Service Manual

Model D-108 & 8345/5040

DIGITAL MULTITRACK RECORDER

FOSTEX®

CAUTION

RISK OF ELECTRIC SHOCK
DO NOT OPEN

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK,

DO NOT REMOVE COVER (OR BACK).

NO USER-SERVICEABLE PARTS INSIDE.

REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

CAUTION:

TO PREVENT ELECTRIC SHOCK, MATCH WIDE BLADE OF PLUG TO WIDE SLOT, FULLY INSERT.

ATTENTION:

POUR ÉVITER LES CHOCS ÉLECTRIQUES, INTRODUIRE LA LAME LA PLUS LARGE DE LA FICHE DANS LA BORNE CORRESPONDANTE DE LA PRISE ET POUSSER JUSQU' AU FOND.

The lightening flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated “dangerous voltage” within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

“WARNING”

“TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.”

SAFETY INSTRUCTIONS

1. Read instructions - All the safety and operating instructions should be read before the appliance is operated.
2. Retain instructions - The safety and operating instructions should be retained for future reference.
3. Heed warnings - All warnings on the appliance and in the operating instructions should be adhered to.
4. Follow instructions - All operating and use instructions should be followed.
5. Water and Moisture - The appliance should not be used near water - for example, near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool, and the like.
6. Carts and Stands - The appliance should be used only with a cart or stand that is recommended by the manufacturer.

An appliance and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the appliance and cart combination to overturn.

7. Wall or Ceiling Mounting - The appliance should be mounted to a wall or ceiling only as recommended by the manufacturer.
8. Ventilation - The appliance should be situated so that its location or position does not interfere with its proper ventilation. For example, the appliance should not be situated on a bed, sofa, rug, or similar surface that may block the ventilation openings; or, placed in a built-in installation, such as a bookcase or cabinet that may impede the flow of air through the ventilation openings.
9. Heat - The appliance should be situated away from heat sources such as radiators, heat registers, stoves, or other appliances (including amplifiers) that produce heat.
10. Power Sources - The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance.
11. Grounding or Polarization - The precautions that should be taken so that the grounding or polarization means of an appliance is not defeated.
12. Power Cord Protection - Power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.
13. Cleaning - The appliance should be cleaned only as recommended by the manufacturer.
14. Nonuse Periods - The power cord of the appliance should be unplugged from the outlet when left unused for a long period of time.
15. Object and Liquid Entry - Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.
16. Damage requiring Service - The appliance should be serviced by qualified service personnel when:
    A. The power supply cord or the plug has been damaged; or
    B. Objects have fallen, or liquid has been spilled into the appliance; or
    C. The appliance has been exposed to rain; or
    D. The appliance does not appear to operate normally or exhibits a marked changed in performance; or
    E. The appliance has been dropped, or the enclosure damaged.
17. Servicing - The user should not attempt to service the appliance beyond that described in the operating instructions. All other servicing should be referred to qualified service personnel.

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NOTES

* Service mode, error code list, exploded view, PCB assembly, parts list and circuit diagrams are given in this manual to assist the service technician in maintaining the Model D-108.

* The following accessories are supplied with D-108 as the standard accessories.

Owner's manual	: 8288421000 (for export model)
	: 8288422000 (for domestic model)
Quick manual	: 8288435000 (for export model)
	: 8288436000 (for domestic model)

* Following is the packing material for the Model D-108.

Carton, inner, D-108	: 8228720000
Carton, outer, D-108	: 8228899000
Packing, side, L, D-108/160	: 8228430001
Packing, side, R, D-108/160	: 8228430002
Packing, case, D-108/160	: 8228435000
Inner carton, 9040	: 8228698000
Packing, side, 9040/9041	: 8228414000

CAUTION

⚠ Parts marked with this sign are safety critical components. They must always be replaced with identical components. Refer to the Fostex Parts List and ensure exact replacement.

1. SPECIFICATIONS

● D-108

INPUT & OUTPUT

INPUT (1 ~ 8)

Connector	RCA pin jack (x 8)
Input Level	-10 dBV
Input Impedance	10 kΩ or more

OUTPUT (1 ~ 8)

Connector	RCA pin jack (x 8)
Output Level	-10 dBV
Load Impedance	10 kΩ or more

DATA IN / OUT

Connector	Square shape optical
Format	IEC consumer optical standard IEC 958 Part 3 ALESIS Proprietary Multi Channel Optical Digital Interface

MIDI IN / OUT / THRU

Connector	DIN 5-pin
Format	Comply to MIDI standard

PUNCH IN / OUT

Connector	Ø6 mm phone jack (CMOS level)

SCSI

Connector	D-SUB 25-pin
Protocol	SCSI-2, unbalanced transfer method
Transfer Type	Asynchronous
Number of Units Connected	2

RECORD & PLAYBACK

Recording Medium	Internal 3.5” E-IDE hard disk drive (optional) External fixed / removable SCSI-2 hard disk drive
Standard	SCSI-2 or better
Sampling Frequency	44.1 kHz, 48kHz (Switchable by SETUP mode)
Quantization	16-bit linear
Emphasis	Not available
Recording Time (mono track min.)	About 18 min. / 100 MB at maximum (at Fs: 44.1 kHz) Recording time will be limited up to 24 hours.
Number of Tracks	24 tracks (8 + 16 additional tracks)
Number of recording tracks at a time	8
Number of playback tracks at a time	8
Recording Format	FDMS-3
Pitch Control	± 6.0 %
Crossfade	10 msec

OPERATION

Shuttle Speed	8 steps (7 steps for FWD direction)
CUE ON	± 1 ~ 8 times (FWD: ± 1 ~ 7 times)
CUE OFF	± 1 ~ 64 times

FFWD / REW Speed

CUE ON	± 3 times
CUE OFF	± 32 times

OPERATION (continued)

Digital Scrubbing (JOG)	0 ~ 1 times (Envelope can be displayed when selecting only one track.)
Locate Memory	6 (7 including [LOCATE] key temporary memory) + 99

LEVEL INDICATION

Type	FL Bargraph
Number of Indicated Levels	11 dots (-∞, -42, -30, -24, -18, -12, -9, -6, -3, 0, OVER)
Reference Level (-10 dBV) Indication	-12 dB

DIMENSIONS	148 (H) x 482 (W) x 381 (D) mm
WEIGHT	8 kg

POWER REQUIREMENT

JPN	100 V AC
USA / CND	120 V AC
EUR / UK	230 V AC
POWER CONSUMPTION	Approx. 33 W

STANDARD ENVIRONMENT

Standard Temperature	20 ± 2 ºC
Standard Humidity	65 ± 5 %

ENVIRONMENT CONDITION (W/O HD)

Characteristics Guaranteed	
Temperature	+ 5 ~ + 40 ºC
Humidity	30 ~ 70 %
AC voltage deviation	± 5 % or less
Operation Guaranteed	
Temperature	- 5 ~ + 45 ºC
Humidity	85 % or less
AC voltage deviation	± 10 % or less

CHARACTERISTICS

Overall Frequency Response	20 ~ 20 kHz +1, -2 dB
Signal to Noise Ratio	88 dB or more (between ADC and DAC)
Dynamic Range	88 dB or more (between ADC and DAC)
T.H.D.	0.008 % or less (at 1 kHz, -1 dBV)
Channel Separation	80 dB or more (at 1 kHz)
Phase Difference between Channels	20 º or less

● 8345

INPUT & OUTPUT

TIME CODE INPUT

Format	SMPTE
Connector	XLR-3-31 type (Pin 1: GND, Pin 2: HOT, Pin 3: COLD)
Standard Input Level	2 V p-p
Minimum Input Level	0.25 V p-p
Input Impedance	20 kΩ or more

TIME CODE OUTPUT

Format	SMPTE
Connector	XLR-3-32 type (Pin 1: GND, Pin 2: HOT, Pin 3: COLD)
Standard Output Level	2 V p-p
Minimum Output Level	0.25 V p-p
Load Impedance	20 kΩ or more

VIDEO INPUT

Format	Composite (Applied video signal must comply to PAL or NTSC standard and be interlace type)
Connector	BNC
Frame Pulse	24, 25, 29.97, 30 Hz (± 1000 ppm)
Field Pulse	48, 50, 59.94, 60 Hz (± 1000 ppm)
Standard Input Level	1 V p-p
Input Impedance	75 Ω (ON / OFF by terminator SW)

VIDEO THRU

Connector	BNC
Output Level	Direct output of signal fed to Video Input connector

WORD INPUT

Connector	BNC
Frequency	44.1, 48 kHz
Standard Input Level	TTL level
Input Impedance	75 Ω (ON / OFF by terminator SW)

WORD OUTPUT

Connector	BNC
Standard Output Level	TTL level
Load Impedance	75 Ω (ON / OFF by terminator SW)

DIMENSIONS	215 (W) x 80 (D) mm
POWER SUPPLY	Supplied from D-108
Digital	DC + 5 V
Analog	DC + 19 V / - 15 V

● 5040

INPUT (1 ~ 8)

Connector	D-SUB 25-pin
Standard Input Level	+ 4 dBu
Input Impedance	10 kΩ or more

OUTPUT (1 ~ 8)

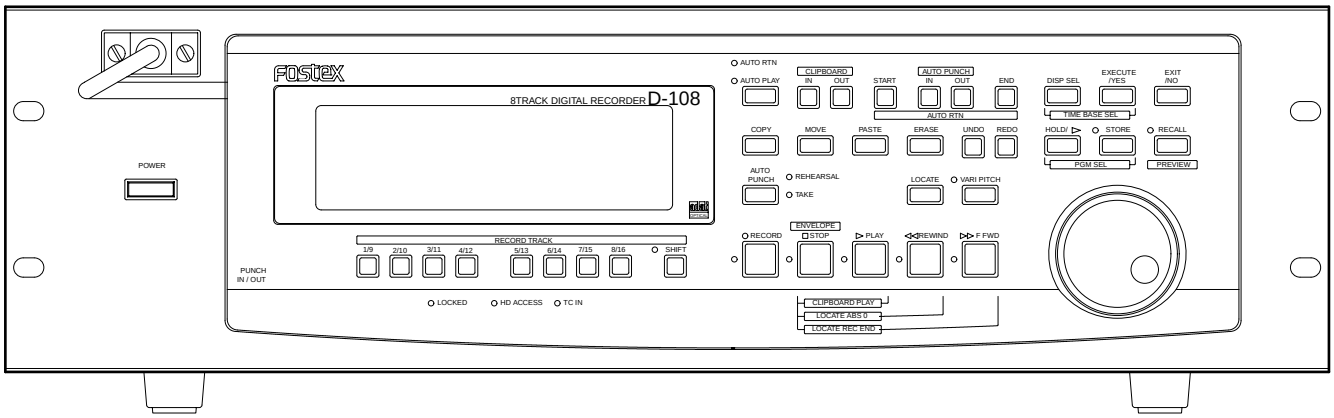
Connector	D-SUB 25-pin
Output Level	+ 4 dBu
Load Impedance	600 Ω or more

DIMENSIONS	270 (W) x 70 (D) mm
POWER SUPPLY	DC + 15 V (Supplied from D-160)

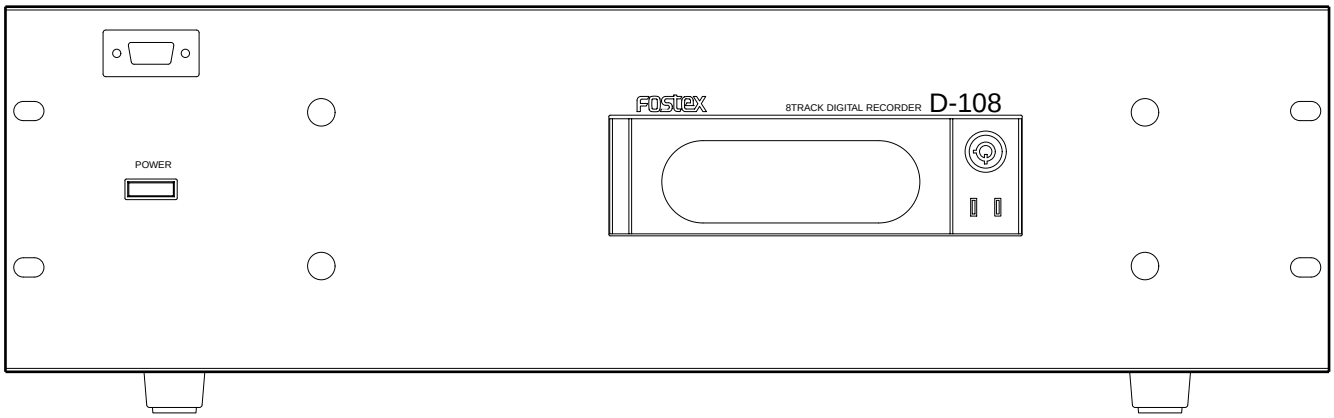
Specifications and appearance are subject to change without notice for product improvement.

2. CONTROLS, INDICATORS & CONNECTORS

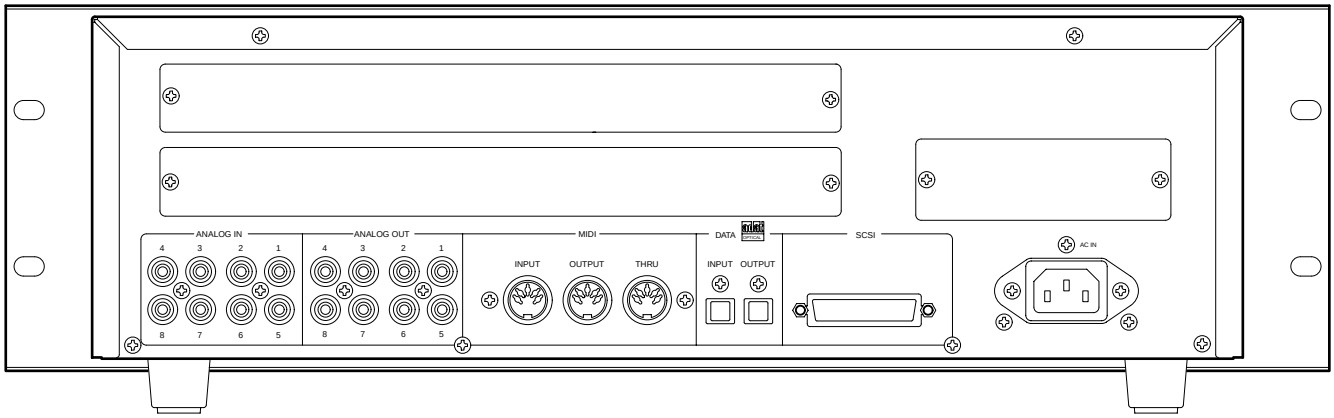
< Front Panel Section with Detachable Controller >



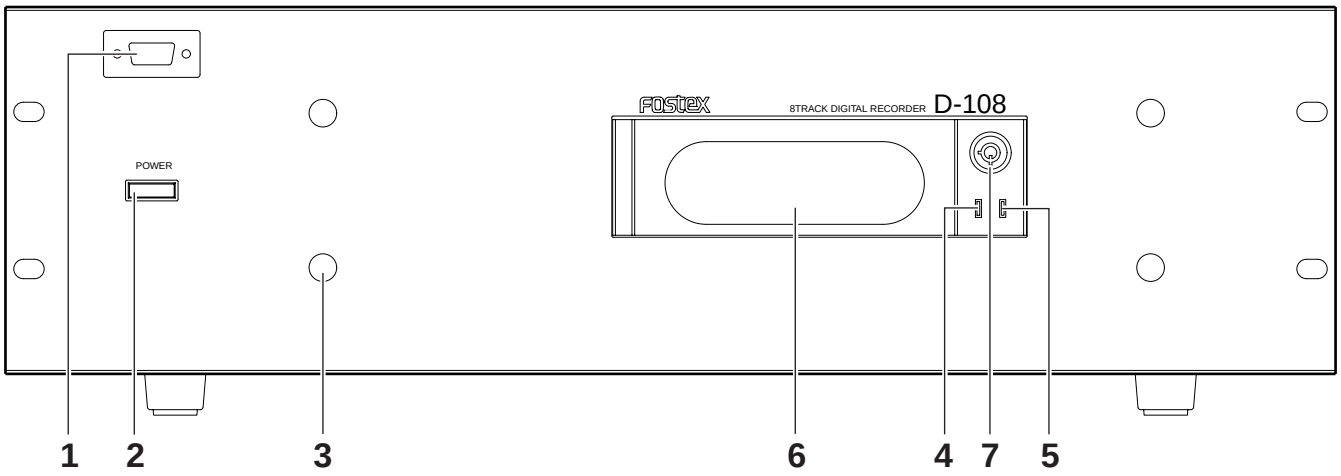
< Front Panel Section without Detachable Controller >



< Rear Panel Section >

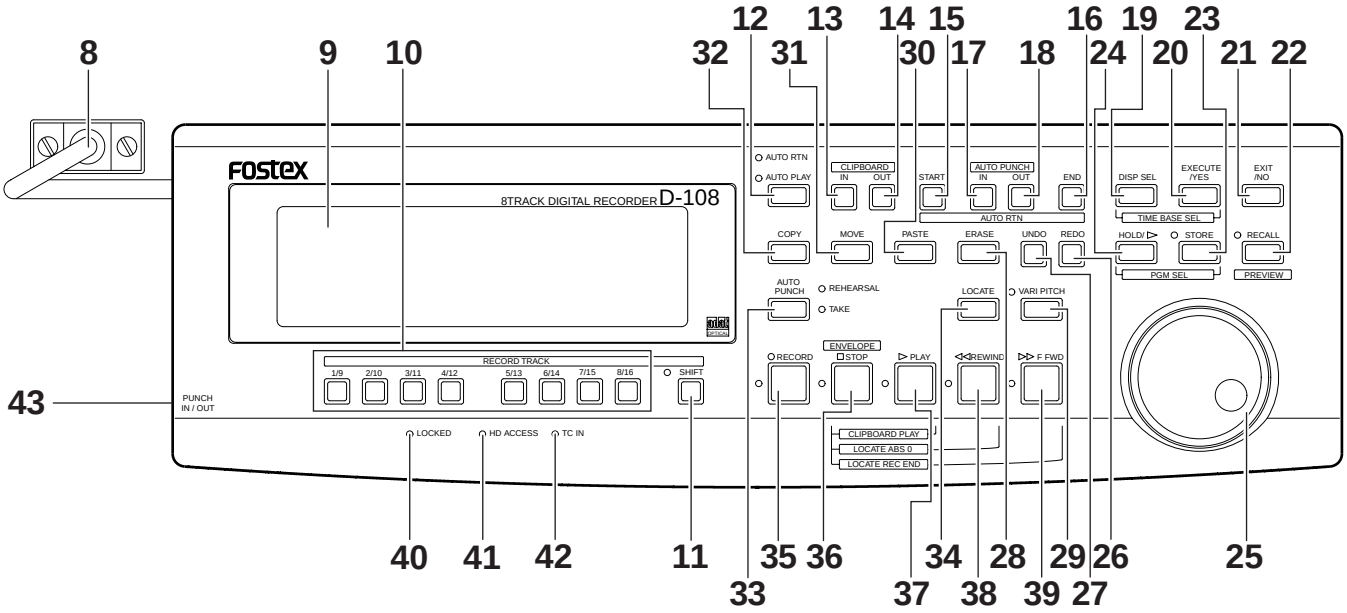


< Front Panel Section without Detachable Controller >



1. Detachable remote controller connector (DSUB 15-pin)
2. Power switch [POWER]
3. Controller mount
4. Hard disk access LED (Red)
5. Hard disk power LED (Green)
6. Removable hard disk cartridge slot
7. Lock / Unlock key

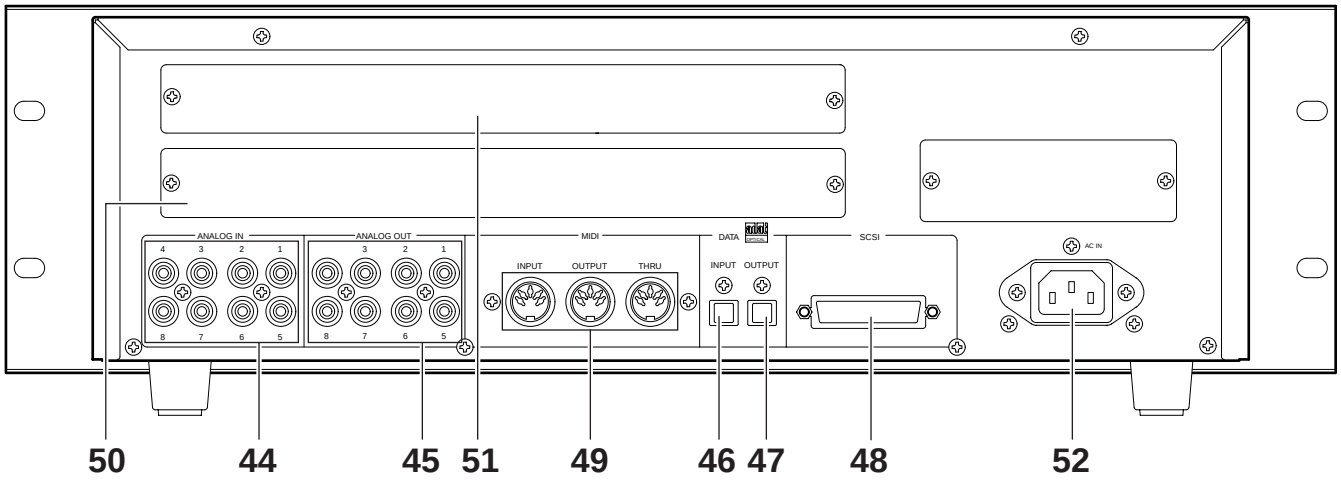
< Detachable Controller Section >



8. Controller connection cable
9. Meter display
10. Record track select key [RECORD TRACK 1 ~ 8]
11. Shift key [SHIFT]
12. Auto play / Auto return key [AUTO PLAY/AUTO RTN]
13. Clipboard in key [CLIPBOARD IN]
14. Clipboard out key [CLIPBOARD OUT]
15. Auto return start key [AUTO RTN START]
16. Auto return end key [AUTO RTN END]
17. Auto punch in key [AUTO PUNCH IN]
18. Auto punch out key [AUTO PUNCH OUT]
19. Display select key [DISP SEL]
20. Execute / Yes key [EXECUTE/YES]
21. Exit / No key [EXIT/NO]
22. Recall key [RECALL]
23. Store key [STORE]
24. Hold / Digit move key [HOLD/▶]
25. Jog / Shuttle dial
26. Redo key [REDO]
27. Undo key [UNDO]
28. Erase key [ERASE]
29. Vari pitch key [VARI PITCH]
30. Paste key [PASTE]
31. Move key [MOVE]

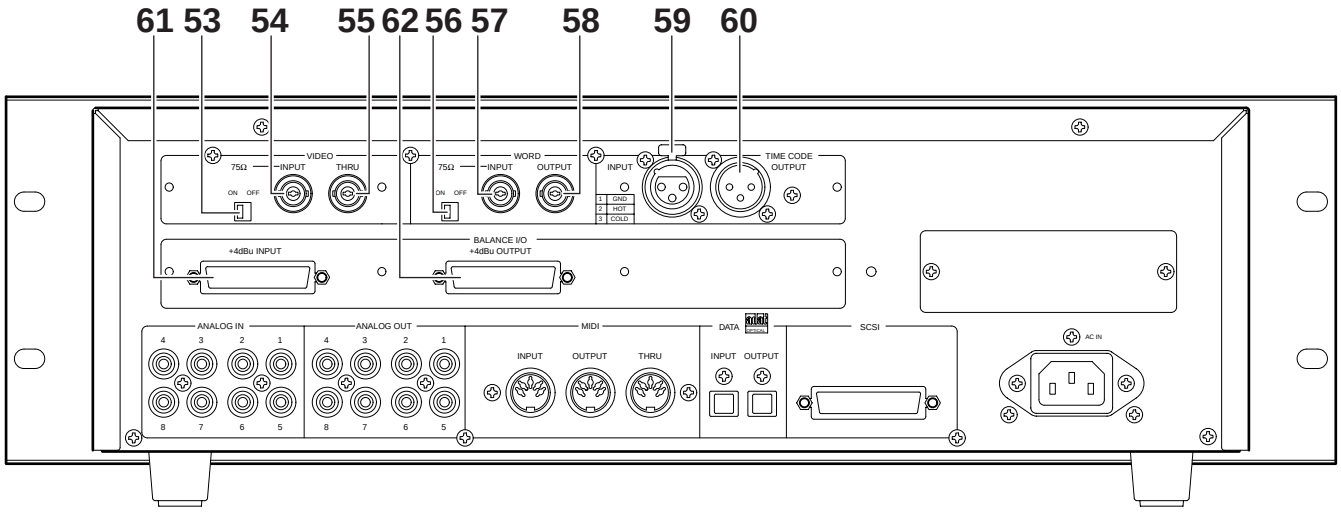
32. Copy key [COPY]
33. Auto punch mode on / off key [AUTO PUNCH (REHEARSAL/TAKE)]
34. Locate key [LOCATE]
35. Record button [RECORD]
36. Stop button [STOP]
37. Play button [PLAY]
38. Rewind button [REWIND]
39. Fast forward button [F FWD]
40. Locked LED [LED] (Green)
41. Hard disk access LED [HD ACCESS] (Green)
42. MIDI time code in LED [TC IN] (Green)
43. Punch in / out jack [PUNCH IN/OUT] (Phone)

< Rear Panel Section >



44. Input jack [ANALOG IN 1 ~ 8] (RCA)
45. Output jack [ANALOG OUT 1 ~ 8] (RCA)
46. Data input connector [DATA INPUT] (Optical)
47. Data output connector [DATA OUTPUT] (Optical)
48. SCSI connector [SCSI] (D-SUB 25-pin)
49. MIDI input / output / thru connector [MIDI INPUT/OUTPUT/THRU] (DIN 5-pin)
50. Panel A for optional card (Model 5041)
51. Panel B for optional card (Model 8345)
52. AC IN connector [AC IN]

< Rear Panel Section with Model 8345 and 5041 >



53. Video input terminating switch [75Ω ON/OFF]
54. Video input connector [VIDEO INPUT] (BNC)
55. Video thru connector [VIDEO THRU] (BNC)
56. Word input terminating switch [75Ω ON/OFF]
57. Word input connector [WORD INPUT] (BNC)
58. Word output connector [WORD OUTPUT] (BNC)
59. Time code input connector [TIME CODE INPUT] (XLR)
60. Time code output connector [TIME CODE OUTPUT] (XLR)
61. Balanced input connector [+4dBu INPUT] (XLR)
62. Balanced output connector [+4dBu OUTPUT] (XLR)

3. SOFTWARE UPDATE

Like the FD-4 and FD-8, the D-108 software can be updated through the SCSI port. This means that unscrewing and opening up the D-108 top cover is not necessary to change the EPROMs. Please refer to the following explanation for correct software updating procedures.

3-1. Method of Sending Software from Fostex Japan

There are two ways of sending the D-108 updated software.

1. Updated software in a removable medium (e.g. floppy disk, zip disk, etc.) to be sent via airmail
2. Updated software as an attachment file to be sent via Email

3-2. Required Tools

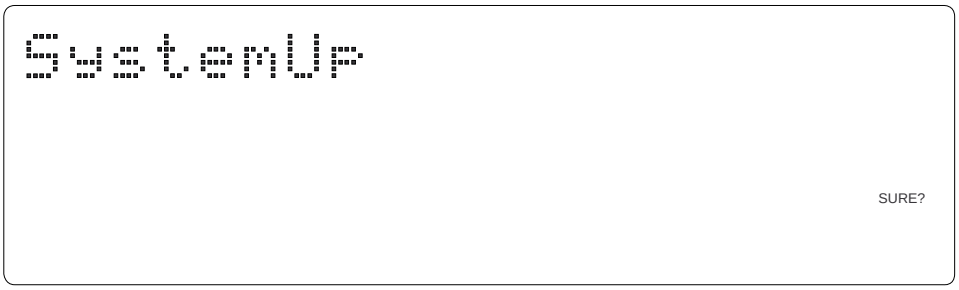
The following tools/equipment are required to update the D-108 software.

1. IBM PC/AT compatible computer with SCSI board
2. Removable type SCSI drive
3. Cable between the removable type SCSI drive and the SCSI board
4. Cable between the removable type SCSI drive and the D-108 (D-SUB 25-pin)

3-3. Software Updating Procedures

Presuming that the updated software is correctly sent and is copied into your computer.

1. Connect the removable type SCSI drive to the IBM PC/AT compatible computer SCSI port.
2. Insert the diskette to the removable type SCSI drive and format it by the computer on which Windows 95/98 is running.
3. Copy the updated software file to the removable type SCSI drive (diskette).
4. Set the removable type SCSI drive ID to 0 ~ 5 and connect to the D-108 SCSI port.
5. Turn on the power of removable drive and then D-108. While the system is booted up, do not forget to check the software version as well as the programming date.
6. Select “SCSI” by the Drive Select SETUP menu (Drive_Sel.?) and press the EXECUTE/YES key.
7. After confirming that the D-108 recognizes the connected SCSI drive, insert the diskette with updated software file. The D-108 is automatically put into the software updating mode and comes to a standstill at the display below.



8. Pressing the EXECUTE/YES key will start updating the software. The display shows “Loading!”, “Writing!” and “Initial..” in order and automatically returns to the above condition again. Check the displayed ROM version and date if the software is correctly updated by the optional mode “4-2. Flash ROM & CPU Version” (page 11).
9. Eject the diskette with updated software file by the press of STOP or EXIT/NO key and insert the diskette formatted by the D-108.

CAUTION:

1. The diskette in which the updated software file is copied must be formatted by IBM PC/AT computer, not by Macintosh.
2. If something wrong happens while updating the software (e.g. A blackout occurred while updating the software.), the D-108 might not be able to boot up the system software inside the Flash ROM. In such a case, please refer to the section “4-8. Flash ROM” (page 21).
3. The SCSI ID to be connected to the D-108 must be selected to 0 ~ 5. The SCSI ID “6” is used for backing up purpose exclusively. The SCSI ID “7” cannot be used on the D-108 by technical reasons.

4. SERVICE MODE

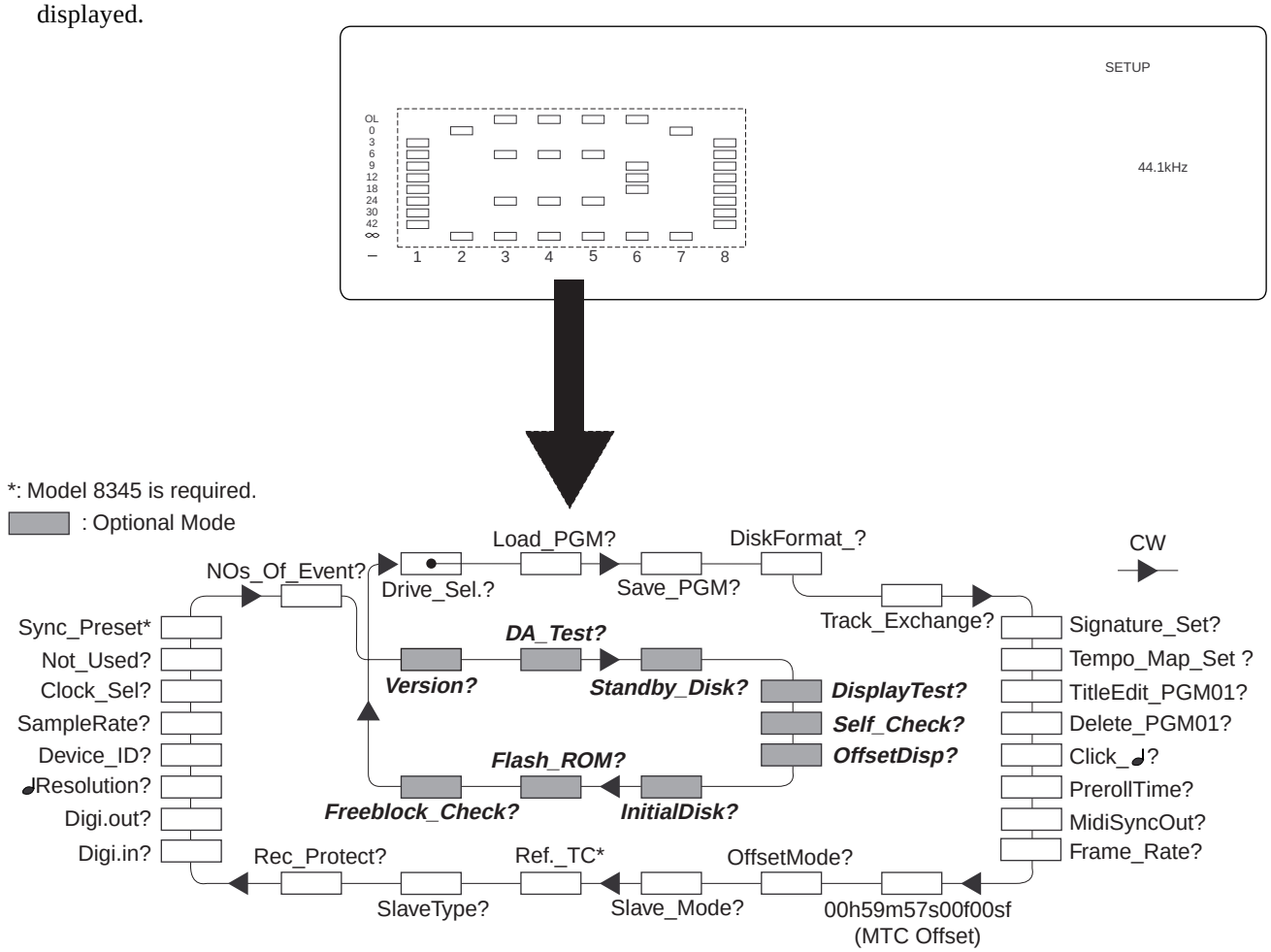
There are various optional modes available in the D-108 Service Mode. Please utilize them when servicing the unit.

