

Service
Service
Service



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260808

Service Manual

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4.3.11 IR & LED Board

1. Remove screw and lift the IR & LED Board from the front cover.
 2. Release the cables from the cable clamps.
 3. Unplug the connectors.
- When defective, replace the whole unit.

4.3.12 Lightguide

Refer to next figure for details.

1. Do all steps up to and including step 5 as described in the removal of the LCD Panel.
2. Release the cables from the cable clamps [1].
3. Remove the screws [2] and lift the light guide from the front cover.
4. Remove the unit from the front cover.

When defective, replace the whole unit.



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Figure 4-6 IR & LED Board

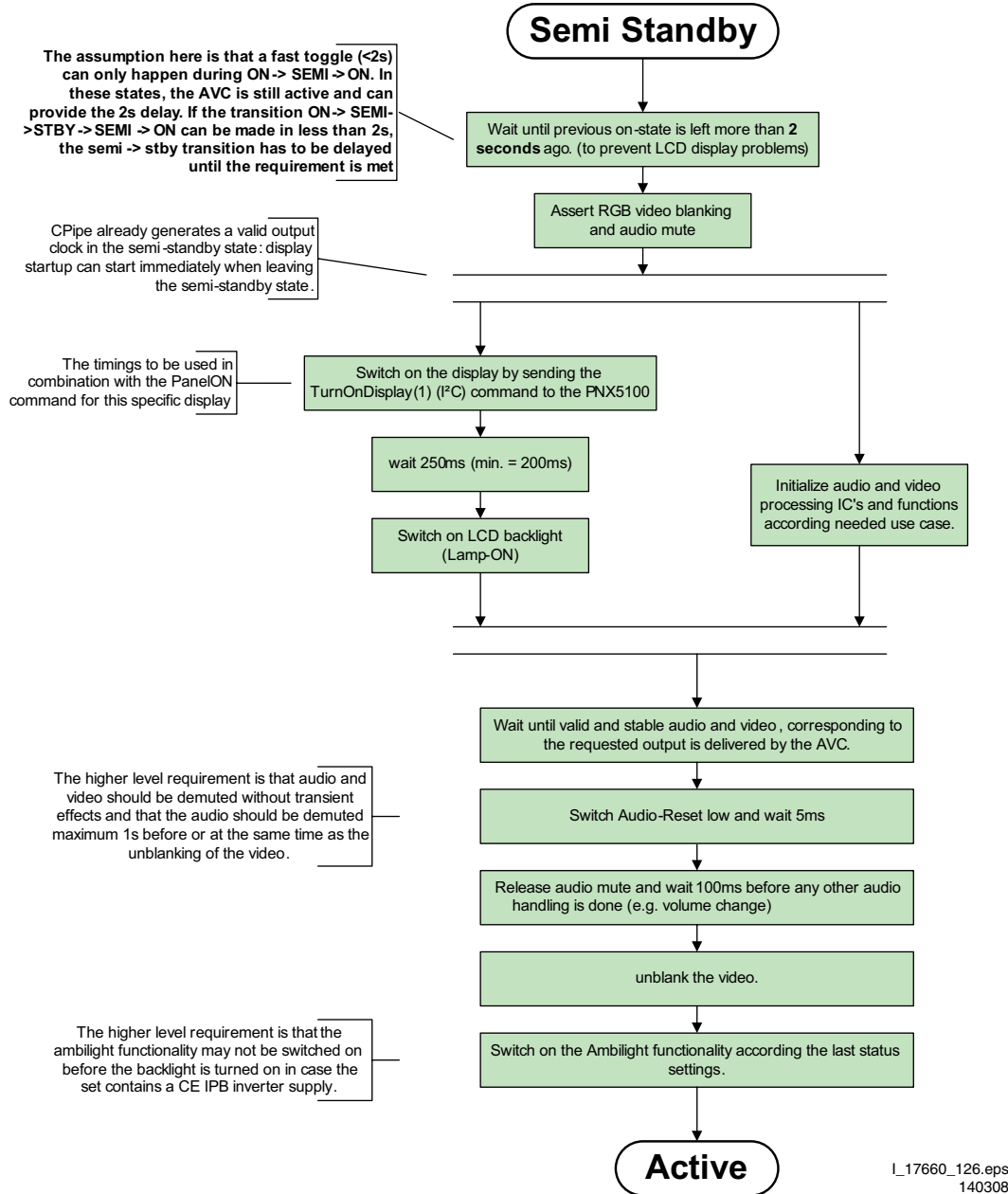
Constraints taken into account:

