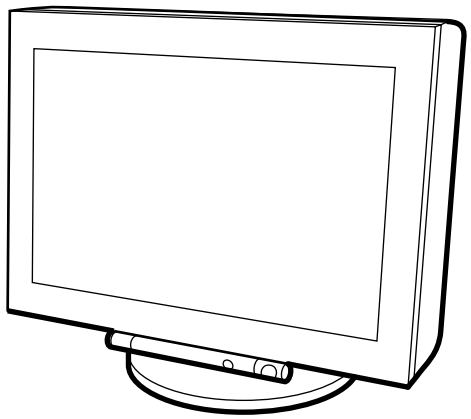
GDM-FW9012

SERVICE MANUAL

N.Hemisphere Model

Chassis No. SCC-L34E-A



G1W CHASSIS

SPECIFICATIONS

CRT	0.23 – 0.27 mm aperture grille pitch 24 inches measured diagonally 90-degree deflection FD Trinitron
Viewable image size	Approx. 482.1 × 308.2 mm (w/h) (19 × 12 1/4 inches) 22.5" viewing image
Resolution	Maximum (16:10) Horizontal: 2304 dots Vertical: 1440 lines Maximum (4:3) Horizontal: 2048 dots Vertical: 1536 lines Recommended (16:10) Horizontal: 1920 dots Vertical: 1200 lines
Input signal levels	Video signal Analog RGB: 0.700 Vp-p (positive), 75 Ω SYNC signal H/V separate or composite sync: TTL 2 kΩ, Polarity free Sync on Green: 0.3 Vp-p (negative)
Standard image area	16:10 Approx. 474 × 296 mm (w/h) (18 3/4 × 11 3/4 inches) 4:3 Approx. 395 × 296 mm (w/h) (15 5/8 × 11 3/4 inches) 5:4 Approx. 370 × 296 mm (w/h) (14 5/8 × 11 3/4 inches)
Deflection frequency*	Horizontal: 30 to 121 kHz Vertical: 48 to 160 Hz
AC input voltage/current	100 to 240 V, 50/60 Hz, 2.2 – 1.2 A
Power consumption	Approx. 160 W (with no USB devices connected)
Operating temperature	10˚C to 40˚C
Dimensions	Approx. 571.5 × 500 ×522.5mm(w/h/d) (22 1/2 × 19 3/4 × 20 5/8 inches)
Mass	Approx. 42 kg (92 lb 10 oz)
Plug and Play	DDC1/DDC2B/DDC2Bi, GTF**
Supplied accessories	• Power cord (1) • Video signal cable (1) • USB cable (1) • Exclusive Power Mac G3/G4 adapter (1) • Warranty card (1) • Notes on cleaning the screen's surface (1) • This instruction manual (1)

* Recommended horizontal and vertical timing condition
- Horizontal sync width duty should be more than 4.8% of total horizontal time or 0.8 µs, whichever is larger.
- Horizontal blanking width should be more than 2.3 µsec.
- Vertical blanking width should be more than 450 µsec.

** If the input signal is Generalized Timing Formula (GTF) compliant, the GTF feature of the monitor will automatically provide an optimal image for the screen.

Design and specifications are subject to change without notice.

24-inch Color Monitor

HP

SECTION 3
ADJUSTMENTS

Note: Hand degauss must be used on stand-by or power-off condition.
This model has an automatic earth magnetism correction function by using an earth magnetism sensor and a LCC coil. When using a hand degauss while monitor (LCC coil) is being operated, it sometimes gets magnetized, and the system may not work properly as a result.

• Landing Rough Adjustment

1. Enter the full white signal. (or the full black dots signal).
2. Adjust the contrast to the maximum.
3. Make the screen monogreen.

Note: Off the outputs from R ch and B ch of SG.

4. Reverse the DY, and adjust coarsely the purity magnet so that a green raster positions in the center of screen.
5. Adjust the tilt of DY, and fix lightly with a clamp.

Note: "TILT" = "128".

• Landing Fine Adjustment

1. Put the set inside the Helmholtz coil. ("LCC SW" = "12")
2. Input the single green signal and set the "CONTRAST" = "255".

Note: After the W/B adjustment with 9300K, measure an average of ΣIk when a full white signal is entered in the CONT MAX/BRT CENT status. Then make adjustment so that the specified screen can be attained after aging for 2 hours with Ik equivalent to 30% of the average value.

3. Demagnetize the metal part of the chassis with the hand degausser and coil degausser, and the CRT surface with the hand degausser.
   Input AC 230V to AC IN, turn on and off the power to perform auto degaussing. (Perform auto degaussing by setting "FUNCTION SW" = 1. Return to the original value after use.)
   Demagnetize the CRT surface with the hand degausser again.

Note:

(1) Hand degauss must be used on stand-by or power-off condition.
This model has an automatic earth magnetism correction function by using an earth magnetism sensor and a LCC coil. When using a hand degauss while monitor (LCC coil) is being operated, it sometimes gets magnetized, and the system may not work properly as a result.

(2) Adjust in a non-magnetic field.

(3) If adjusting in a magnetic fields, add the shift from the non-magnetic field in your estimation.

4. Attach the wobbling coil to the designated part of the CRT neck.
5. Attach the sensor of the landing adjustment unit on the CRT surface.

6. Adjust the DY position and purity, and the DY tilt, and landing of the center and 4 corners with the landing checker.
   After adjustment, set “LCC SW” to “13”.
   - Write terrestrial magnetism sensor reading VX and VY to “LCC VX” and LCC VY” respectively. Adjust the landing by moving “LCC NS”, “LCC LT”, “LCC LB”, “LCC RT” and “LCC RB”. However, the register adjustment must be limited within the following range.

     “LCC NS” 128 ± 45

     “LCC LT”, “LCC LB”, “LCC RT”, “LCC RB” 128 ± 40

     Save the service data.

* Adjustment and measurement should be made at the points one inch inside the fluorescent screen.

7. Tighten DY screw.

Note: Torque 22 ± 2 kg.cm (2.2 ± 0.2 Nm) auto degauss it.

8. For the up/down swing, swing the DY and insert a wedge so that the up and down pins are equal at the top and bottom. Adjust the H.TRP VR of DY so that the horizontal trapezoid is equal at the left and right. Insert the wedge firmly so that the DY does not shake.

9. Check the landing of each corner, and if it does not satisfy the specification, adjust the landing of four corners using “LCC LT“, “LCC LB”, “LCC RT” and “LCC RB”.
   However, the register adjustment must be limited within the following range.

   “LCC NS” 128 ± 15

<Specifications>

Adjust so that the green is within the specification given right.
4 corner adjust target : within ± 1

(µm)

0 ± 3	0 ± 7.5	0 ± 3
0 ± 3	0 ± 7.5	0 ± 3
0 ± 3	0 ± 7.5	0 ± 3

The red and blue must be within the specification given right with respect to the green.

(µm)

± 6	± 6	± 6
± 6	± 6	± 6
± 6	± 6	± 6

A difference between red and blue must be within the specification given right.

(µm)

10	10	10
10	7	10
10	10	10

“LCC LT”, “LCC LB”, “LCC RT”, “LCC RB” 128 ± 45

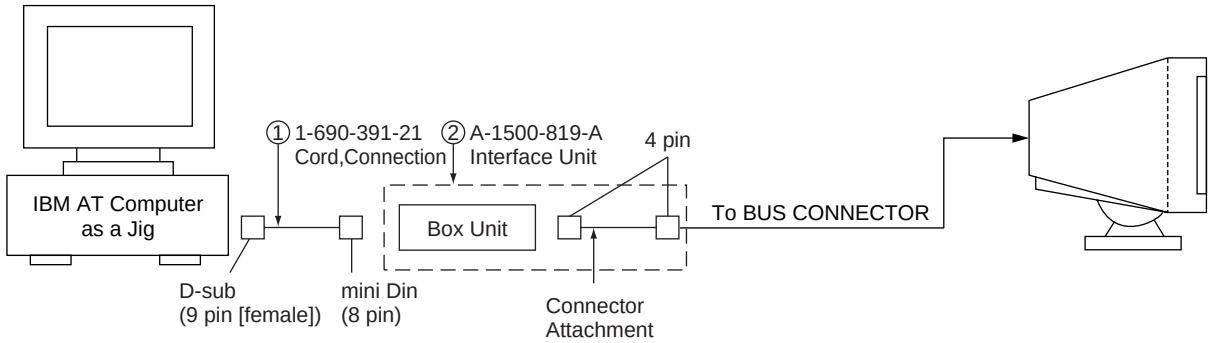
After adjustment, save the service data.

10. Remove the sensor and wobbling coil.

11. Switch the signal to R.G.B., and check that each color is pure.

12. Check that the DY is not tilting, and fix the purity Mg with a white pen. Fix wedges with RTV.

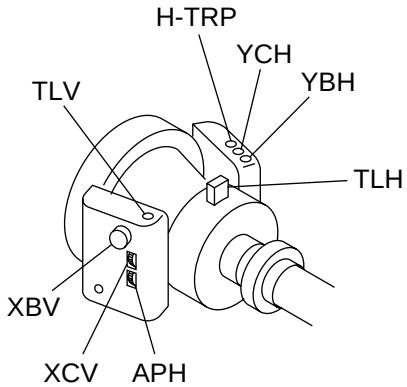
Connect the communication cable of the computer to the connector located on the D board. Run the service software and then follow the instruction.

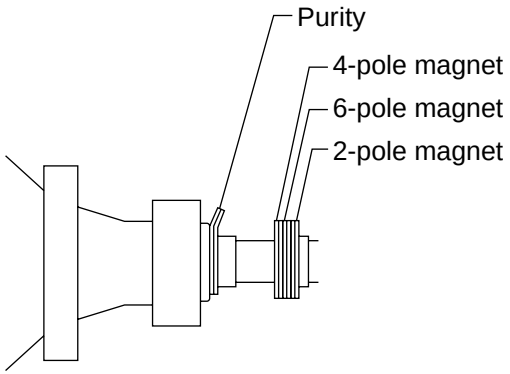


*The parts above (① and ②) are necessary for DAS adjustment.