4-1. Putting D-108 into Service Mode

The way of putting the D-108 into Service Mode is as follow.

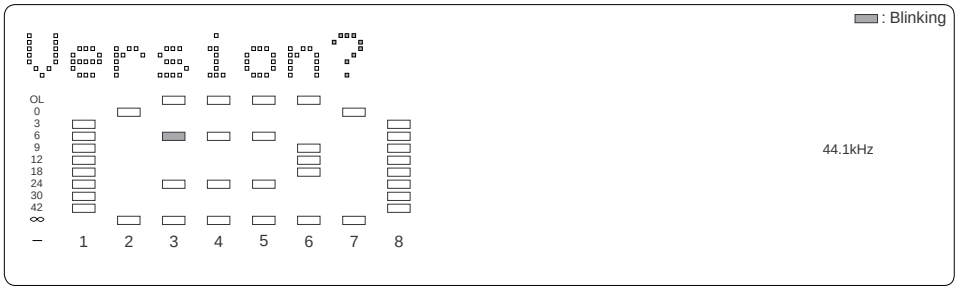
1) Insert a 3.5” E-IDE internal HDD into the HDD cartridge slot or connect an external SCSI recording/playback device (SCSI ID: 0 ~ 5) to the D-108 SCSI connector.
2) Turn on the power of D-108.
3) While holding down the STOP button, press the DISP SEL key to select the SETUP menu and then press the EXECUTE/YES key.

   As shown below, by rotating the jog dial C.W. or C.C.W., various optional modes will be displayed in addition to the general SETUP menus. In order to select a certain optional mode, press the EXECUTE/YES key while its menu is displayed.

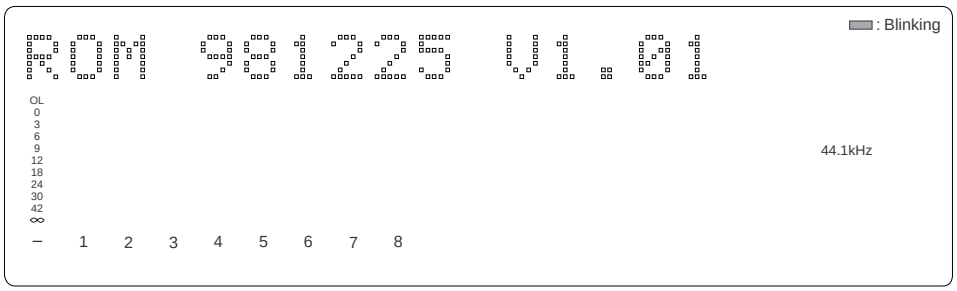


4-2. Flash ROM & CPU Version

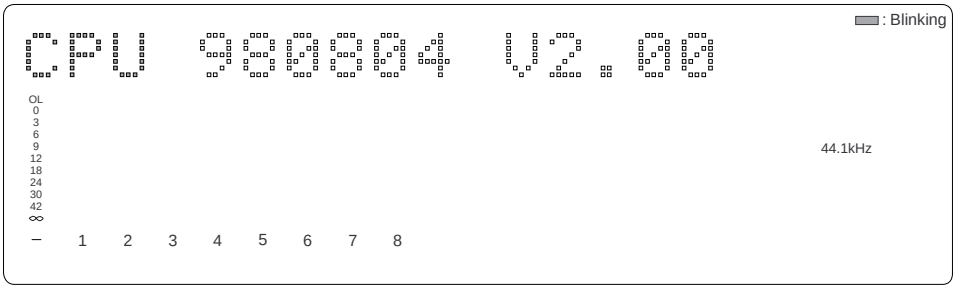
This mode is used to check the Flash ROM and CPU versions currently installed in the unit.



In order to check the version number, press the “EXECUTE/YES” key while “?” is blinking.

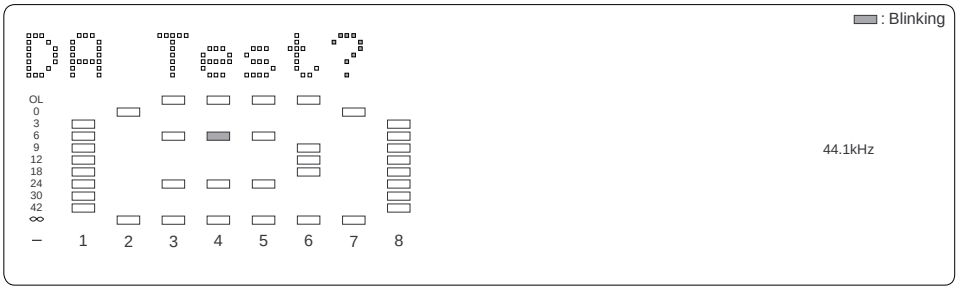


The example on the above indicates that the Flash ROM version is V1.01 and its programming date is December 25, 1998. In this condition, by turning the jog dial C.W. or C.C. W., the CPU version can be checked. The example below indicates that the CPU version is V2.00 and its programming date is August 4, 1998.

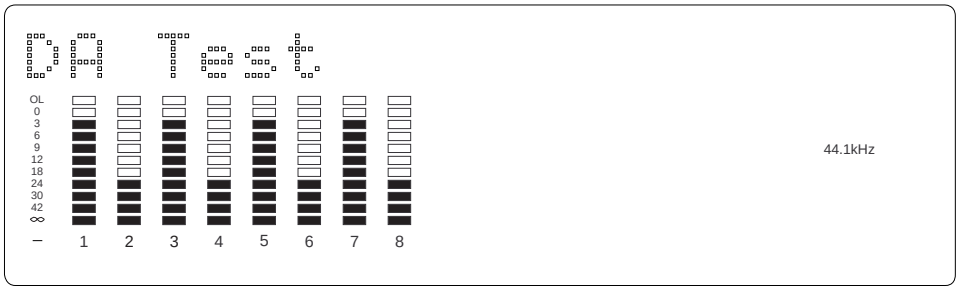


4-3. DA Test

This mode tests the signal flow from the DATA INPUT jack to the D/A converter. A S/P DIF digital signal (Fs: 44.1kHz) must be input to the DATA INPUT jack to execute this test. Then, press the EXECUTE/YES key while “?” is blinking.



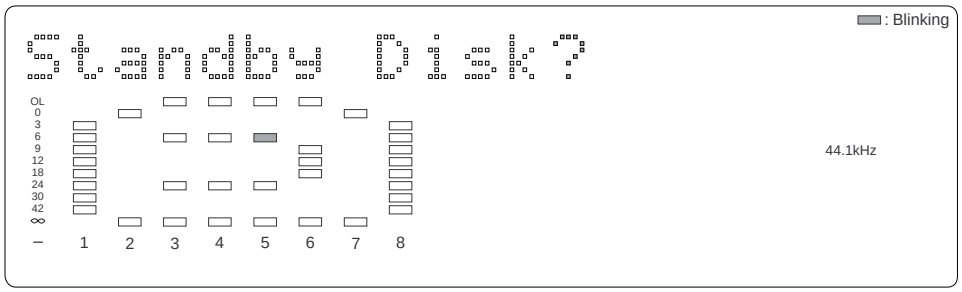
If the D-108 is in a normal condition, “44.1kHz” and “DIGITAL” will be lit solid. The odd (1, 3, 5, 7 and L) and even (2, 4, 6, 8 and R) channels indicate the left and right input level of S/P DIF digital signal fed to the DATA INPUT jack respectively.



If the D-108 is not in a normal condition, “DIGITAL” and “EXT SYNC” on the display will blink and the bargraph meter will not indicate any level.

4-4. Standby Disk

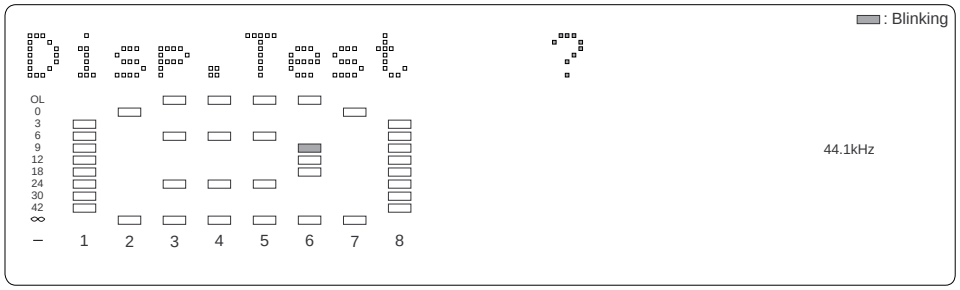
This mode makes the internal hard disk stop spinning for purposes such as “shock” test.



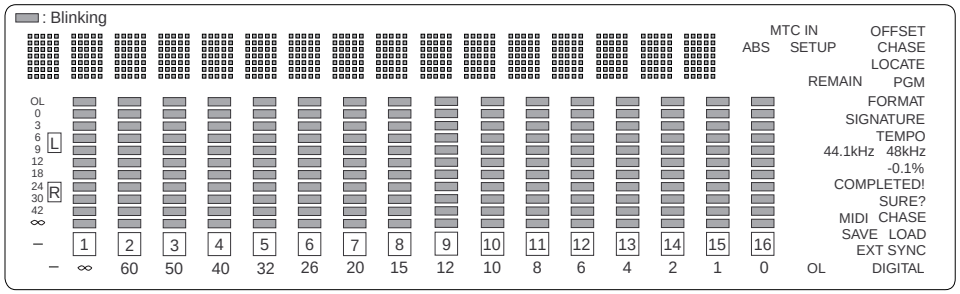
If the EXECUTE/YES key is pressed when “?” is blinking, the “SURE” prompt will start blinking. If you would like to go on, press the EXECUTE/YES key once again. The internal hard disk will stop spinning.

4-4. Display/Button Test

This mode tests if all the segments on the FL display, LEDs and buttons (switches) on the D-108 controller are correctly working or not. To execute this test, press the EXECUTE/YES key while “?” is blinking.



If the D-108 is in a normal condition, all the segments on the FL display will be lit solid (Dot matrix and bargraph meter sections on the FL display will blink.) and all the LEDs on the top panel will start blinking.



If the D-108 is not in a normal condition, faulty segments on the LCD display and/or LEDs on the top panel will remain unlit.

In this condition, if the EXECUTE/YES key is pressed one more time, the Button Test can be executed. The Button Test checks if each key/button and jog dial are working properly or not. The display below indicates that the PLAY button is pressed and held down.

The table below shows the relationship between the key/button/jog dial and the corresponding numbers appear on the LCD display.

Key/Button	No.	Key/Button	No.	Key/Button	No.
AUTO RTN/PLAY	01	ERASE	14	RECORD TRACK 5	27
CLIPBOARD IN	02	UNDO	15	RECORD TRACK 6	28
CLIPBOARD OUT	03	REDO	16	RECORD TRACK 7	29
AUTO RTN START	04	HOLD/	17	RECORD TRACK 8	30
AUTO PUNCH IN	05	STORE	18	SHIFT	31
AUTO PUNCH OUT	06	RECALL	19	RECORD	32
AUTO RTN END	07	AUTO PUNCH	20	STOP	33
DISP SEL	08	LOCATE	21	PLAY	34
EXECUTE/YES	09	VARI PITCH	22	REWIND	35
EXIT/NO	10	RECORD TRACK 1	23	F. FWD	36
COPY	11	RECORD TRACK 2	24	SHUTTLE	00~07
MOVE	12	RECORD TRACK 3	25	JOG (C.W.)	51
PASTE	13	RECORD TRACK 4	26	JOG (C.C.W.)	49

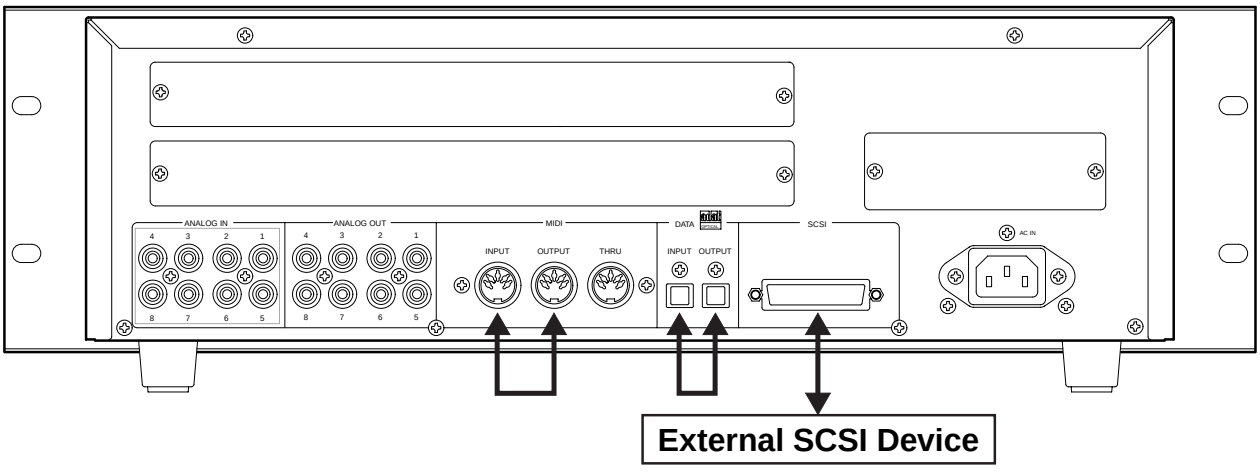
In order to quit the Button Test, turn the jog dial C.W. or C.C.W. further after “51” or “49” is displayed respectively.

4-5. Self Check

This mode automatically tests the following points in order.

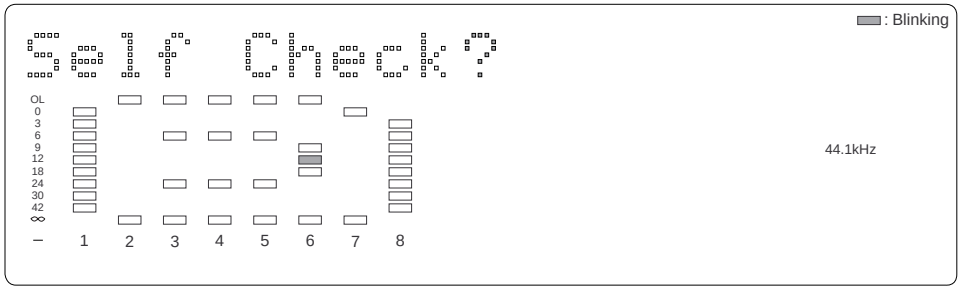
- SCSI port
- ATA (E-IDE) bus
- Option (Model 8345) bus
- MIDI in/out circuit
- S/P DIF digital signal in/out (44.1kHz)
- ADAT digital signal in/out (48kHz)
- 8345 vari-pitch circuit
- D-108 vari-pitch circuit
- A/D and D/A circuit (Input Monitor)

< Cable connection in “Self Check” mode >

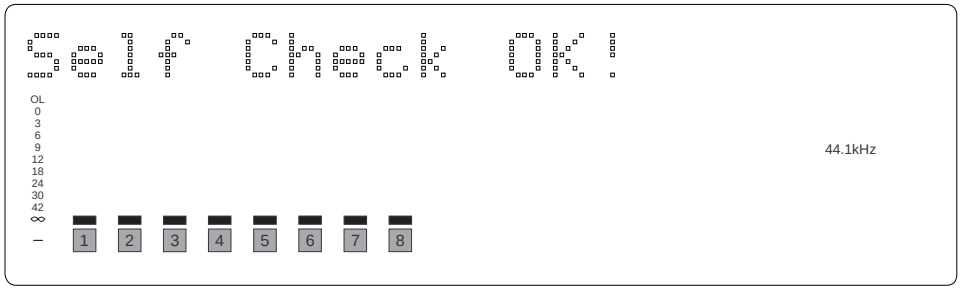


CAUTION: In order not to form a MIDI signal loop, connect the MIDI cable after putting the D-108 into the Service Mode.

To start the Self Check mode, press the EXECUTE/YES key when “?” is blinking.



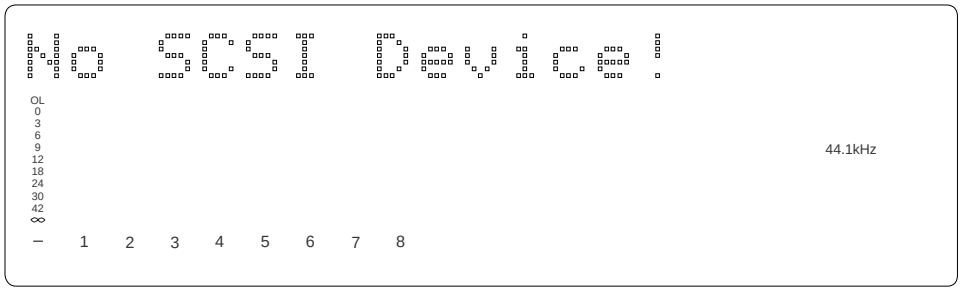
The D-108 automatically checks the before mentioned points. If the D-108 is working properly, the following appears on the display with REC LED blinking.



In order to go back to the normal display, press the EXIT/NO key or STOP button.

4-5-1. SCSI Port Check

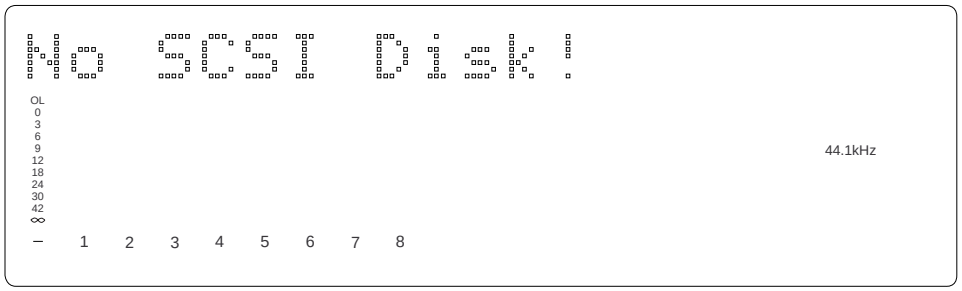
If the D-108 does not recognize a SCSI device connected to the D-108 SCSI port, the prompt below will be displayed.



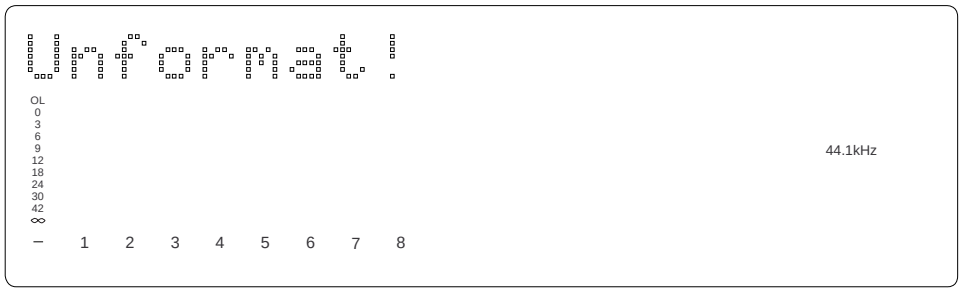
The following is considered to be the cause of problem.

- Bad cable connection, bad cable contact and / or the power of SCSI device is being turned off.
- SCSI device ID is not set to 0 ~ 5.
- MAIN PCB is defective. (bad soldering of U7, U8, J6, etc.)

If a removable type SCSI drive is connected and in case a disk is not inserted into the drive, the following prompt will be displayed.



In the case that the inserted disk is not FDMS-3 formatted, the following prompt will be displayed.



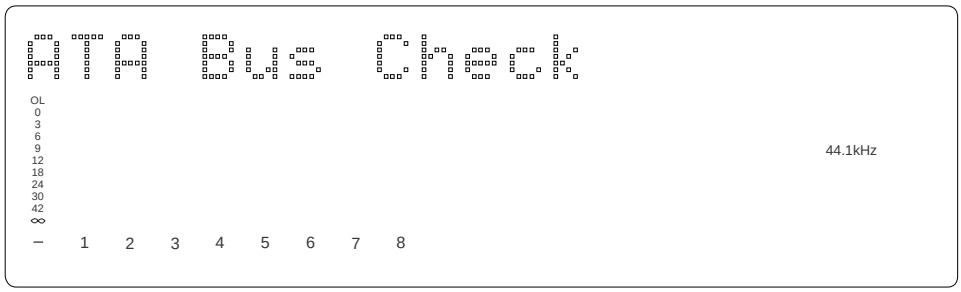
Fs, DIGITAL IN, DIGITAL OUT and SLAVE MODE settings on the disk to be used when the Self Check test is executed should be as follow.

- Fs: 44.1kHz
- DIGITAL IN: OFF (L: - R: -)
- DIGITAL OUT: ADAT
- SLAVE MODE: OFF

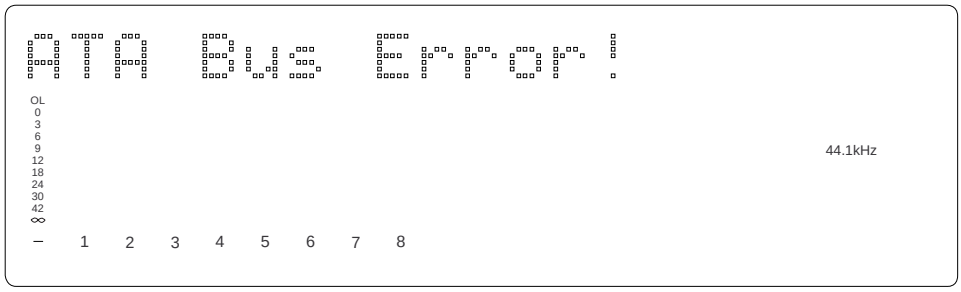
Even if the before mentioned prompt is displayed, pressing the EXECUTE/YES key would reach the next test.

4-5-2. ATA (E-IDE) Bus Check

This test checks if data can be properly read out from the preformatted internal hard disk .
If the “ALTERNATE STATUS” which indicates the hard disk condition cannot be read out, the prompt below will be displayed.



If the data (SYSTEM ID) written by formatting the disk cannot be read out correctly, the prompt below will be displayed.



The following is considered to be the cause of problem.

- Breaking, shortage and / or bad contact of flat cable J12.
- Bad soldering of gate array U5 on the MAIN PCB.

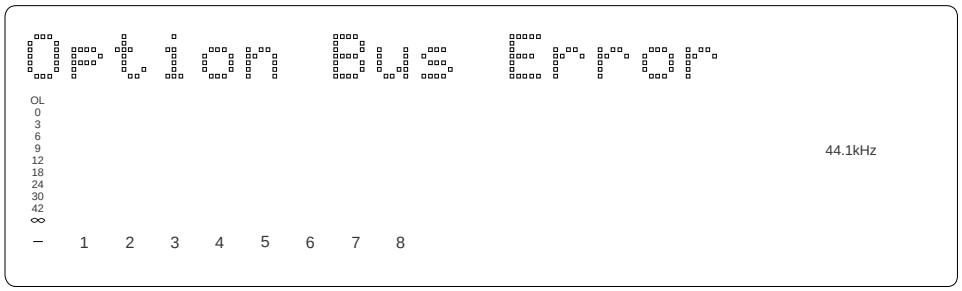
Fs, DIGITAL IN, DIGITAL OUT and SLAVE MODE settings on the internal disk to be used when the Self Check test is executed should be as follow.

- Fs: 44.1kHz
- DIGITAL IN: OFF (L: - R: -)
- DIGITAL OUT: ADAT
- SLAVE MODE: OFF

Even if the before mentioned prompt is displayed, pressing the EXECUTE/YES key would reach the next test. If the EXECUTE/YES key is pressed with the “ATA Bus Check” prompt displayed, checking the SYSTEM ID on the SCSI device will be executed. The current drive setting after the Self Check test will become “SCSI”.

4-5-3. Option (Model 8345) Bus Check

This test checks if the option bus (J9 on the MAIN PCB) to which the Model 8345 is connected is working properly or not. If reading out and / or writing in data are not correctly executed, the prompt below will be displayed.



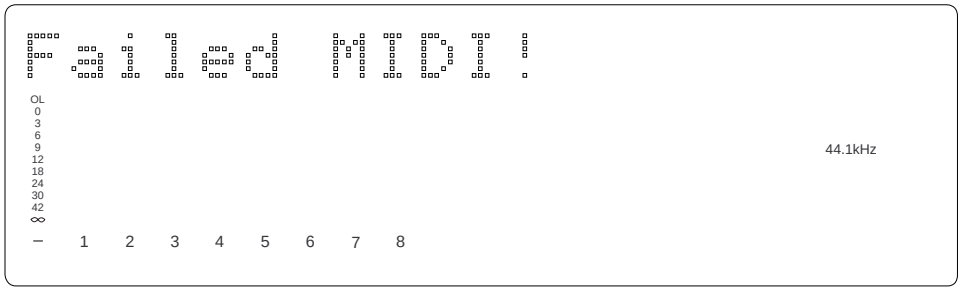
The following is considered to be the cause of problem.

- Bad connection and / or wrongly connected J9.
- Bad soldering of J9, U16, U17, U34, etc. on the MAIN PCB

Even if the before mentioned prompt is displayed, pressing the EXECUTE/YES key would reach the next test.

4-5-4. MIDI In/Out Check

By connecting the MIDI IN and OUT ports, this test checks if the reply against the ID inquiry is correctly received. If not, the prompt below will be displayed.



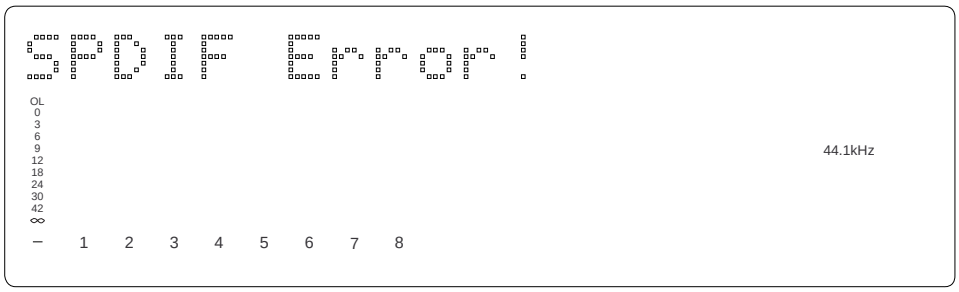
The following is considered to be the cause of problem.

- Bad soldering of J2, U11, U19 and surrounding circuit on the MAIN PCB

Even if the before mentioned prompt is displayed, pressing the EXECUTE/YES key would reach the next test.

4-5-5. S/P DIF In/Out (44.1kHz) Check

By connecting the DATA IN and OUT terminals, this tests checks if the S/P DIF signal output by itself is correctly received. If the PLL circuit is not in a “LOCKED” condition, the prompt below will be displayed.



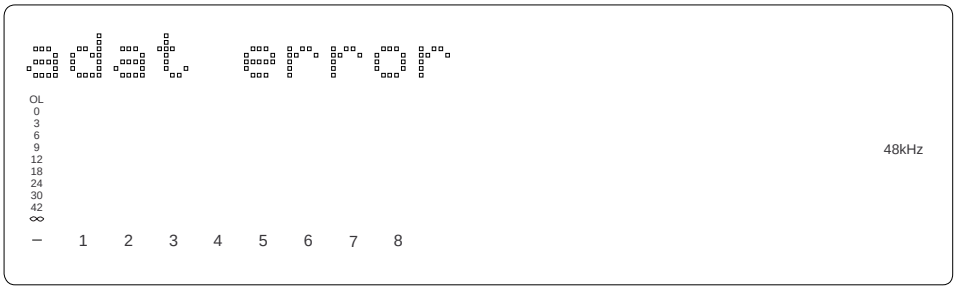
The following is considered to be the cause of problem.

* Defect on DIGITAL OUT
  - No oscillation of resonator X1.
  - Connector J4, gate array U5, U20 and / or surrounding circuit are defective.
* Defect on DIGITAL IN
  - Connector J5, gate array U5, U20 and / or surrounding circuit are defective.
  - PLL circuit (U10 and surrounding circuit) are defective.
* The SETUP “DIGITAL IN” is set other than “L: - R: -”.

Even if the before mentioned prompt is displayed, pressing the EXECUTE/YES key would reach the next test.

4-5-6. Adat In/Out (48kHz) Check

By connecting the DATA IN and OUT terminals, this tests checks if the ADAT digital signal output by itself is correctly received. If the PLL circuit is not in a “LOCKED” condition, the prompt below will be displayed.



The following is considered to be the cause of problem.

* Defect on DIGITAL OUT
  - No oscillation of resonator X2.
  - Connector J4, gate array U5, U20 and / or surrodunding circuit are defective.
* Defect on DIGITAL IN
  - Connector J5, gate array U5, U20 and / or surrounding circuit are defective.
  - PLL circuit (U22, 23, 35, 36, 37, 38, 39 and / or surrounding circuit) are defective.
* The SETUP “DIGITAL IN” is set other than “L: - R: -”.

Even if the before mentioned prompt is displayed, pressing the EXECUTE/YES key would reach the next test.

4-5-7. 8345 Vari-Pitch Circuit (48kHz) Check

The master clock is generated using the Model 8345 LRCK (J9 pin-24: EXT_LRCK). In the meantime, the adat digital signal is generated based on this master clock. This test checks if the adat digital signal output by itself is correctly received. If not, it means that the vari-pitch circuit does not work correctly. As a result, the prompt below will be displayed.

If “adat error” is displayed in the before mentioned test, the above error prompt will be naturally displayed.

If the Model 8345 test is not installed in the D-108, this test will be skipped.

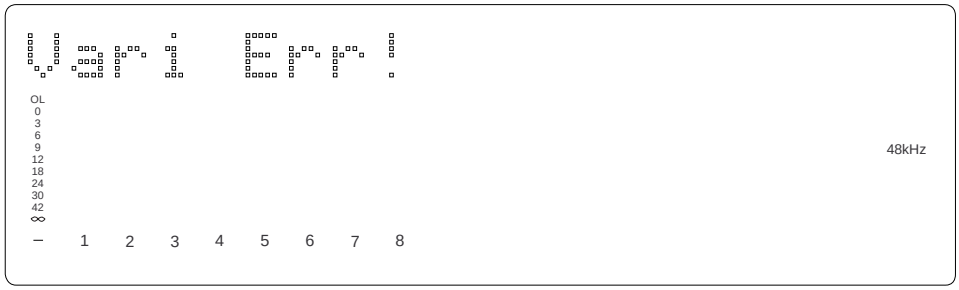
The following is considered to be the cause of problem.

- Wrongly connected flat cable to J9 on the MAIN PCB.
- Bad soldering of J9, U9, U3 and / or surrounding circuit

Even if the before mentioned prompt is displayed, pressing the EXECUTE/YES key would reach the next test.

4-5-8. D-108 Vari-Pitch Circuit (48kHz) Check

Using the master clock generated through the D-108 vari-pitch circuit on the MAIN PCB, the adat digital signal is output. This test checks if the adat digital signal output by itself is correctly received. If not, it means that the vari-pitch circuit does not work correctly. As a result, the prompt below will be displayed.



If “adat error” is displayed in the before mentioned test, the above error prompt will also be naturally displayed.

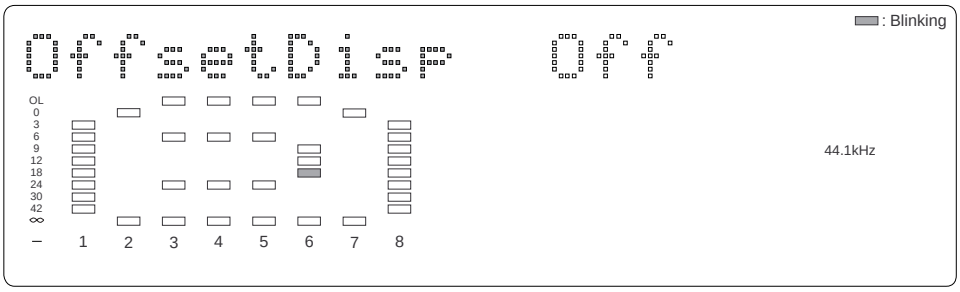
The following is considered to be the cause of problem.

- Defects on the vari-pitch circuit (U3, U9), gate array (U5) and / or surrounding circuit.

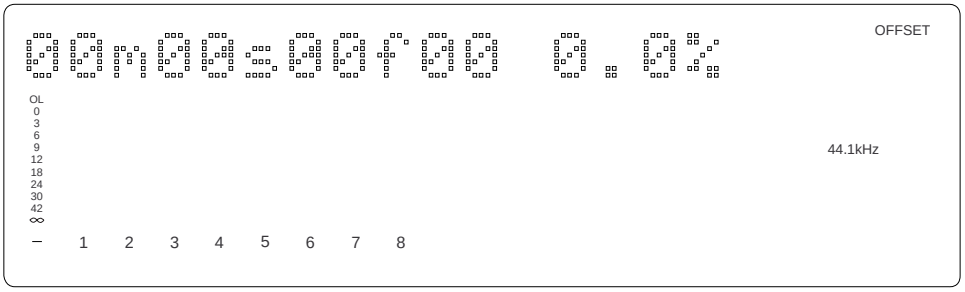
Even if the before mentioned prompt is displayed, pressing the EXECUTE/YES key would reach the next test.