- Display may only be started when valid LVDS output clock can be delivered by the AVC .
- Between 5 and 50 ms after power is supplied, display should receive valid lvds clock .
- minimum wait time to switch on the lamp after power up is 200ms.

action holder: AVC

action holder: St-by

autonomous action



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Figure 5-6 “Semi Stand-by” to “Active” flowchart

before activating via SDM. **In case one of the speakers is not connected, the protection can also be triggered.**

Repair Tips

- It is also possible that the set has an audio DC protection because of an interruption in one or both speakers (the DC voltage that is still on the circuit cannot disappear through the speakers). **Caution:** (Dis)connecting the speakers during the ON state of the TV can damage the audio amplifier.

5.7.3 Important remark regarding the blinking LED indication

As for the blinking LED indication, the blinking led of error layer 1 displaying can be switched off by pushing the power button on the keyboard.

This condition is not valid after the set was unpowered (via mains interruption). The blinking LED starts again and can only be switched off by unplugging the mains connection.

This can be explained by the fact that the MIPS can not load the keyboard functionality from software during the start-up and doesn't recognize the keyboard commands at this time.

5.8 Fault Finding and Repair Tips

Read also section "5.5 Error Codes, 5.5.4 Error Buffer, Extra Info".

Caution: For the whole platform the speaker connections are grounded on -12 V level. During service measurements with earth grounded equipment like e.g. scope, great risk of using the speaker terminal connections for earth ground is currently present. One will short circuit the -12 V to earth ground in that way and will cause damage of the supply/audio part!

5.8.1 Ambilight

Due to degeneration process of the AmbiLights, there can be a difference in the colour and/or light output of the spare ambilight module in comparison with the originals ones contained in the TV set. Via ComPair the light output can be adjusted.

5.8.2 Audio Amplifier

The Class D-IC 7D10 has a powerpad for cooling. When the IC is replaced it must be ensured that the powerpad is very well pushed to the PCB while the solder is still liquid. This is needed to insure that the cooling is guaranteed, otherwise the Class D-IC could break down in short time.

5.8.3 CSM

When CSM is activated and there is a USB stick connected to the TV, the software will dump the complete CSM content to the USB stick. The file (Csm.txt) will be saved in the root of the USB stick. If this mechanism works it can be concluded that a large part of the operating system is already working (MIPS, USB...)

5.8.4 DC/DC Converter

Introduction

The onboard supply consists of 5 DC/DC converters and 7 linear stabilizers. The DC/DC converters have all +12V input voltage and deliver:

- +1V2-PNX8541 supply voltage, stabilized close to PNX8541 chip.
- +1V2-PNX5100 supply voltage, stabilized close to PNX5100 chip.

- +3V3 (overall 3.3 V for onboard ICs).
- +5V for USB and Conditional Access Interface and +5V5-TUN tuner stabilizer.
- +33VTUN for analog only tuners (**AP diversity**).

The linear stabilizers are providing:

- +1V supply voltage (out of +1V2-PNX8541), stabilized close to ST7101 chip (**MPEG4 diversity**).
- +1V8-PNX5100.
- +1V8-PNX8541 (**reserved** because +1V8-PNX5100 used also for DDR2 interface of PNX8541 via 5FB0).
- +2V5 (**MPEG4 diversity**).
- +1V2-STANDBY (out of +3V3-STANDBY).
- +5V-TUN (out of +5V5-TUN).
- +3V3-STANDBY (out of +12V, **reserved**).

+3V3-STANDBY and +1V2-STANDBY are permanent voltages. Supply voltages +1V2-PNX8541, +1V2-PNX5100 and +1V are started immediately when +12V incoming voltage is available (+12V is enabled by STANDBY signal, active low). Supply voltages +3V3, 2V5, +1V8-PNX5100, +1V8-PNX8541, +5V and +5V-TUN are switched-on directly by signal ENABLE-3V3 (active low) when +12V and previous mentioned voltages are all available.

