP412
CONV.BAL
PB COLOR
TP404
VIDEO SIGNAL
B/W MODE (HIGH)
CH SET (HIGH)
IC502
BA7004
Q507
Q508
Q509
Q510
Q511
Q113
2SC2021Q
CF 501
OSC
EF
NOTES: Unless
1. NPN ty
2. Diodes
3. All resi
4. All cap
5. All indr
IAL PATH
L PATH
AL PATH



NOTES: Unless otherwise specified

1. NPN type transistors are 2SC2021Q, R or S.
2. Diodes are 1SS133.
3. All resistance values are in ohms, 1/6 W
4. All capacitance values are in μF
   - Electroytic
   - Mylar or ceramic
5. All indnctance values are in H



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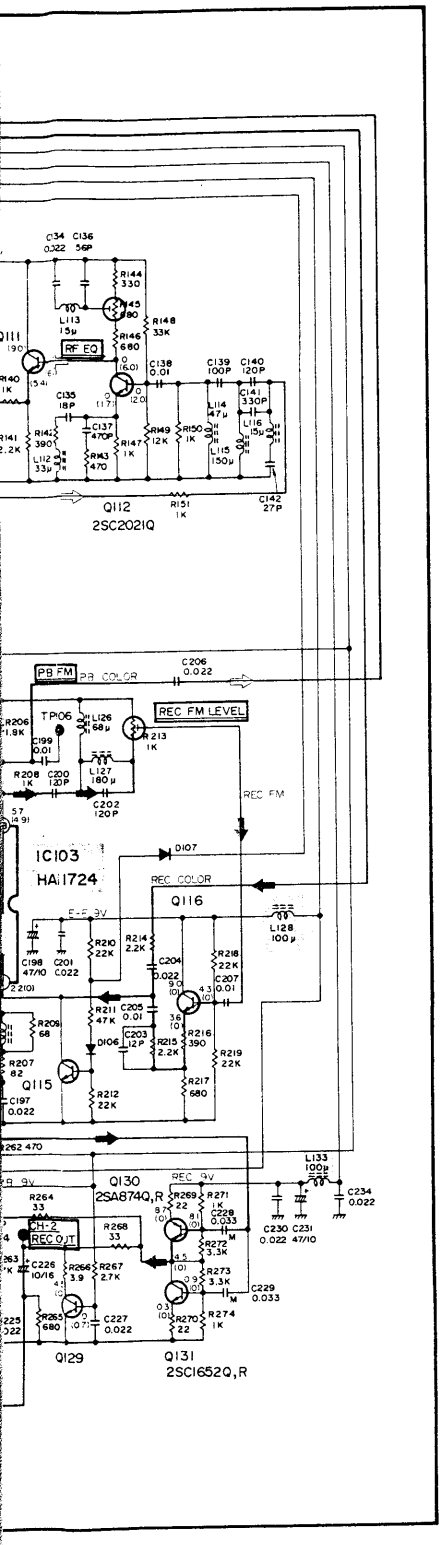
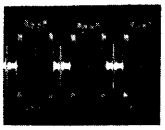
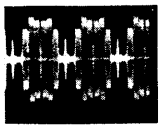
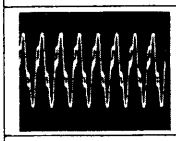
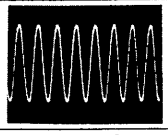
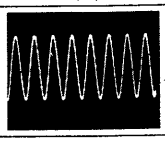
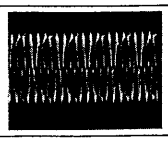
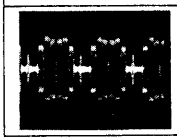
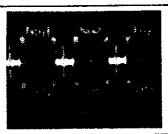
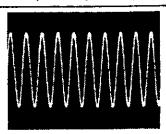
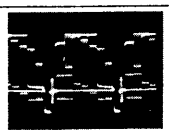
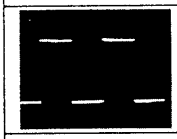
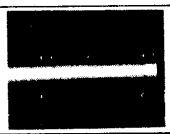
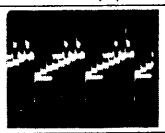
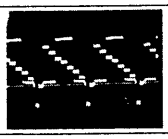
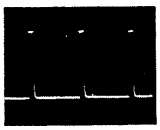
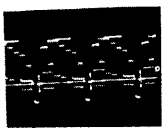
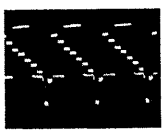
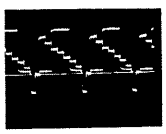
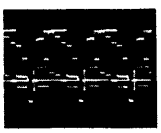
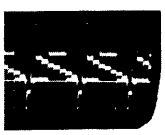
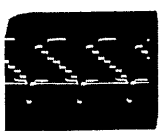
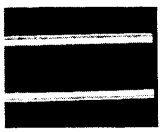
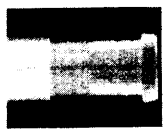
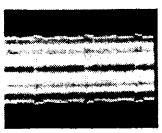
email:- sales@mauritron.co.uk