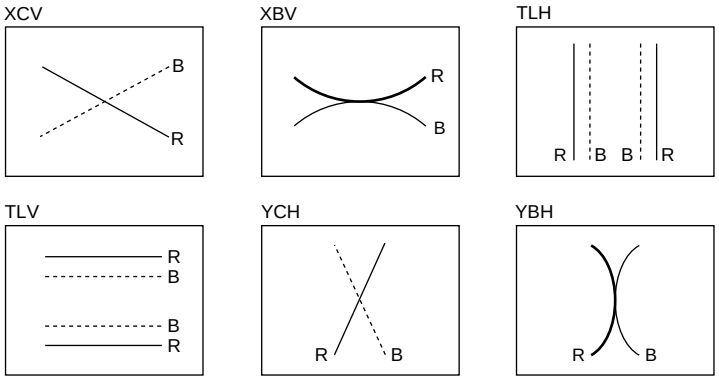
• Convergence Rough Adjustment

(1) Receive an image of the white crosshatch signals (white lines on black).
(2) Place the protrusions of the 6-fold poles magnet attached to the CRT neck upon each other.
(3) Make rough adjustment of the H and V direction convergence by using 4-fold poles magnet.

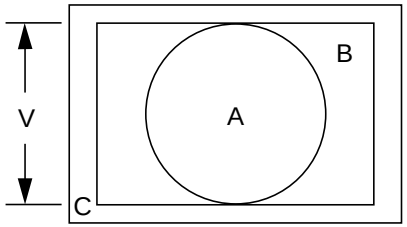




* Set so that the protruding parts of the 2 magnet rings agree with each other.



• Convergence Specification

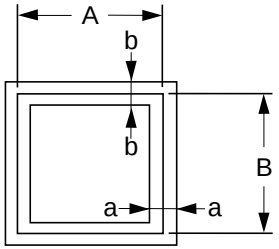


fH	70kHz ≦	70kHz >
A	0.24 mm	0.24 mm
B	0.24 mm	0.28 mm
C	0.28 mm	0.32 mm

• White Balance Adjustment Specification

1. 9300K
   x = 0.283 ± 0.015
   y = 0.298 ± 0.015
   (All White)
2. 6500K
   x = 0.313 ± 0.015
   y = 0.329 ± 0.015
   (All White)
3. 5000K
   x = 0.346 ± 0.015
   y = 0.359 ± 0.015
   (All White)

• Vertical and Horizontal Position and Size Specification



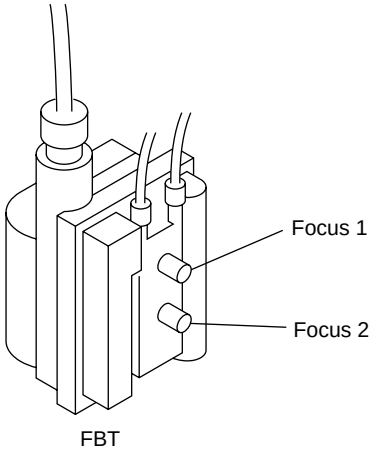
a ≦ 3.5 mm
b ≦ 3.5 mm

MODE	4 : 3	5 : 4
A	395	370
B	296	296

MODE	16 : 9	16 : 10
A	474	266
B	474	296

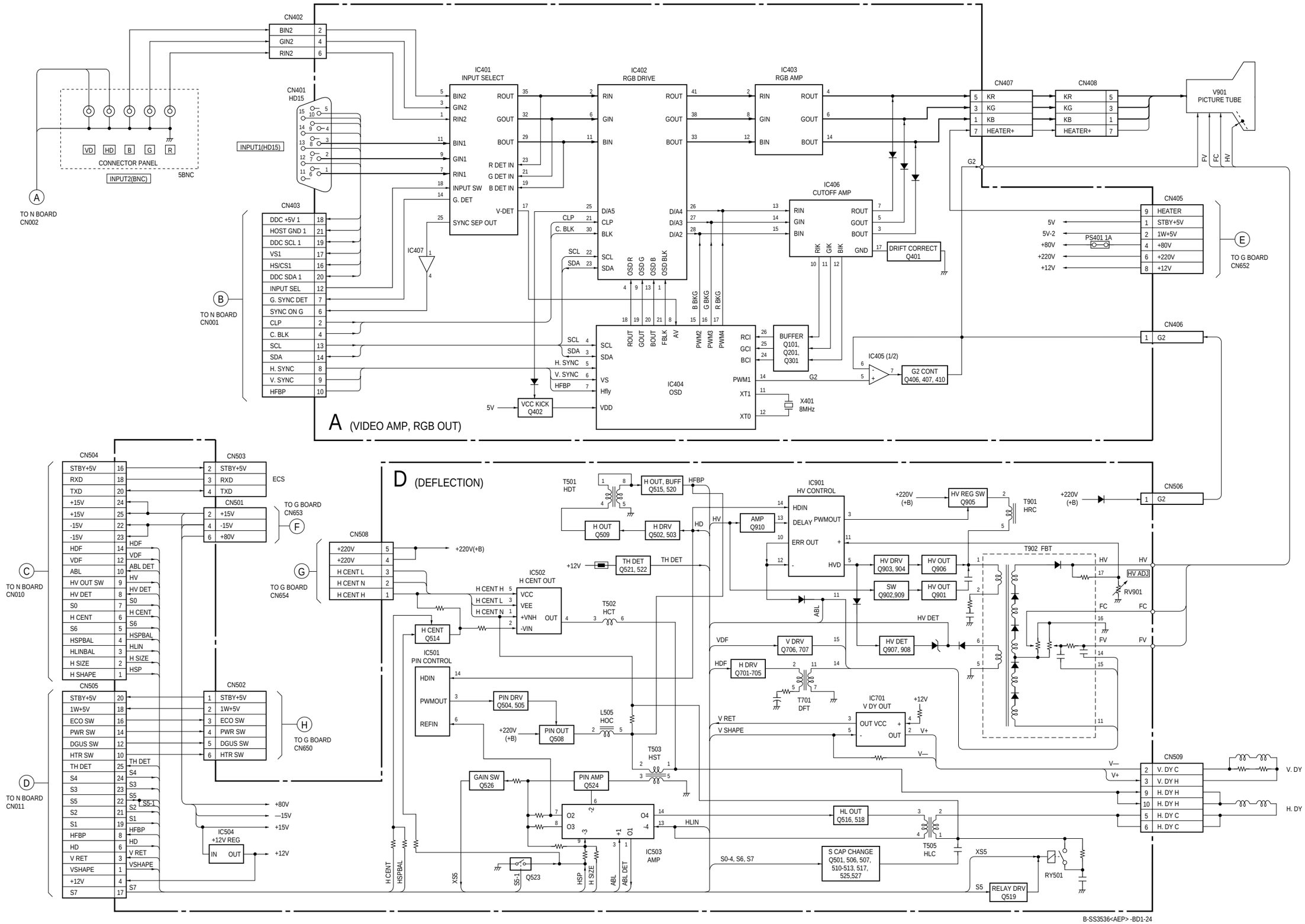
• Focus adjustment

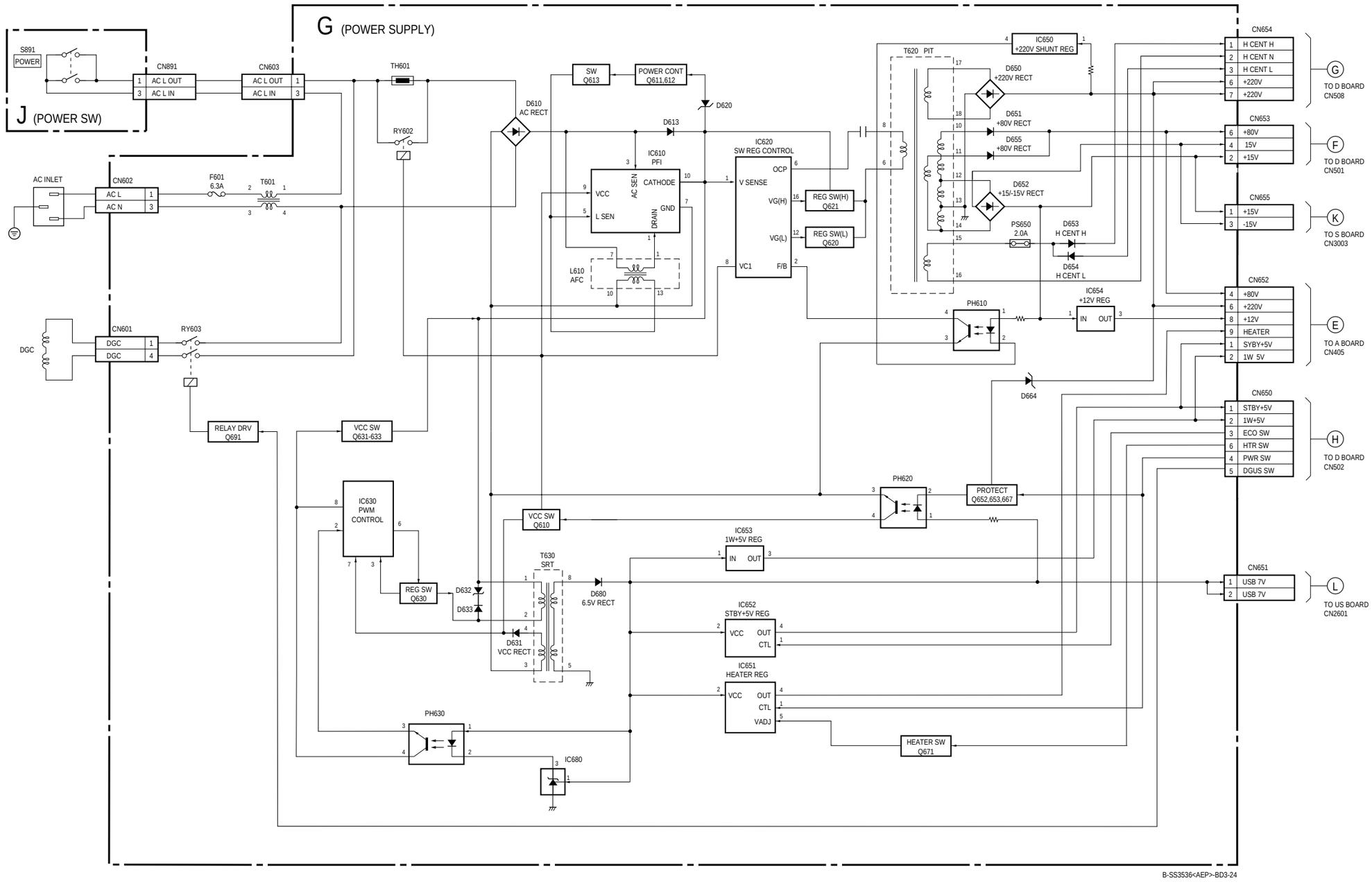
Adjust the focus volume 1 and 2 for the optimum focus.