Debugging

The best way to find a failure in the DC/DC converters is to check their starting-up sequence at power-on via the mains cord, presuming that the standby microprocessor and the external supply are operational. Take STANDBY signal high-to-low transition as reference.

When +12V rises above 10V then +1V2-PNX8541, +1V2-PNX5100 and +1V are started immediately. Then, after ENABLE-3V3 goes low, all the other supply voltages should rise within 10 ms. Boost voltages should be OK when +1V2-PNX8541, +1V2-PNX5100 are available (FU07 and FU8A, around 19V).

SUPPLY-FAULT signal should be high when all supply voltages are started-up.

Tips

- Usually, when supply voltage is short-circuited to GND, the corresponding DC/DC converter is making audible noise.
- The drop voltage across resistors 3U70 and 3U3T is 100 mV to 2000 mV.
- Defective (in short-circuit) power MOS-FETs lead usually to their controller IC broken; if one or more high-side MOS-FETs (7U05, 7U08, 7U0D-1 or 7U0H-1) is broken then the platform can be heavily damaged if started in SDM-mode (SUPPLY-FAULT signal is then ignored, while higher than normal supplies will be generated).
- The +33VTUN generator circuit (7U0P + 7U0Q + surrounding components) has low output current capability. In case of too low or no output voltage check transistor 7U0P (gate voltage pulses of about 10 V amplitude and drain voltage pulses of about 35 V amplitude) and the load (not more than 4.5 mA).
- High output ripple voltage of DC/DC converters can be caused by defective (cracked or bad soldered) ceramic capacitors in the feedback (DC or AC) input or output filtering.

5.8.5 Exit "Factory Mode"

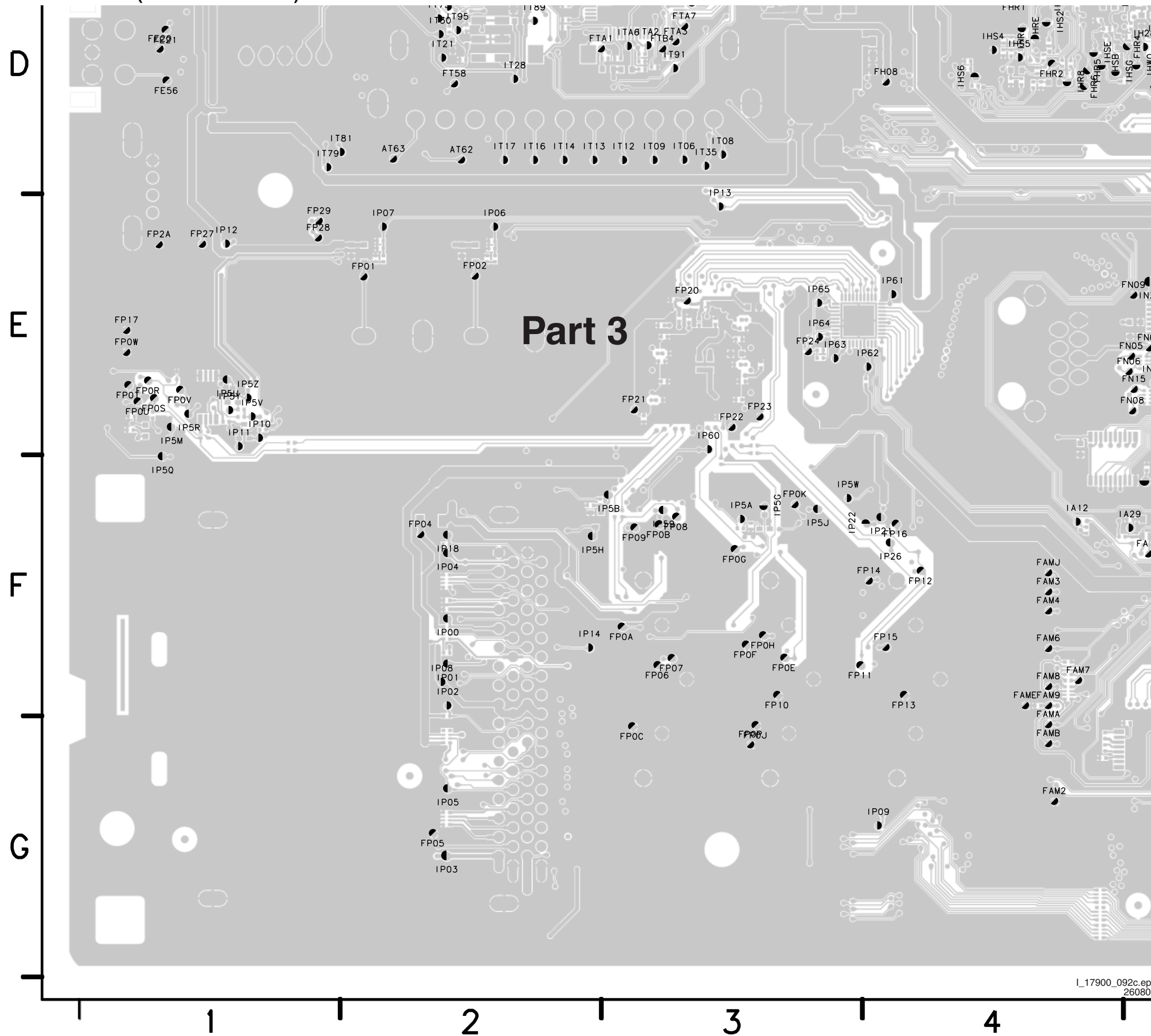
When an "F" is displayed in the screen's right corner, this means the set is in "Factory" mode, and it normally happens after a new SSB is mounted. To exit this mode, push the "VOLUME minus" button on the TV's local keyboard for 10 seconds (this disables the continuous mode). Push now the "MENU" button for 10 seconds until the "F" disappears from the screen.