N O P Q

4.6.10 Main wave forms of video circuit



Video circuit

			
IC401 ① Rec color out 0.7Vp-p	IC401 ② ACC out 1.1Vp-p	IC401 ④ Rec (PB) color in 0.22Vp-p (Rec), 0.38Vp-p (PB)	IC401 ⑥ Sync in 5.5Vp-p
			
IC401 ⑫ VCO out 1.4Vp-p 4.43MHz	IC401 ⑬ VXO in 0.6Vp-p 4.43MHz	TP403 VCO 0.4Vp-p (Fs+1/8Fh)	TP412 Sub. conv. out 1.2Vp-p
			
IC401 ⑳ PB color out 0.8Vp-p	TP404 PB color 0.45Vp-p	IC401 ㉖ 5.6MHz in (Fs+40Fh+1/8Fh) 0.23Vp-p	TP510 Video out 0.9Vp-p
			
TP411 Drum FF 7.5Vp-p	TP125 Peaking 0.15Vp-p	Q106 B PB Video (Y) in 0.7Vp-p	TP126 Sharpness preset 1.1Vp-p
			
IC102 ③ Sync out 8Vp-p	IC102 ⑤ Video out 1.8Vp-p	IC102 ⑦ Color mix in 0.2Vp-p	IC102 ⑫ De-empha in 1Vp-p
			
IC102 ⑬ Amp in 0.27Vp-p	IC102 ⑭ Video (Y) 0.8Vp-p	IC102 ㉔ Rec AGC out 0.58Vp-p	IC102 ㉔ Demod. out 3.5Vp-p
			
IC102 ㉖ Video in 0.9Vp-p	TP103 W/D clip 1.1Vp-p	IC103 ⑱ Clamp in 0.8Vp-p	IC103 ㉒ DOC out 0.7Vp-p
			
IC103 ㉘ Rec mod. out 1.4Vp-p	TP106 PB FM 0.4Vp-p	Q116 E Rec FM 0.45Vp-p	TP123-4 CH-1,2 Rec out 4Vp-p