SECTION 4
DIAGRAMS

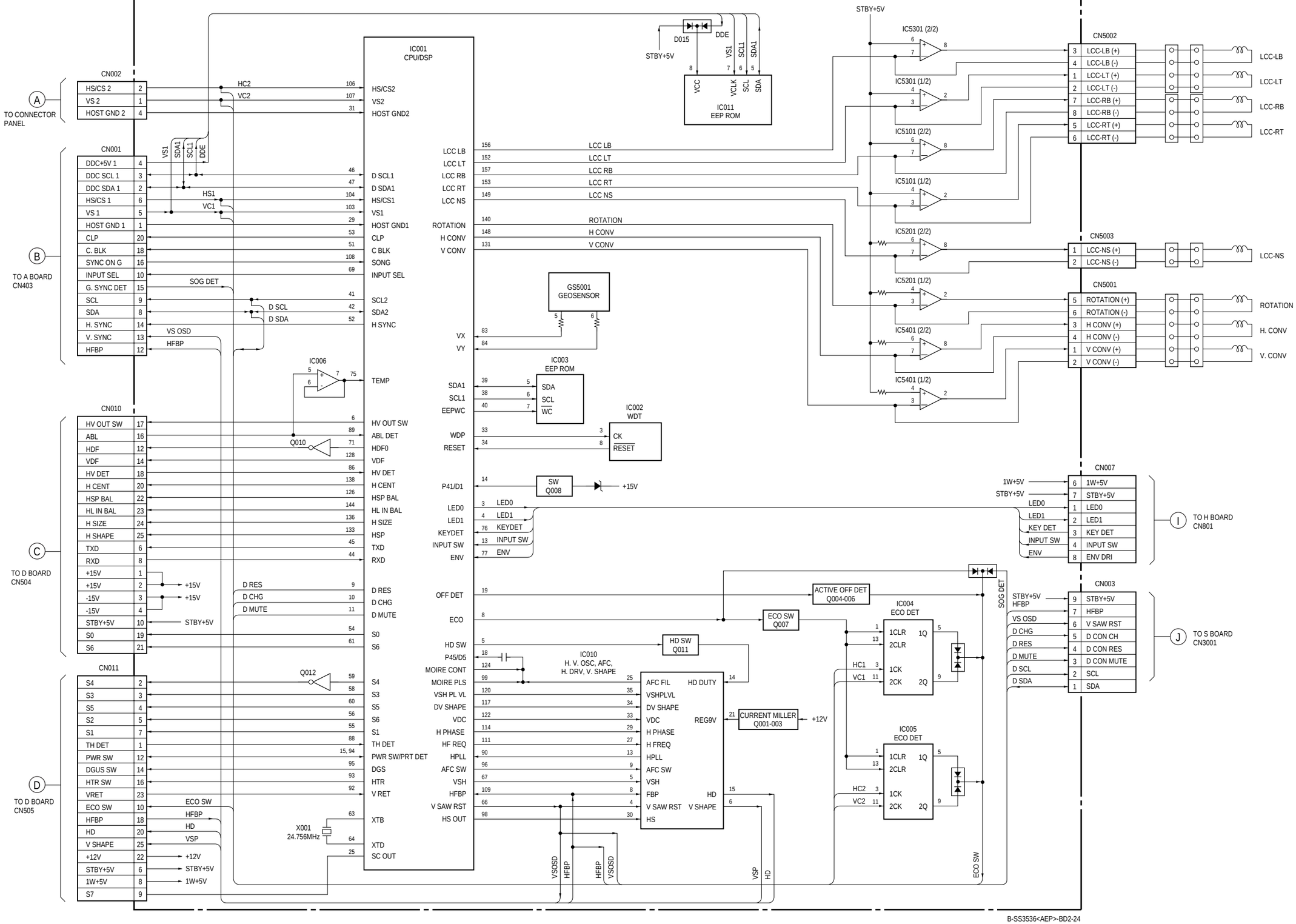
4-1. BLOCK DIAGRAMS



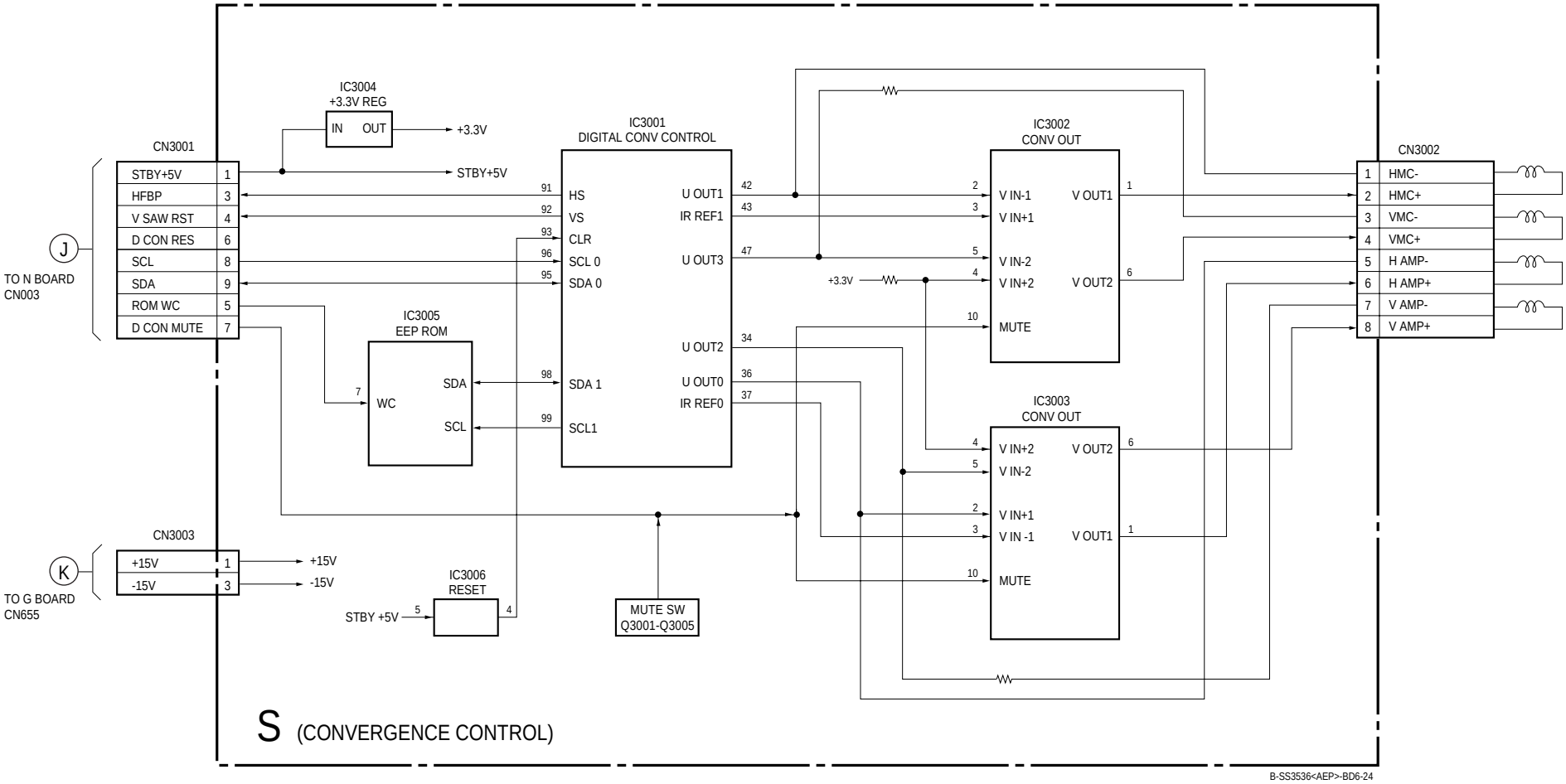


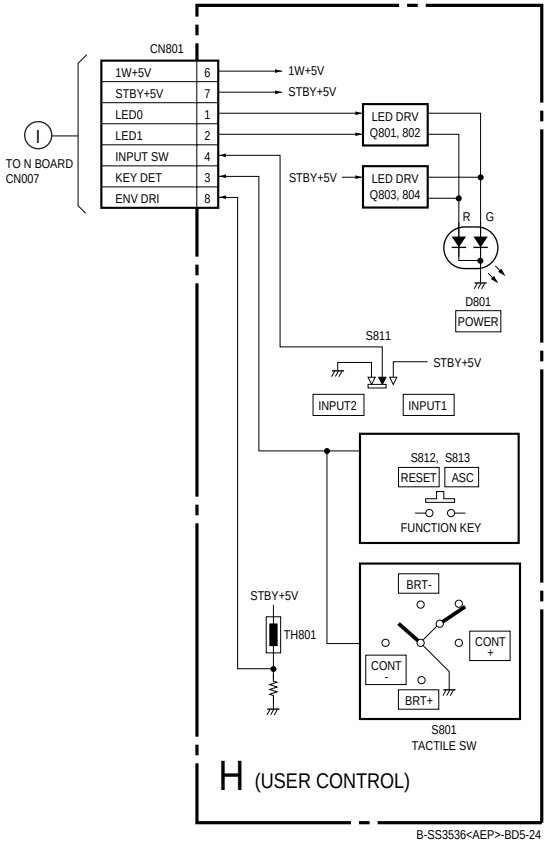
B-SS3536<AEP>-BD3-24

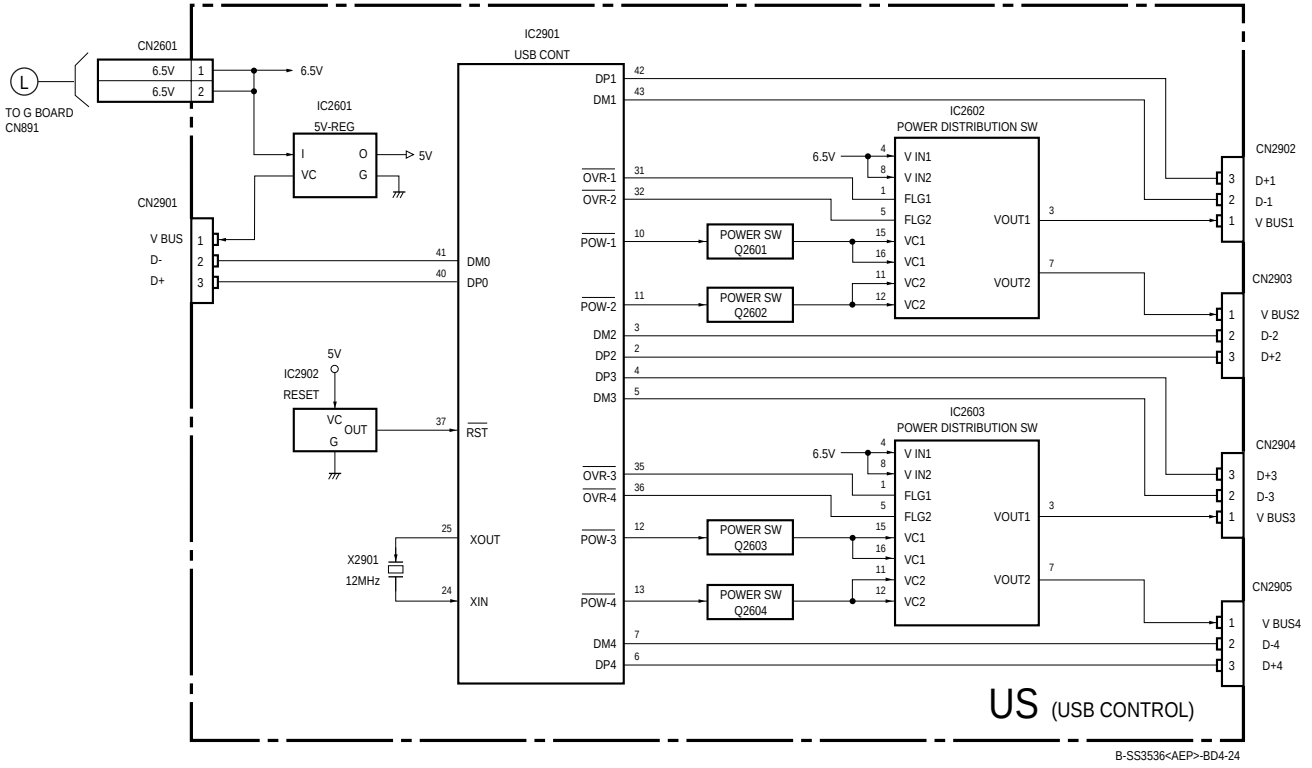
N ⟨ μ-COM, V.CONV, H. CONV, LCC, GEO MAGNETIC SENSOR ⟩



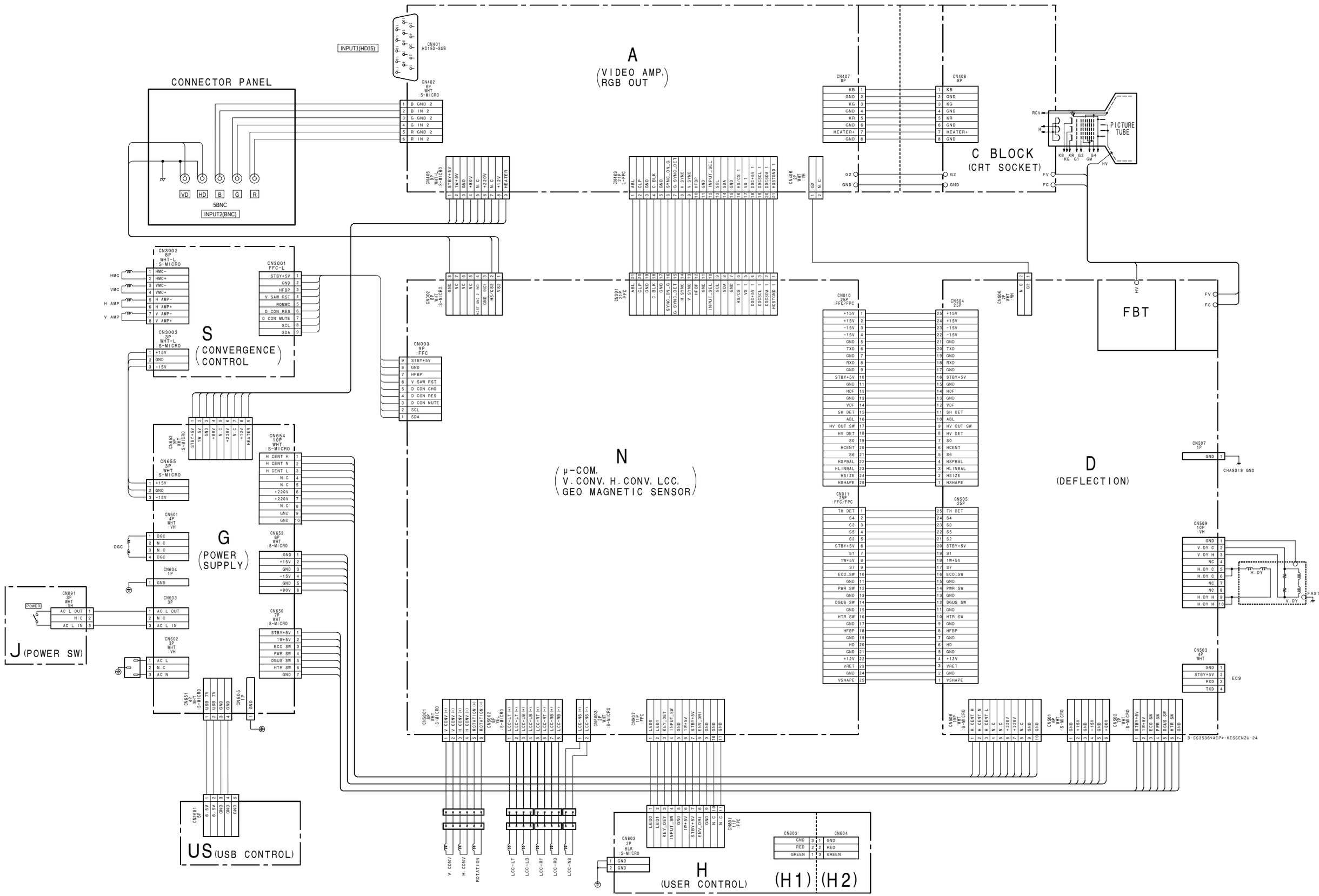
B-SS3536<AEP>-BD2-24


IC3004
+3.3V REG
IN
OUT
+3.3V
CN3001
STBY+5V
HFBP
V SAW RST
D CON RES
SCL
SDA
ROM WC
D CON MUTE
J
TO N BOARD
CN003
IC3001
DIGITAL CONV CONTROL
HS
VS
CLR
SCL 0
SDA 0
SDA 1
SCL1
U OUT1
IR REF1
U OUT3
U OUT2
U OUT0
IR REF0
IC3002
CONV OUT
V IN-1
V IN+1
V IN-2
V IN+2
MUTE
V OUT1
V OUT2
IC3003
CONV OUT
V IN+2
V IN-2
V IN+1
V IN -1
MUTE
V OUT2
V OUT1
CN3002
HMC-
HMC+
VMC-
VMC+
H AMP-
H AMP+
V AMP-
V AMP+
IC3005
EEP ROM
WC
SDA
SCL
CN3003
+15V
-15V
K
TO G BOARD
CN655
IC3006
RESET
STBY +5V
MUTE SW
Q3001-Q3005
S (CONVERGENCE CONTROL)
B-SS3536<AEP>-BD6-24


CN801
1W+5V
STBY+5V
LED0
LED1
INPUT SW
KEY DET
ENV DRI
6
7
1
2
4
3
8
1W+5V
STBY+5V
LED DRV
Q801, 802
LED DRV
Q803, 804
R
G
D801
POWER
S811
STBY+5V
INPUT2
INPUT1
S812, S813
RESET
ASC
FUNCTION KEY
STBY+5V
TH801
BRT-
CONT
+
CONT
-
BRT+
S801
TACTILE SW
TO N BOARD
CN007
H (USER CONTROL)
B-SS3536<AEP>-BD5-24


CN2601
6.5V
6.5V
1
2
TO G BOARD
CN891
6.5V
IC2601
5V-REG
I
O
VC
G
5V
CN2901
V BUS
D-
D+
1
2
3
IC2901
USB CONT
DM0
DP0
41
40
5V
IC2902
RESET
VC
OUT
G
37
RST
25
XOUT
X2901
12MHz
24
XIN
DP1
DM1
DM2
DP2
DM3
DP3
DM4
DP4
42
43
31
32
10
11
12
13
35
36
12
13
7
6
OVR-1
OVR-2
POW-1
POW-2
OVR-3
OVR-4
POW-3
POW-4
IC2602
POWER DISTRIBUTION SW
IC2603
POWER DISTRIBUTION SW
6.5V
V IN1
V IN2
FLG1
FLG2
VC1
VC1