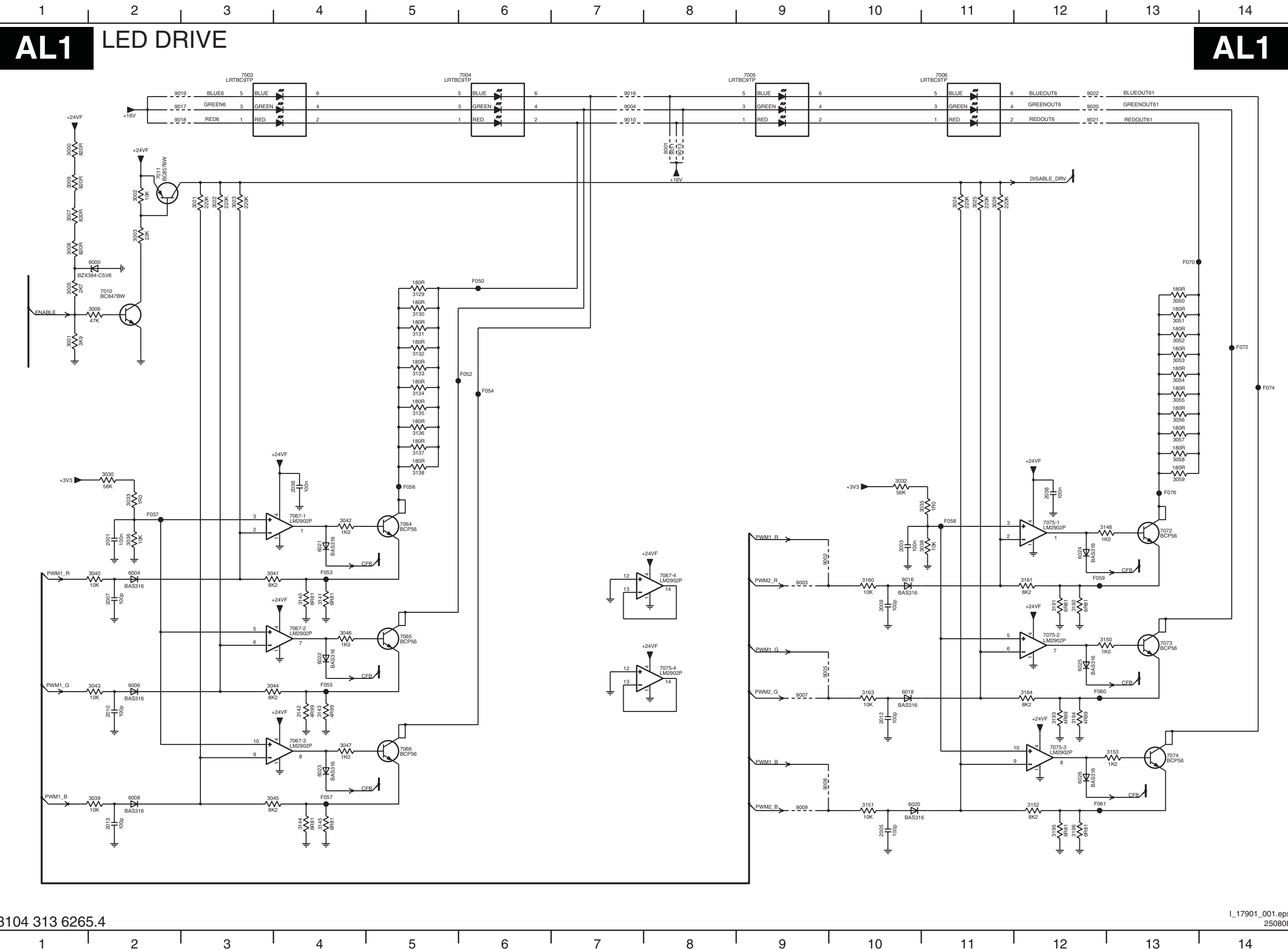
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Figure 5-21 Example UART log during SWUPG start-up (Normal start-up) part 4.