4-6. Offset Display

This mode determines if the offset value against a master machine should be displayed when the D-108 is working as a slave machine. If you would like to turn ON the offset display, press the EXECUTE/YES key while "?" is blinking. (The default setting is "off".) Then, turn the jog dial C.W. to change the display to "ON" and press the EXECUTE/YES key.



In order to check the offset value, select the "MTC" time base and the "REMAINING TIME" display. The display below is an example of offset display.



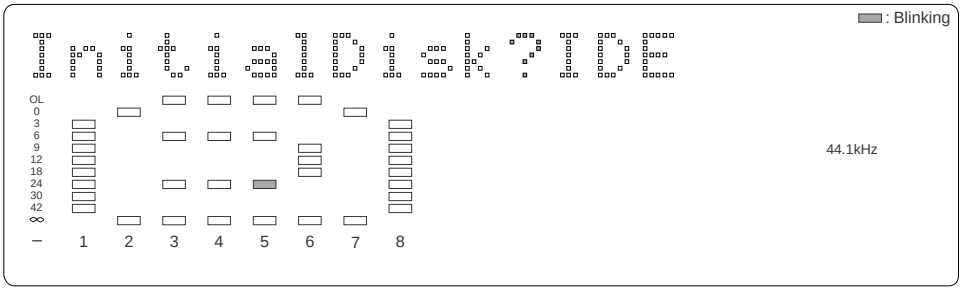
CAUTION: There might be a case that the percentage value does not indicate "0.0%" exactly. This is caused by the difference of internal clocks between master and slave machines, which are running independently.

4-7. Initializing Disk

This mode initializes a 3.5" internal E-IDE hard disk drive or an external SCSI device connected to the SCSI port.

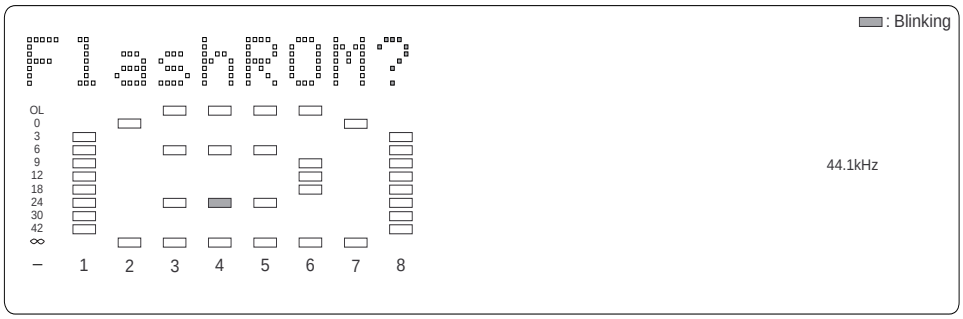
CAUTION:
1. If both the external SCSI drive and the internal 3.5" E-IDE hard disk drive are connected at the same time, currently selected drive by the SETUP menu "Drive_Sel?" will be initialized.
2. Up to 2 x SCSI drives can be connected to the D-108 at a time. One is for recording / reproducing (SCSI ID: 0 ~ 5) and the other for exclusive backing up (SCSI ID: 6). Initializing is possible on the SCSI drive (ID: 0 ~ 5) used for recording / reproducing only.

After pressing the EXECUTE/YES key, "SURE?" will start blinking in the FL display. In this condition, pressing the EXECUTE/YES key one more time would initialize the recognized disk drive. This mode puts the disk back to the condition originally formatted.



4-8. Flash ROM

This mode is used when copying the system software from EPROMs to Flash ROM. As mentioned in the section “3. SOFTWARE UPDATE” (page 10), the D-108 software inside the Flash ROM can be updated through the SCSI port. However, if something wrong happens when updating the software (e.g. A blackout occurred while updating the software.), the D-108 might not be able to boot up by the system software inside the Flash ROM.



In this case, the following procedures must be taken.

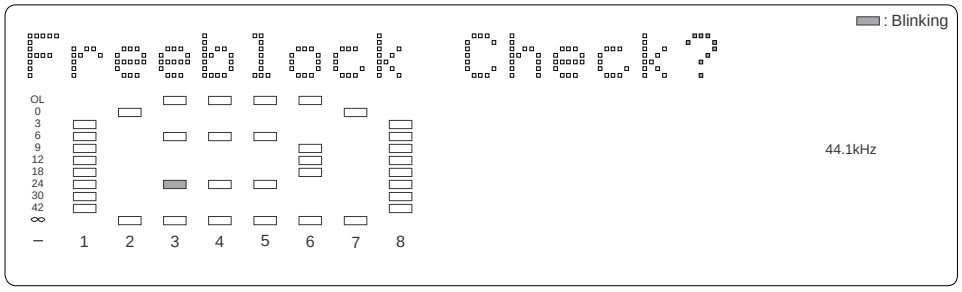
1. Turn off the power of D-108 and turn the switch on the ROM CARD PCB assy to “EPROM” side.
2. Plug the EPROMs into the sockets on the ROM CARD PCB assy which will be supplied to you separately.
3. Connect the ROM CARD PCB assy to J10 (50-pin connector) on the MAIN PCB assy.
4. Turn on the power of D-108.

In this condition, the D-108 is booted up by the system software inside the EPROMs. The next procedures to take are as follows.

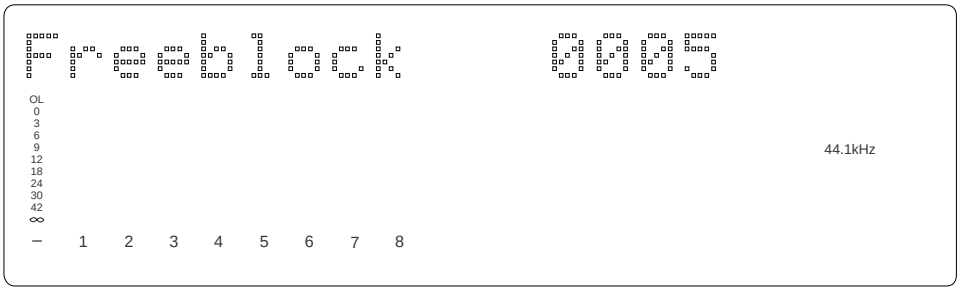
1. Put the D-108 into the Service Mode, select “FlashROM” and press EXECUTE/YES key. (“SURE?” is blinking.)
2. Press the EXECUTE/YES key one more time to copy the system software from EPROMs to Flash ROM.
3. After the completion, turn the switch on the ROM CARD PCB assy to “FLMEM” side.
4. In order to confirm that the D-108 is correctly booted up using the system software inside the Flash ROM, turn off the power, disconnect the cable connected to the J10 on the MAIN PCB assy and turn the power back on again.
5. After the confirmation, referring to the section “3. SOFTWARE UPDATE” (page 10), update the system software inside the Flash ROM through SCSI port again.

4-9. Free Block Check

This mode is used to check the condition of the diskette inserted into an external SCSI drive connected to the D-108 or the internal E-IDE hard disk drive. The drive to be checked is the one currently selected drive by the SETUP menu “Drive_Sel?”.



Press the EXECUTE/YES key when “?” is blinking. The display indicates the free audio file numbers.



If the Free Block indicates a large number even after formatting and no signal is recorded or recorded signals are frequently skipped, the diskette / hard disk drive can be judged to be in a bad condition.

5. ERROR CODE LIST

The chart below indicates the error code number and corresponding description. Since the error code list is basically designed for our engineers to improve the software, the description is quite technical. If you find the D-108 with one of the error codes displayed, we encourage you to update the software first. In case updating the software does not solve the problem, we would like you to inform us about details.

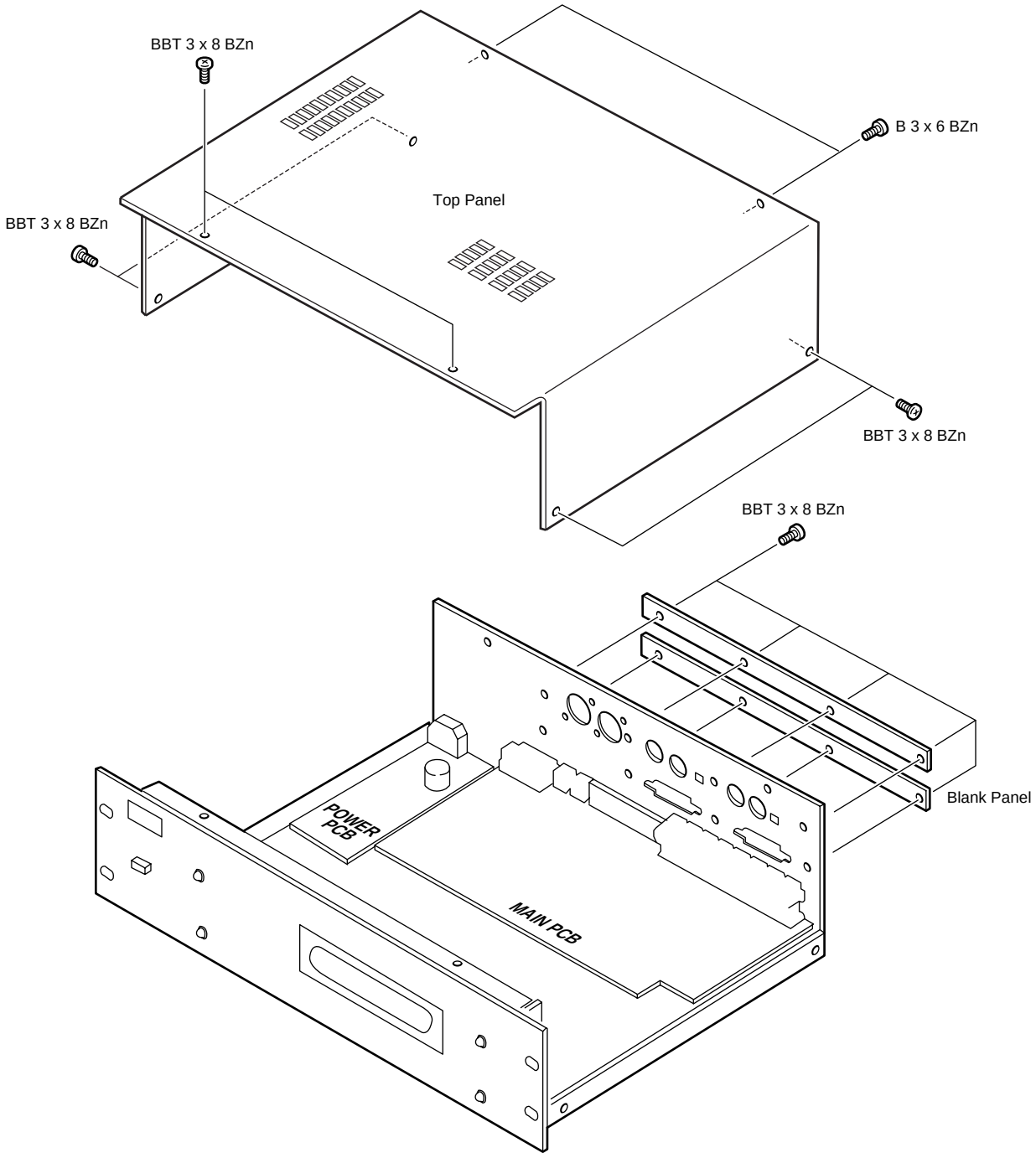
D-108 ERROR CODE LIST

ERROR CODE	DESCRIPTION
1	D-108 tries to access the address which does not exist.
3	SCSI drive does not boot up correctly when in SCSI access operation.
9	When saving system region sector, its address is registered in Free_block File during Free block File checking procedure.
10	Link_pointer which links Audio File indicates smaller address (out of region) than Link_File address region in RAM.
11	Link_pointer indicates larger address (out of region) than Link_File address region in RAM.
12	“Pointer_addre” calculation of Link_Pointer is not correct.
14	Link_Pointer during recording/reproducing indicates smaller address (out of region) than actual Link_File address region.
15	Link_Pointer during recording/reproducing indicates larger address (out of region) than actual Link_File address region.
16	“Pointer_addre” calculation of Link_Pointer during recording/reproducing is not correct.
20	src_cash_load: Improper access of link address occurred while PASTE editing.
21	bak_cash_load: Program link during PASTE/MOVE editing is incorrect.
22	bak_cash_load: Imcompatibility problem occurred on program link during PASTE/MOVE editing.
30	Error when executing MOVE editing. Improper Link Pointer. Error in “bak_cash_load” function.
31	Error when executing MOVE editing. Improper Link Pointer. Error in “bak_cash_load” function.
32	Error when executing MOVE editing. Improper Link Pointer. Error in “bak_cash_load” function.
35	Backup_Save:Error occurred when saving data to SCSI device.
36	Backup_Load: Error occurred when loading data from SCSI device.
38	Displayed in Test Mode only. SCSI device cannot be recognized during initial test.
40	dis_cah_load: Improper access occurred when recording/reproducing.
41	dis_cah_load: Improper access occurred when recording/reproducing.
42	dis_cah_load: Improper access occurred when recording/reproducing.
45	get_non_des_block: Remaining disk capacity is insufficient.
52	non_des_cash_save_sub: Improper access occurred when recording/reproducing.
60	remake_free_block: There was improper access to program management region.
61	remake_free_block: There was improper access to program management region.
62	remake_free_block: Number of manageable events exceeds limit.
63	remake_free_block: There was improper access to program management region.
64	remake_free_block: There is an overlapping section in program management region.
96	There was improper access to program management region.
97	There was improper access to program management region when saving System File.
99	There was improper access when fading in/out.

6. MODEL 8345/5040 INSTALLING PROCEDURES

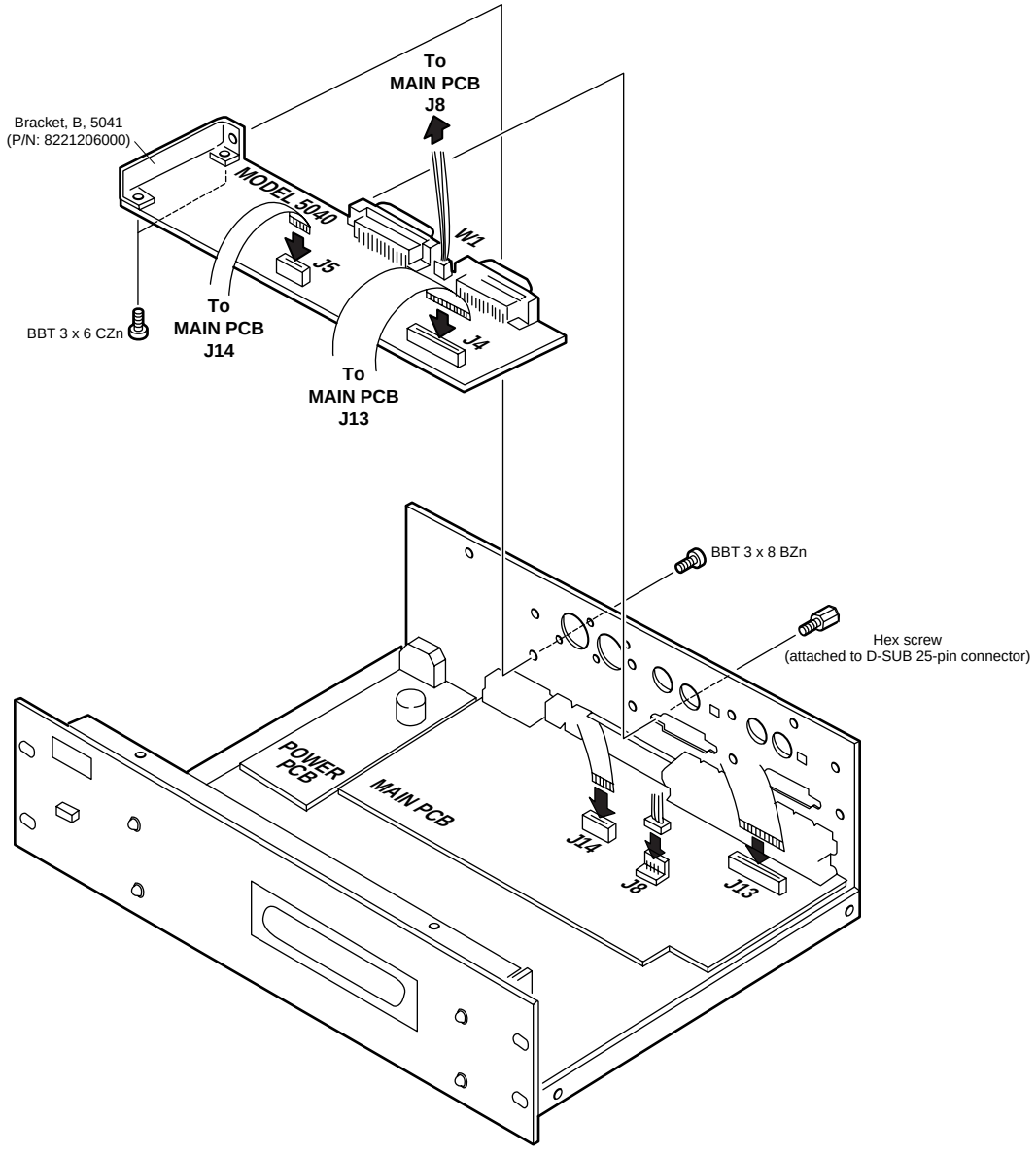
CAUTION: When retrofitting both the MODEL 8345 and 5040 to the D-108, please make sure that the MODEL 5040 will be the one to retrofit first.

1) Open up the top panel by loosening the following screws.
   - 4 x BBT 3 x 8 BZN screws on both sides of top panel
   - 2 x BBT 3 x 8 BZn screws on the top of top panel
   - 2 x B 3 x 6 BZn screws on the rear side of top panel
2) Remove the blank panels by loosening 4 x BPT 3 x 8 BZn screws.



3) Loosen 4 x PWH 3 x 6 Ni scerws which fix the hard disk bay assy to the HD bracket. In this condition, the hard disk bay can be moved towards the front panel so that the cable can be easily connected / disconnected.
4) Before fixing the MODEL 5040 to the D-108 rear panel, insert the 17-pin and 8-pin flat cables included in the MODEL 5040 package into the connector J13 and J14 on the D-108 MAIN PCB assy respectively.
5) Remove 4 x hex screws originally attached to the MODEL 5040 D-SUB connectors.
6) Fix the Bracket, B, 5041 (P/N: 8221206000) to the MODEL 5040 PCB assy.
7) Fix the MODEL 5040 to the D-108 rear panel by the following screws.
    - 1 x B 3 x 6 BZn screws included in the MODEL 5041 package
    - 4 x hex screws originally attached to the D-SUB connectors
8) Connect the following cables.
    - 17-pin flat cable from the connector J13 on the D-108 MAIN PCB assy to the connector J4 on the MODEL 5040 PCB assy
    - 8-pin flat cable from the connector J14 on the D-108 MAIN PCB assy to the connector J5 on the MODEL 5040 PCB assy
    - 4-pin connector cable W1 on the MODEL 5040 PCB assy to the connector J8 on the MODEL 5040 PCB assy

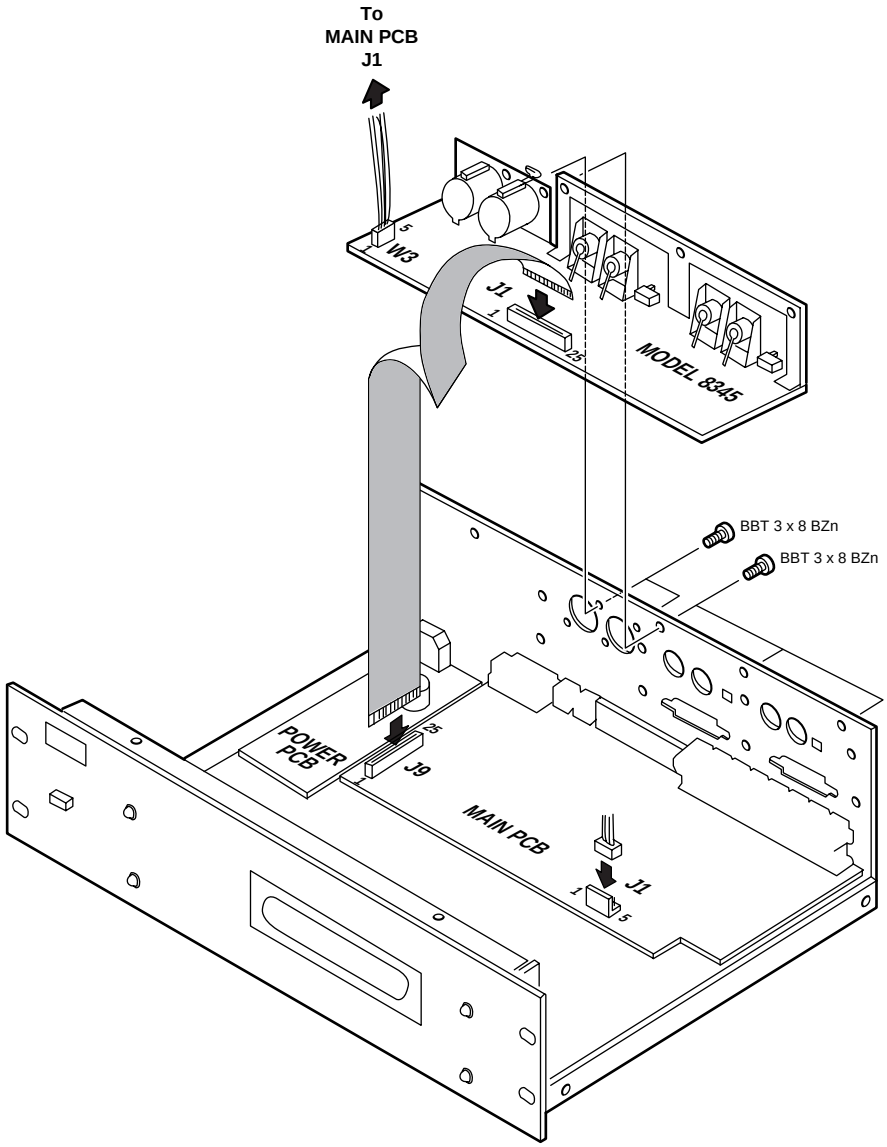
CAUTION: On the MODEL 5040 PCB assy, if the 8-pin connector to be connected to the J14 on the D-108 MAIN PCB assy is mounted on the J5 location, the flat cable does not have to be twisted around. However, if the 8-pin connector is mounted on the J6 location, the flat cable has to be twisted around to match the pin numbers.



9) Before fixing the MODEL 8345 to the D-108 rear panel, insert the 25-pin flat cable included in the MODEL 8345 package into the connector J9 on the D-108 MAIN PCB assy .

10) Fix the MODEL 5040 to the D-108 rear panel by the following screws.
    - 3 x B 3 x 6 BZn screws included in the MODEL 8345 package - Bracket section
    - 4 x BBT 3 x 8 BZn screws included in the MODEL 8345 package - XLR connector section

11) Connect the following cables.
    - 25-pin flat cable from the connector J9 on the D-108 MAIN PCB assy to the connector J1 on the MODEL 5040 PCB assy
    - 5-pin connector cable W3 on the MODEL 5040 PCB assy to the connector J1 on the MODEL 5040 PCB assy

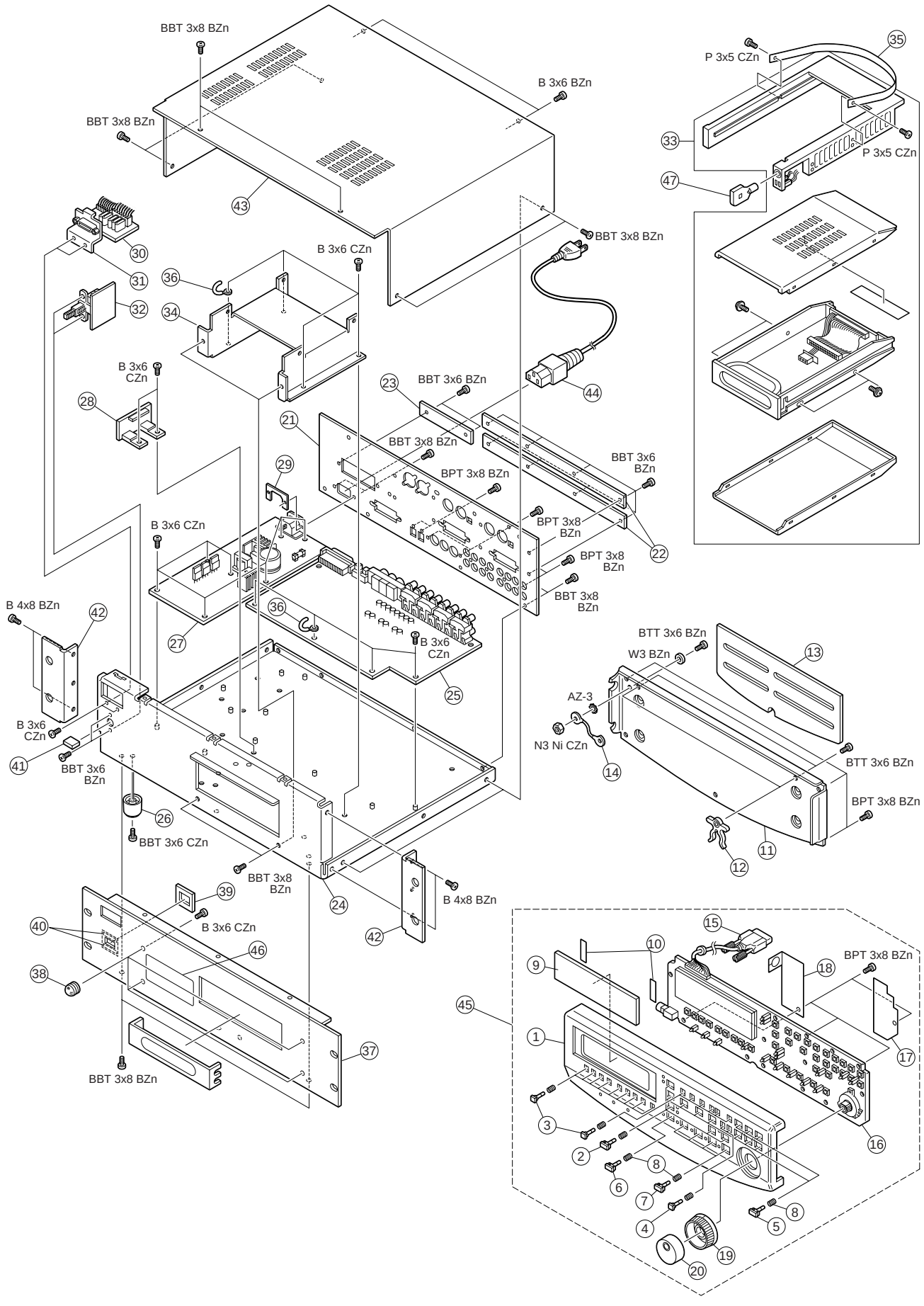


7. EXPLODED VIEW, PCB ASSEMBLY & PARTS LIST

● D-108 OVERALL EXPLODED VIEW

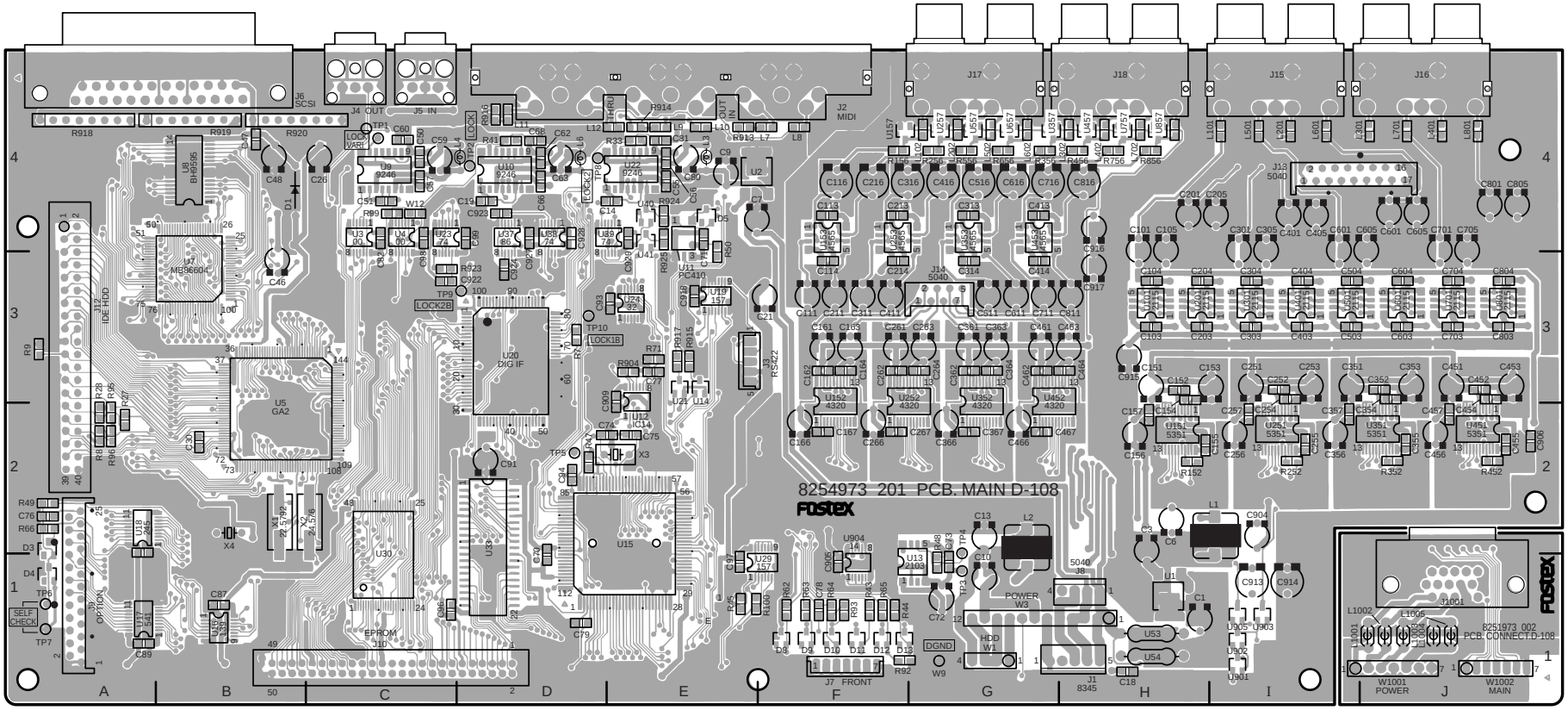
Ref. No.	Part No.	Description
1	8212 5811 03	Panel, controller, D-series
2	8226 1852 05	Button, 11 x 5, E
3	8226 1842 08	Button, 6 x 6, H
4	8226 1842 02	Button, 6 x 6, B
5	8226 1852 04	Button, 11 x 5, D
6	8226 1831 05	Button, 11 x 11, E
7	8226 1831 04	Button, 11 x 11, D
8	8214 2700 00	Spring, 8 x 3, 0.2
9	8212 5830 01	Window, FL, D-108
10	N/A	Both-sided tape, 10 mm (w) x 40 mm (H)
11	8221 1740 00	Panel, rear, remote, D-108
12	8212 5820 00	Lock, controller, D-series
13	8216 6281 00	Pad, controller, D-series
14	8277 3530 10	Cable assy, earth lug, D3-D3, L100
15	8277 4092 00	Cable assy, remote, D-series
16	8274 1700 00	PCB assy, Display, D-108
17	8216 6290 00	Sheet, remote controller, B, D-series
18	8216 6310 00	Sheet, remote controller, B, D-80
19	8226 1702 00	Knob, shuttle, D-10, D-series
20	8226 1711 01	Knob, jog, D-10, D-series
21	8221 2600 00	Panel, rear, D-108
22	8221 2101 00	Panel, blank, L
23	8221 2091 00	Panel, blank, S
24	8221 2591 00	Chassis, D-108
25	8274 1690 00	PCB assy, Main, D-108
26	8207 0130 00	Foot, FF1011
⚠ 27	8274 1710 00	PCB assy, Power Supply, D-108
⚠ 28	8274 2020 00	PCB assy, Regulator, D-108
29	8221 2610 00	Bracket, AC IN, D-108
30	8274 1720 00	PCB assy, Connect, D-108
31	8221 1710 00	Bracket, D-SUB, D-series
⚠ 32	8274 1730 00	PCB assy, Power SW, D-108
33	8260 5240 00	Bay assy, HD
34	8221 2130 00	Bracket, HD, D-160/D-108
35	8216 6561 00	Belt, HD, D-series
36	8207 0117 01	Cord holder, CS-1
37	8221 1670 03	Panel, dress, D-108
38	8223 2942 00	Hook, controller, D-series
39	8226 0191 01	Escutcheon, B, No. 8
40	N/A	Both-sided tape, 5 mm (W) x 20 mm (H)
41	8226 0130 04	Button, push, B, No. 8
42	8221 1730 00	Angle, back, 133
43	8221 2140 00	Panel, top, D-160/D-108
⚠ 44	8276 8010 00	Cord, power, UL/CSA, VM0033-0089, USA/CND
	8276 8021 00	Cord, power, CEE, 0309B-0310B, EUR
	8276 8000 00	Cord, power, DM, VM1292-1298
45	8360 5580 00	Controller assy, D-108
46	8218 7760 00	Label, caution, HD
47	8207 0116 00	Key, HD, D-series