VC2
VC2
VOUT1
VOUT2
POWER SW
Q2601
POWER SW
Q2602
POWER SW
Q2603
POWER SW
Q2604
CN2902
D+1
D-1
V BUS1
CN2903
V BUS2
D-2
D+2
CN2904
D+3
D-3
V BUS3
CN2905
V BUS4
D-4
D+4
US (USB CONTROL)
B-SS3536<AEP>-BD4-24

4-2. FRAME SCHEMATIC DIAGRAM



4-4. SCHEMATIC DIAGRAMS AND PRINTED WIRING BOARDS

Note:

- All capacitors are in μF unless otherwise noted. (pF: μμF)
  Capacitors without voltage indication are all 50 V.
- Indication of resistance, which does not have one for rating electrical power, is as follows.

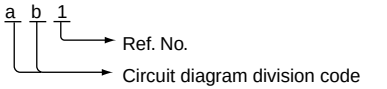
  Pitch: 5 mm
  Rating electrical power 1/4 W (CHIP : 1/10 W)

- All resistors are in ohms.
- : nonflammable resistor.
- : fusible resistor.
- △ :internal component.
- : panel designation, and adjustment for repair.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- ⊥ : earth-ground.
- ⏚ : earth-chassis.
- The components identified by ⋈ in this basic schematic diagram have been carefully factory-selected for each set in order to satisfy regulations regarding X-ray radiation.
  Should replacement be required, replace only with the value originally used.
- When replacing components identified by ◢, make the necessary adjustments indicated. (See page 2-1)
- When replacing the part in below table, be sure to perform the related adjustment.
- All voltages are in V.
- Readings are taken with a 10 MΩ digital multimeter.
- Readings are taken with a color-bar signal input.
- Voltage variations may be noted due to normal production tolerances.
- ∗ : Can not be measured.
- Circled numbers are waveform references.
- ▬▬ : B + bus.
- ▬ ▬ ▬ : B – bus.