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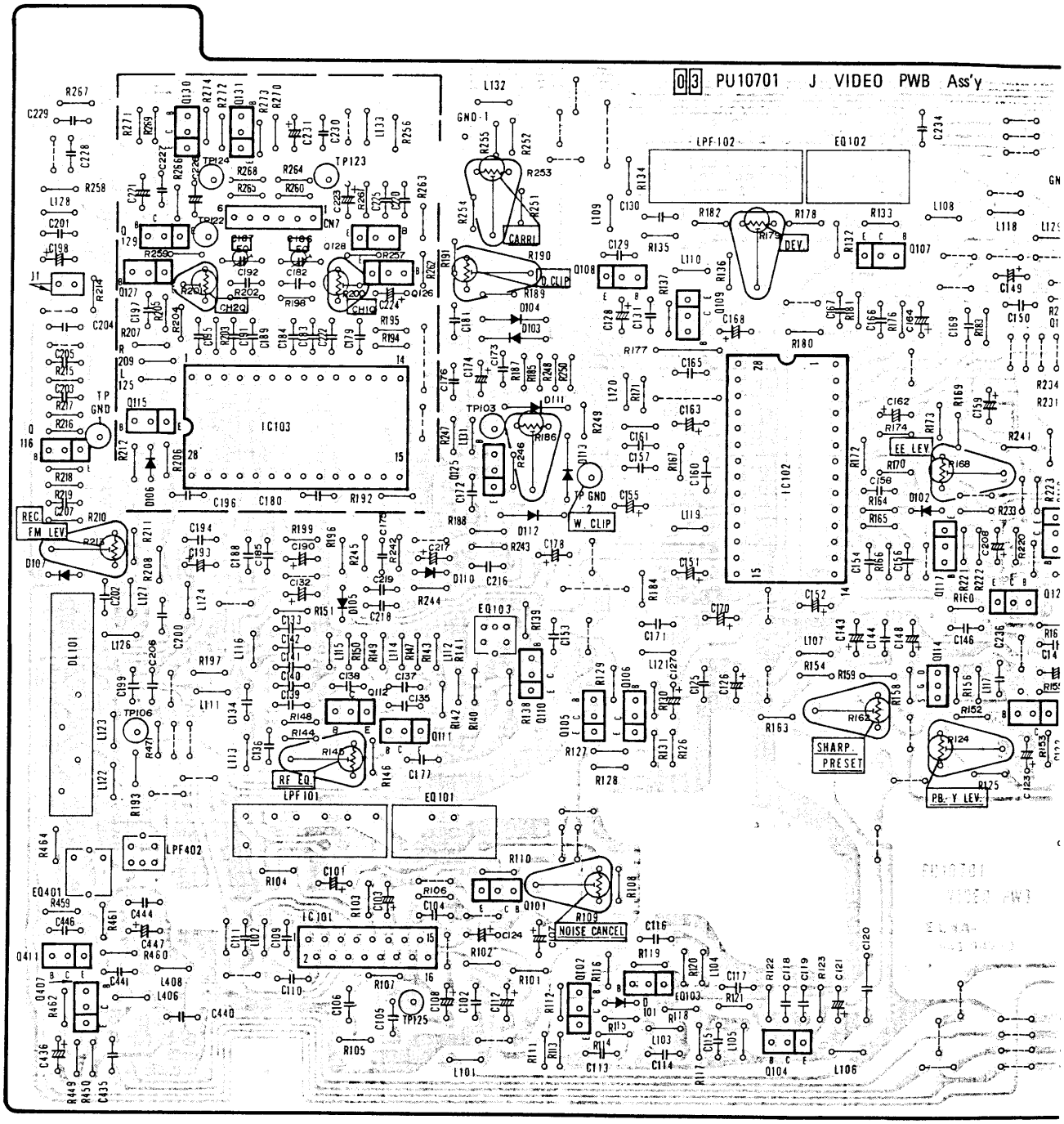
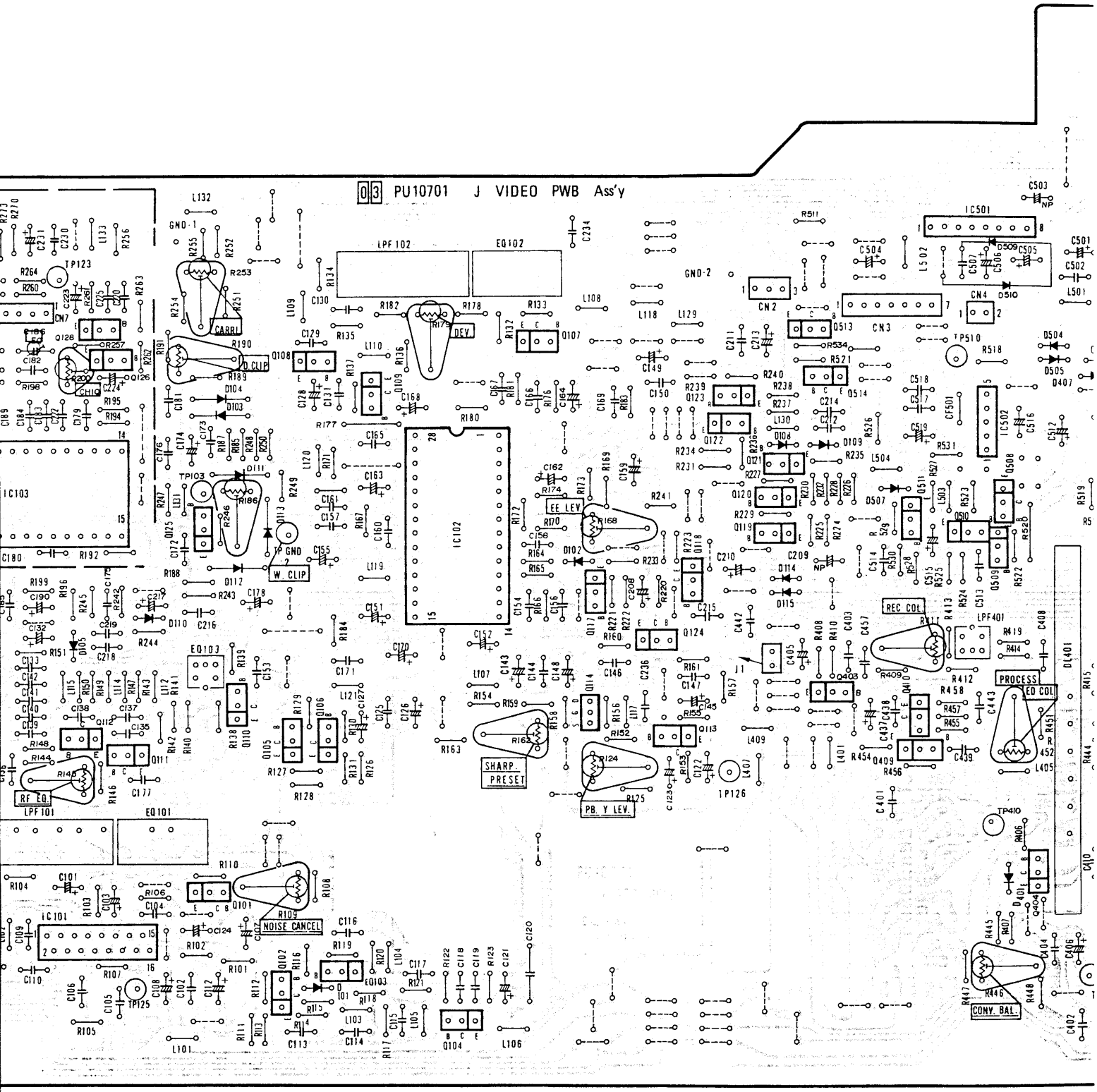