● D-108 OVERALL EXPLODED VIEW

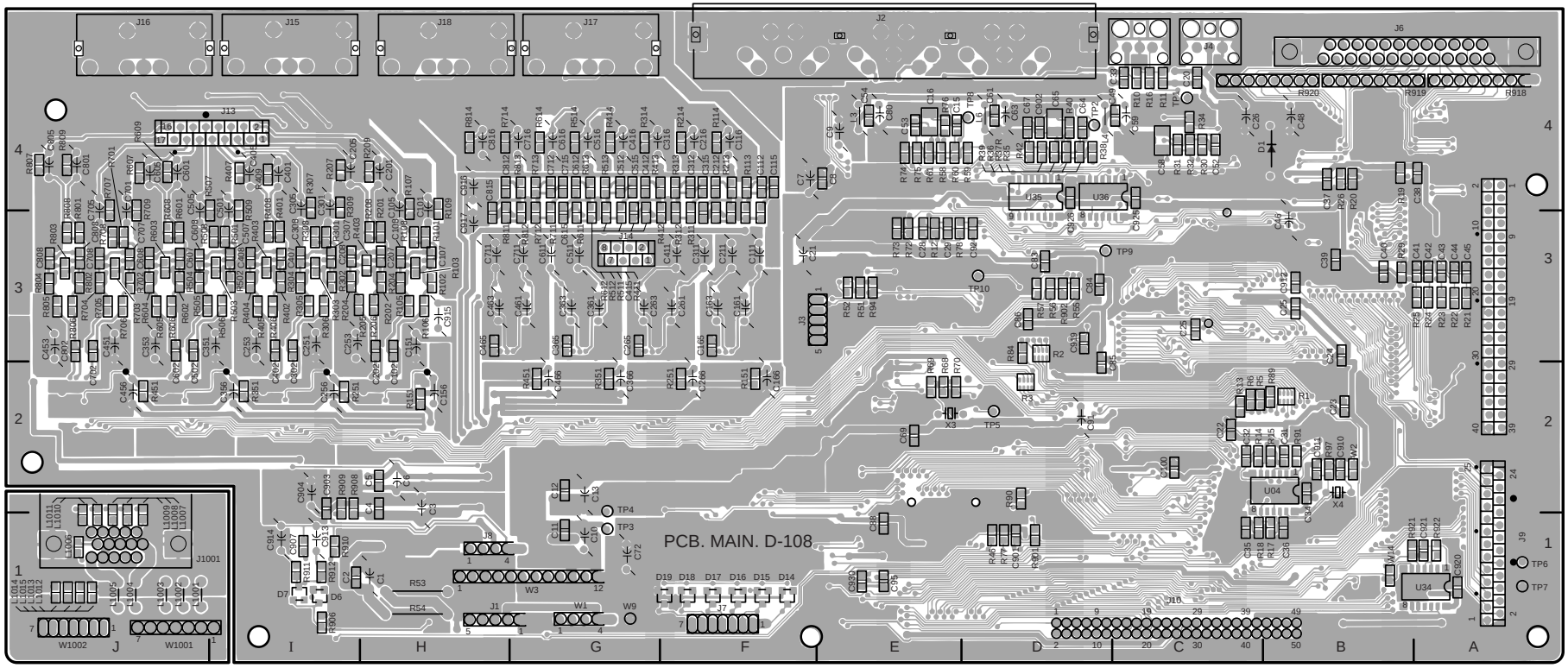


● D-108 PCB PATTERN DRAWING

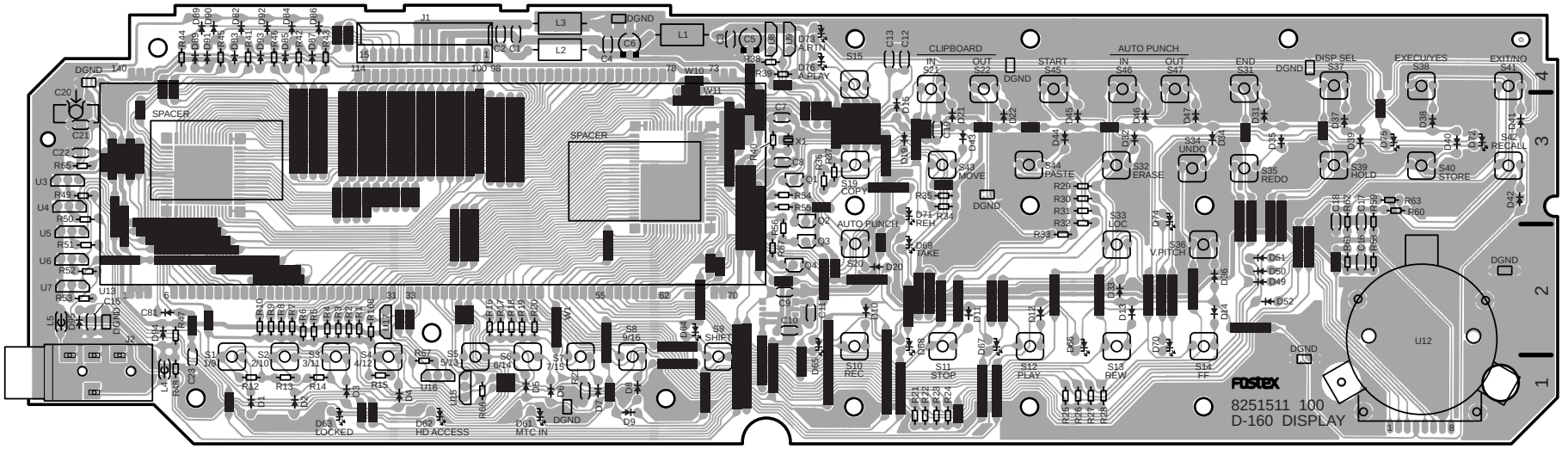
• Parts Side of MAIN / CONNECT PCB



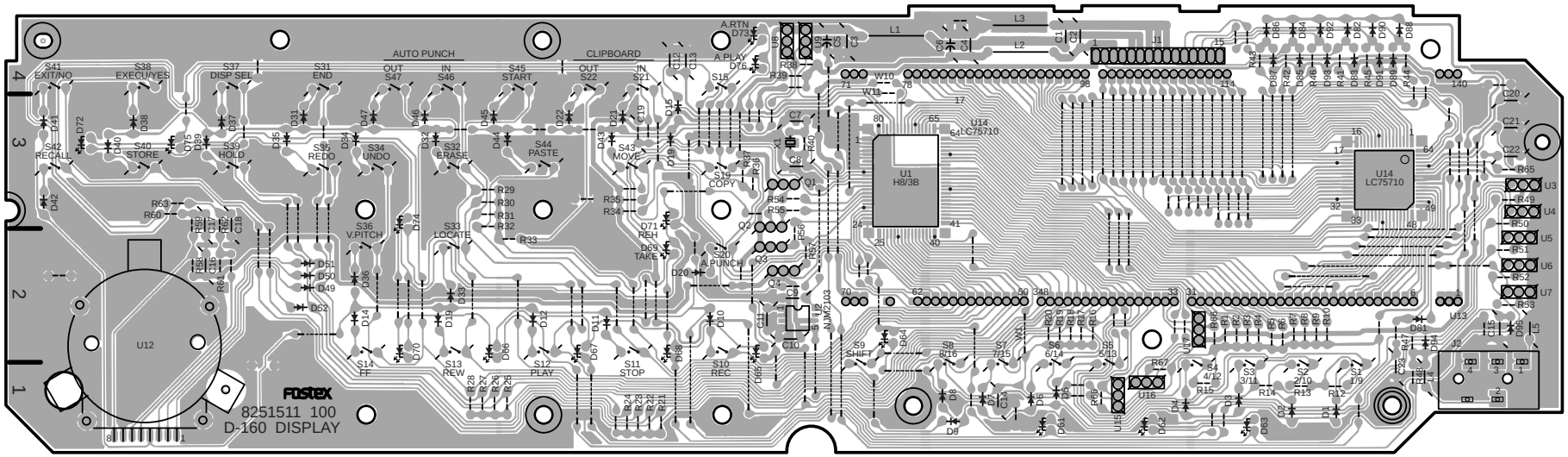
• **Foil Side of MAIN / CONNECT PCB**



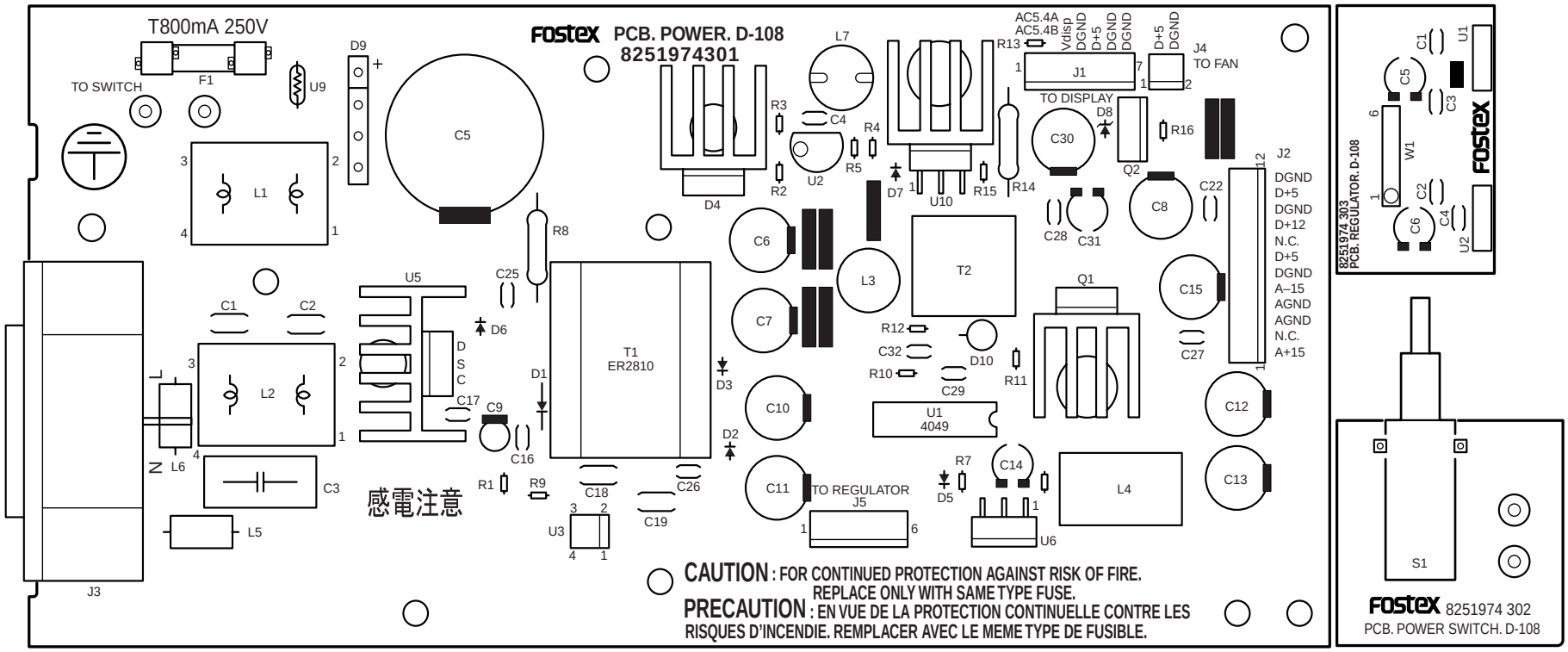
• Parts side of DISPLAY PCB



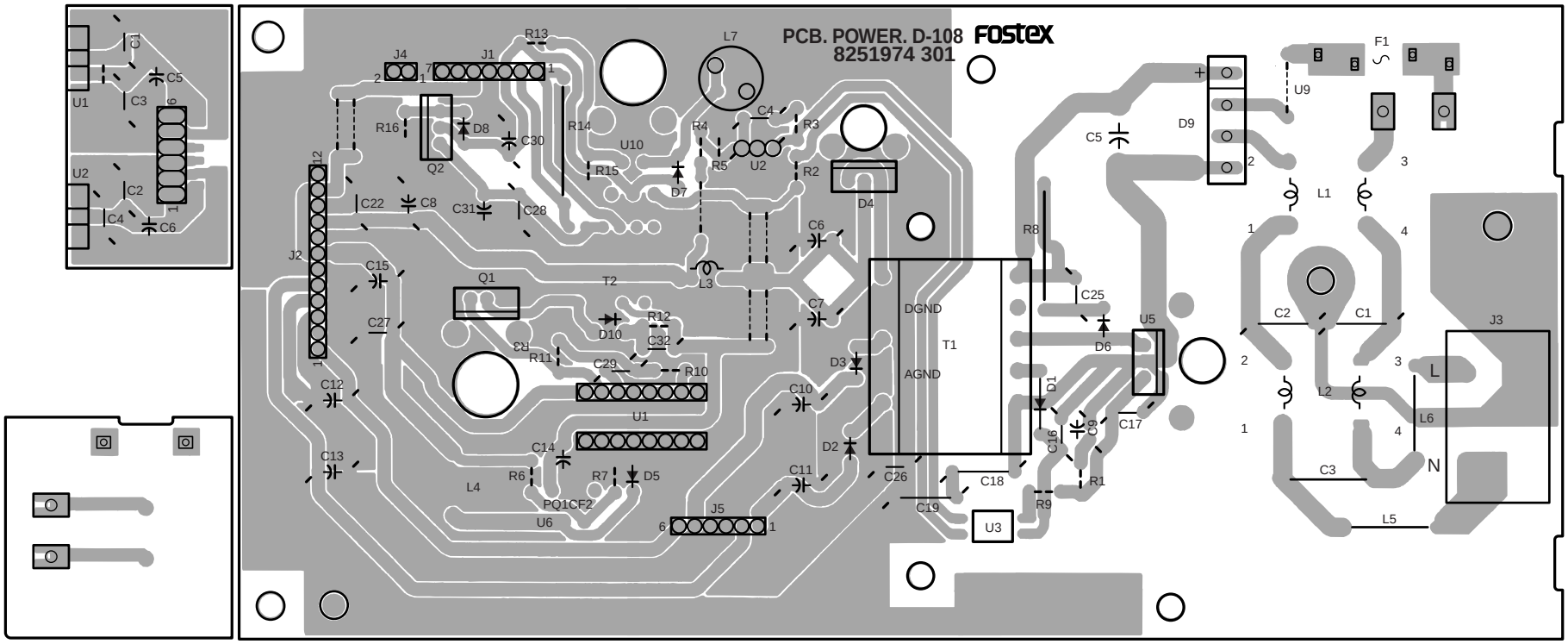
• Foil side of DISPLAY PCB



• Parts side of POWER / POWER SW / REGULATOR PCB



• Foil side of POWER / POWER SW / REGULATOR PCB



● D-108 Parts List

• MAIN PCB assy

Ref. No.	Part No.	Description
	8274 1690 00	PCB assy, Main, D-108
B101	8251 9731 01	Plain PCB, Main, D-108

ICs

Ref. No.	Part No.	Description
U001, 002	8236 5403 01	ST, AN, regulator, NJM78M05DLA
U003, 004	8236 5450 00	ST, TSSOP, 74VHC00
U005	8236 0818 00	QFP, DG, gate array, ASPI
U006	8236 5610 04	ST, DG, 74HCU04
U007	8236 0828 00	QFP, DG, SCSI, MB86604L
U008	8236 0829 00	SOP, DG, SCSI, terminator, BH9595FP-Y
U009, 010	8236 5034 00	ST, DG, VCO, TC9246F
U011	8234 5047 00	Opt., Photo, PC410
U012	8236 5450 14	ST, TSSOP, 74VHC14
U013	8236 5025 00	ST, AN, reset, NJM2103M
U014	8236 5701 01	ST, DG, driver, DTC114EK
U015	8236 0838 02	QFP, DG, CPU, main, FD-8/D-108, mask, SH7042, F28
U016	8236 5451 39	ST, TSSOP, 74VHC139
U017	8236 5455 41	ST, TSSOP, 74VHC541
U018	8236 5452 45	ST, TSSOP, 74VHC245
U019	8236 5451 57	ST, TSSOP, 74VHC157
U020	8236 0850 00	QFP, DG, gate array, DIF
U021	8236 5701 01	ST, DG, driver, DTC114EK
U022	8236 5034 00	ST, DG, vco, TC9246F
U023	8236 5450 74	ST, TSSOP, 74VHC74
U024	8236 5450 32	ST, TSSOP, 74VHC32
U025~028		N/A
U029	8236 5451 57	ST, TSSOP, 74VHC157
U030	8236 0840 11	TSOP, DG, from, M29F400T-400
U031~033		N/A
U034		N/A (14P)
U035	8236 5600 86	ST, TSSOP, 74HC86
U036	8236 5601 61	ST, DG, 74HC161
U037	8236 5450 00	ST, TSSOP, 74VHC00
U038, 039	8236 5450 74	ST, TSSOP, 74VHC74
U040	8236 5704 01	ST, DG, driver, DTA114EK
U041	8236 5701 01	ST, DG, driver, DTC114EK
U101~801	8236 5407 00	ST, AN, op amp, NJM2115M
U151~451	8236 5407 00	ST, DG, ADC, AK5351
U152~452	8236 5053 00	ST, DG, DAC, AK4320
U153~453	8236 5412 00	ST, AN, NJM4565M
U157~857	8236 5702 01	ST, DG, driver, DTC314TK
U901, 902	8236 5701 01	ST, DG, driver, DTC114EK
U903	8236 5708 01	ST, DG, driver, DTB114EK
U904	8236 5450 04	ST, TSSOP, 74VHC04
U905	8236 5708 01	ST, DG, driver, DTB114EK

DIODEs

Ref. No.	Part No.	Description
D001	8234 1050 00	VF, schottky, EK13
D002		N/A
D003~006	8234 5028 00	ST, DAN202K
D007	8234 7506 00	ST, RB400D
D008~019	8234 5028 00	ST, DAN202K

RESISTORs

Ref. No.	Part No.	Description
R001~003	8230 5081 01	ST, resistor array, 100Ω x 4, 5%, CN1J4
R004		N/A
R005~007	8230 5001 01	ST, carbon, 1/10W, 100Ω, 5%
R008	8230 5001 03	ST, carbon, 1/10W, 1kΩ, 5%
R009	8230 5005 62	ST, carbon, 1/10W, 5.6kΩ, 5%
R010	8230 5003 32	ST, carbon, 1/10W, 3.3kΩ, 5%
R011	8230 5002 22	ST, carbon, 1/10W, 2.2kΩ, 5%
R012	8230 5001 01	ST, carbon, 1/10W, 100Ω, 5%
R013	8230 5003 31	ST, carbon, 1/10W, 330Ω, 5%
R014	8230 5001 05	ST, carbon, 1/10W, 1MΩ, 5%
R015	8230 5000 00	ST, carbon, 1/10W, 0Ω, 5%
R016	8230 5003 31	ST, carbon, 1/10W, 330Ω, 5%
R017	8230 5001 05	ST, carbon, 1/10W, 1MΩ, 5%
R018	8230 5000 00	ST, carbon, 1/10W, 0Ω, 5%
R019	8230 5004 72	ST, carbon, 1/10W, 4.7kΩ, 5%
R020		N/A
R021~025	8230 5001 01	ST, carbon, 1/10W, 100Ω, 5%
R026, 027	8230 5000 00	ST, carbon, 1/10W, 0Ω, 5%
R028		N/A
R029	8230 5004 72	ST, carbon, 1/10W, 4.7kΩ, 5%
R030	8230 5001 52	ST, carbon, 1/10W, 1.5kΩ, 5%
R031	8230 5001 01	ST, carbon, 1/10W, 100Ω, 5%
R032	8230 5002 24	ST, carbon, 1/10W, 220kΩ, 5%
R033	8230 5005 61	ST, carbon, 1/10W, 560Ω, 5%
R034	8230 5003 31	ST, carbon, 1/10W, 330Ω, 5%
R035	8230 5007 51	ST, carbon, 1/10W, 750Ω, 5%
R036	8230 5008 22	ST, carbon, 1/10W, 8.2kΩ, 5%
R037		N/A
R038	8230 5003 31	ST, carbon, 1/10W, 330Ω, 5%
R039	8230 5001 03	ST, carbon, 1/10W, 10kΩ, 5%
R040	8230 5001 01	ST, carbon, 1/10W, 100Ω, 5%
R041	8230 5005 61	ST, carbon, 1/10W, 560Ω, 5%
R042	8230 5004 72	ST, carbon, 1/10W, 4.7kΩ, 5%
R043, 044	8230 5001 01	ST, carbon, 1/10W, 100Ω, 5%
R045~048	8230 5001 03	ST, carbon, 1/10W, 10kΩ, 5%
R049	8230 5003 31	ST, carbon, 1/10W, 330Ω, 5%
R050	8230 5001 02	ST, carbon, 1/10W, 1kΩ, 5%
R051	8230 5001 03	ST, carbon, 1/10W, 10kΩ, 5%

Ref. No.	Part No.	Description
R052	8230 5001 01	ST, carbon, 1/10W, 100Ω, 5%
R053, 054	8230 5001 00	ST, carbon, 1/10W, 10Ω, 5%
R055, 056	8230 5005 61	ST, carbon, 1/10W, 560Ω, 5%
R057	8230 5001 01	ST, carbon, 1/10W, 100Ω, 5%
R058		N/A
R059	8230 5003 31	ST, carbon, 1/10W, 330Ω, 5%
R060	8230 5007 51	ST, carbon, 1/10W, 750Ω, 5%
R061	8230 5008 22	ST, carbon, 1/10W, 8.2kΩ, 5%
R062~065	8230 5001 01	ST, carbon, 1/10W, 100Ω, 5%
R066	8230 5001 52	ST, carbon, 1/10W, 1.5kΩ, 5%
R067		N/A
R068	8230 5003 31	ST, carbon, 1/10W, 330Ω, 5%
R069	8230 5002 22	ST, carbon, 1/10W, 2.2kΩ, 5%
R070	8230 5003 31	ST, carbon, 1/10W, 330Ω, 5%
R071	8230 5001 03	ST, carbon, 1/10W, 10kΩ, 5%
R072		N/A
R073	8230 5000 00	ST, carbon, 1/10W, 0Ω, 5%
R074	8230 5004 72	ST, carbon, 1/10W, 4.7kΩ, 5%
R075		N/A
R076	8230 5001 01	ST, carbon, 1/10W, 100Ω, 5%
R077	8230 5001 03	ST, carbon, 1/10W, 10kΩ, 5%
R078	8230 5001 01	ST, carbon, 1/10W, 100Ω, 5%
R079~088		N/A
R089	8230 5001 01	ST, carbon, 1/10W, 100Ω, 5%
R090	8230 5001 03	ST, carbon, 1/10W, 10kΩ, 5%
R091	8230 5001 01	ST, carbon, 1/10W, 100Ω, 5%
R092	8230 5004 73	ST, carbon, 1/10W, 47kΩ, 5%
R093	8230 5004 73	ST, carbon, 1/10W, 47kΩ, 5%
R094	8230 5001 03	ST, carbon, 1/10W, 10kΩ, 5%
R095	8230 5001 02	ST, carbon, 1/10W, 1kΩ, 5%
R096	8230 5001 02	ST, carbon, 1/10W, 1kΩ, 5%
R097	8230 5001 05	ST, carbon, 1/10W, 1MΩ, 5%
R098		N/A
R099	8230 5003 31	ST, carbon, 1/10W, 330Ω, 5%
R100		N/A
R101~801	8230 5002 03	ST, carbon, 1/10W, 20kΩ, 5%
R102~802	8230 5001 23	ST, carbon, 1/10W, 12kΩ, 5%
R103~803	8230 5001 03	ST, carbon, 1/10W, 10kΩ, 5%
R104~804	8230 5001 03	ST, carbon, 1/10W, 10kΩ, 5%
R105~805	8230 5003 31	ST, carbon, 1/10W, 330Ω, 5%
R106~806	8230 5003 31	ST, carbon, 1/10W, 330Ω, 5%
R107~807	8230 5001 04	ST, carbon, 1/10W, 100kΩ, 5%
R108~808	8230 5002 03	ST, carbon, 1/10W, 20kΩ, 5%
R109~809	8230 5001 04	ST, carbon, 1/10W, 100kΩ, 5%
R110~810		N/A
R111~811	8230 5001 03	ST, carbon, 1/10W, 10kΩ, 5%
R112~812	8230 5001 03	ST, carbon, 1/10W, 10kΩ, 5%
R113~813	8230 5002 72	ST, carbon, 1/10W, 2.7kΩ, 5%
R114~814	8230 5001 04	ST, carbon, 1/10W, 100kΩ, 5%
R141~451	8230 5001 00	ST, carbon, 1/10W, 10Ω, 5%
R142~452	8230 5001 01	ST, carbon, 1/10W, 100Ω, 5%
R156~856	8230 5001 01	ST, carbon, 1/10W, 100Ω, 5%
R161~461	8230 5001 00	ST, carbon, 1/10W, 10Ω, 5%
R901	8230 5001 03	ST, carbon, 1/10W, 10kΩ, 5%
R902	8230 5005 61	ST, carbon, 1/10W, 560Ω, 5%
R903		N/A
R904	8230 5005 61	ST, carbon, 1/10W, 560Ω, 5%
R905		N/A
R906, 907	8230 5001 03	ST, carbon, 1/10W, 10kΩ, 5%
R908, 909	8230 5001 02	ST, carbon, 1/10W, 1kΩ, 5%
R910~912	8230 5001 03	ST, carbon, 1/10W, 10kΩ, 5%
R913~917	8230 5002 21	ST, carbon, 1/10W, 220Ω, 5%
R918~922		N/A
R923	8230 5001 02	ST, carbon, 1/10W, 1kΩ, 5%
R924, 925	8230 5002 23	ST, carbon, 1/10W, 22kΩ, 5%
R926, 927	8230 5001 03	ST, carbon, 1/10W, 10kΩ, 5%

CAPACITORs

ALU = Electrolytic type

CER = Ceramic type

Ref. No.	Part No.	Description
C001	8232 1431 06	VT, ALU, 16V, 10µF, 20%, SME-VB
C002	8233 5021 04	ST, CER, 50V, 0.1µF, +80-20%, CC20F
C003	8232 1431 06	VT, ALU, 16V, 10µF, 20%, SME-VB
C004, 005	8233 5021 04	ST, CER, 50V, 0.1µF, +80-20%, CC20F
C006, 007	8232 1431 06	VT, ALU, 16V, 10µF, 20%, SME-VB
C008	8233 5021 04	ST, CER, 50V, 0.1µF, +80-20%, CC20F
C009, 010	8232 1431 06	VT, ALU, 16V, 10µF, 20%, SME-VB
C011, 012	8233 5021 04	ST, CER, 50V, 0.1µF, +80-20%, CC20F
C013	8232 1421 07	VT, ALU, 10V, 100µF, 20%, SME-VB
C014	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C015	8233 5001 50	ST, CER, 50V, 15pF, 5%, CC20SL
C016	8233 5094 74	ST, CER, 25V, 0.47µF, 20%, KC30E
C017		N/A
C018	8233 5021 04	ST, CER, 50V, 0.1µF, +80-20%, CC20F
C019, 020	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C021	8232 1431 06	VT, ALU, 16V, 10µF, 20%, SME-VB
C022~025	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C026	8232 1431 06	VT, ALU, 16V, 10µF, 20%, SME-VB
C027	8233 5004 71	ST, CER, 50V, 470pF, 5%, CC20SL
C028	8233 5001 01	ST, CER, 50V, 100pF, 5%, CC20SL
C029		N/A
C030	8233 5004 71	ST, CER, 50V, 470pF, 5%, CC20SL
C031, 032	8233 5002 20	ST, CER, 50V, 22pF, 5%, CC20SL
C033, 034	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C035, 036	8233 5002 20	ST, CER, 50V, 22pF, 5%, CC20SL
C037~040	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C041~045		N/A
C046	8232 1431 06	VT, ALU, 16V, 10µF, 20%, SME-VB
C047	8233 5021 04	ST, CER, 50V, 0.1µF, +80-20%, CC20F

Ref. No.	Part No.	Description
C048	8232 1431 06	VT, ALU, 16V, 10µF, 20%, SME-VB
C049~051	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C052	8233 5001 50	ST, CER, 50V, 15pF, 5%, CC20SL
C053~057	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C058	8233 5094 74	ST, CER, 25V, 0.47µF, 20%, KC30E
C059	8232 1431 06	VT, ALU, 16V, 10µF, 20%, SME-VB
C060	8233 5021 04	ST, CER, 50V, 0.1µF, +80-20%, CC20F
C061, 062	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C063	8232 1431 06	VT, ALU, 16V, 10µF, 20%, SME-VB
C064	8233 5001 50	ST, CER, 50V, 15pF, 10%, CC20SL
C065	8233 5094 74	ST, CER, 25V, 0.47µF, 20%, KC30E
C066, 067	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C068~070	8233 5021 04	ST, CER, 50V, 0.1µF, +80-20%, CC20F
C071	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C072	8232 1461 05	VT, ALU, 50V, 1µF, 20%, SME-VB
C073	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C074, 075	8233 5003 30	ST, CER, 50V, 33pF, 5%, CC20SL
C076	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C077	8233 5001 01	ST, CER, 50V, 100pF, 5%, CC20SL
C078	8233 5004 71	ST, CER, 50V, 470pF, 5%, CC20SL
C079		N/A
C080	8232 1431 06	VT, ALU, 16V, 10µF, 20%, SME-VB
C081	8233 5021 04	ST, CER, 50V, 0.1µF, +80-20%, CC20F
C082~087	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C088	8233 5021 04	ST, CER, 50V, 0.1µF, +80-20%, CC20F
C089, 090	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C091	8232 1431 06	VT, ALU, 16V, 10µF, 20%, SME-VB
C092		N/A
C093, 094	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C095	8233 5001 01	ST, CER, 50V, 100pF, 5%, CC20SL
C096~099	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C100		N/A
C101~801	8232 1431 06	VT, ALU, 16V, 10µF, 20%, SME-VB
C102~802	8233 5001 52	ST, CER, 50V, 0.0015µF, 5%, CC20SL
C103~803	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C104~804	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C105~805	8232 1431 06	VT, ALU, 16V, 10µF, 20%, SME-VB
C106~806		N/A
C107~807		N/A
C108~808		N/A
C109~809		N/A
C110~810		N/A
C111~811	8232 1431 06	VT, ALU, 16V, 10µF, 20%, SME-VB
C112~812	8233 5006 81	ST, CER, 50V, 680pF, 5%, CC20SL
C113~413	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C114~414	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C115~815		N/A
C116~816	8232 1431 07	VT, ALU, 16V, 100µF, 20%, SME-VB
C151~451	8232 1431 06	VT, ALU, 16V, 10µF, 20%, SME-VB
C152~452	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C153~453	8232 1431 06	VT, ALU, 16V, 10µF, 20%, SME-VB
C154~454	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C155~455	8233 5021 04	ST, CER, 50V, 0.1µF, +80-20%, CC20F
C156~456	8232 1431 06	VT, ALU, 16V, 10µF, 20%, SME-VB
C157~457	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C161~461	8232 1431 06	VT, ALU, 16V, 10µF, 20%, SME-VB
C162~462	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C163~463	8232 1434 76	VT, ALU, 16V, 47µF, 20%, SME-VB
C164~464	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C165~465		N/A
C166~466	8232 1431 06	VT, ALU, 16V, 10µF, 20%, SME-VB
C167~467	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C901	8233 5004 71	ST, CER, 50V, 470pF, 5%, CC20SL
C902		N/A
C903	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C904	8232 1421 07	VT, ALU, 10V, 100µF, 20%, SME-VB
C905	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C906	8233 5021 04	ST, CER, 50V, 0.1µF, +80-20%, CC20F
C907, 908		N/A
C909	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C910		N/A
C911	8230 5000 00	Resistor, carbon, 1/10W, 0Ω, 5%
C912	8233 5003 30	ST, CER, 50V, 33pF, 5%, CC20SL
C913, 914	8232 1441 07	VT, ALU, 25V, 100µF, 20%, SME-VB
C915	8232 1431 06	VT, ALU, 16V, 10µF, 20%, SME-VB
C916, 917	8232 1434 76	VT, ALU, 16V, 47µF, 20%, SME-VB
C918	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C919	8233 5004 71	ST, CER, 50V, 470pF, 5%, CC20SL
C920, 921		N/A
C922	8233 5004 70	ST, CER, 50V, 47pF, 5%, CC20SL
C923, 924	8233 5001 01	ST, CER, 50V, 100pF, 5%, CC20SL
C925~929	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C930	8233 5001 01	ST, CER, 50V, 100pF, 5%, CC20SL

MISCELLANEOUS

Ref. No.	Part No.	Description
E1301	8276 0010 00	Pin, header
J001	8245 0530 05	Connector, PI, jack, 8263, 5P, WHT
J002	8245 2970 00	Connector, PL, DIN, 5P, YKF51-5040
J003	8245 1711 05	Connector, PI, jack, 8283, 5P, WHT
J004	8245 5520 00	Connector, opt., GPIF32T
J005	8245 5530 00	Connector, opt., GPIF32R
J006	8245 3120 05	Connector, PL, jack, D-SUB, 25P, 70057-025, EMIFIL
J007	8276 7770 35	Cable assy, 7P, WHT MT/F-MT/BS, L350
J008	8245 0530 04	Connector, PI, jack, 8263, 4P, WHT
J009	8245 2720 25	Connector, PI, jack, FPC, 25P
J010	8245 3220 50	Connector, PI, jack, AMPMOD, 2mm, 50P, 176264