SSB: Test Points (Part 3 Bottom Side)



4 LED OSRAM: LED Drive

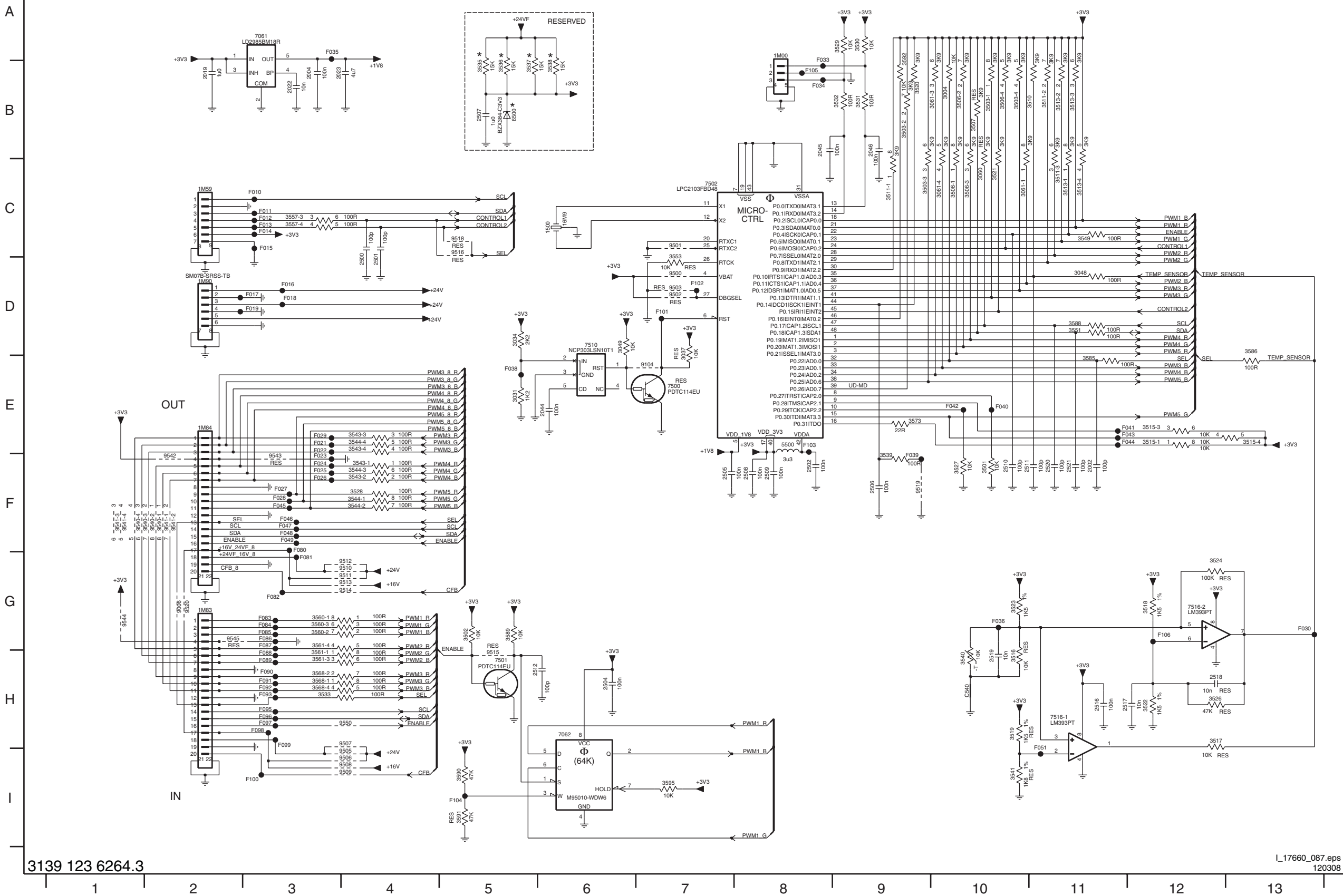


- 2001 F2
- 2003 F10
- 2005 I10
- 2007 F2
- 2009 F10
- 2010 H2
- 2012 H10
- 2013 I2
- 2036 E4
- 2038 E12
- 3000 A1
- 3001 D1
- 3002 B2
- 3003 B2
- 3005 C1
- 3006 C2
- 3007 B1
- 3008 C1
- 3009 B1
- 3021 B3
- 3022 B3
- 3023 B3
- 3024 B11
- 3025 B11
- 3030 E2
- 3032 E10
- 3033 E2
- 3035 E11
- 3036 F2
- 3038 F11
- 3039 H2
- 3040 F2
- 3041 F3
- 3042 E4
- 3043 G2
- 3044 G3
- 3045 H3
- 3046 G4
- 3047 H4
- 3050 C13
- 3051 C13
- 3052 D13
- 3053 D13
- 3054 D13
- 3055 D13
- 3056 D13
- 3057 E13
- 3058 E13
- 3059 E13
- 3129 C5
- 3130 C5
- 3131 C5
- 3132 D5
- 3133 D5
- 3134 D5
- 3135 D5
- 3136 E5
- 3137 E5
- 3138 E5
- 3140 F4
- 3141 F4
- 3142 H4
- 3143 H4
- 3144 I4
- 3145 I4
- 3148 F12
- 3150 G12
- 3151 I10
- 3152 I12