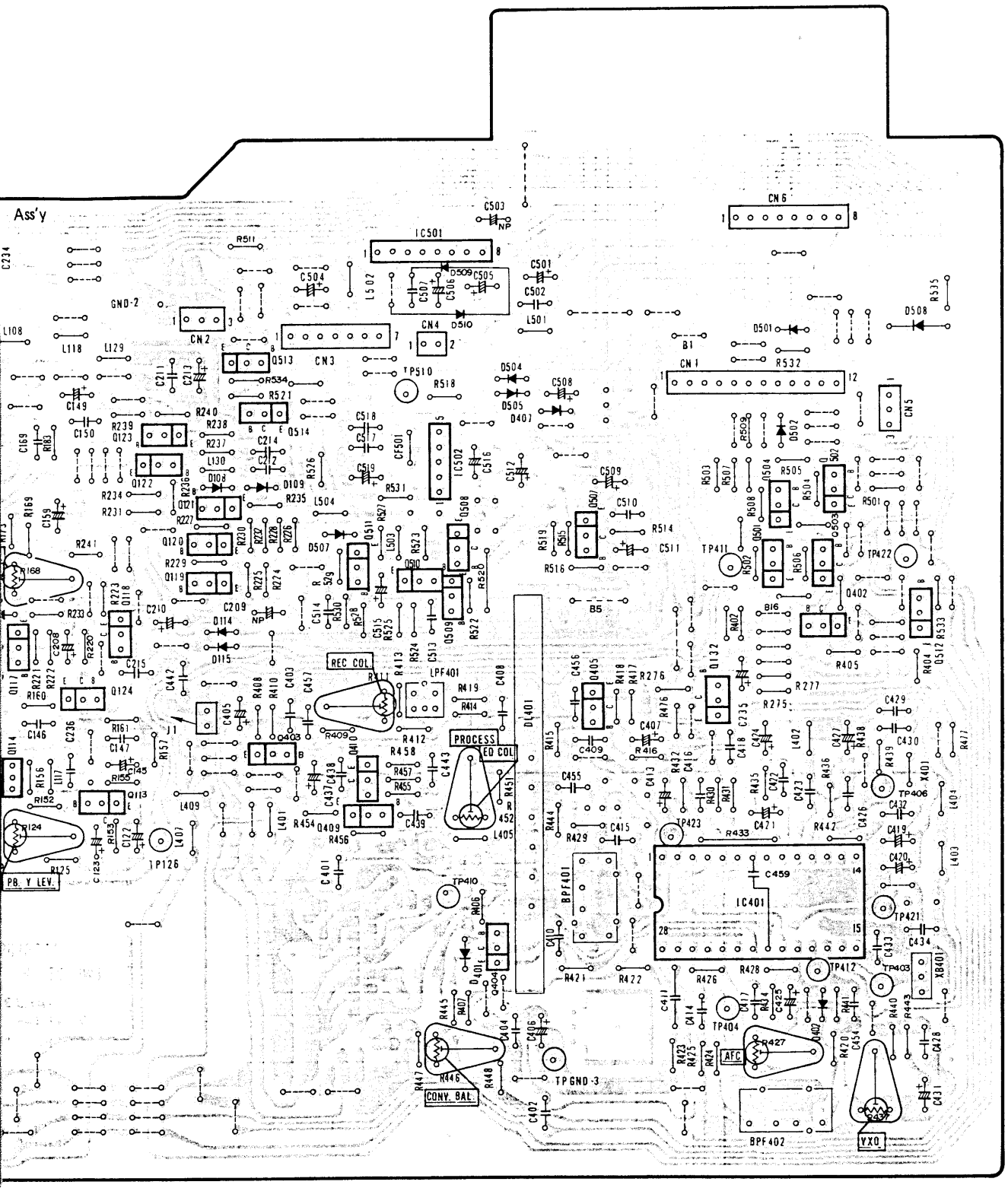
4.6.11 Video circuit board