Ref. No.	Part No.	Description
J011		N/A
J012	8277 4771 22	Cable assy, FC, 40P/F-/B, core, L220, reverse
J013	8245 2720 17	Connector, PI, jack, FPC, 17P
J014	8245 2720 08	Connector, PI, jack, FPC, 8P
J015~018	8245 2860 00	Connector, RCA, 4P, UKC21-3077
L001, 002	8242 5025 60	Core, ST, CDHR104, 56µH
L003, 004	8242 1962 23	Coil, PVT, 22µH, LF5.0S
L005		N/A
L006	8242 1962 23	Coil, PVT, 22µH, LF5.0S
L007~012	8242 5011 21	Filter, ST, EMI, MMZ2012, 121
L101~801	8242 5011 21	Filter, ST, EMI, MMZ2012, 121
L102~802	8242 5011 21	Filter, ST, EMI, MMZ2012, 121
W001	8277 3184 20	Cable assy, 4P, 5395-CNC, L200
W002		N/A
W003	8276 7360 35	Cable assy, 12P, 8263WHT-5395, #22, L350
W004~013		N/A
W014	8230 5000 00	Resistor, carbon, 1/10W, 0Ω, 5%
X001	8256 1700 01	Resonator, ST, XTL, 22.579MHz, FUP-FBB3A
X002	8256 1700 02	Resonator, ST, XTL, 24.576MHz, FUP-FBB3A
X003	8256 1790 01	Resonator, PT, CER, 7.00MHz, F5, EFOEN
X004		N/A

• DISPLAY PCB assy

Ref. No.	Part No.	Description
	8274 1700 00	PCB assy, Display, D-108
B101	8251 5111 00	Plain PCB, Main, D-108

ICs

Ref. No.	Part No.	Description
U001	8236 0704 03	QFP, DG, CPU, HD6433723, DISP, FL_CTRL
U002	8236 5025 00	ST, AN, reset, NJM2103M
U003~006	8236 0781 01	PT, DG, driver, DTC114ES
U007		N/A
U008, 009	8236 0782 01	PT, DG, driver, DTA114ES
U012	8256 1090 01	Module, shuttle, SRGPHJ-A-3-2
U013	8256 1730 00	Module, display, FL, CND1538D
U014	8236 0830 01	QFP, DG, VFD driver, LC75710NE
U015~17	8236 0782 01	PT, DG, driver, DTA114ES

TRANSISTORs

Ref. No.	Part No.	Description
Q001~004	8234 1008 02	VT, PNP, 2SA1150Y

DIODEs

Ref. No.	Part No.	Description
D001~015	8234 5007 00	HT, 1SS136
D019~022	8234 5007 00	HT, 1SS136
D031~047	8234 5007 00	HT, 1SS136
D049~052	8234 5007 00	HT, 1SS136
D061~064	8234 0191 00	Opt., V, LED, green, GL-2EG6
D065	8234 0100 00	Opt., V, LED, orange, GL-2HD6
D066~068	8234 0191 00	Opt., V, LED, green, GL-2EG6
D069	8234 0100 00	Opt., V, LED, orange, GL-2HD6
D070~076	8234 0191 00	Opt., V, LED, green, GL-2EG6
D081~083		N/A
D084~095	8234 5007 00	HT, 1SS136

RESISTORs

Ref. No.	Part No.	Description
R001~010		N/A
R012~037		N/A
R038, 039	8230 1381 54	HT, carbon, 1/4W, 150kΩ, 5%
R040	8230 1381 05	HT, carbon, 1/4W, 1MΩ, 5%
R041		N/A
R042~046	8230 1381 01	HT, carbon, 1/4W, 100Ω, 5%
R047	8230 1481 52	HT, metal, 1/4W, 1.5kΩ, 1%
R048	8230 1381 01	HT, carbon, 1/4W, 100Ω, 5%
R049~052	8230 1383 90	HT, carbon, 1/4W, 39Ω, 5%
R053		N/A
R054~057	8230 1381 02	HT, carbon, 1/4W, 1kΩ, 5%
R058, 061	8230 1382 23	HT, carbon, 1/4W, 22kΩ, 5%
R059, 062	8230 1381 03	HT, carbon, 1/4W, 10kΩ, 5%
R060, 063	8230 1381 04	HT, carbon, 1/4W, 100kΩ, 5%
R065	8230 1381 03	HT, carbon, 1/4W, 10kΩ, 5%
R066~068	8230 1381 54	HT, carbon, 1/4W, 150kΩ, 5%

CAPACITORs

ALU = Electrolytic type

CER = Ceramic type

Ref. No.	Part No.	Description
C001, 003	8232 8181 04	VT, CER, 25V, 0.1µF, +80-20%, YF
C002, 004	8232 8031 04	VT, CER, 50V, 0.1µF, +80-20%, YF
C005, 006	8232 1461 06	VT, ALU, 50V, 10µF, 20%, SME-VB
C007, 008	8232 8013 00	VT, CER, 50V, 30pF, 5%, SL
C009	8232 8031 03	VT, CER, 50V, 0.01µF, +80-20%, YF
C010~013	8232 8181 04	VT, CER, 25V, 0.1µF, +80-20%, YF
C014	8232 8031 04	VT, CER, 50V, 0.1µF, +80-20%, YF
C015	8232 8031 03	VT, CER, 50V, 0.01µF, +80-20%, YF
C016	8232 8181 04	VT, CER, 25V, 0.1µF, +80-20%, YF
C017, 018	8232 8031 03	VT, CER, 50V, 0.01µF, +80-20%, YF
C019	8232 8014 71	VT, CER, 50V, 470pF, 5%, SL
C020	8232 8181 04	VT, CER, 25V, 0.1µF, +80-20%, YF
C021	8232 8013 00	VT, CER, 50V, 30pF, 5%, SL
C022	8232 8031 04	VT, CER, 50V, 0.1µF, +80-20%, YF
C023	8232 8014 71	VT, CER, 50V, 470pF, 5%, SL

MISCELLANEOUS

Ref. No.	Part No.	Description
E401		Jumper, F5.0
E402		Jumper, F7.5
E403		Jumper, F10.0
E404		Jumper, F12.5
E405		Jumper, F20.0
E406		Jumper, F30.0
J001	8245 1721 15	Connector, jack, 8283, horizontal, 15P, WHT
J002	8245 2980 00	Connector, jack, phone, LGR4609-7000
L001~003	8242 1340 01	Filter, EMI, 6 hole
L004, 005	8242 1860 13	Filter, T, EMI, LF7W-M3R2T
S001~015	8253 1350 02	SW, PT, tact, SOR-112HS
S019~022	8253 1350 02	SW, PT, tact, SOR-112HS
S031~047	8253 1350 02	SW, PT, tact, SOR-112HS
W001		Jumper, F10.0
X001	8256 1340 03	Resonator, PF, CER, 8.00MHz, F5, EFOEN
Y701	8207 0100 11	Spacer, LED, 11
Y702	8207 0100 09	Spacer, LED, 9
Y703	8216 5910 00	Spacer, FL, DMT-8

• POWER SW PCB assy

Ref. No.	Part No.	Description
	8274 1730 00	PCB assy, Power SW, D-108
B101	8251 9743 02	Plain PCB, Power SW, D-108

Ref. No.	Part No.	Description
S1001	8253 4610 02	Switch, push, power, SDDLB1-B1-F2
W1001	8277 1620 40	Cable assy, SIN1.8-SIN1.8, 400
W1002	8277 1620 40	Cable assy, SIN1.8-SIN1.8, 400

• POWER PCB assy

Ref. No.	Part No.	Description
	8274 1710 00	PCB assy, Power, D-108
B101	8251 9743 01	Plain PCB, Power, D-108

ICs

Ref. No.	Part No.	Description
U001	8236 0028 01	DIP, DG, CMOS, 4049UB
U002	8236 5409 00	VT, AN, regulator, AN1431T
U003	8234 1081 00	Opt., H, photo coupler, ON3171
U004		N/A
U005	8236 5410 06	V, AN, power, MIP166
U006	8236 0853 00	V, AN, DC-DC, PQ1CF2
U007		N/A
U009	8234 1095 00	V, thermistor, NTH18D8R0LA
U010	8236 0853 00	V, AN, DC-DC, PQ1CF2

TRANSISTORs

Ref. No.	Part No.	Description
Q001	8234 1094 03	V, FET, 2SK2661, TO-220NIS
Q002	8234 1034 00	V, PNP, 2SA1606

DIODEs

Ref. No.	Part No.	Description
D001	8234 1079 00	HT, 80V, 0.2A, MA171
D002, 003	8234 1085 00	HT, fast recovery, D1NL40
D004	8234 1080 00	V, 200V, 5.0A, MA649
D005	8234 1084 00	VT, schottkey, EK03W
D006	8234 1078 00	HT, 600V, 1.0A, D1N60-4084
D007	8234 1085 00	HT, fast recovery, D1NL40
D008	8234 5039 34	HT, zener, MTXJ6.8
D009	8234 1077 00	Stack, 500VAC, 1.5A, D2SBA60
D010	8234 5052 00	VT, 600V, 1.7A, S2V60-4002

RESISTORs

Ref. No.	Part No.	Description
R001	8230 1386 29	HT, carbon, 1/4W, 6.2Ω, 5%
R002	8230 1383 31	HT, carbon, 1/4W, 330Ω, 5%
R003	8230 1381 01	HT, carbon, 1/4W, 100Ω, 5%
R004	8230 1388 22	HT, carbon, 1/4W, 8.2kΩ, 5%
R005	8230 1382 02	HT, carbon, 1/4W, 2kΩ, 5%
R006	8230 1484 72	HT, metal, 1/4W, 4.7kΩ, 1%
R007	8230 1481 52	HT, metal, 1/4W, 1.5kΩ, 1%
R008	8230 1251 04	H, metal, 2W, 100kΩ, 5%, F20, RSS
R009	8230 1386 89	HT, carbon, 1/4W, 6.8Ω, 5%
R010	8230 1381 03	HT, carbon, 1/4W, 10kΩ, 5%
R011	8230 1384 72	HT, carbon, 1/4W, 4.7kΩ, 5%
R012	8230 5094 72	HT, nflame, 1/4W, 4.7kΩ, 5%, MHT
R013	8230 1382 02	HT, carbon, 1/4W, 2kΩ, 5%
R014	8230 1251 01	H, metal, 2W, 100Ω, 5%, F20, RSS
R015	8230 1384 73	HT, carbon, 1/4W, 47kΩ, 5%

CAPACITORs

ALU = Electrolytic type
CER = Ceramic type
PES = Mylar type

Ref. No.	Part No.	Description
C001, 002	8232 3542 22	VT, CER, 250V, 0.0022µF, 20%, ECK-ZNS
C003	8232 3521 04	VT, PES, 250V, 0.1µF, 10%, ECQ-EKF
C004	8232 8181 04	VT, CER, 25V, 0.1µF, +80-20%, YF
C005	8232 3241 07	V, ALU, 400V, 100µF, 20%, SMH-VNSN, D2
C006~008	8232 3584 77	VT, ALU, 25V, 470µF, 20%, LXV, D10
C009	8232 1444 76	VT, ALU, 25V, 47µF, 20%, SME-VB
C010~013	8232 3584 77	VT, ALU, 25V, 470µF, 20%, LXV, D10
C014	8232 1441 07	VT, ALU, 24V, 100µF, 20%, SME-VB
C015	8232 3584 77	VT, ALU, 25V, 470µF, 20%, LXV, D10

Ref. No.	Part No.	Description
C016, 017	8232 8181 04	VT, CER, 25V, 0.1µF, +80-20%, YF
C018, 019	8232 3542 22	VT, CER, 250V, 0.0022µF, 20%, ECK-ZNS
C020, 021		N/A
C022	8232 8031 03	VT, CER, 50V, 0.01µF, +80-20%, YF
C023, 024		N/A
C025	8232 3491 03	VT, PES, 630V, 0.01µF, 10%, ECQ-EKF
C026, 027	8232 8181 04	VT, CER, 25V, 0.1µF, +80-20%, YF
C028	8232 8031 03	VT, CER, 50V, 0.01µF, +80-20%, YF
C029	8232 8014 71	VT, CER, 50V, 470pF, 5%, SL
C030	8232 4383 37	V, ALU, 50V, 330µF, 20%, LXV
C031	8232 1464 76	VT, ALU, 50V, 47µF, 20%, SME-VB
C032	8232 8031 03	VT, CER, 50V, 0.01µF, +80-20%, YF

MISCELLANEOUS

Ref. No.	Part No.	Description
E301	8239 0002 00	Holder, PI, fuse, S-N5057
F001	8239 0007 08	Fuse, SEMKO, timelag, 0.8A
J001	8245 0530 07	Connector, PI, jack, 8263, 7P, WHT
J002	8245 0530 12	Connector, PI, jack, 8263, 12P, WHT
J003	8245 3210 00	Connector, PL, jack, AC INLET, 3P, AP-320V
J004	8245 0530 02	Connector, PI, jack, 8263, 2P, WHT
J005	8245 0530 06	Connector, PI, jack, 8263, 6P, WHT
L001	8242 2491 93	Filter, line, 19MH, 0.5A, ELFI5N005A
L002	8242 2491 02	Filter, line, 1MH, 2.2A, ELFI5N022A
L003	8242 2501 03	Coil, pvt, 10µH, 2A, ELC
L004	8242 2640 01	Coil, DC-DC, R17, 256µH
L005, 006	8242 1340 01	Filter, EMI, 6 hole
L007	8242 2620 00	Coil, DC-DC, RCH110, 180µH
T001	8242 2580 00	Transformer, sw power, ER2810, 12-18
T002	8242 2600 00	Transformer, DC-DC, EE1605, AC5CT
Y501	8207 0126 02	Heat sink, 17PB23, L25, B
Y502~504	8207 0015 00	Heat sink, OSH-1625-SP
Y505		Screw, P3 x 6 CZn

• REGULATOR PCB assy

Ref. No.	Part No.	Description
	8274 2020 00	PCB assy, Regulator, D-108
B101	8251 9743 03	Plain PCB, Regulator, D-108

Ref. No.	Part No.	Description
U001	8236 0321 06	IC, 220, AN, regulator, NJM7815FA
U002	8236 0348 06	IC, 220, AN, regulator, NJM7915FA
C001~004	8232 8031 03	Capacitor, VT, CER, 50V, 0.01µF, +80-20%, YF
C005, 006	8232 1431 06	Capacitor, VT, ALU, 16V, 10µF, 20%, SME-VB
W001	8276 7300 20	Cable assy, 6P, 8263WH-5395, L200

• CONNECT PCB assy

Ref. No.	Part No.	Description
	8274 1720 00	PCB assy, Connect, D-108
B101	8251 9730 02	Plain PCB, Connect, D-108

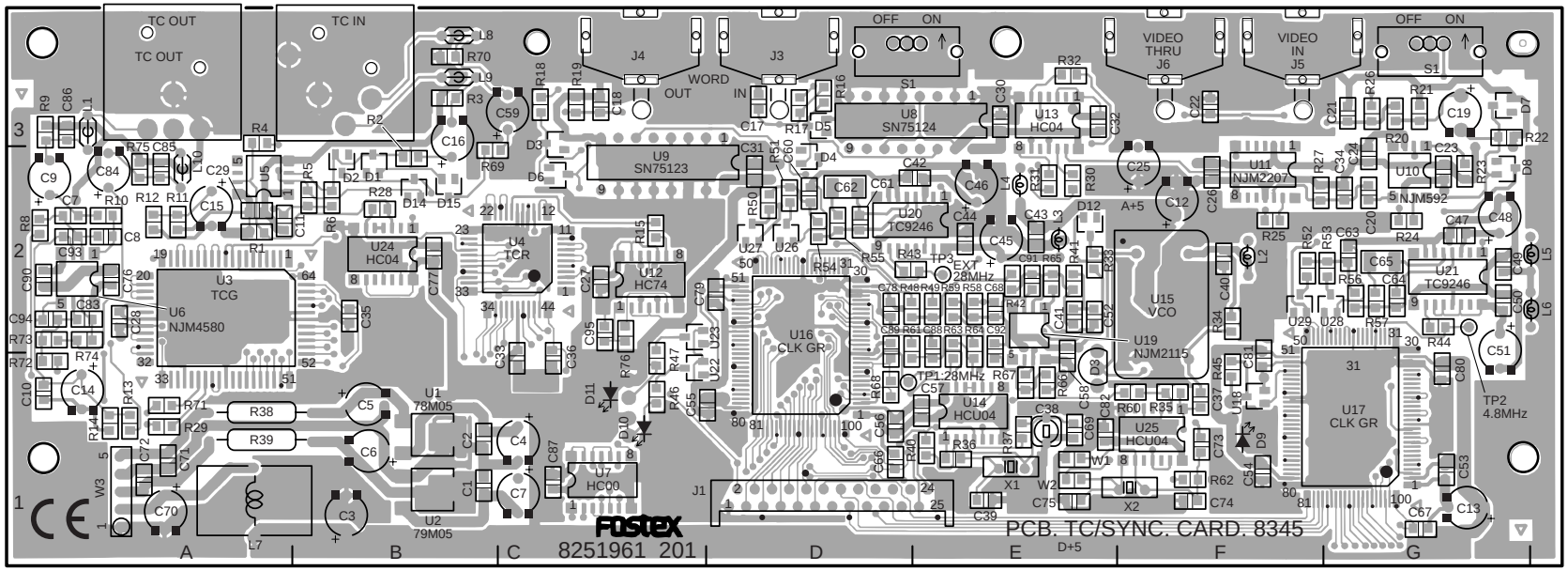
Ref. No.	Part No.	Description
J1001	8245 2960 00	Connector, PL, jack, D-SUB/F, 15P-HD
L1001~05	8242 1860 13	Filter, T, EMI, LFW7B-M3R2T
L1006~15	8242 5011 21	Filter, ST, EMI, MMZ2012, 121
W1001	8276 7310 20	Cable assy, 7P, 8263WHT-5395, #22, L200
W1002	8245 1711 07	Connector, PI, jack, 8283, 7P, WHT

● Abbreviation

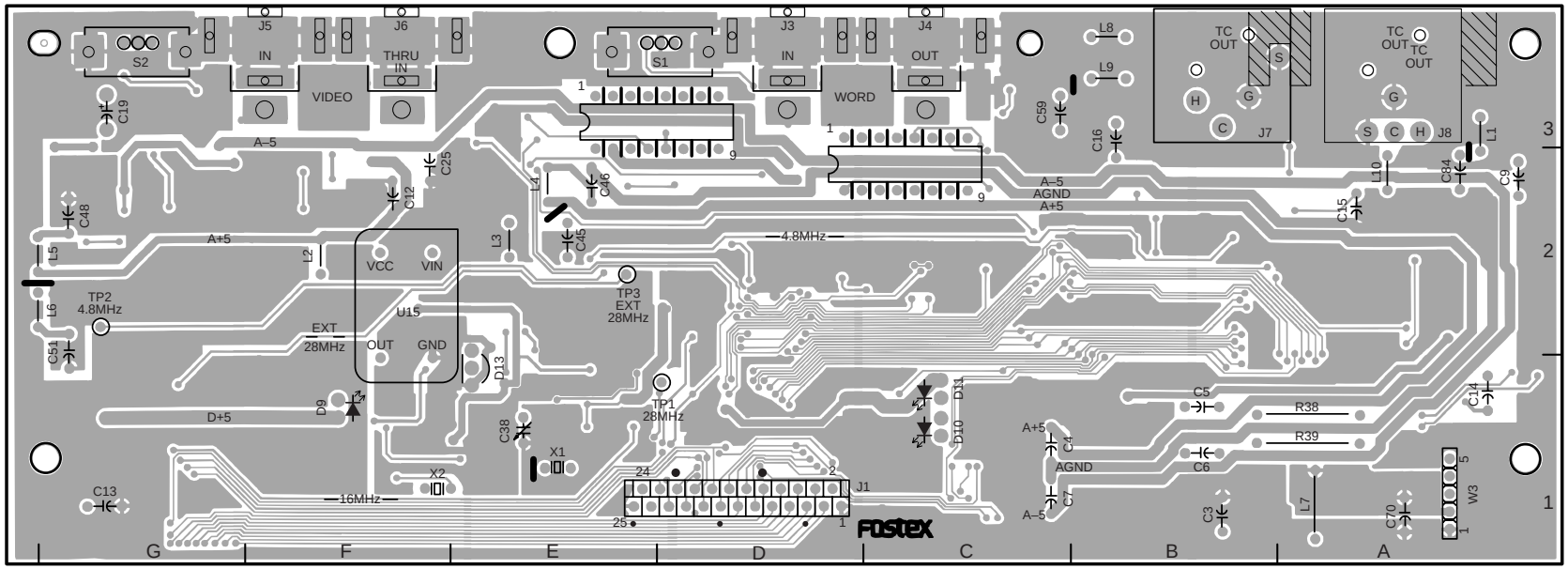
S:	Surface mount
T:	Taping device
F:	Forming device
P:	Penetrate mount
V:	Vertical mount
H:	Horizontal mount
I:	I form
L:	L form
QFP:	Quad Flat Package
SOP:	Small Outline Package
TSSOP:	Thin Shrink Small Outline Package
DIP:	Dual In-line Package
220:	TO-220 type
DG:	Digital
AN:	Analog

● 8345 PCB PATTERN DRAWING

• Parts Side of 8345 PCB

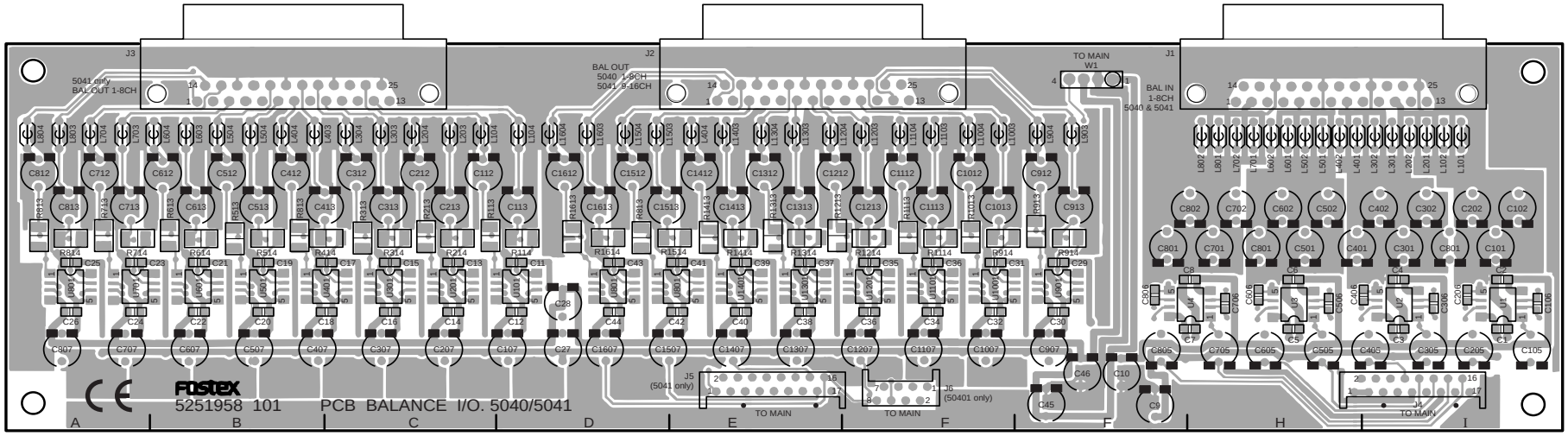


• Foil Side of 8345 PCB

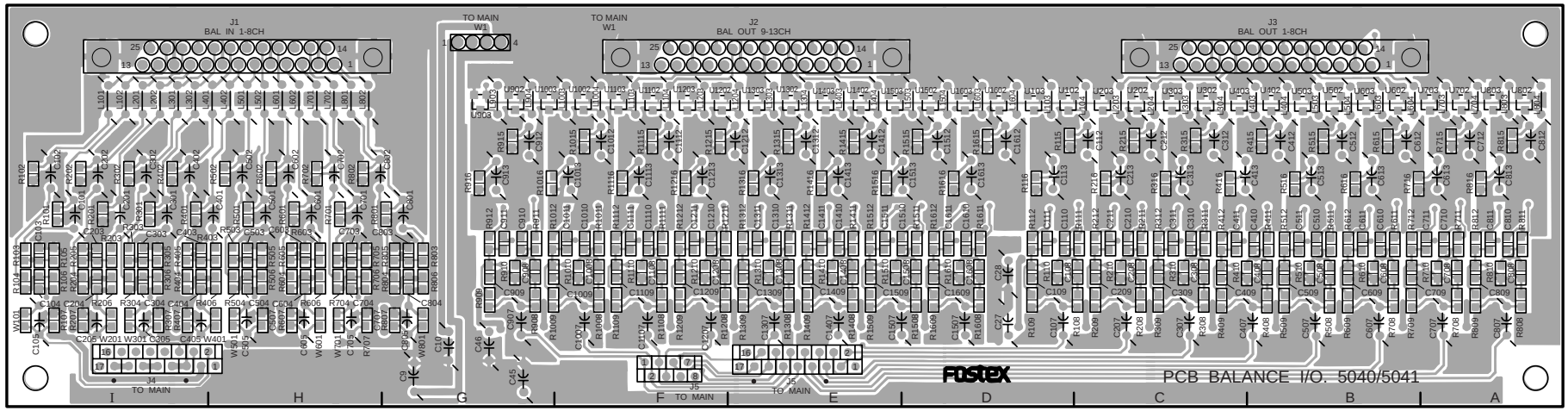


● 5040 PCB PATTERN DRAWING

• Parts Side of 5040 PCB



• Foil Side of 5040 PCB



● 8345 Parts List

• 8345 PCB assy

Ref. No.	Part No.	Description
	N/A	PCB assy, 8345
B101	8251 9612 01	Plain PCB, 8345

ICs

Ref. No.	Part No.	Description
U001	8236 5403 01	ST, AN, regulator, NJM78M05DLA
U002	8236 5404 01	ST, AN, regulator, NJM78M05DLA
U003	8236 0619 00	QFP, DG, gate array, TCG
U004	8236 0762 00	QFP, DG, gate array, TCR
U005	8236 5055 00	ST, AN, comparator, NJM311M
U006	8236 5031 00	ST, AN, op amp, NJM4580E
U007	8236 5600 00	ST, DG, 74HC00
U008	8236 0185 00	DIP, DG, TTL, SN75124
U009	8236 0793 00	DG, line IF, SN75123
U010	8236 7210 00	ST, AN, NJM592M
U011	8234 7211 00	ST, AN, NJM2207M
U012	8236 5600 74	ST, DG, 74HC74
U013	8236 5600 14	ST, DG, 74HC14
U014	8236 5610 04	ST, DG, 74HCU04
U015	8236 1780 00	Module, VCO, 28.224MHz, F100
U016, 017	8236 8200 00	QFP, DG, gate array, µPD65640GF-215-3BNEC, NEWCLK
U018	8236 5701 01	ST, DG, driver, DTC114EK
U019	8236 5050 11	ST, AN, op amp, NJM2115M (TEI)
U020, 021	8236 5034 00	ST, DG, VCO, TC9246F
U023	8236 5701 01	ST, DG, driver, DTC114EK
U024	8236 5600 04	ST, DG, 74HC04
U025	8236 5610 04	ST, DG, 74HCU04
U026	8236 5701 01	ST, DG, driver, DTC114EK
U027	8236 5704 01	ST, DG, driver, DTA114EK
U028	8236 5701 01	ST, DG, driver, DTC114EK
U029	8236 5704 01	ST, DG, driver, DTA114EK

DIODEs

Ref. No.	Part No.	Description
D001~008	8234 5028 00	ST, DAN202K
D009, 010	8234 2024 01	Opt., LED, red, SLR-40VR
D011~013		N/A
D014, 015	8234 5028 00	ST, DAN202K

RESISTORs

Ref. No.	Part No.	Description
R001	8230 5002 72	ST, carbon, 1/10W, 2.7kΩ, 5%
R002	8230 5001 03	ST, carbon, 1/10W, 10kΩ, 5%
R003	8230 5001 04	ST, carbon, 1/10W, 100kΩ, 5%
R004	8230 5001 05	ST, carbon, 1/10W, 1MΩ, 5%
R005, 006	8230 5001 03	ST, carbon, 1/10W, 10kΩ, 5%
R007	8230 5002 02	ST, carbon, 1/10W, 2kΩ, 5%
R008	8230 5001 03	ST, carbon, 1/10W, 10kΩ, 5%
R009	8230 5004 73	ST, carbon, 1/10W, 47kΩ, 5%
R010	8230 5001 51	ST, carbon, 1/10W, 150Ω, 5%
R011, 012	8230 5001 02	ST, carbon, 1/10W, 1kΩ, 5%
R013, 014	8230 5004 72	ST, carbon, 1/10W, 4.7kΩ, 5%
R015, 016	8230 5001 01	ST, carbon, 1/10W, 100Ω, 5%
R017	8230 5007 50	ST, carbon, 1/10W, 75Ω, 5%
R018	8230 5001 00	ST, carbon, 1/10W, 10Ω, 5%
R019, 020	8230 5001 02	ST, carbon, 1/10W, 1kΩ, 5%
R021	8230 5001 04	ST, carbon, 1/10W, 100kΩ, 5%
R022, 023	8230 5001 03	ST, carbon, 1/10W, 10kΩ, 5%
R024	8230 5003 32	ST, carbon, 1/10W, 3.3kΩ, 5%
R025	8230 5001 01	ST, carbon, 1/10W, 100Ω, 5%
R026	8230 5007 50	ST, carbon, 1/10W, 75Ω, 5%
R027, 028	8230 5001 05	ST, carbon, 1/10W, 1MΩ, 5%
R029~032	8230 5001 01	ST, carbon, 1/10W, 100Ω, 5%
R033	8230 5002 22	ST, carbon, 1/10W, 2.2kΩ, 5%
R034	8230 5006 81	ST, carbon, 1/10W, 680Ω, 5%
R035	8230 5001 05	ST, carbon, 1/10W, 1MΩ, 5%
R036	8230 5001 01	ST, carbon, 1/10W, 100Ω, 5%
R037	8230 5001 05	ST, carbon, 1/10W, 1MΩ, 5%
R038, 039	8230 4001 00	H, metal, 1W, 10Ω, 5%
R040	8230 5001 01	ST, carbon, 1/10W, 100Ω, 5%
R041	8230 5001 02	ST, carbon, 1/10W, 1kΩ, 5%
R042	8230 5001 52	ST, carbon, 1/10W, 1.5kΩ, 5%
R043, 044	8230 5001 01	ST, carbon, 1/10W, 100Ω, 5%
R045, 046	8230 5002 71	ST, carbon, 1/10W, 270Ω, 5%
R047		N/A
R048, 049	8230 5001 01	ST, carbon, 1/10W, 100Ω, 5%
R050~053	8230 5001 52	ST, carbon, 1/10W, 1.5kΩ, 5%
R054	8230 5002 24	ST, carbon, 1/10W, 220kΩ, 5%
R055	8230 5001 01	ST, carbon, 1/10W, 100Ω, 5%
R056	8230 5002 24	ST, carbon, 1/10W, 220kΩ, 5%
R057	8230 5001 01	ST, carbon, 1/10W, 100Ω, 5%
R058, 059	8230 5004 72	ST, carbon, 1/10W, 4.7kΩ, 5%
R060	8230 5003 31	ST, carbon, 1/10W, 330Ω, 5%
R061	8230 5001 01	ST, carbon, 1/10W, 100Ω, 5%
R062		N/A
R063	8230 5001 01	ST, carbon, 1/10W, 100Ω, 5%
R064	8230 5001 05	ST, carbon, 1/10W, 1MΩ, 5%
R065		N/A
R066, 067	8230 5001 03	ST, carbon, 1/10W, 10kΩ, 5%
R068	8230 5001 01	ST, carbon, 1/10W, 100Ω, 5%
R069	8230 5001 03	ST, carbon, 1/10W, 10kΩ, 5%

Ref. No.	Part No.	Description
R070	8230 5001 04	ST, carbon, 1/10W, 100kΩ, 5%
R071	8230 5001 01	ST, carbon, 1/10W, 100Ω, 5%
R072	8230 5001 03	ST, carbon, 1/10W, 10kΩ, 5%
R073	8230 5002 02	ST, carbon, 1/10W, 2kΩ, 5%
R074	8230 5001 51	ST, carbon, 1/10W, 150Ω, 5%
R075	8230 5004 73	ST, carbon, 1/10W, 47kΩ, 5%
R076	230 5001 03	ST, carbon, 1/10W, 10kΩ, 5%