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

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

- Divided circuit diagram
  One sheet of D board circuit diagram is divided into three sheets, each having the code D-ⓐ to D-ⓒ. For example, the destination (ab1) on the code D-ⓐ sheet is connected to (ab1) on the D-ⓑ sheet.



	Part Replaced (⋈)
HV ADJ	RV901

	Part Replaced (◪)
HV Regulator Circuit Check	D Board C901, R923, R924, R929, R943, T902(FBT) • Mounted D Board
HV Protector Circuit Check	D Board C922, C926, D912, D915, D921, Q907, Q908, R921, R922, R932, R937, R939, T902(FBT) • Mounted D Board
Beam Current Protector Circuit Check	D Board C921, C933, D901, D913, R920, R928, R930, 931, T902(FBT) • Mounted D Board N Board IC001, R031, R032 • Mounted N Board

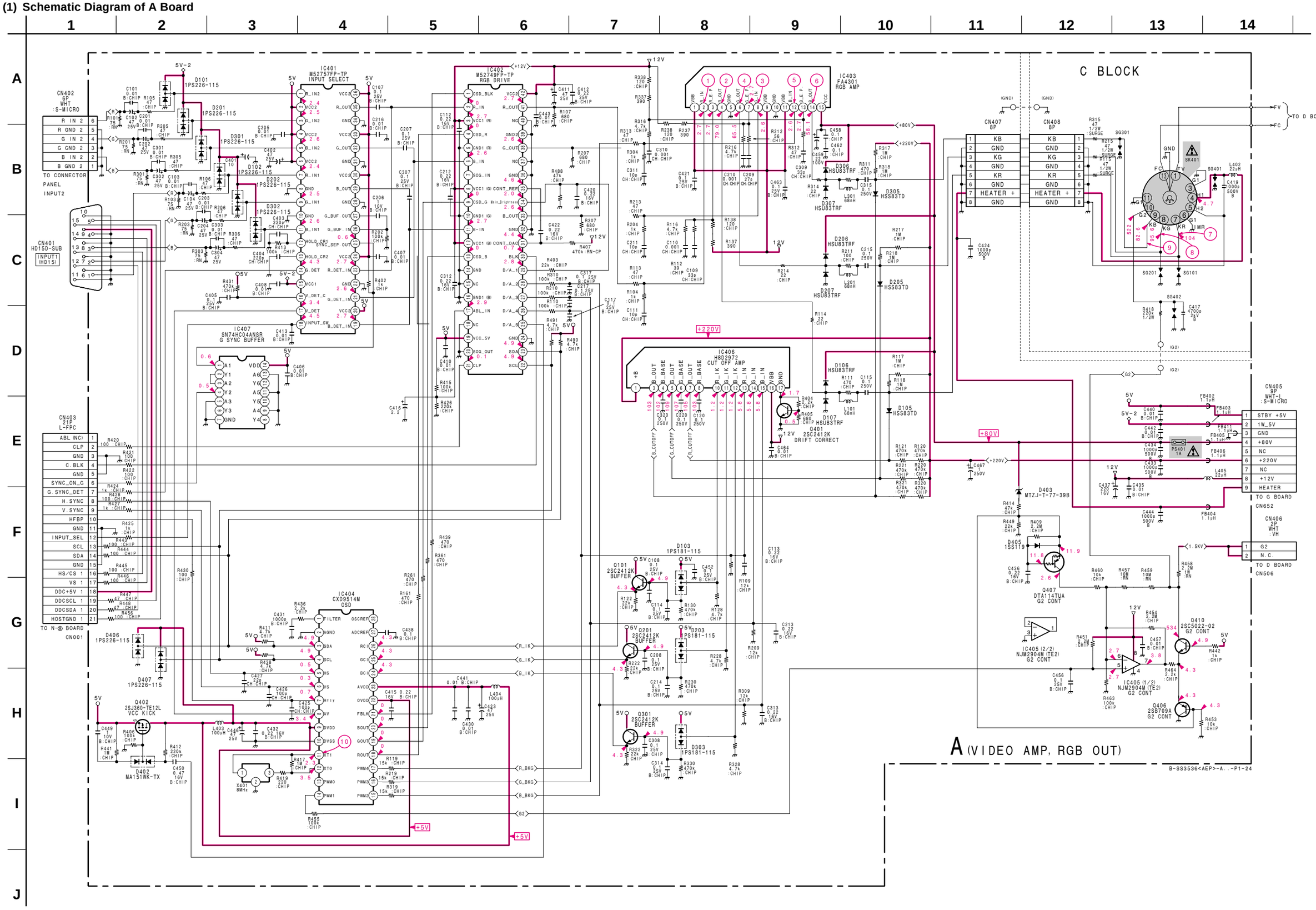
Terminal name of semiconductors in silk screen printed circuit (⁎)

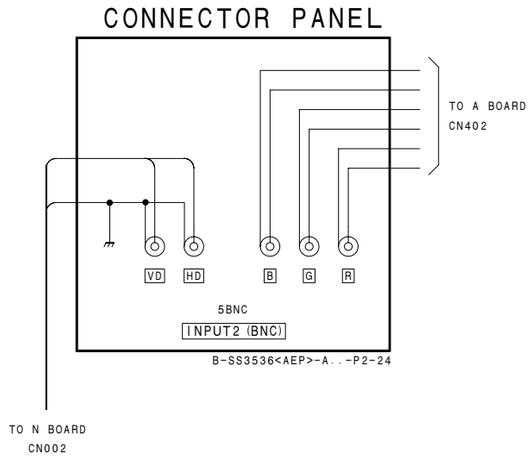
	Device	Printed symbol	Terminal name	Circuit
①	Transistor	T	Collector Base Emitter	
②	Transistor	—	Collector Base Emitter	
③	Diode	⊓	Cathode Anode	
④	Diode	T	Cathode Anode (NC)	
⑤	Diode	—	Cathode Anode (NC)	
⑥	Diode	T	Common Anode Cathode	
⑦	Diode	—	Common Anode Cathode	
⑧	Diode	T	Common Anode Anode	
⑨	Diode	—	Common Anode Anode	
⑩	Diode	T	Common Cathode Cathode	
⑪	Diode	—	Common Cathode Cathode	
⑫	Diode	|	Anode Cathode Anode Anode Cathode Anode	
⑬	Transistor (FET)	|	Drain Source Gate	
⑭	Transistor (FET)	⊢	Drain Source Gate	
⑮	Transistor (FET)	|	□ Source □ Drain □ Gate	
⑯	Transistor	|	□ Emitter □ Collector □ Base	
—	Discrete semiconductot			

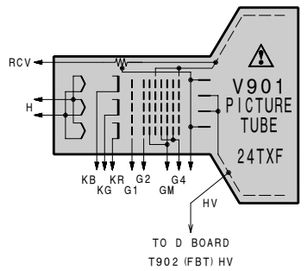
(Chip semiconductors that are not actually used are included.)