- 3153 H13
- 3160 F10
- 3161 F12
- 3163 G10
- 3164 G12
- 3191 F12
- 3192 F12
- 3193 H12
- 3194 H12
- 3195 I12
- 3196 I12
- 6000 C2
- 6004 F2
- 6006 G2
- 6008 H2
- 6016 F10
- 6018 G10
- 6020 I10
- 6021 F4
- 6022 G4
- 6023 H4
- 6024 F12
- 6025 G12
- 6026 H12
- 7003 A3
- 7004 A6
- 7005 A9
- 7006 A11
- 7010 C2
- 7011 B2
- 7064 F5
- 7065 G5
- 7066 H5
- 7067-1 E4
- 7067-2 G4
- 7067-3 H4
- 7067-4 F8
- 7072 F13
- 7073 G13
- 7074 H13
- 7075-1 F12
- 7075-2 G12
- 7075-3 H12
- 7075-4 G8
- 9001 A8
- 9002 F9
- 9003 F9
- 9004 A7
- 9005 G9
- 9007 G9
- 9008 H9
- 9009 I9
- 9010 A7
- 9011 A8
- 9013 A8
- 9016 A7
- 9017 A2
- 9018 A2
- 9019 A2
- 9020 A12
- 9021 A12
- 9022 A12
- F037 E2
- F050 C8
- F052 D6
- F053 F4
- F054 D6
- F055 G4
- F056 E5
- F057 H4
- F058 E11
- F059 F12
- F060 G12
- F061 I12
- F070 C13
- F072 D14
- F074 D14
- F076 E13