CAPACITORs

ALU = Electrolytic type

CER = Ceramic type

PES = Mylar type

Ref. No.	Part No.	Description
C001, 002	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C003	8232 1434 76	VT, ALU, 16V, 47µF, 20%, SME-VB
C004	8232 1431 06	VT, ALU, 16V, 10µF, 20%, SME-VB
C005, 006	8232 1461 05	VT, ALU, 50V, 1µF, 20%, SME-VB
C007	8232 1431 06	VT, ALU, 16V, 10µF, 20%, SME-VB
C008	8233 5105 62	ST, CER, 50V, 5600pF, 10%, CC20B
C009	8232 1434 76	VT, ALU, 16V, 47µF, 20%, SME-VB
C010, 011	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C012~016	8232 1431 06	VT, ALU, 16V, 10µF, 20%, SME-VB
C017, 018	8233 5004 70	ST, CER, 50V, 47pF, 5%, CC20SL
C019	8232 1431 06	VT, ALU, 16V, 10µF, 20%, SME-VB
C020	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C021, 022	8233 5004 70	ST, CER, 50V, 47pF, 5%, CC20SL
C023, 024	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C025	8232 1431 06	VT, ALU, 16V, 10µF, 20%, SME-VB
C026~033	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C034	8233 5002 21	ST, CER, 50V, 220pF, 5%, CC20SL
C035, 036	8233 5001 01	ST, CER, 50V, 100pF, 5%, CC20SL
C037	8233 5005 60	ST, CER, 50V, 56pF, 5%, CC20SL
C038	8233 5003 00	ST, CER, 50V, 30pF, 5%, CC20SL
C039	8233 5002 20	ST, CER, 50V, 22pF, 5%, CC20SL
C040~044	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C045, 046	8232 1431 06	VT, ALU, 16V, 10µF, 20%, SME-VB
C047	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C048	8232 1431 06	VT, ALU, 16V, 10µF, 20%, SME-VB
C049, 050	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C051	8232 1431 06	VT, ALU, 16V, 10µF, 20%, SME-VB
C052	8233 5021 04	ST, CER, 50V, 0.1µF, +80-20, CC20R
C053~058	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C059	8232 1431 06	VT, ALU, 16V, 10µF, 20%, SME-VB
C060	8233 5001 50	ST, CER, 50V, 15pF, 5%, CC20SL
C061	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C062	8233 5094 74	ST, CER, 25V, 0.47µF, 20%, KC30E
C063	8233 5001 50	ST, CER, 50V, 15pF, 5%, CC20SL
C064	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C065	8233 5094 74	ST, CER, 25V, 0.47µF, 20%, KC30E
C066, 067	8233 5004 71	ST, CER, 50V, 470pF, 5%, CC20SL
C068	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C069	8233 5002 20	ST, CER, 50V, 22pF, 5%, CC20SL
C070	8232 1431 07	VT, ALU, 16V, 100µF, 20%, SME-VB
C071, 072	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C073~075		N/A
C076~082	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C083	8233 5105 62	ST, CER, 50V, 5600pF, 10%, CC20B
C084	8232 1434 76	VT, ALU, 16V, 47µF, 20%, SME-VB
C085, 086	8233 5004 70	ST, CER, 50V, 47pF, 5%, CC20SL
C087	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C088, 089	8233 5004 71	ST, CER, 50V, 470pF, 5%, CC20SL
C090	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C091~094		N/A
C095	8233 5002 22	ST, CER, 50V, 0.0022µF, 5%, CC20SL

MISCELLANEOUS

Ref. No.	Part No.	Description
J001	8245 2720 25	Connector, PI, jack, FPC, 25P
J002		N/A
J003~006	8245 3000 00	Connector, jack, BNC, 01K0083
J007	8245 2680 02	Connector, PL, jack, XLR31, NC3FAH2
J008	8245 2670 02	Connector, PL, jack, XLR31, NC3MAH
L001	8242 1860 13	Filter, T, EMI, LFW7B-M3R2T
L002~006	8242 1962 23	Coil, PVT, 22µH, 5%, LF5.0F
L007	8242 1350 01	Coil, 50µH, SKP-2-30
L008~010	8242 1860 13	Filter, T, EMI, LFW7B-M3R2T
S001, 002	8253 6550 04	SW, slide, 1-2, non shortening, SSSF1
TP001~003		N/A

ACCESSORIES

Ref. No.	Part No.	Description
Y101	8221 2150 00	Bracket, 8345
Y102	8288 4010 00	Owner's manual, 8345, multi
Y103	8216 6510 00	Shield, EMI, 8345
Y104	8218 7610 00	Label, TC IN, 8345
W101	8276 8404 30	Cable, flat, FFC, 25P, L300

● Abbreviation

S:	Surface mount
T:	Taping device
V:	Vertical mount
QFP:	Quad Flat Package
DIP:	Dual In-line Package
220:	TO-220 type
DG:	Digital
AN:	Analog

● 5040 Parts List

• BALANCE I/O PCB assy

Ref. No.	Part No.	Description
	N/A	PCB assy, Balance I/O, 5040
B101	8251 9581 00	Plain PCB, Balance I/O, 5040

ICs

Ref. No.	Part No.	Description
U0001~0004	8236 7207 00	ST, AN, NJM4560M
U0101~0801		N/A
U0102~0802		N/A
U0103~0803		N/A
U0901~1601	8236 5031 00	ST, AN, op amp, NJM4580E
U0902~1602	8236 5702 01	ST, DG, driver, DTC314TK
U0903~1603	8236 5702 01	ST, DG, driver, DTC314TK

RESISTORs

Ref. No.	Part No.	Description
R0108~0808	8230 5001 04	ST, carbon, 1/10W, 100kΩ, 5%
R0102~0802	8230 5001 04	ST, carbon, 1/10W, 100kΩ, 5%
R0103~0803	8230 5002 23	ST, carbon, 1/10W, 22kΩ, 5%
R0104~0804	8230 5002 23	ST, carbon, 1/10W, 22kΩ, 5%
R0105~0805	8230 5005 62	ST, carbon, 1/10W, 5.6kΩ, 5%
R0106~0806	8230 5005 62	ST, carbon, 1/10W, 5.6kΩ, 5%
R0107~0807		N/A
R0108~0808		N/A
R0109~0809		N/A
R0110~0810		N/A
R0111~0811		N/A
R0112~0812		N/A
R0113~0813		N/A
R0114~0814		N/A
R0115~0815		N/A
R0116~0816		N/A
R0908~1608	8230 5003 32	ST, carbon, 1/10W, 3.3kΩ, 5%
R0909~1609	8230 5003 32	ST, carbon, 1/10W, 3.3kΩ, 5%
R0910~1610	8230 5001 03	ST, carbon, 1/10W, 10kΩ, 5%
R0911~1611	8230 5001 53	ST, carbon, 1/10W, 15kΩ, 5%
R0912~1612	8230 5008 22	ST, carbon, 1/10W, 8.2kΩ, 5%
R0913~1613	8230 5021 01	ST, carbon, 1/4W, 100Ω, 5%
R0914~1614	8230 5021 01	ST, carbon, 1/4W, 100Ω, 5%
R0915~1615	8230 5001 04	ST, carbon, 1/10W, 100kΩ, 5%
R0916~1616	8230 5001 04	ST, carbon, 1/10W, 100kΩ, 5%

CAPACITORs

ALU = Electrolytic type
CER = Ceramic type
PES = Mylar type

Ref. No.	Part No.	Description
C0001~0008	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C0009, 0010	8232 1434 76	VT, ALU, 16V, 47µF, 20%, SME-VB
C0011~0028		N/A
C0029~0044	8233 5041 03	ST, CER, 25V, 0.01µF, 10%, CC20R
C0045, 0046	8232 1434 76	VT, ALU, 16V, 47µF, 20%, SME-VB
C0101~0801	8232 1434 76	VT, ALU, 16V, 47µF, 20%, SME-VB
C0102~0802	8232 1434 76	VT, ALU, 16V, 47µF, 20%, SME-VB
C0103~0803	8233 5004 70	ST, CER, 50V, 47pF, 5%, CC20SL
C0104~0804	8233 5004 70	ST, CER, 50V, 47pF, 5%, CC20SL
C0105~0805		N/A
C0106~0806		N/A
C0107~0807		N/A
C0108~0808		N/A
C0109~0809		N/A
C0110~0810		N/A
C0111~0811		N/A
C0112~0812		N/A
C0113~0813		N/A
C0907~1607	8232 1434 76	VT, ALU, 16V, 47µF, 20%, SME-VB
C0908~1608		N/A
C0909~1609		N/A
C0910~1610	8233 5001 01	ST, CER, 50V, 100pF, 5%, CC20SL
C0911~1611	8233 5001 01	ST, CER, 50V, 100pF, 5%, CC20SL
C0912~1612	8232 1422 27	VT, ALU, 10V, 220µF, 20%, SME-VB
C0913~1613	8232 1422 27	VT, ALU, 10V, 220µF, 20%, SME-VB

MISCELLANEOUS

Ref. No.	Part No.	Description
J0001	8245 3120 05	Connector, PL, jack, D-SUB, 25P, 70057-025, EMIFIL
J0002	8245 3120 05	Connector, PL, jack, D-SUB, 25P, 70057-025, EMIFIL
J0003		N/A
J0004	8245 2720 17	Connector, PI, jack, FPC, 17P
J0005	8245 2720 08	Connector, PI, jack, FPC, 8P
L0101~0801		N/A
L0102~0802		N/A
L0103~0803		N/A
L0104~0804		N/A
L0903~1603		N/A
L0904~1604		N/A
W0001	8276 7280 30	Cable assy, 4P, 8263WHT-5395, #22, L300
W0002		N/A
W0003		N/A
W0004		N/A
W0005		N/A
W0006		N/A
W0007		N/A
W0101~0801	8230 5000 00	Resistor, ST, carbon, 1/10W, 0Ω

ACCESSORIES

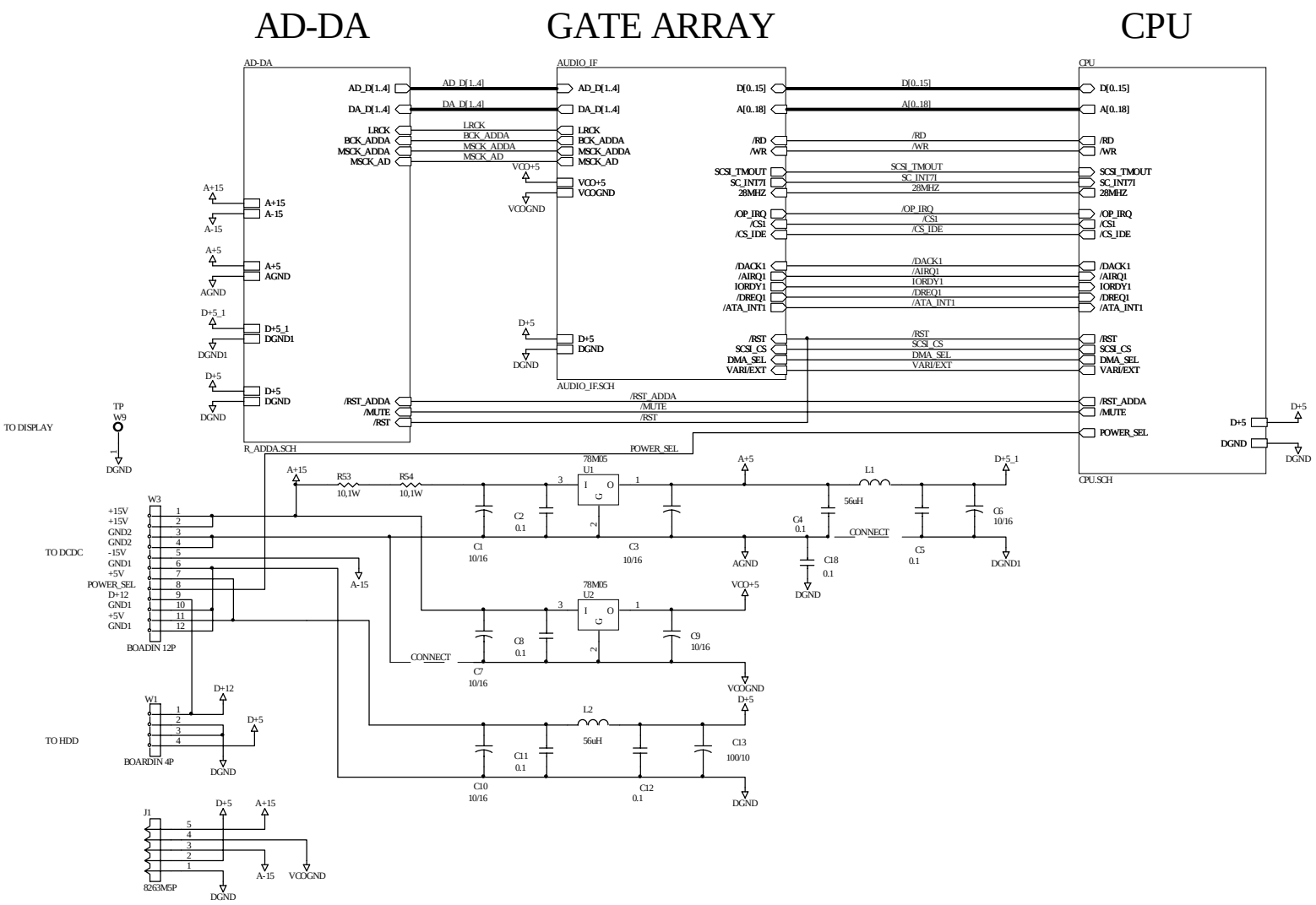
Ref. No.	Part No.	Description
Y102	8221 2060 00	Bracket, B, 5041
Y103	8288 3940 00	Owner’s manual, 5040/5041, multi
W001	8276 8387 25	Cable, flat, FFC, 8P, L250
W002	8276 8396 15	Cable, flat, FFC, 17P, L150

● Abbreviation

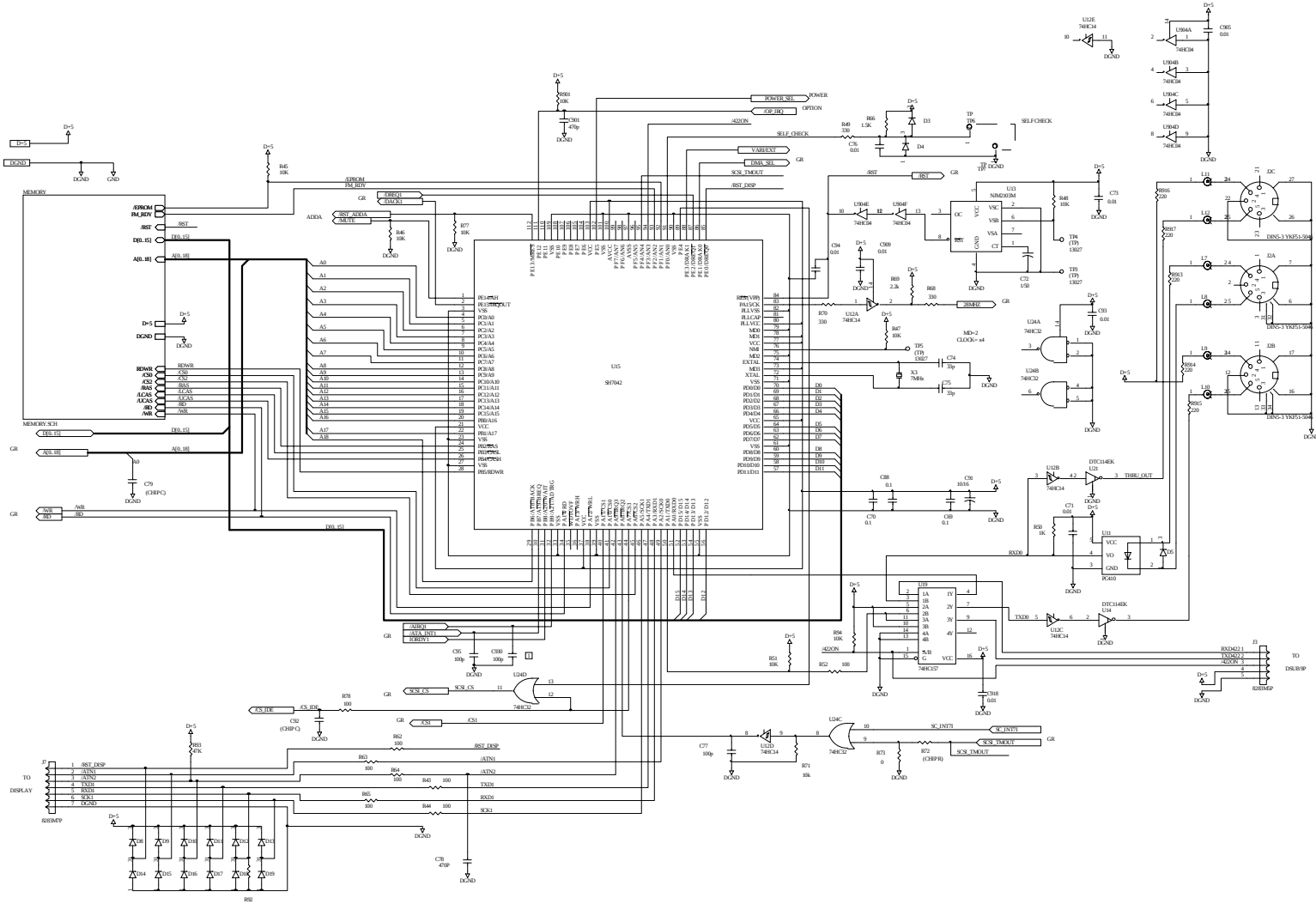
S: Surface mount
T: Taping device
V: Vertical mount
DG: Digital
AN: Analog

8. CIRCUIT DIAGRAMS

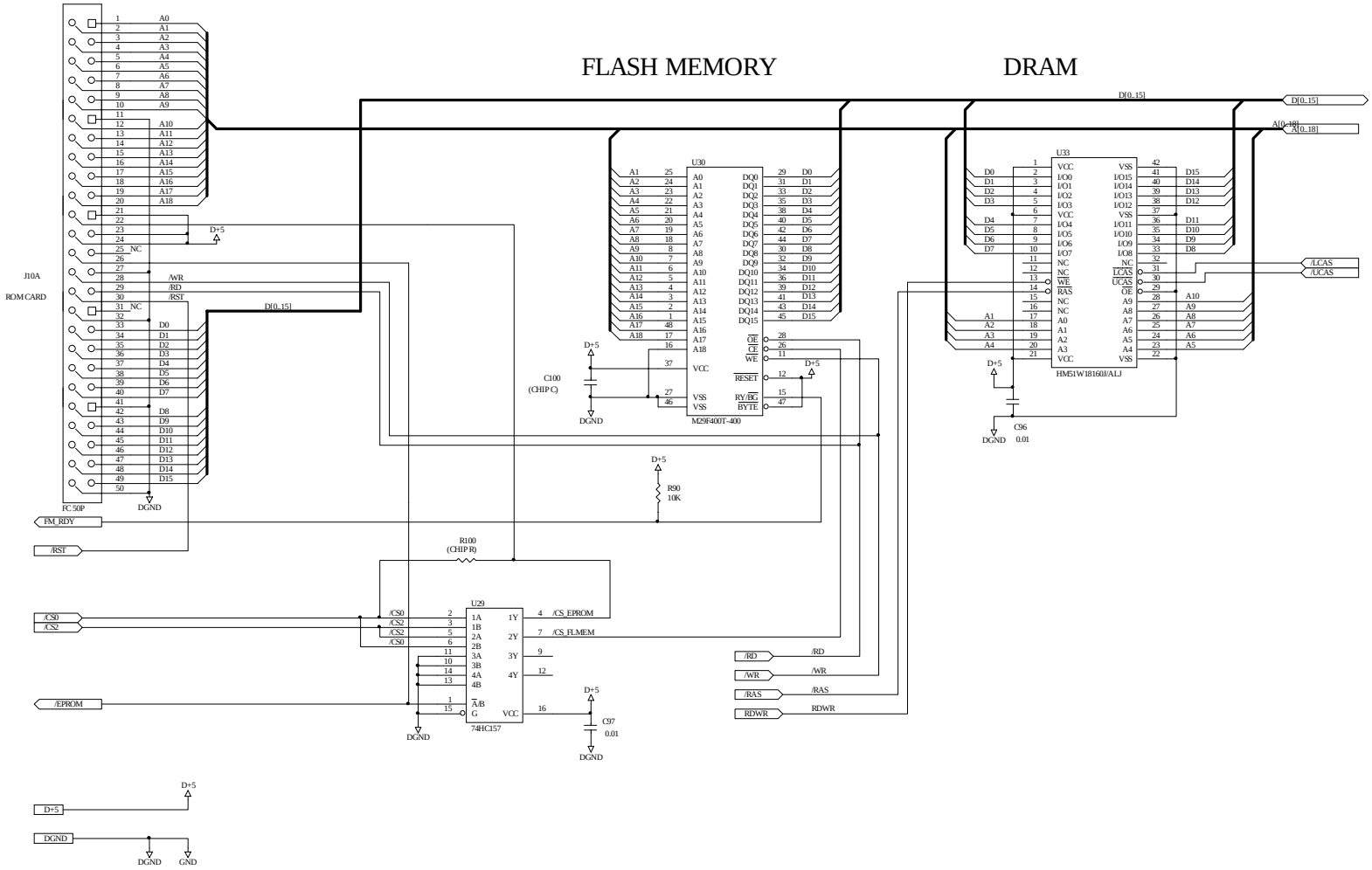
● ROOT, MAIN D-108 (1/11)



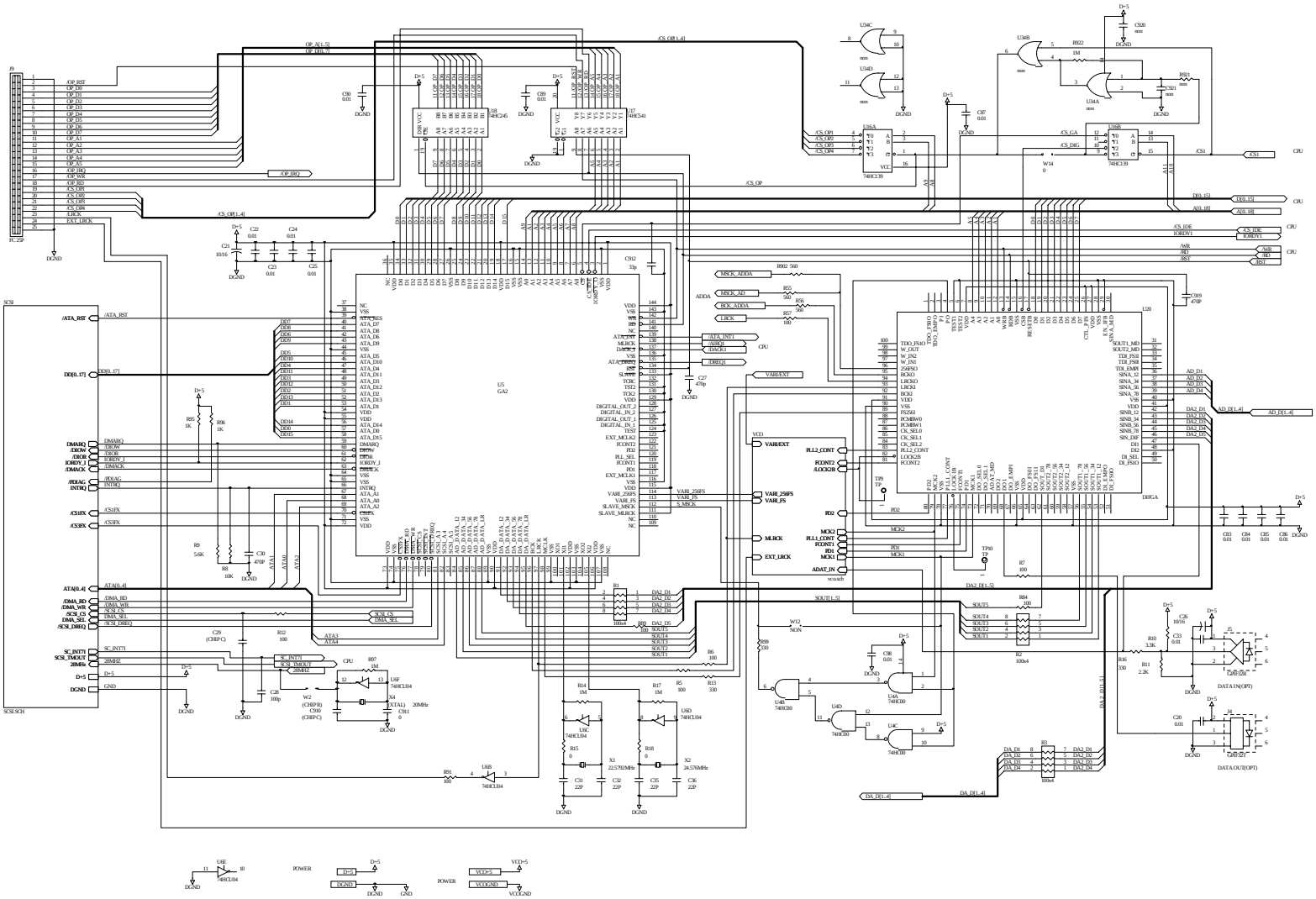
● CPU, MAIN, D-108 (2/11)



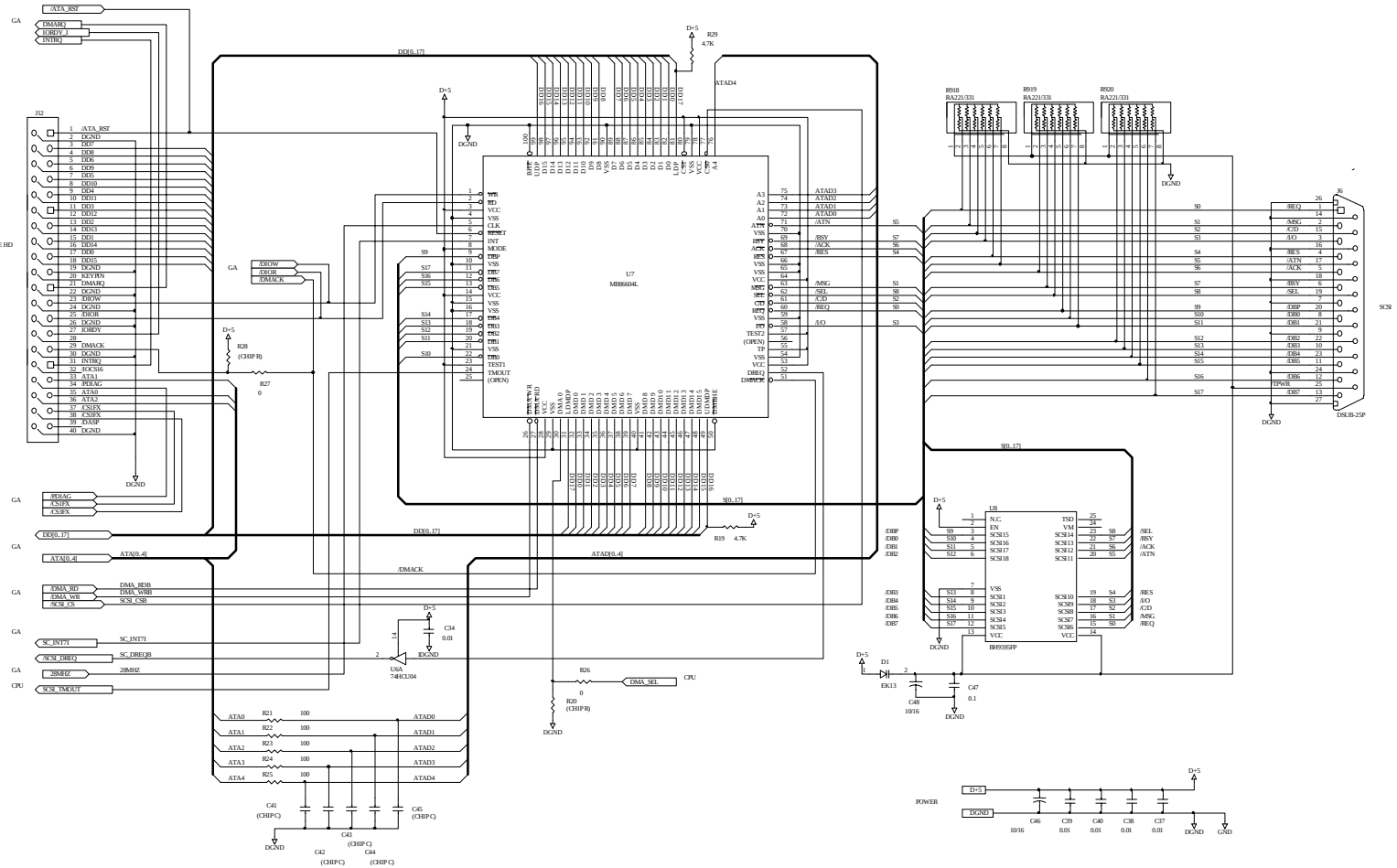
● MEMORY, MAIN, D-108 (3/11)



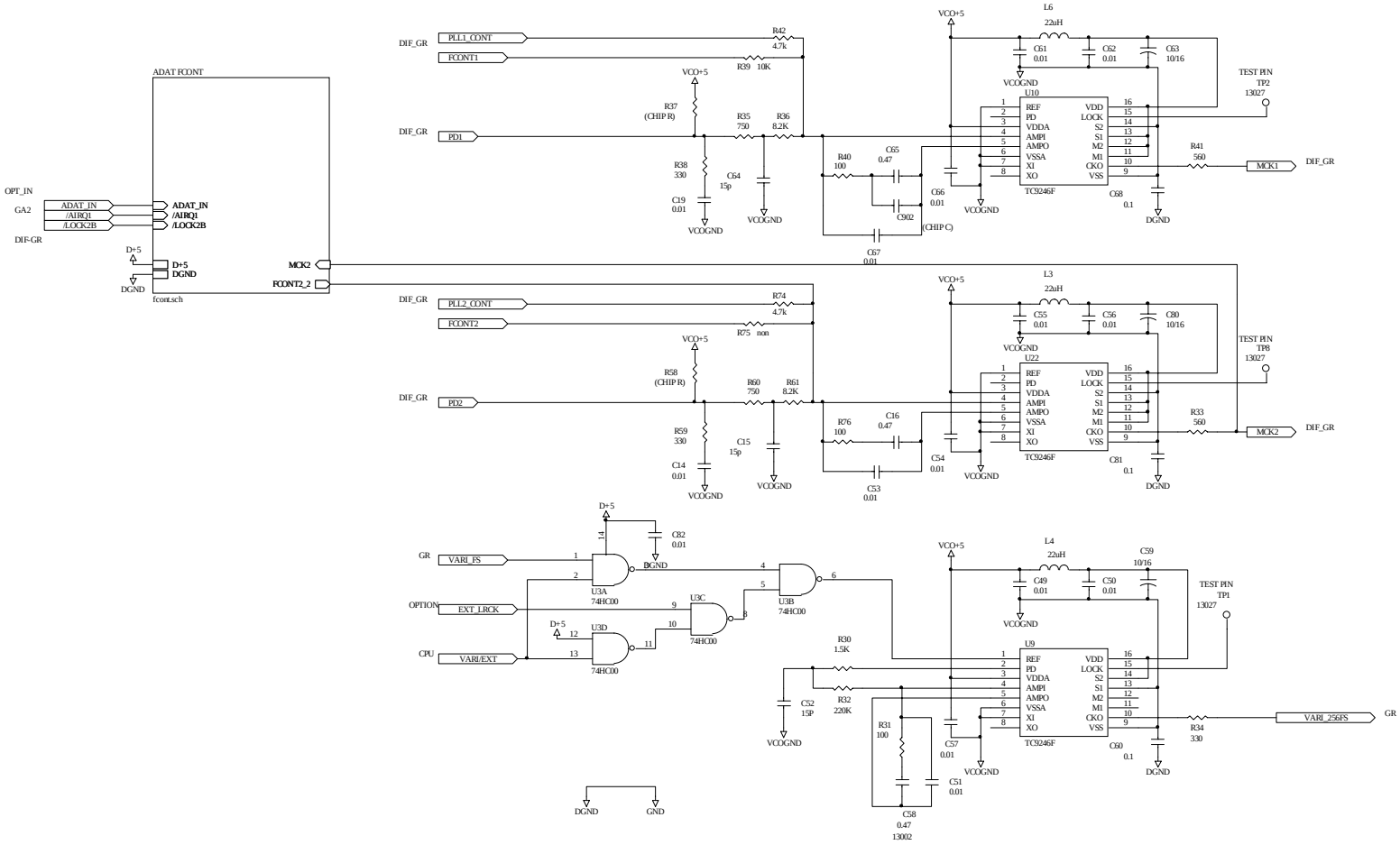
● GATE ARRAY, MAIN, D-108 (4/11)



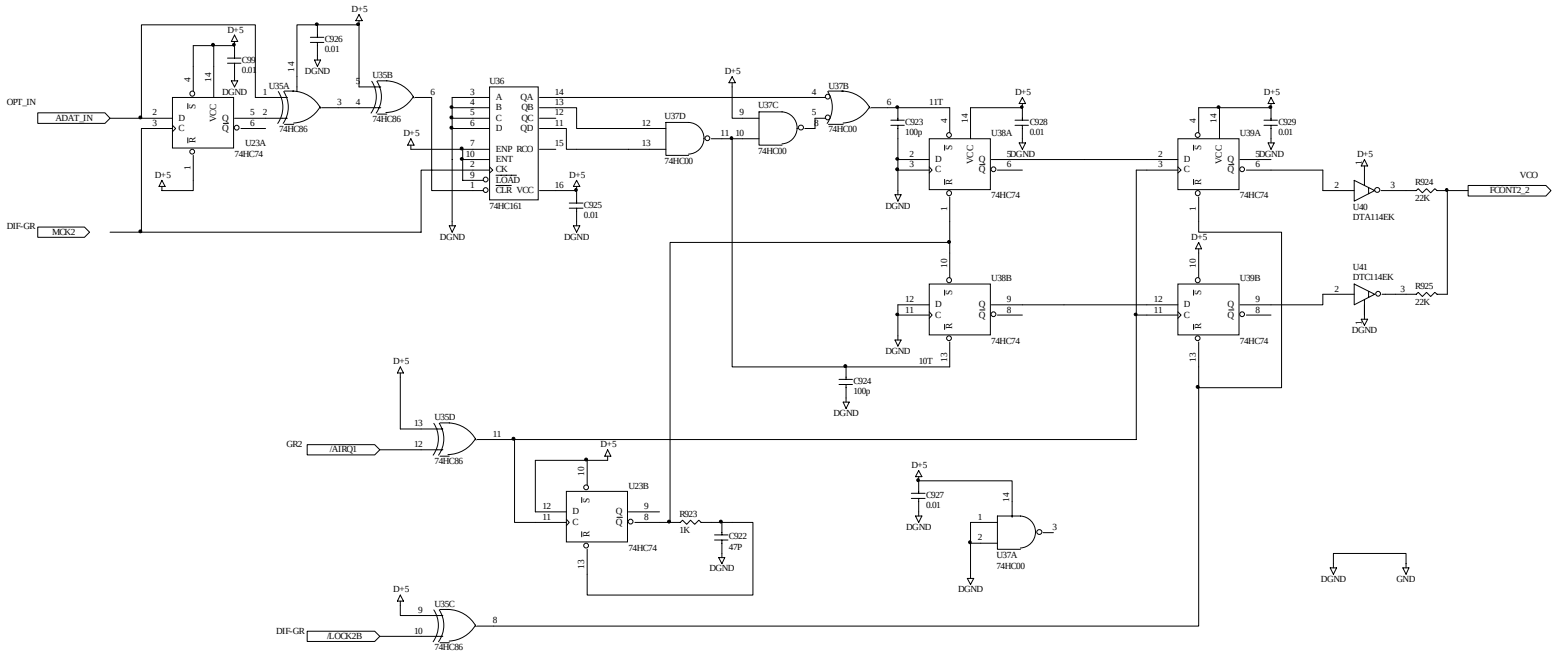
● SCSI I/F, MAIN, D-108 (5/11)