Ver.1.6

(1) Schematic Diagram of A Board



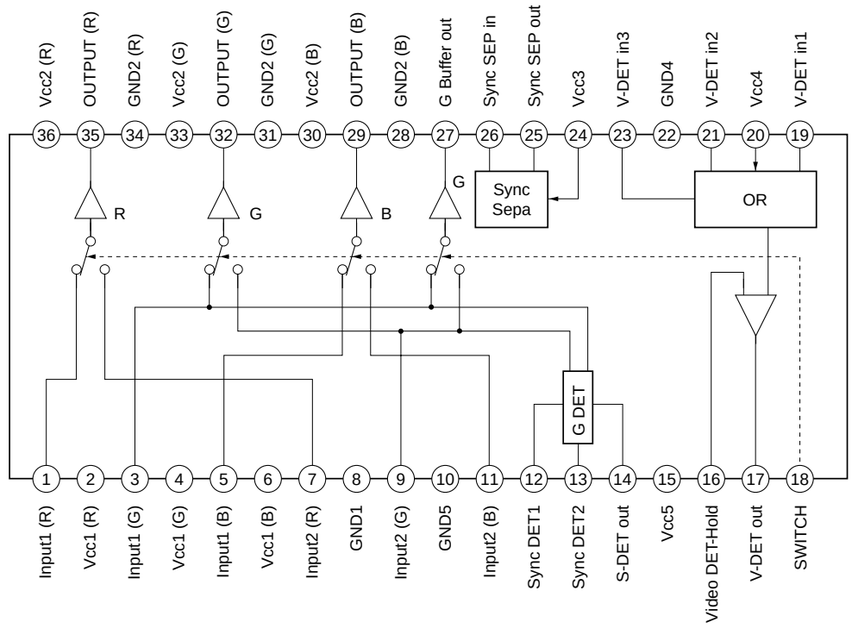




• A BOARD WAVEFORMS

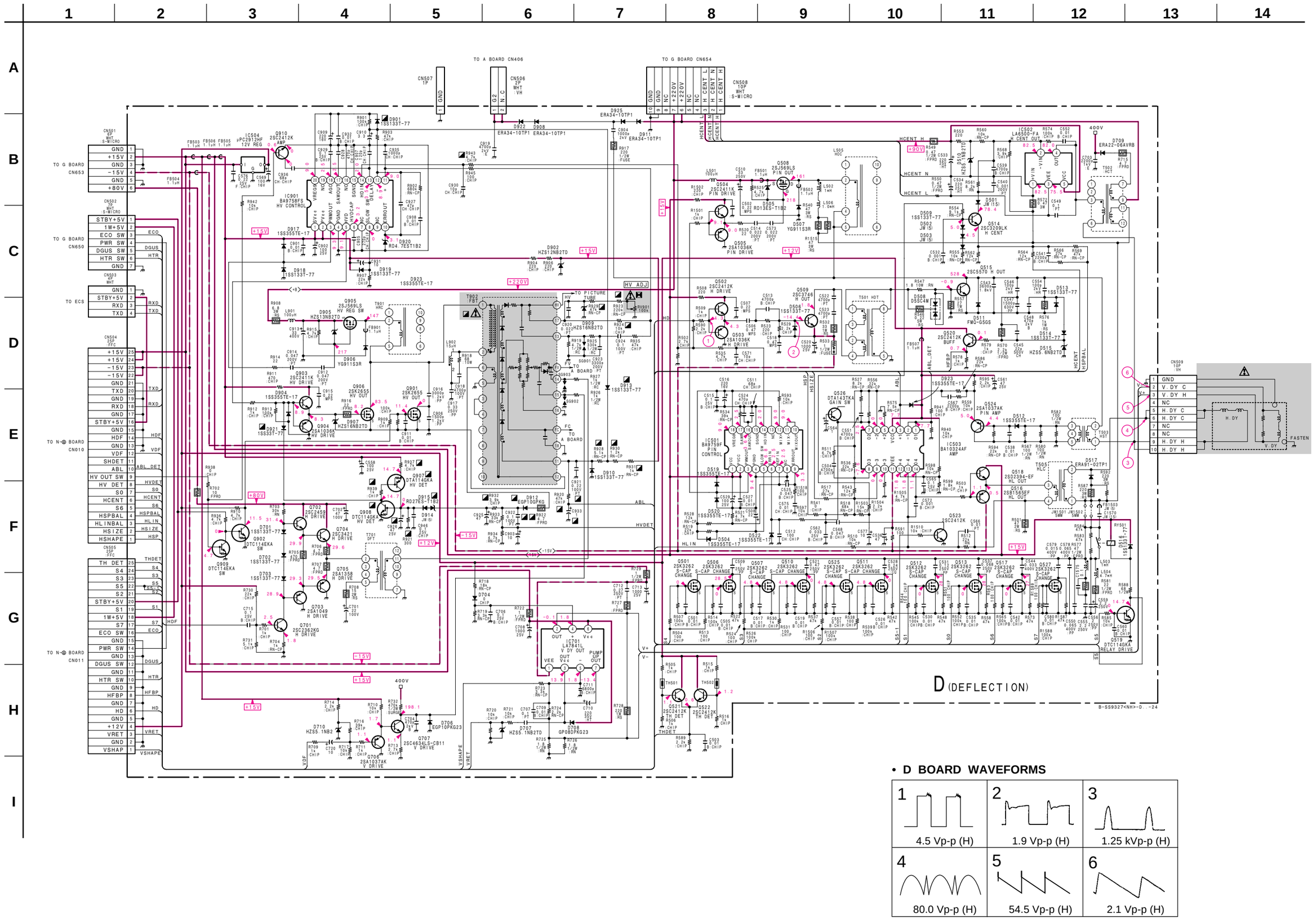
① 4.0 Vp-p (H)	② 56.0 Vp-p (H)	③ 4.0 Vp-p (H)
④ 56.0 Vp-p (H)	⑤ 4.2 Vp-p (H)	⑥ 58.0 Vp-p (H)
⑦ 53.0 Vp-p (H)	⑧ 55.0 Vp-p (H)	⑨ 58.0 Vp-p (H)
⑩ 2.2 Vp-p (8MHz)		

• A BOARD IC401 M52757FP



• A BOARD IC402 M52749FP

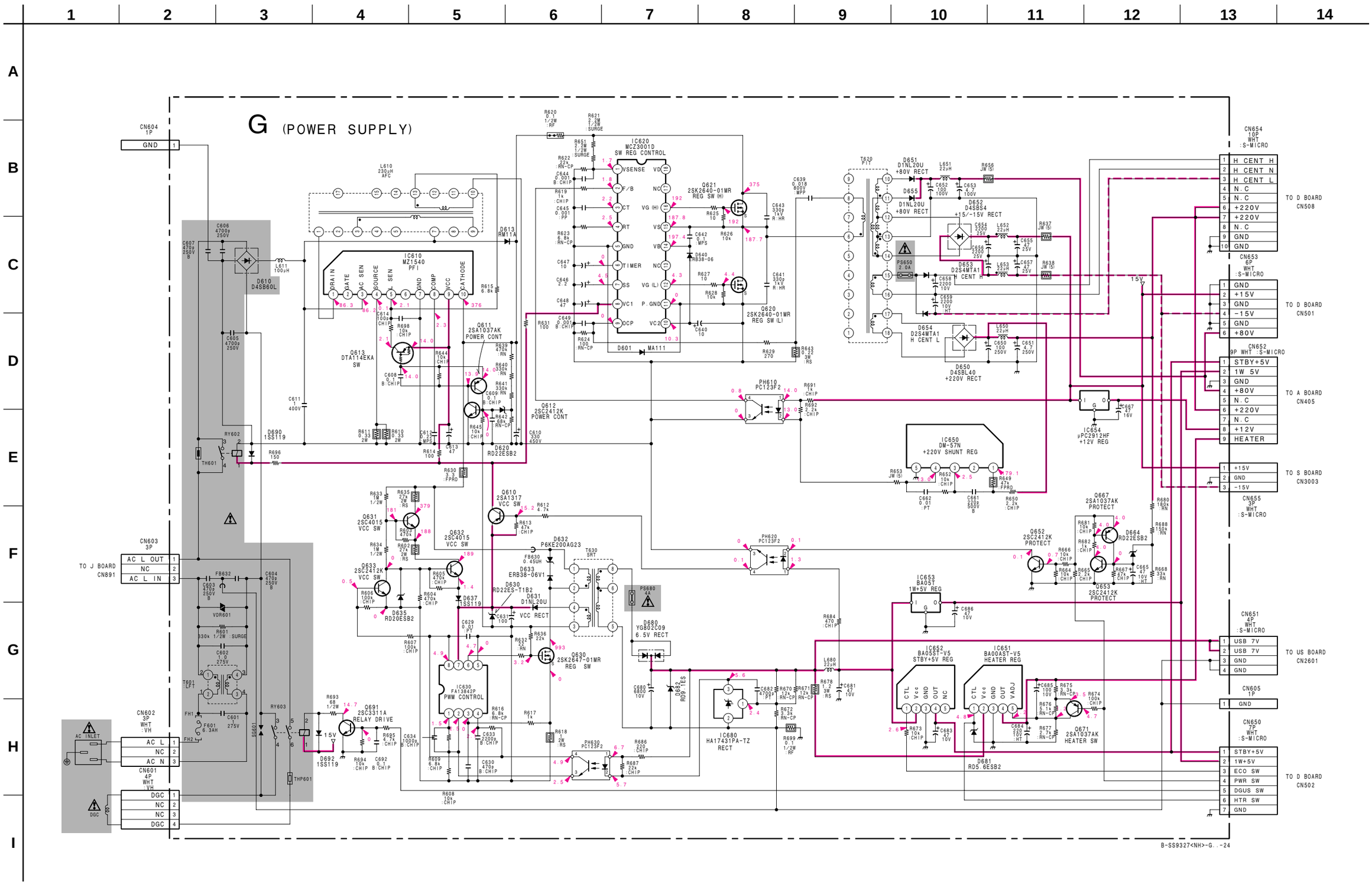
(2) Schematic Diagram of D Board



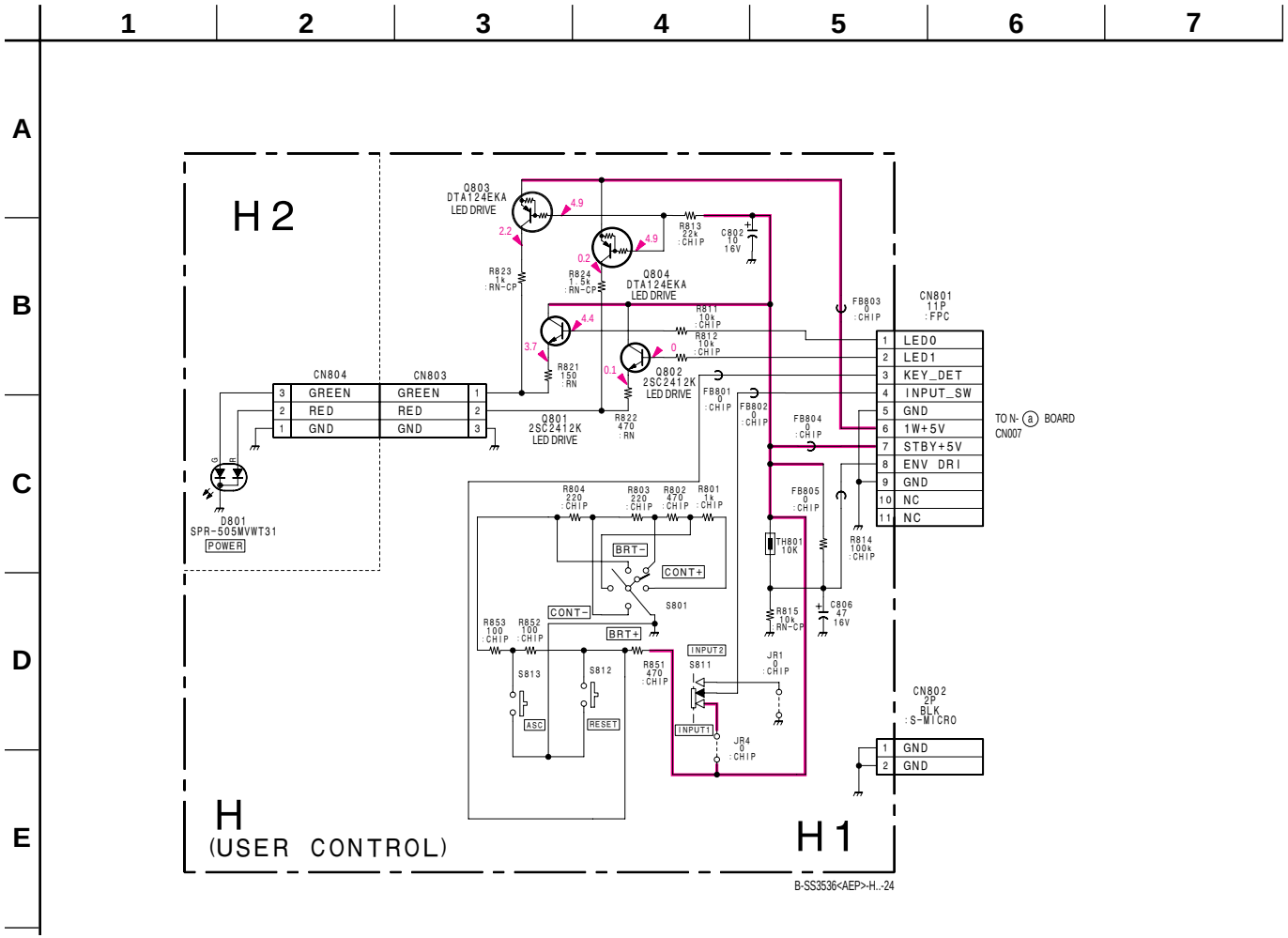
• **D BOARD WAVEFORMS**

1 4.5 Vp-p (H)	2 1.9 Vp-p (H)	3 1.25 kVp-p (H)
4 80.0 Vp-p (H)	5 54.5 Vp-p (H)	6 2.1 Vp-p (H)