B C D E

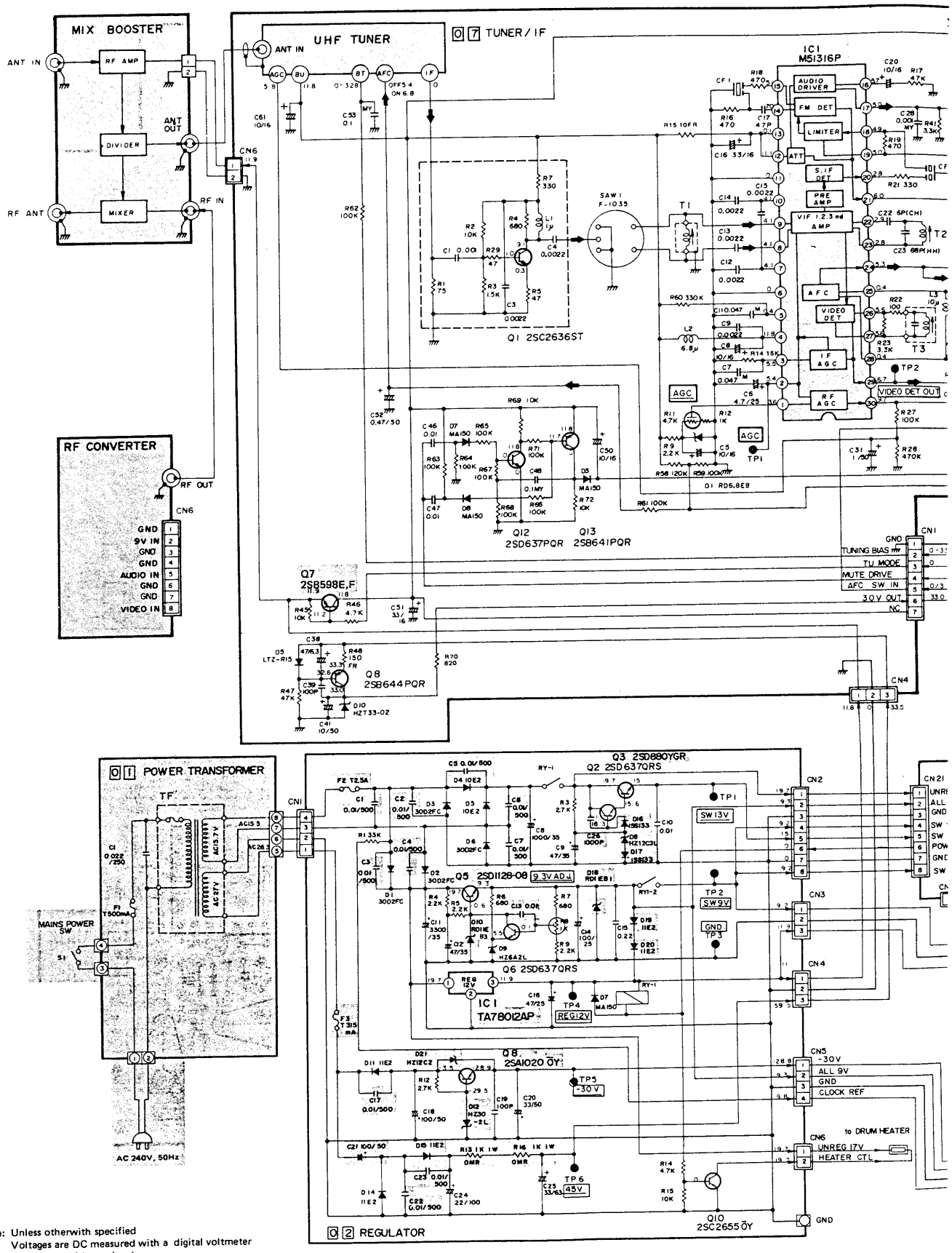


4-9 VIDEO BOARD
(T/IF, T/PRE. P. TRANS. REG. CIRCUITS)



4-9 VIDEO BOARD
(T/IF, T/PRE. P. TRANS. REG. CIRCUITS)