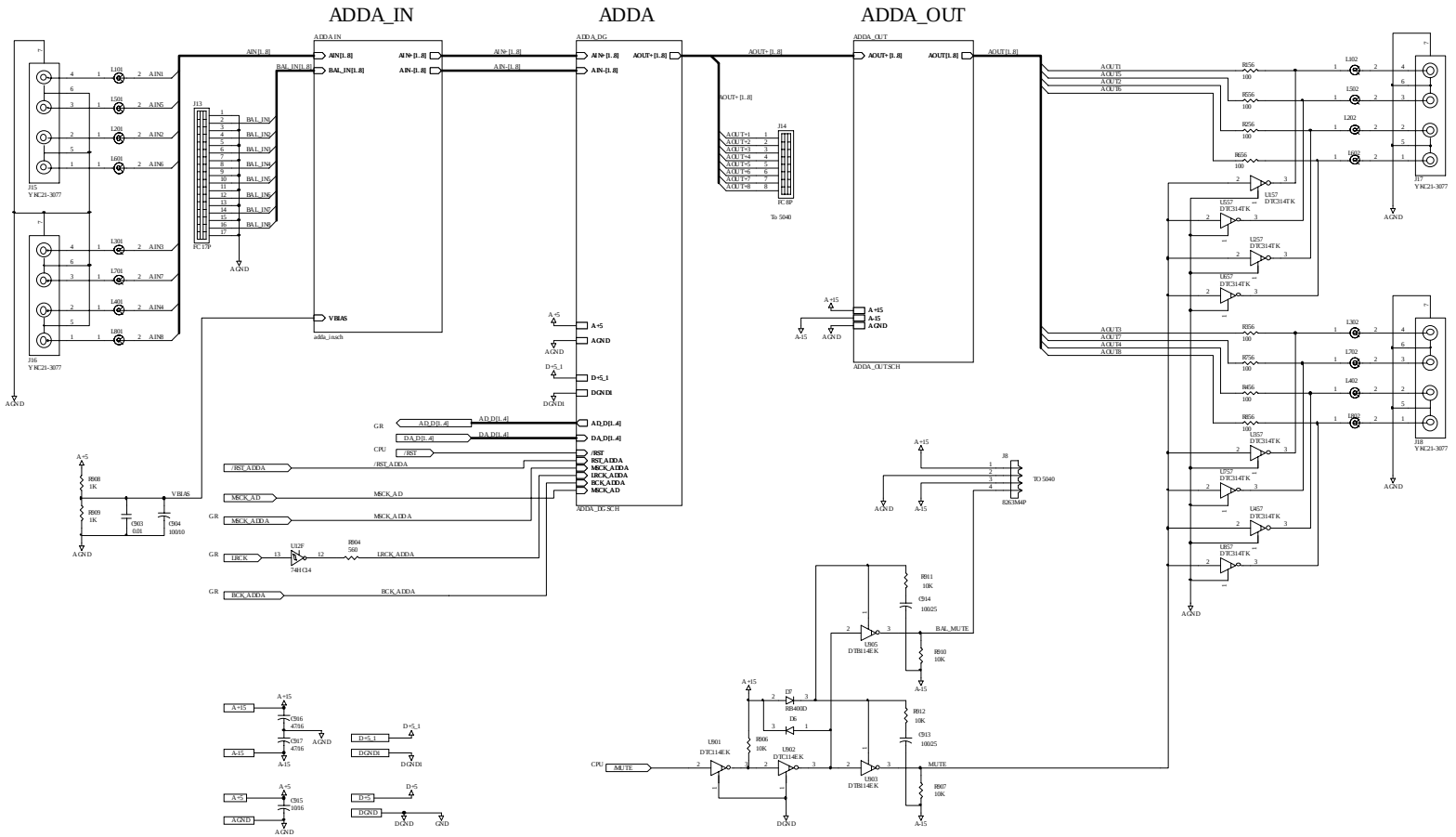
● VCO, MAIN, D-108 (6/11)



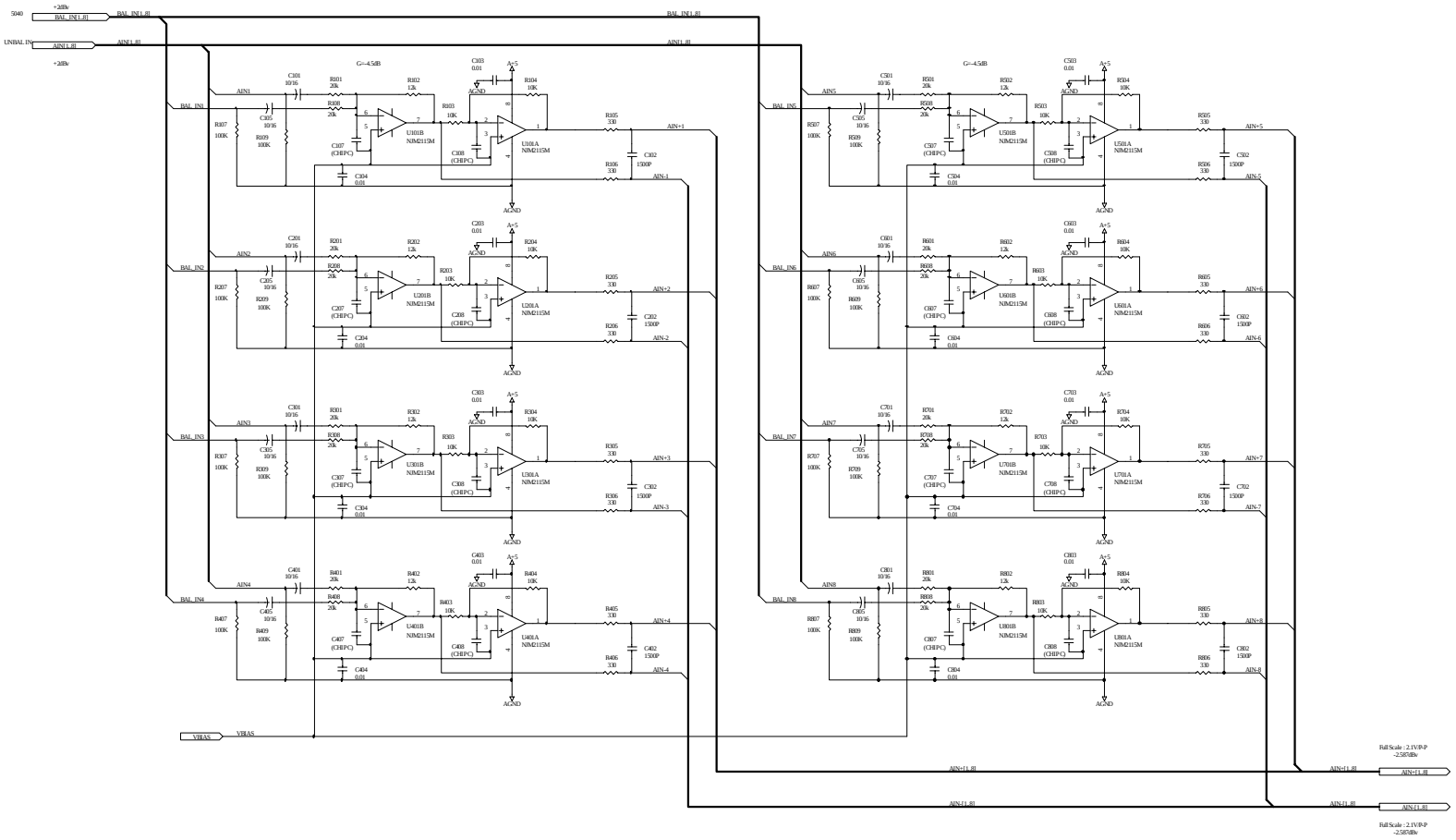
● FCONT, MAIN, D-108 (7/11)



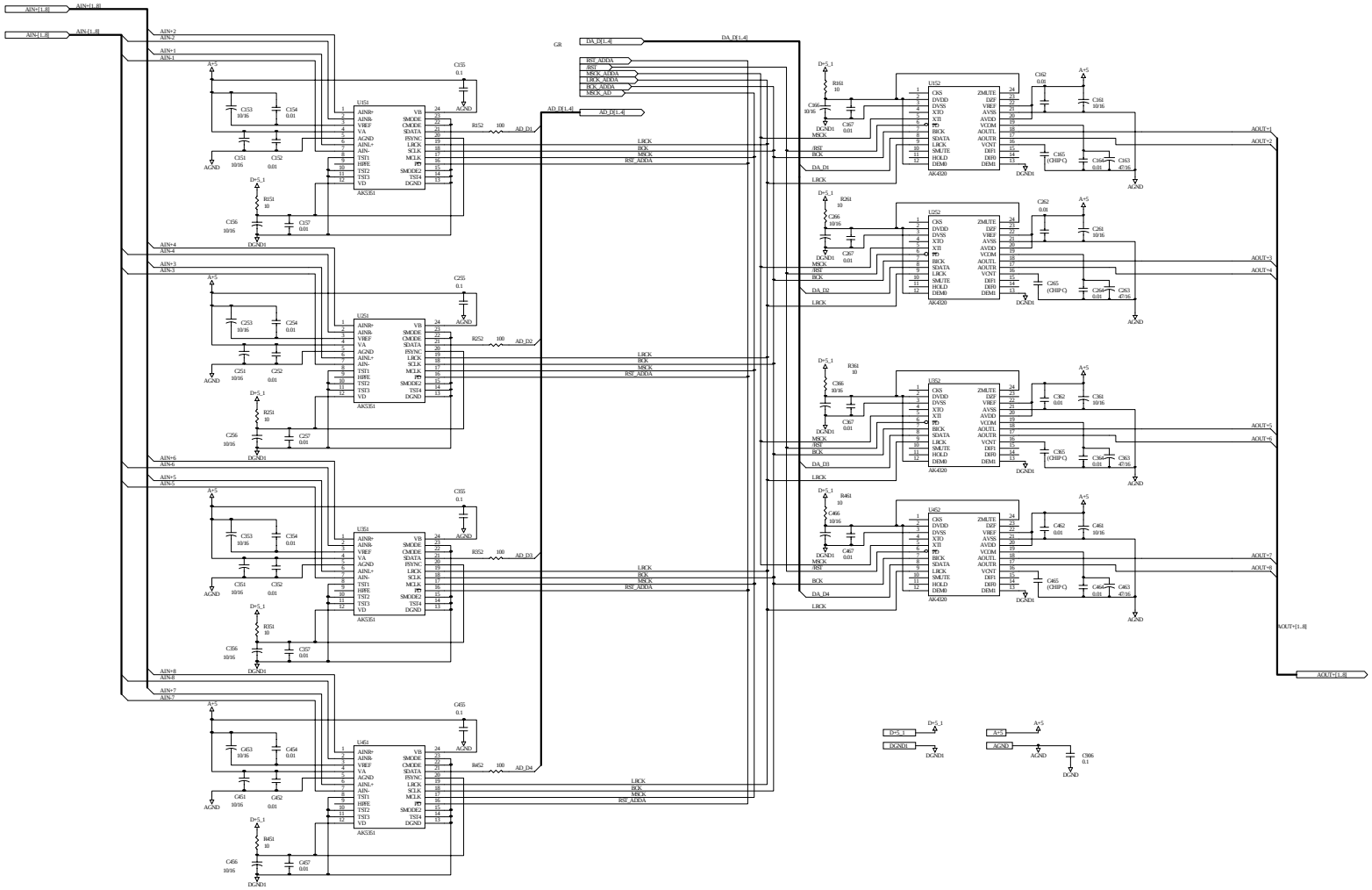
● ROOT, AD-DA, MAIN, D-108 (8/11)



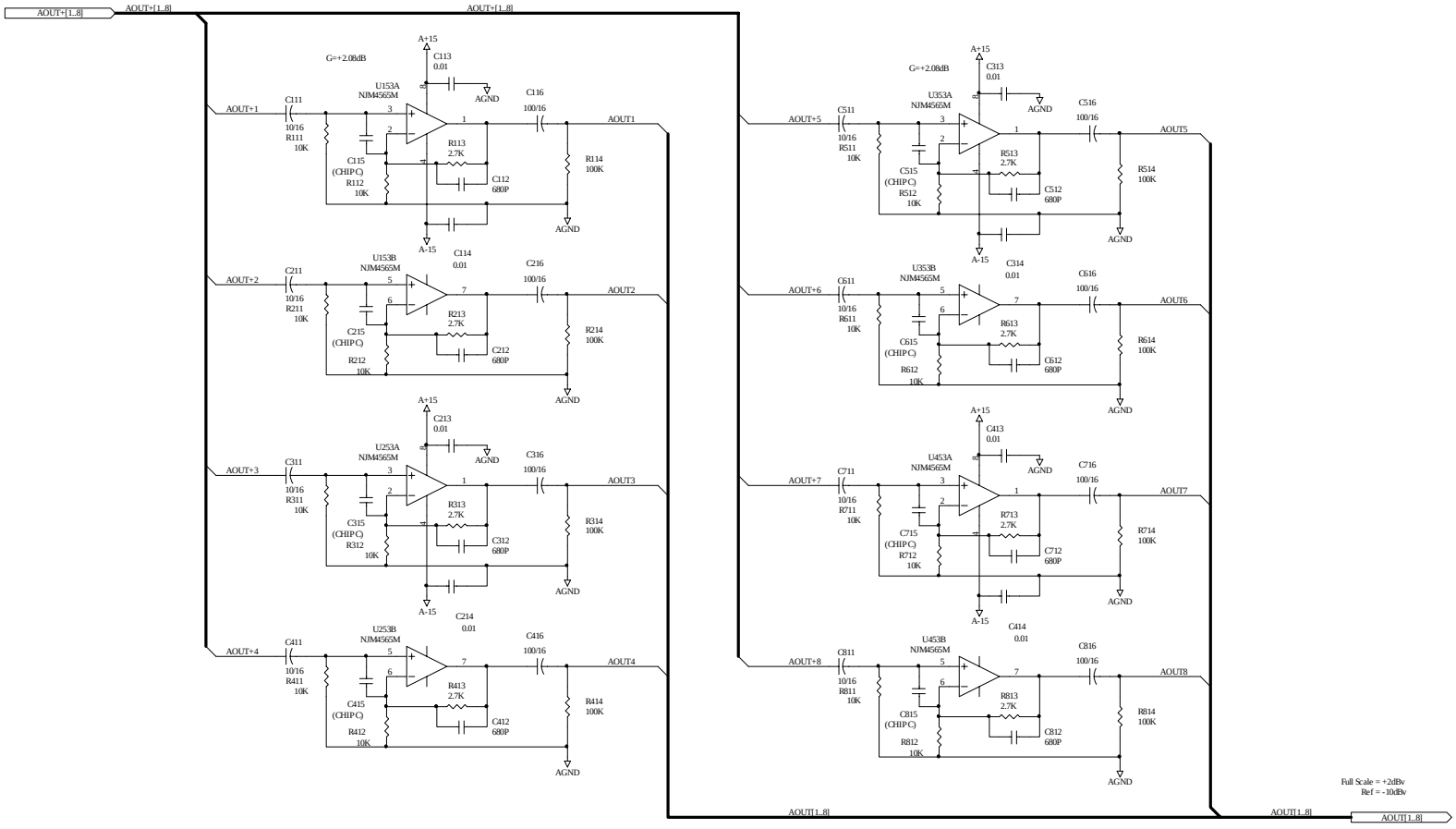
● ADDA IN, D-108 (9/11)



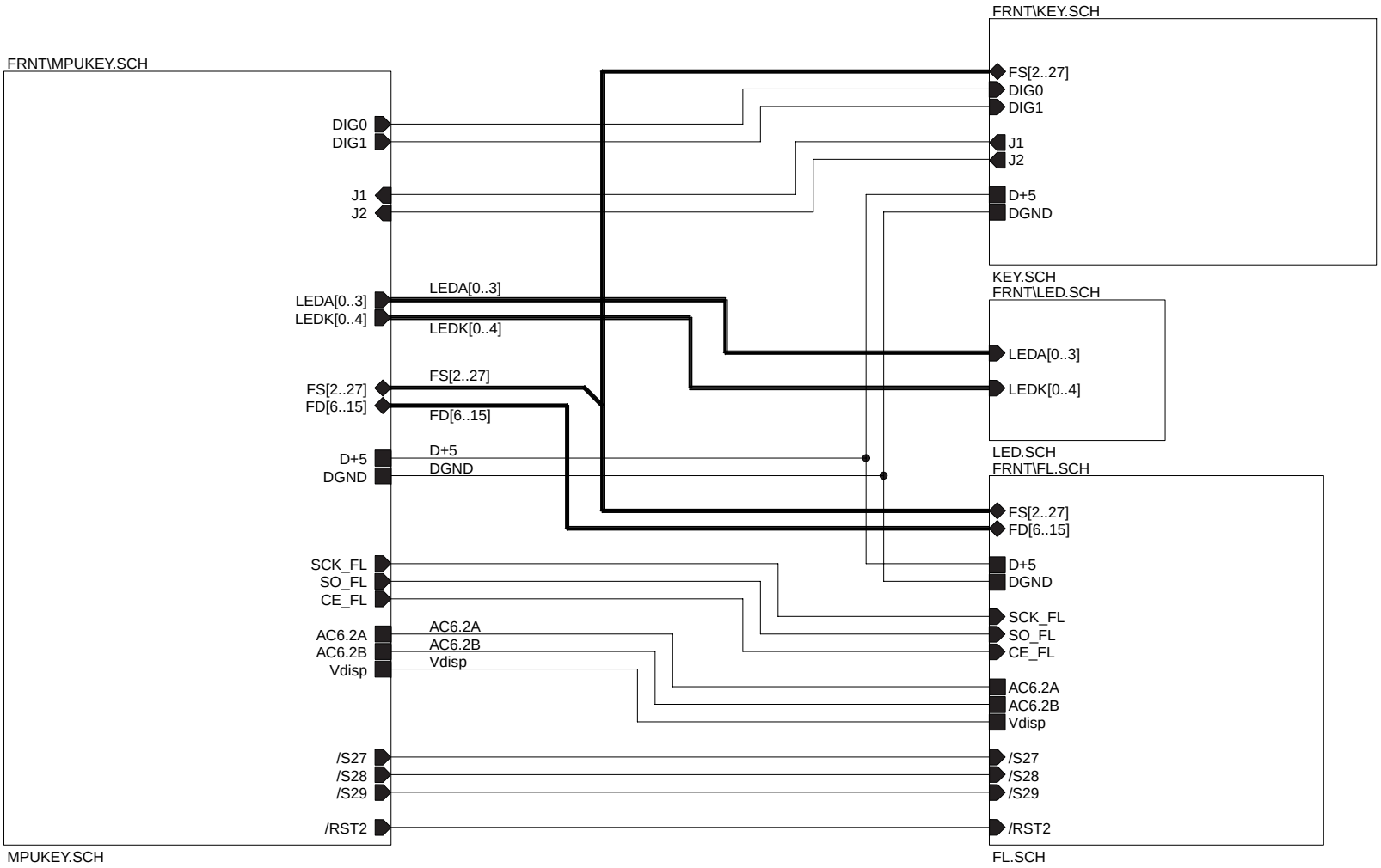
● ADDA, MAIN, D-108 (10/11)



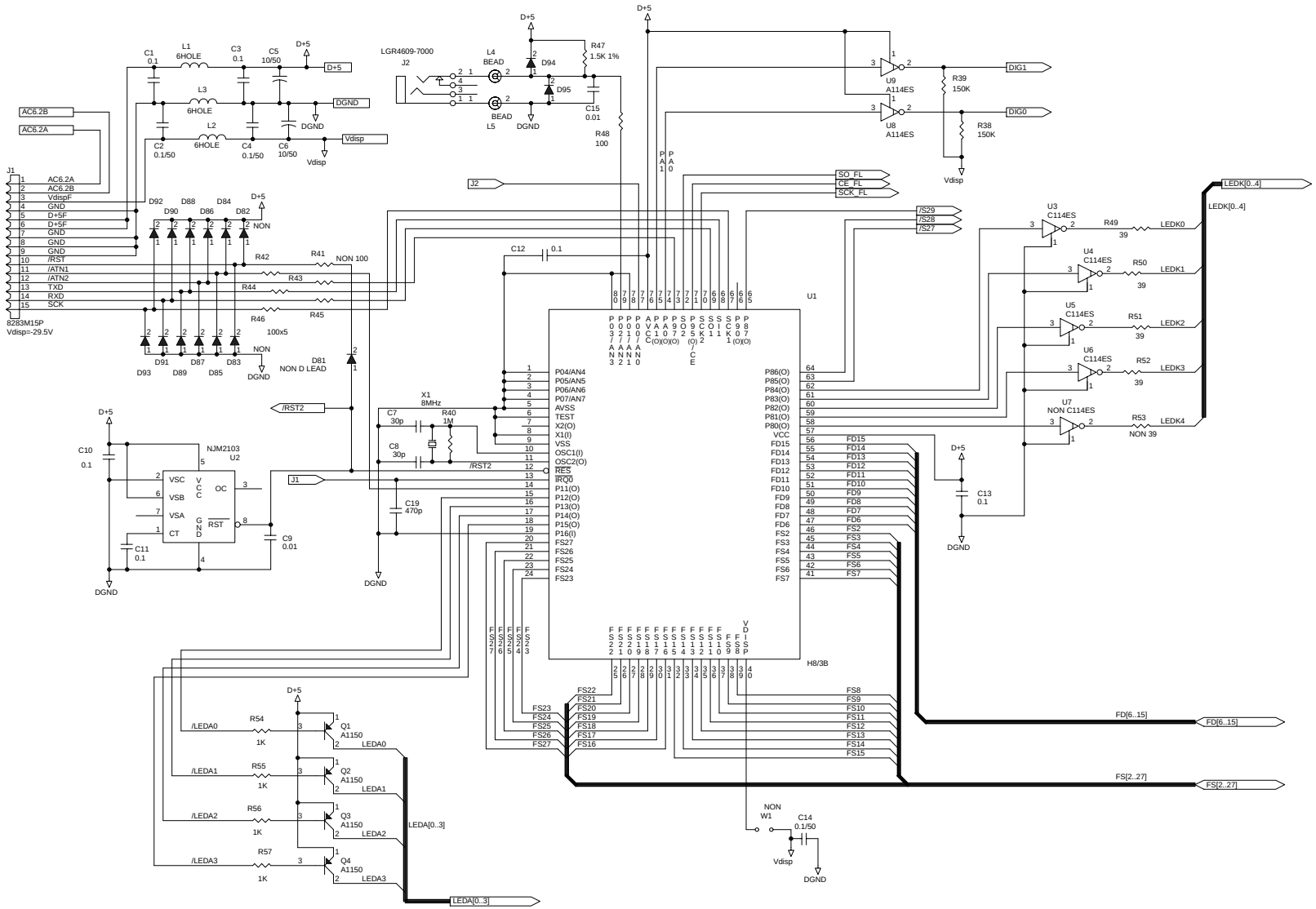
● ANALOG OUT, MAIN, D-108 (11/11)



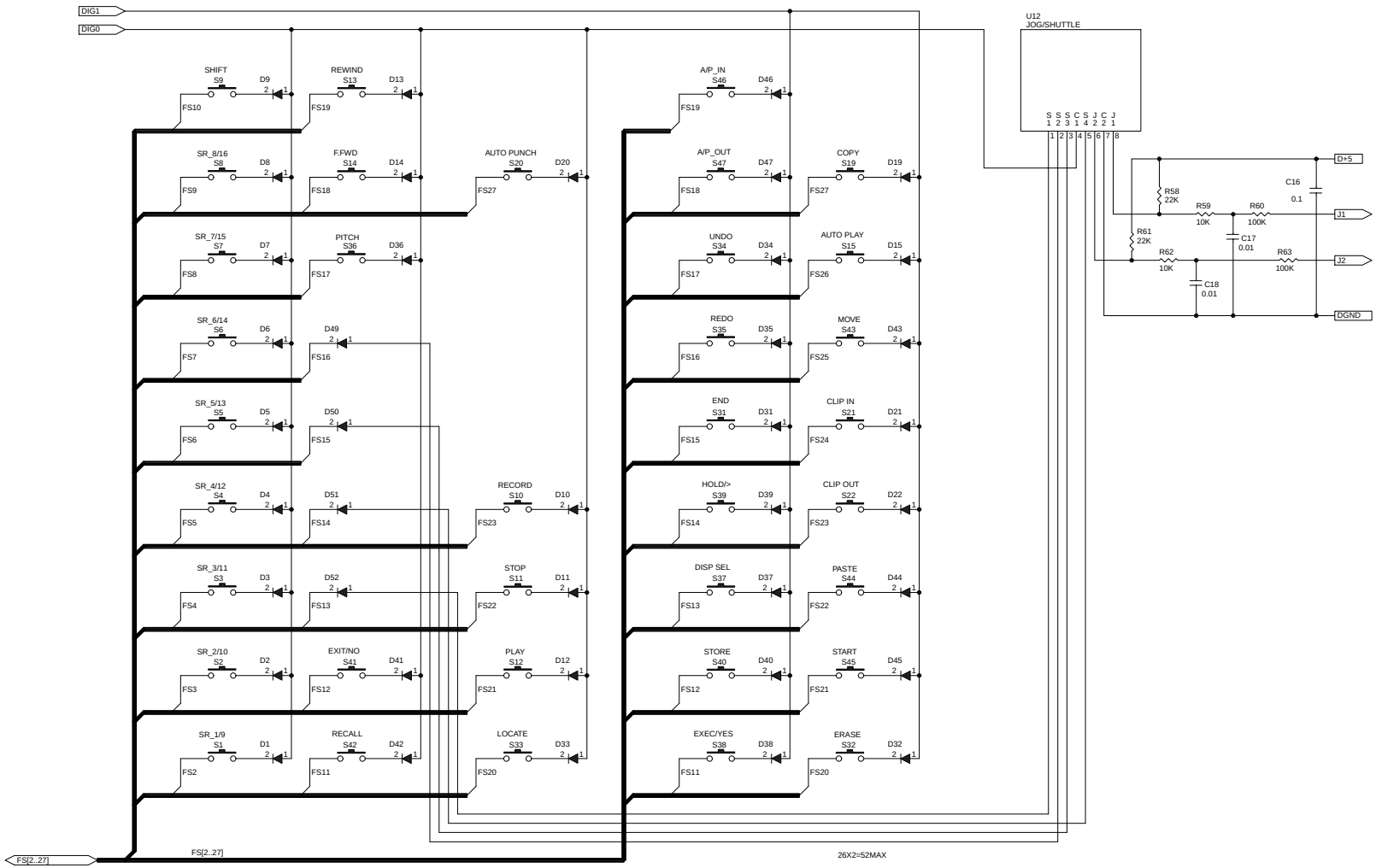
● ROOT, DISPLAY, D-108 / D-160 (1/5)



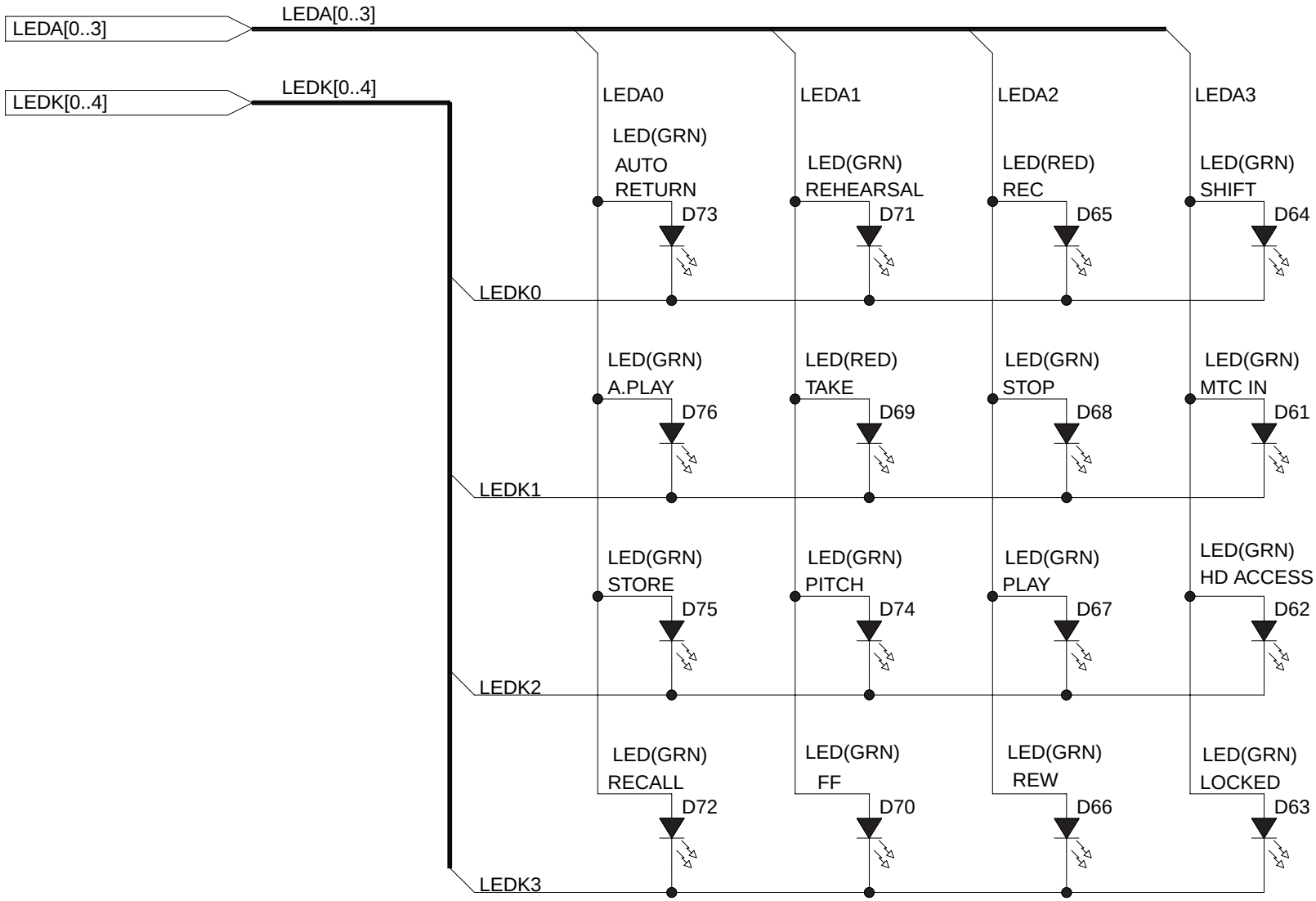
● MPUKEY, DISPLAY, D-108 / D-160 (2/5)



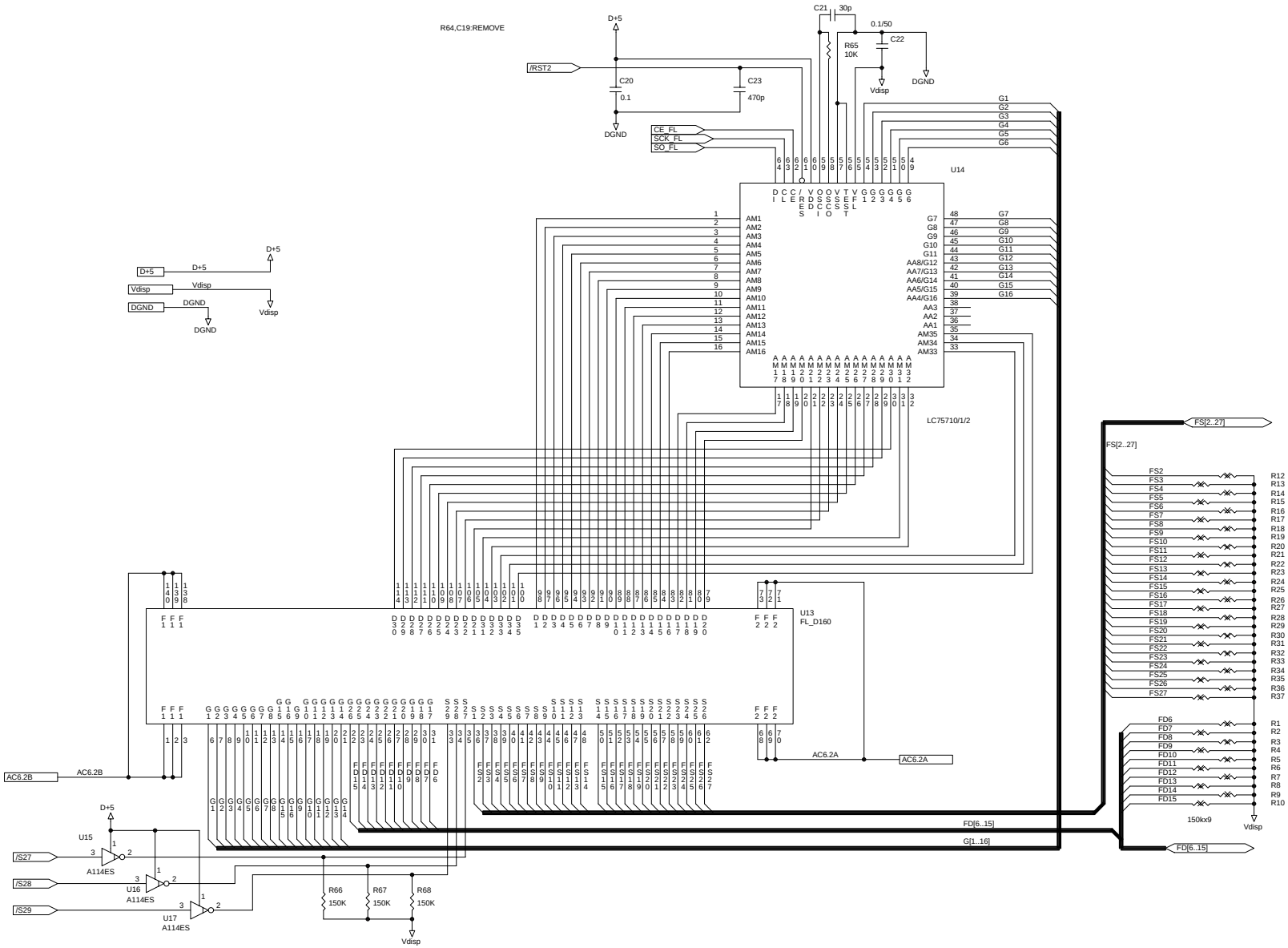
● KEY, DISPLAY, D-108 / D-160 (3/5)