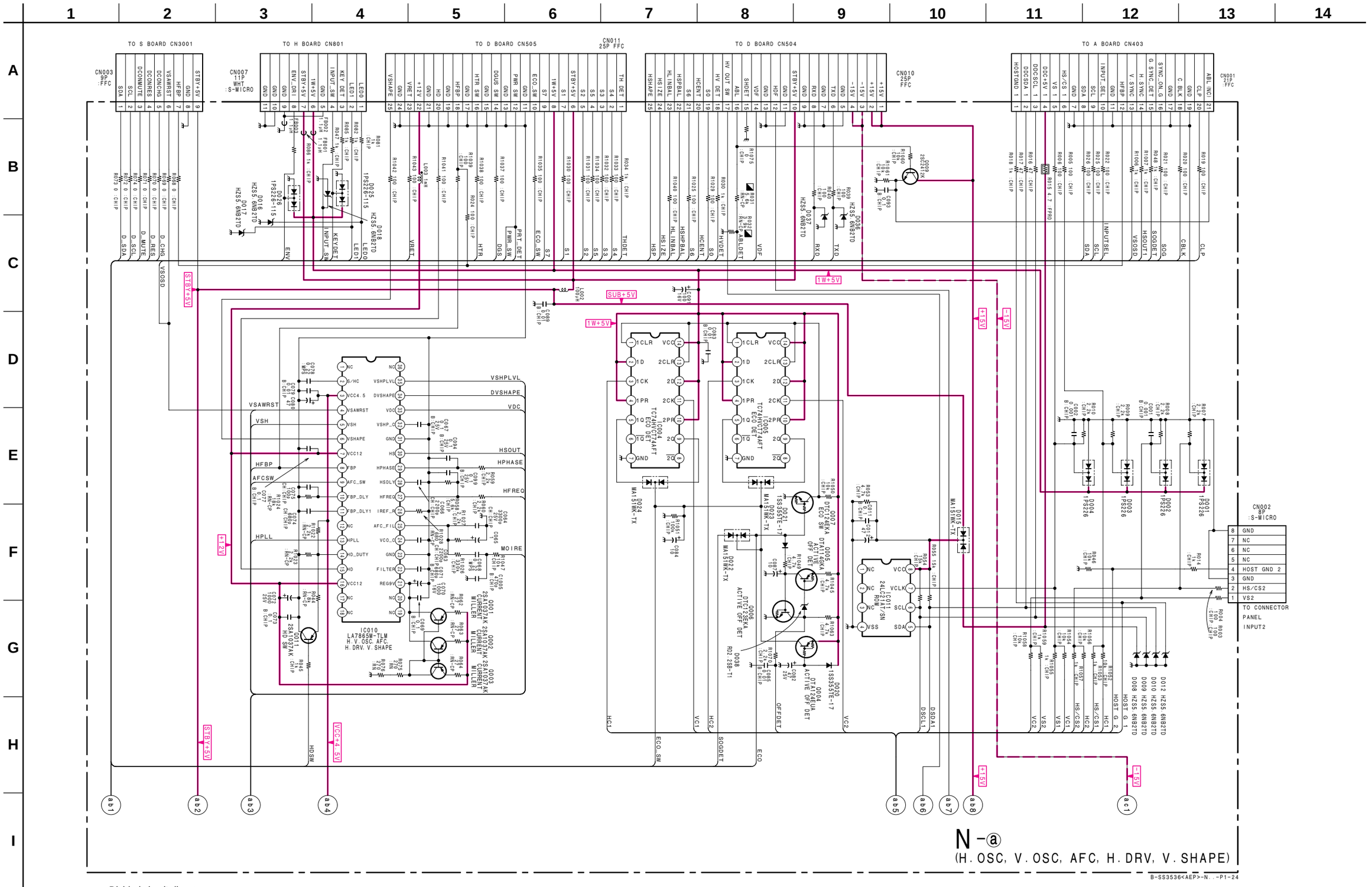
(3) Schematic Diagram of G Board



(4) Schematic Diagram of H Board

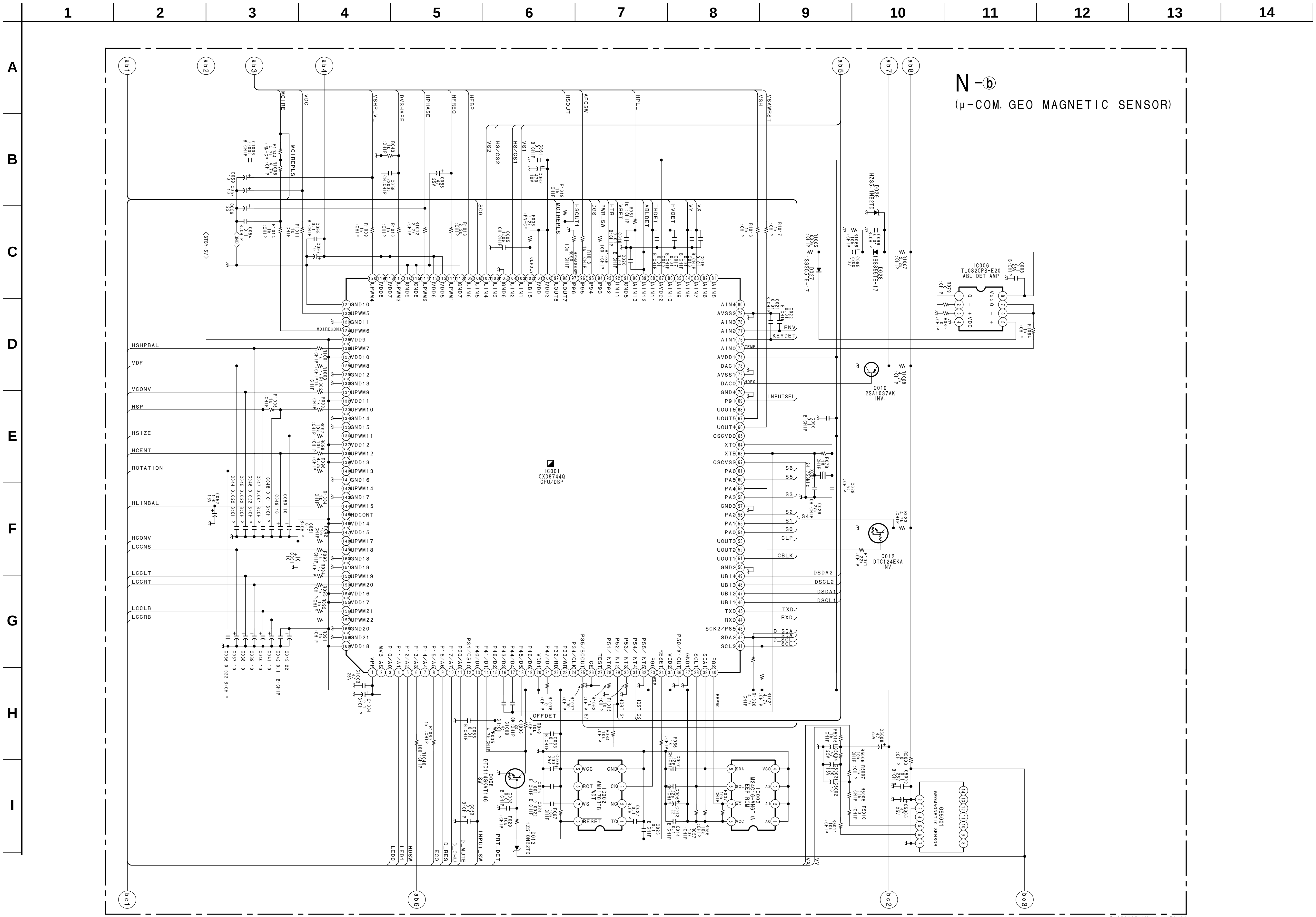


(6) Schematic Diagrams of N (ⓐ, ⓑ, ⓒ) Board

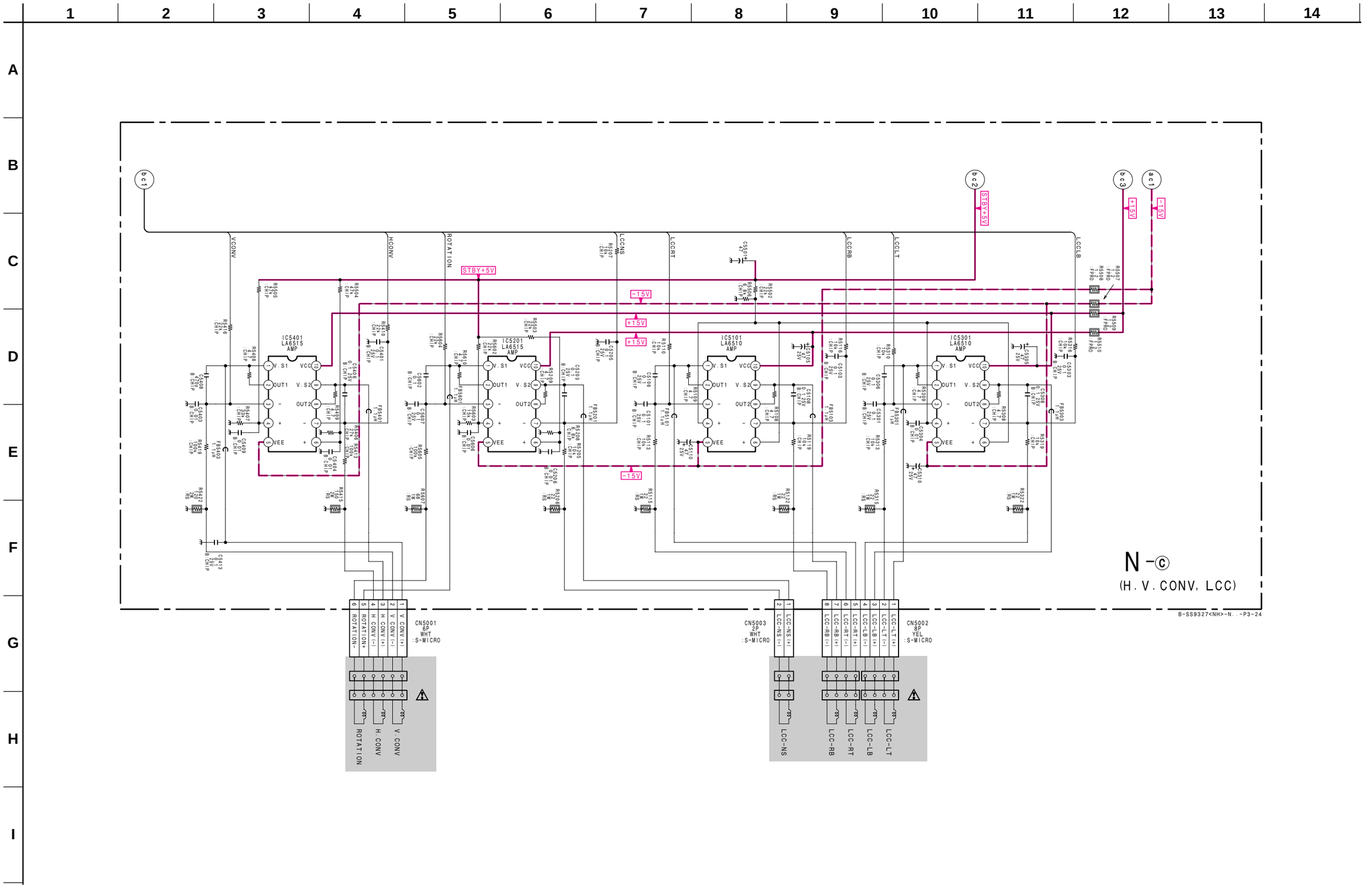


- Divided circuit diagram
  One sheet of D board circuit diagram is divided into three sheets, each having the code D-ⓐ to D-ⓒ. For example, the destination ab1 on the code D-ⓐ sheet is connected to ab1 on the D-ⓑ sheet.