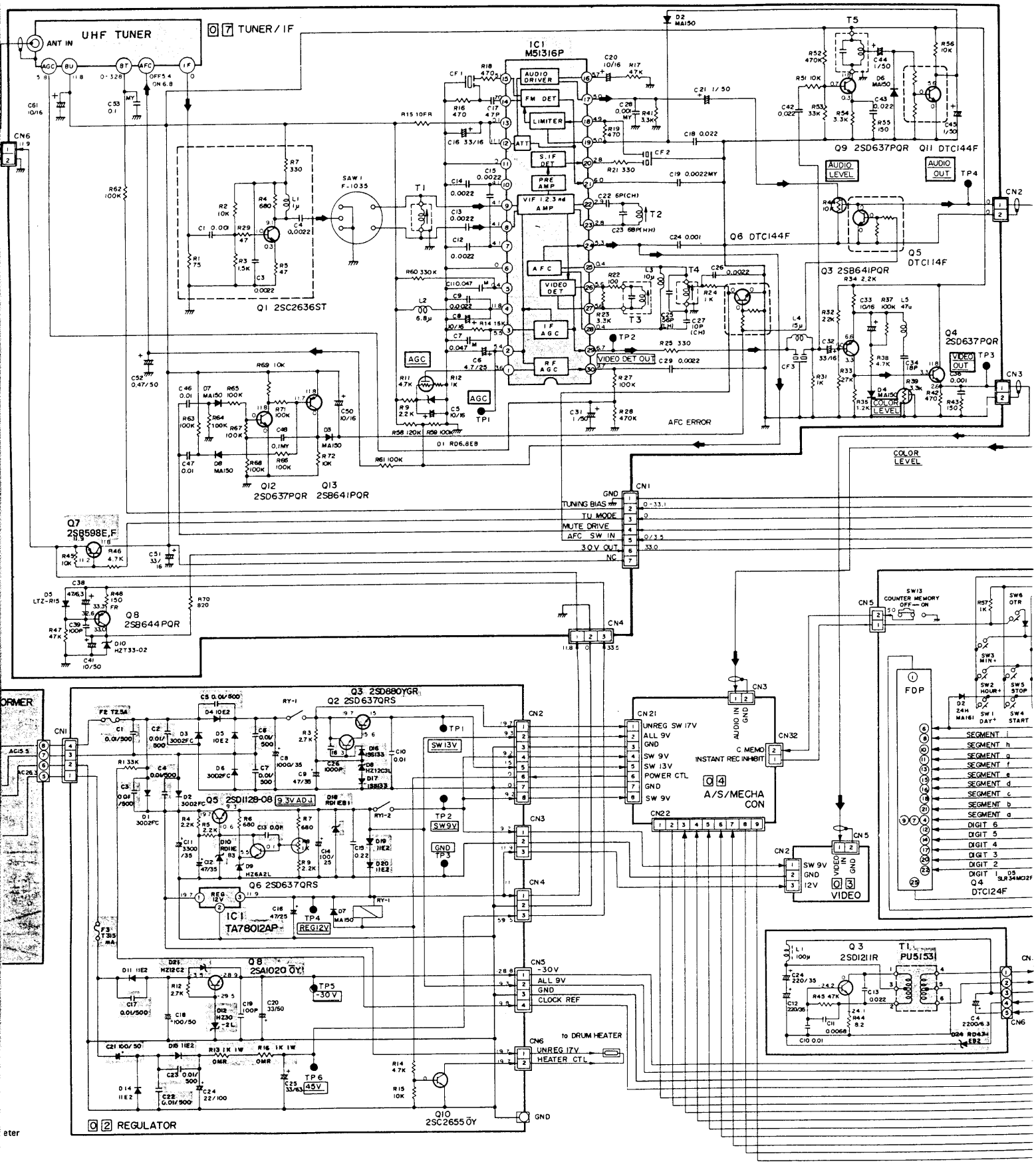
4.6.12 Tuner/IF, Timer/pre-setter, power trans, regulator circuit