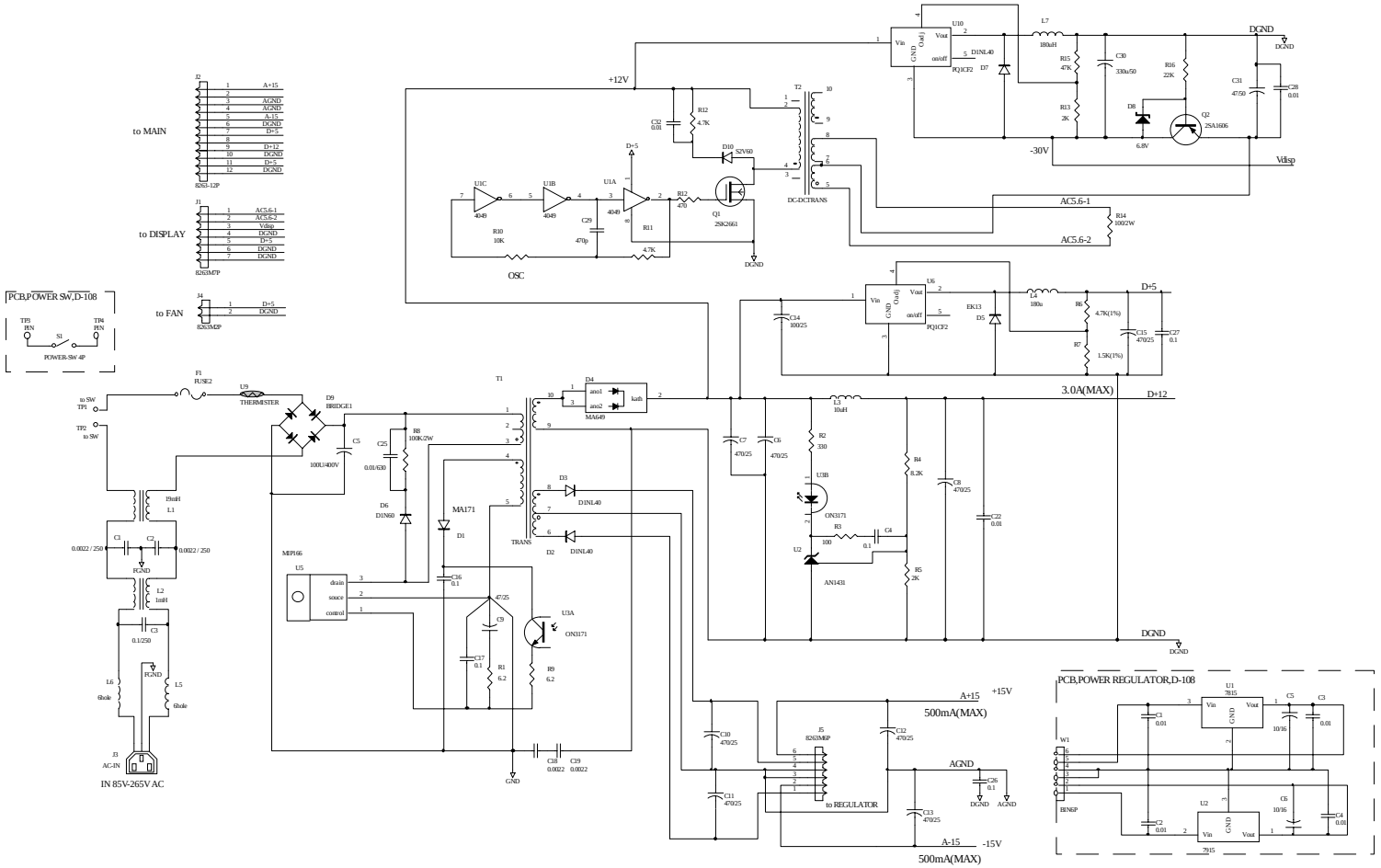
● LED, DISPLAY, D-108 / D-160 (4/5)



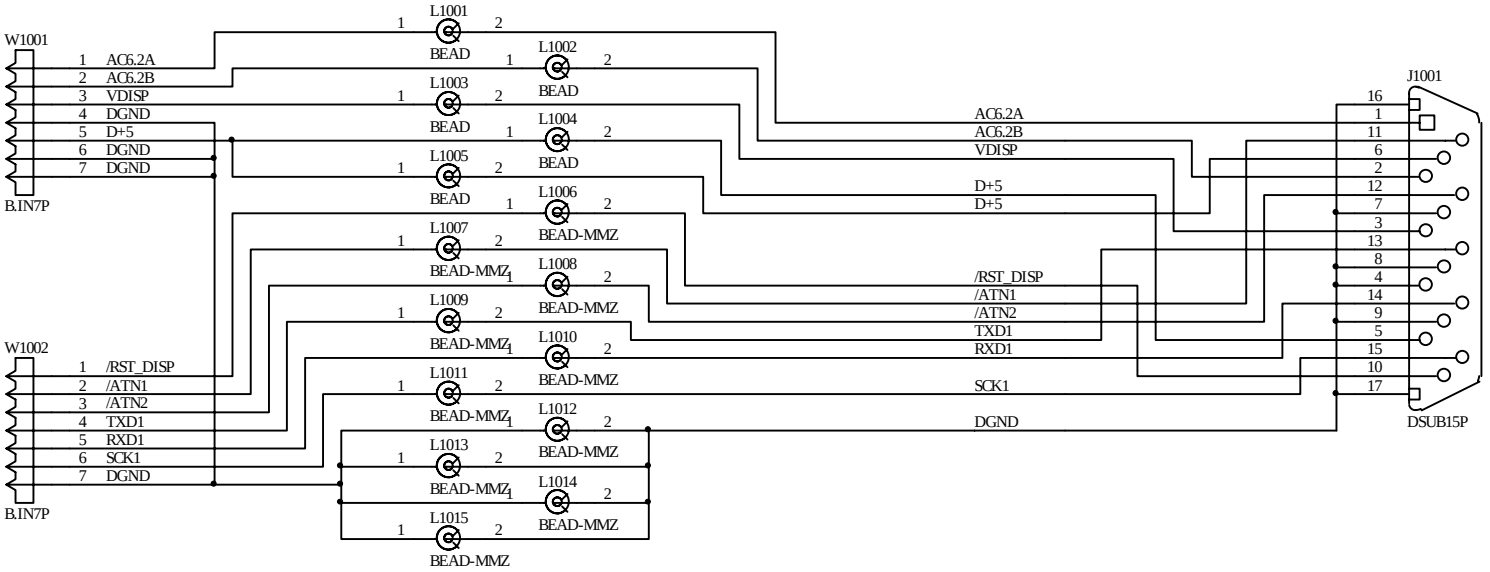
● FL, DISPLAY, D-108 / D-160 (5/5)



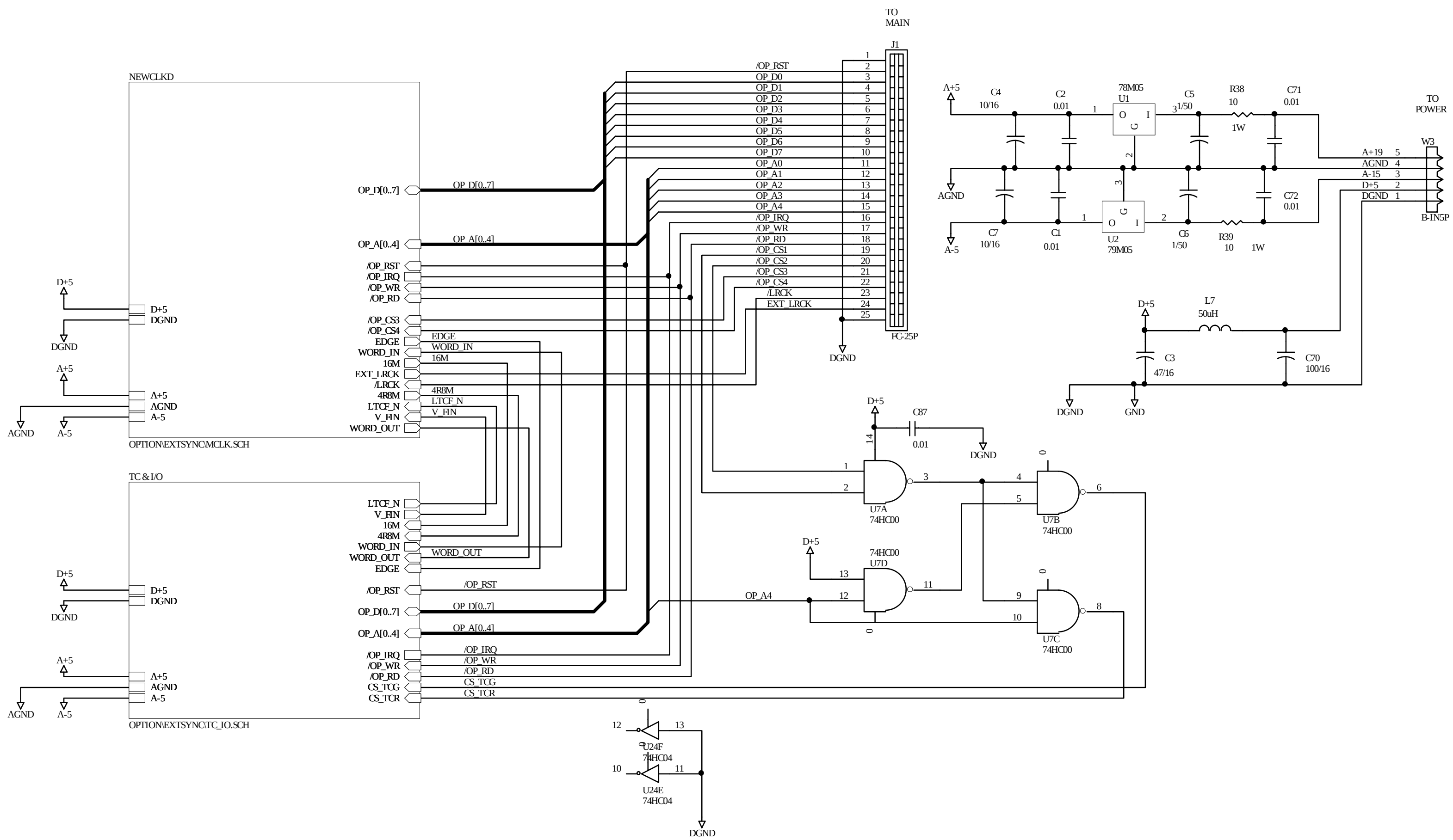
● POWER / POWER SW / REGULATOR, D-108



● CONNECT, D-108

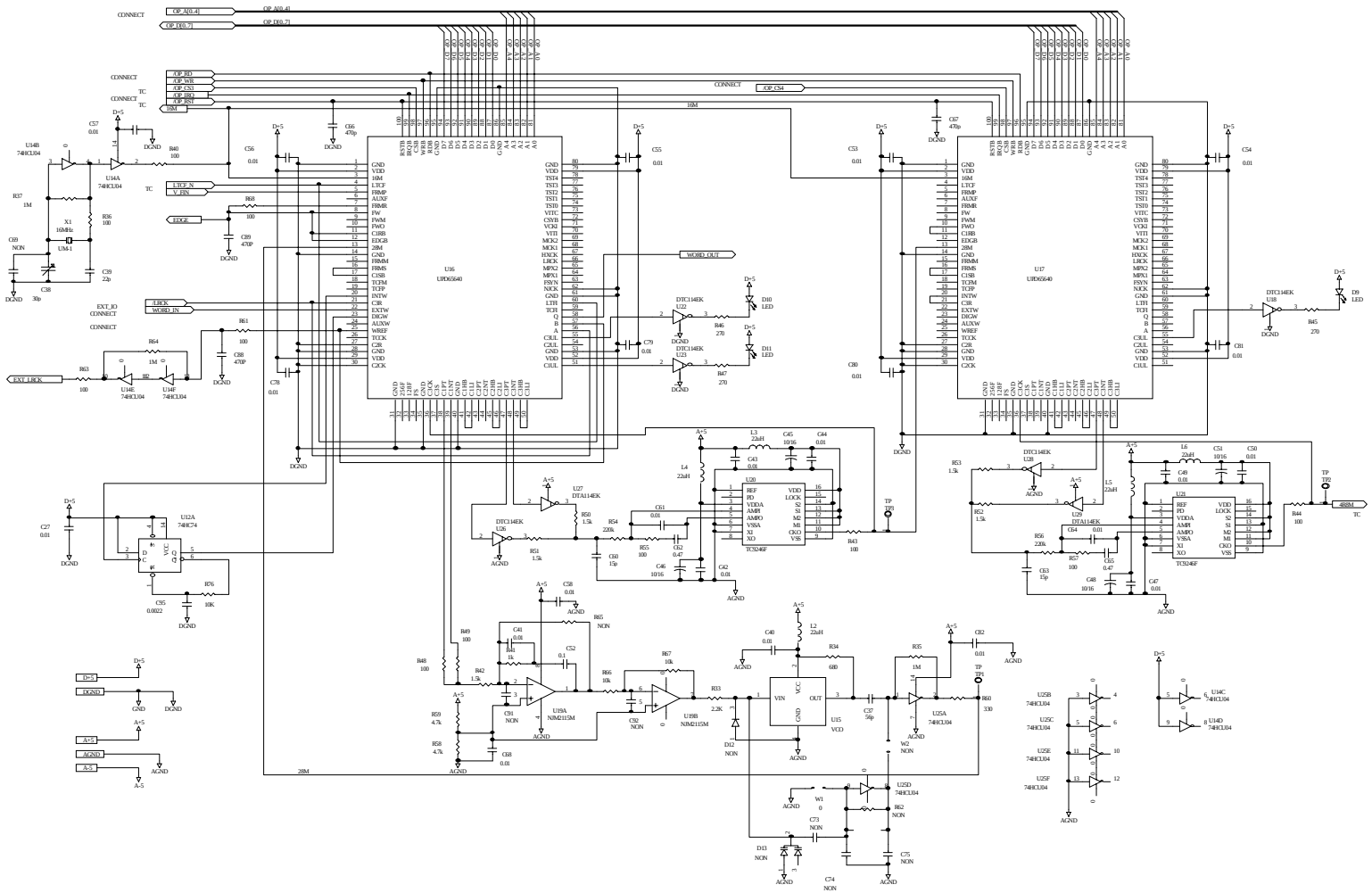


ROOT, 8345 (1/3)

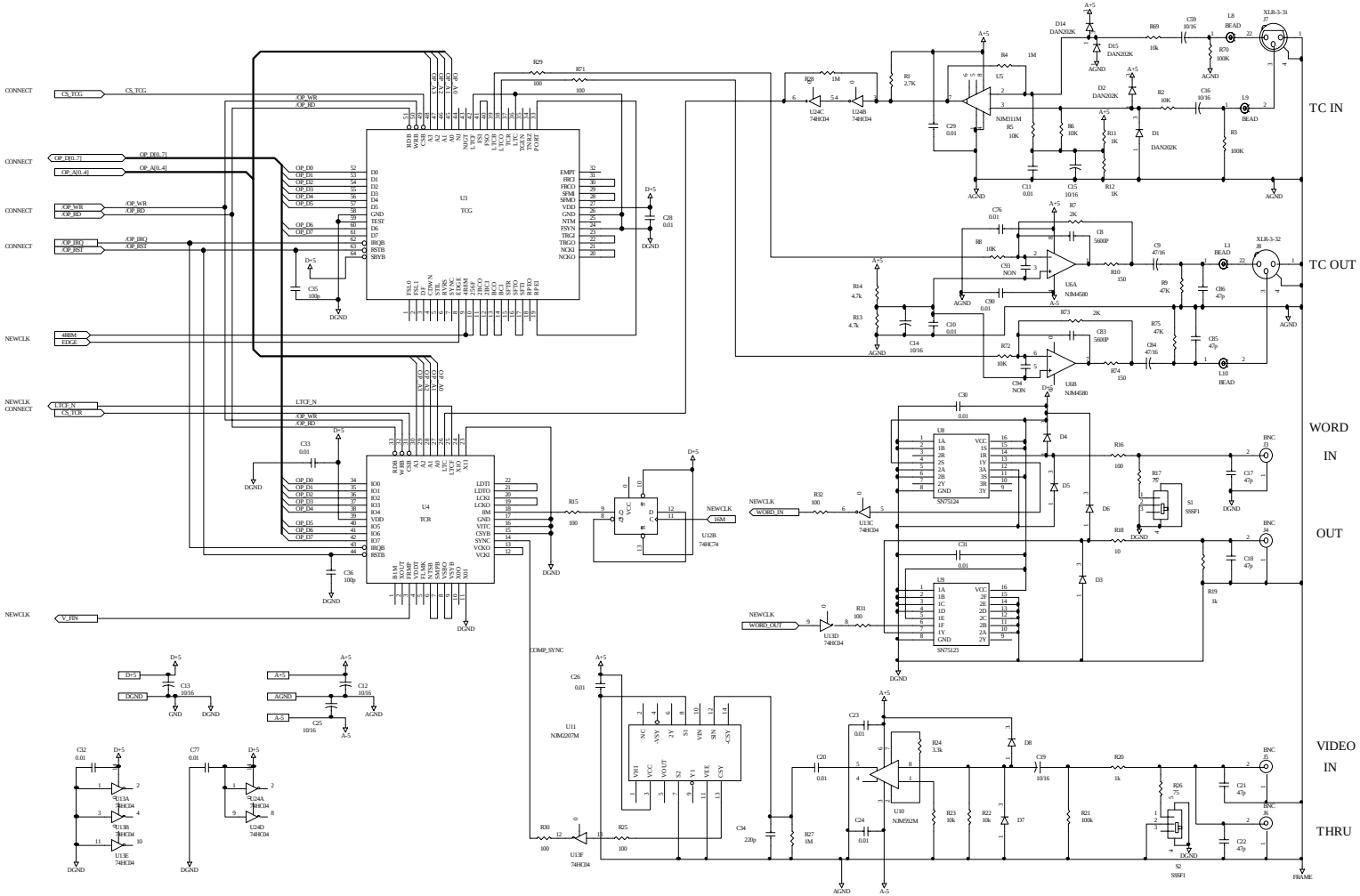


TO MAIN
J1
FC-25P
/OP_RST
OP_D0
OP_D1
OP_D2
OP_D3
OP_D4
OP_D5
OP_D6
OP_D7
OP_A0
OP_A1
OP_A2
OP_A3
OP_A4
/OP_IRQ
/OP_WR
/OP_RD
/OP_CS1
/OP_CS2
/OP_CS3
/OP_CS4
/LRCK
EXT_LRCK
DGND
NEWCLKD
OP_D[0..7]
OP_A[0..4]
/OP_RST
/OP_IRQ
/OP_WR
/OP_RD
/OP_CS3
/OP_CS4
EDGE
WORD_IN
16M
EXT_LRCK
/LRCK
4R8M
LTCF_N
V_FIN
WORD_OUT
D+5
DGND
A+5
AGND
A-5
OPTION\EXTSYNC\MCLK.SCH
TC & I/O
OPTION\EXTSYNC\TC_IO.SCH
CS_TCG
CS_TCR
TO POWER
W3
B-IN5P
A+19
AGND
A-15
D+5
DGND
78M05
U1
79M05
U2
C4 10/16
C2 0.01
C5 1/50
R38 10 1W
C71 0.01
C7 10/16
C1 0.01
C6 1/50
R39 10 1W
C72 0.01
L7 50uH
C3 47/16
C70 100/16
GND
C87 0.01
U7A 74HC00
U7B 74HC00
U7C 74HC00
U7D 74HC00
OP_A4
U24F 74HC04
U24E 74HC04

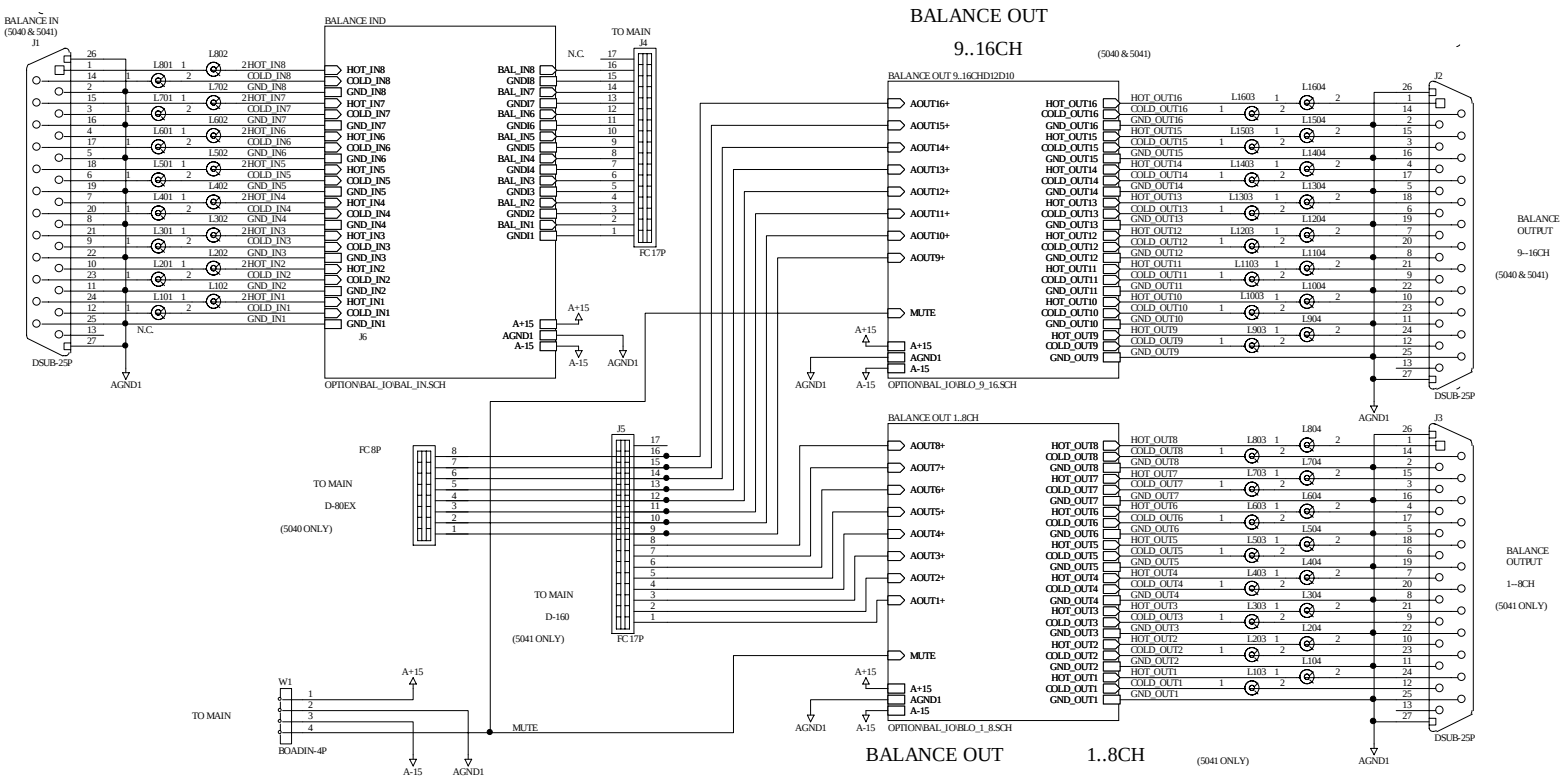
● MCLK, 8345 (2/3)



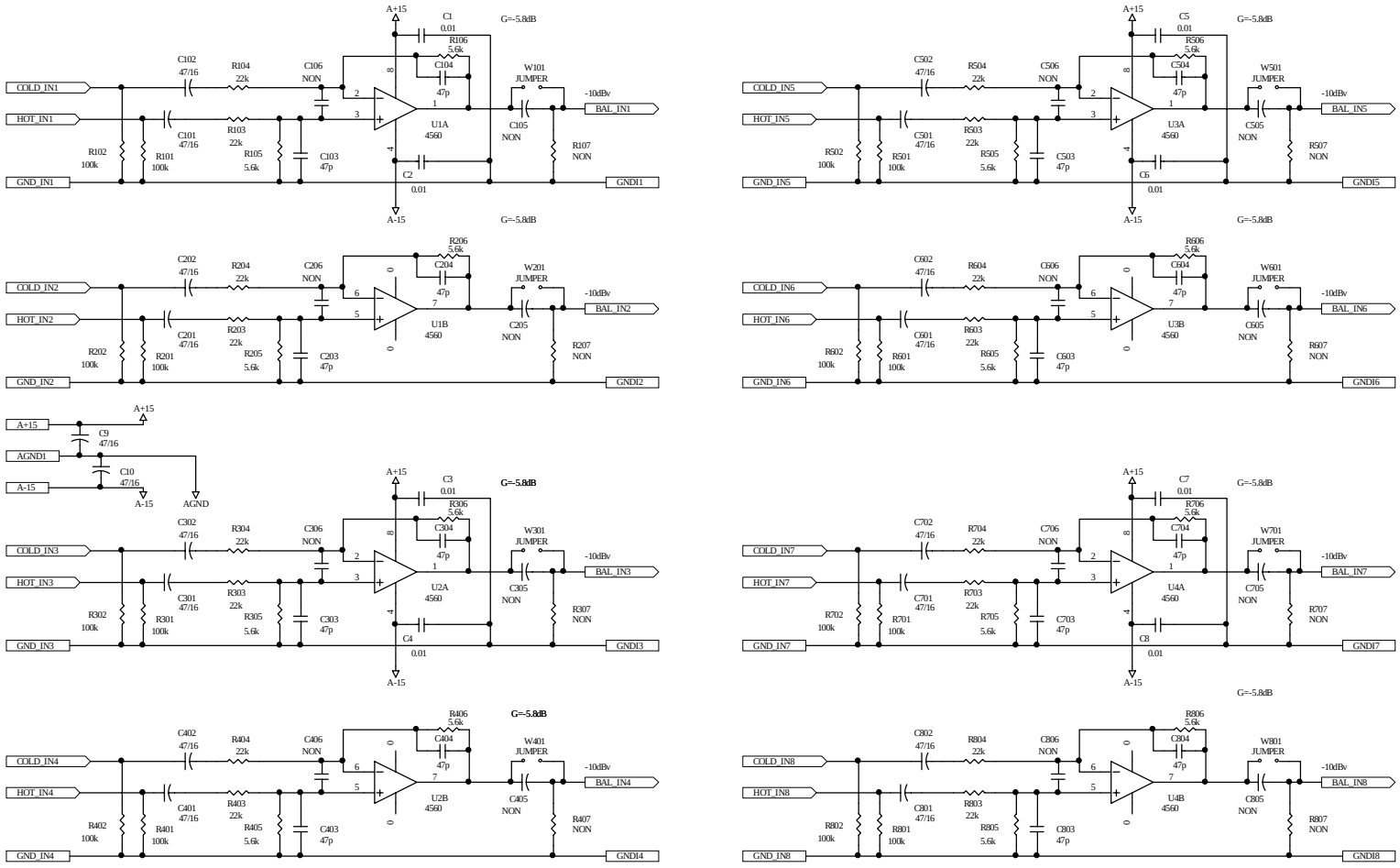
● TC I/O, 8345 (3/3)


TC IN
TC OUT
WORD IN
WORD OUT
VIDEO IN
THRU
CONNECT
NEWCLK
U3 TCG
U4 TCR
U8 SN75124
U9 SN75123
U11 NJM2207M
U10 NJM592M
U6A NJM4580
U6B NJM4580
U5 NJM1111M
U12B 74HC74
U13C 74HC04
U13D 74HC04
U13F 74HC04
U13A 74HC04
U13B 74HC04
U13E 74HC04
U24A 74HC04
U24D 74HC04
U24C 74HC04
U24B 74HC04
XLR-3-31
XLR-3-32
BNC
DAN202K
S1 SSSF1
S2 SSSF1
FRAME
DGND
AGND
A+5
D+5
A-5

● BALANCE I/O, ROOT, 5040 (1/3)

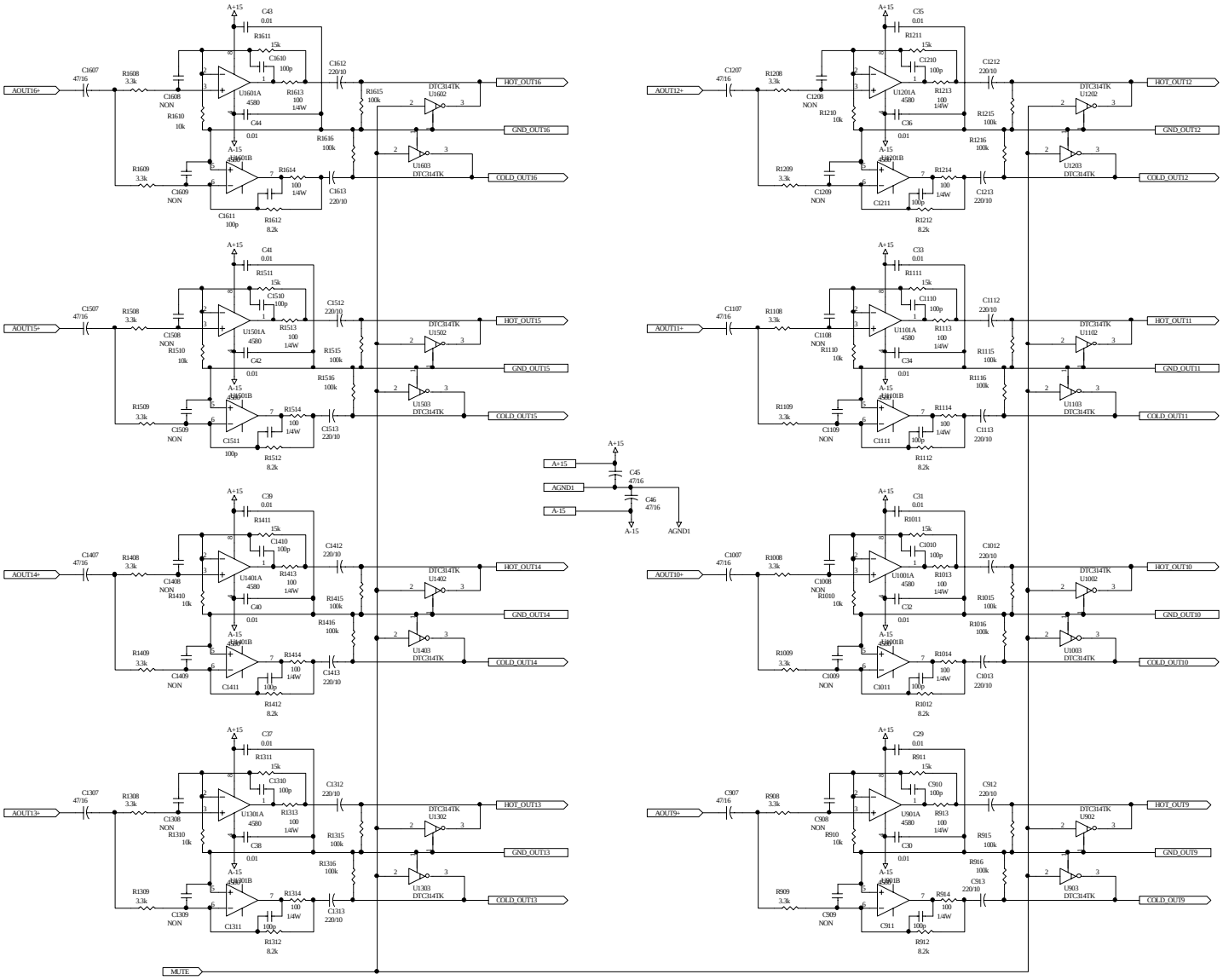


● BALANCE I/O, INPUT, 5040 (2/3)



● BALANCE I/O, OUTPUT 9 - 16, 5040 (3/3)

9..16CH



<NOTE>

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