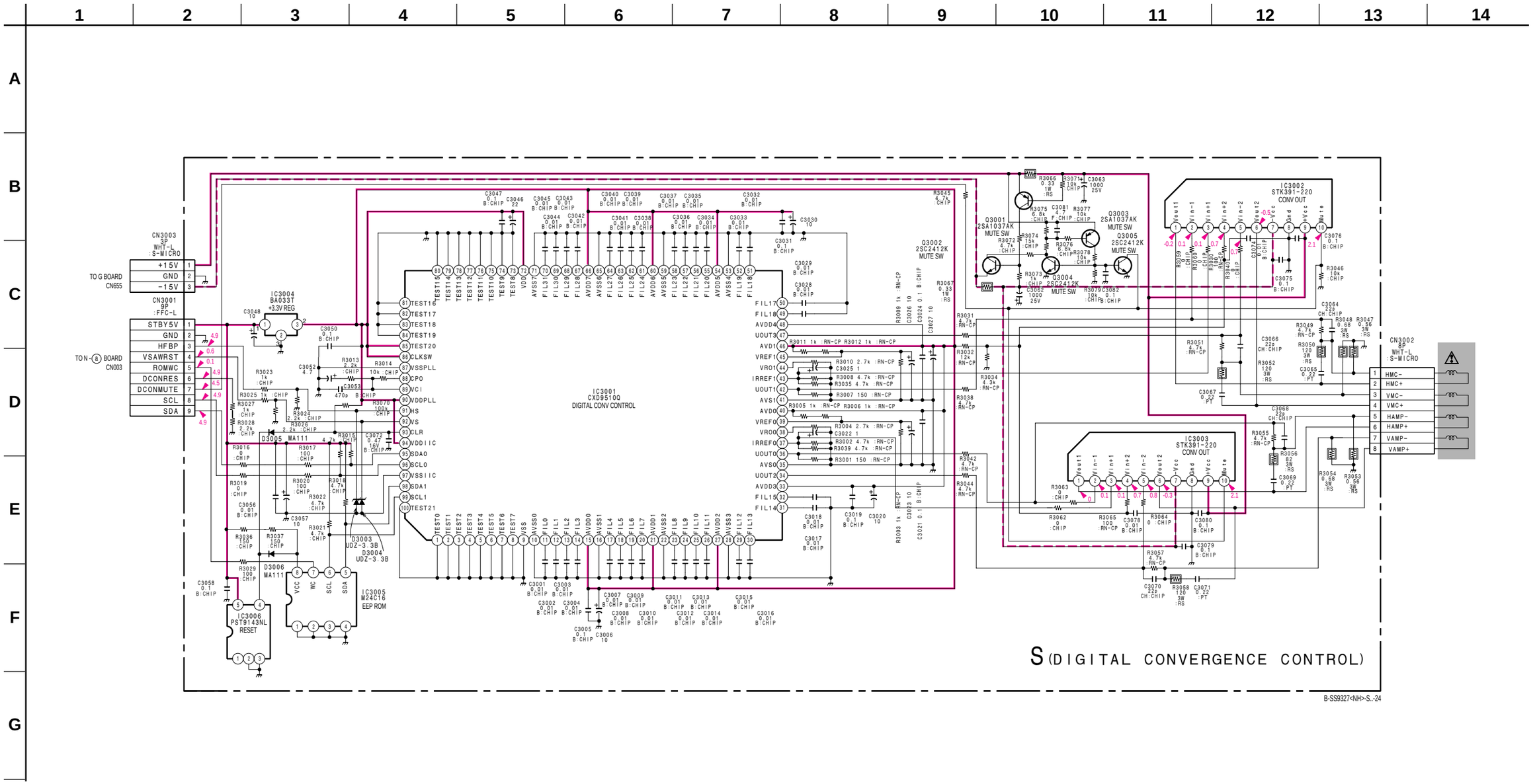
a b 1
- 1 → Ref. No.
- b → Circuit diagram division code



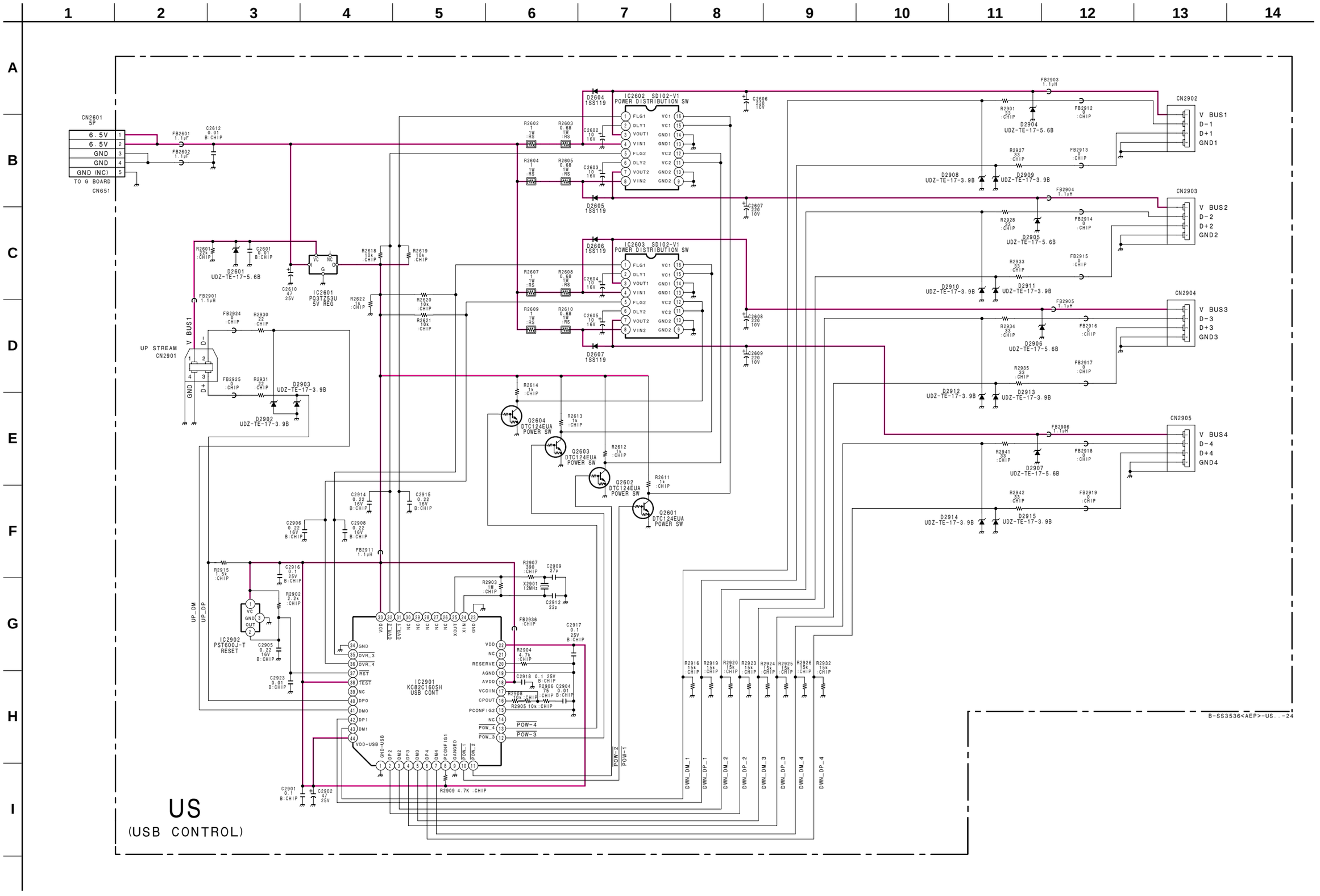
N-ⓑ
(μ-COM, GEO MAGNETIC SENSOR)
IC001
CXD8744Q
CPU/DSP
IC006
TL082CPS-E20
ABL DET AMP
Q010
2SA1037AK
INV.
Q012
DTC124EKA
INV.
IC002
MM1170BFB
WDT
IC003
M24C16-MN6T(A)
EEP ROM
GS5001
GEOMAGNETIC SENSOR
Q008
DTC114GKA-T146
SW
D013
HZS10NB2TD
D028
1SS355TE-17
D029
HZS5.1NB2TD
D027
1SS355TE-17
B-SS9327<NH>-N...-P2-24


N-ⓒ
(H.V.CONV, LCC)
B-SS9327<NH>-N..-P3-24
IC5401 LA6515 AMP
IC5201 LA6515 AMP
IC5101 LA6510 AMP
IC5301 LA6510 AMP
VCONV
HCONV
ROTATION
LCCNS
LCCRT
LCCRB
LCCLT
LCCLB
STBY+5V
+15V
-15V
CN5001 6P WHT :S-MICRO
CN5003 2P WHT :S-MICRO
CN5002 8P YEL :S-MICRO
ROTATION
H.CONV
V.CONV
LCC-NS
LCC-RB
LCC-RT
LCC-LB
LCC-LT

(7) Schematic Diagram of S Board



(8) Schematic Diagram of US Board



US
(USB CONTROL)