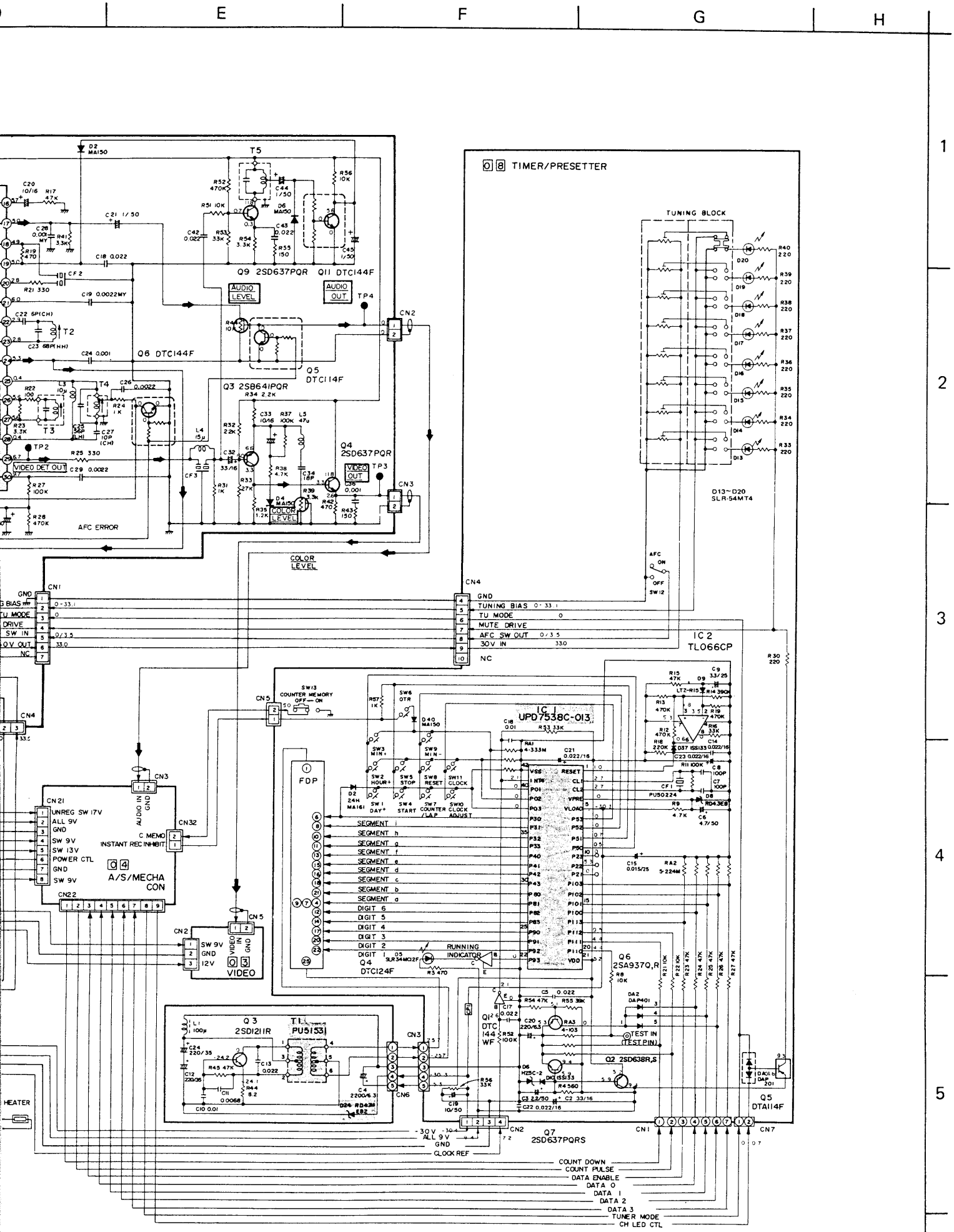
Note: Unless otherwith specified
Voltages are DC measured with a digital voltmeter during stop without signal.

B C D E

-setter, power trans, regulator circuit



4-10 T/IF, T/PRE., P. TRANS. REG. CIRCUITS (VIDEO BOARD)



4-10 T/IF, T/PRE., P. TRANS. REG. CIRCUITS (VIDEO BOARD)