8 LED Lite-On Panel: uC Block

AL3 MICROCONTROLLER BLOCK

AL3



- 1500 C6
- 1M00 A8
- 1M59 C2
- 1M83 G2
- 1M84 E2
- 1M90 D2
- 2002 F11
- 2004 B3
- 2019 B2
- 2022 B3
- 2023 B3
- 2044 E6
- 2045 B8
- 2046 B9
- 2500 D4
- 2501 D4
- 2502 F8
- 2504 H6
- 2505 F7
- 2506 F9
- 2507 B5
- 2508 F8
- 2509 F8
- 2510 F10
- 2511 F10
- 2512 H5
- 2516 H11
- 2517 H11
- 2518 H12
- 2519 H10
- 2520 F11
- 2521 F11
- 3004 B10
- 3031 E5
- 3034 D5
- 3037 D7
- 3048 D11
- 3049 D6
- 3060 C10
- 3061-1 C10
- 3061-2 B10
- 3061-3 B10
- 3061-4 F1
- 3501 F10
- 3502 G5
- 3503-1 B10
- 3503-2 B9
- 3503-3 C9
- 3503-4 B10
- 3506-1 C10
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- 3506-3 C10
- 3506-4 B10
- 3507 B10
- 3510 B11
- 3511-1 C9
- 3511-2 B11
- 3511-3 C11
- 3513-1 B11
- 3513-2 B11
- 3513-3 B11
- 3513-4 C11
- 3515-1 E12
- 3515-3 E12
- 3516 H10
- 3517 H12
- 3518 G12
- 3519 H10
- 3520 B9
- 3521 C10
- 3522 H12
- 3523 G10
- 3524 G12
- 3526 H12
- 3527 F10
- 3528 F4
- 3529 A9
- 3530 A9
- 3531 B9
- 3532 B9
- 3533 H3
- 3535 B5
- 3536 B5
- 3537 B5
- 3538 B6
- 3539 F9
- 3540 H10
- 3541 H10
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- 3557-4 C3
- 3565 H3
- 3560-2 G3
- 3560-3 G3
- 3561-1 H3
- 3561-3 H3
- 3561-4 G3
- 3568-1 H3
- 3568-2 H3
- 3568-4 H3
- 3573 E9
- 3585 E11
- 3588 D13
- 3588 D11
- 3589 G5
- 3591 I5
- 3592 A9
- 3595 I7
- 5500 E8
- 6500 B5
- 7061 A3
- 7062 H6
- 7500 E7
- 7501 H5
- 7502 C7
- 7510 D6
- 7516-1 H11
- 7516-2 G12
- 9006 G2
- 9104 E7
- 9500 D7
- 9501 C7
- 9502 D7
- 9503 D7
- 9505 I4
- 9506 I4
- 9507 H4
- 9508 I4
- 9509 I4
- 9510 G4
- 9511 G4
- 9512 G4
- 9513 G4
- 9514 G4
- 9515 H5
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- 9544 G1
- 9545 G2
- 9550 H4
- C540 H10
- F010 C3
- F011 C3
- F012 C3
- F013 C3
- F014 C3
- F015 C3
- F016 D3
- F017 D3
- F018 D3
- F019 D3
- F020 D3
- F021 D3
- F022 E3
- F023 F3
- F024 F3
- F025 F3
- F026 F3
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- F030 G13
- F031 B8
- F032 B8
- F033 B8
- F034 B8
- F035 A3
- F036 G10
- F037 F9
- F038 E5
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- F047 F3
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- F084 G3
- F085 G3
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- F087 G3
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- F090 H3
- F091 H3
- F092 H3
- F093 H3
- F094 H3
- F095 H3
- F096 H3
- F097 H3
- F098 H3
- F099 H3
- F100 I5
- F101 D7
- F102 D7
- F103 E8
- F104 I5
- F105 B8
- F106 G12

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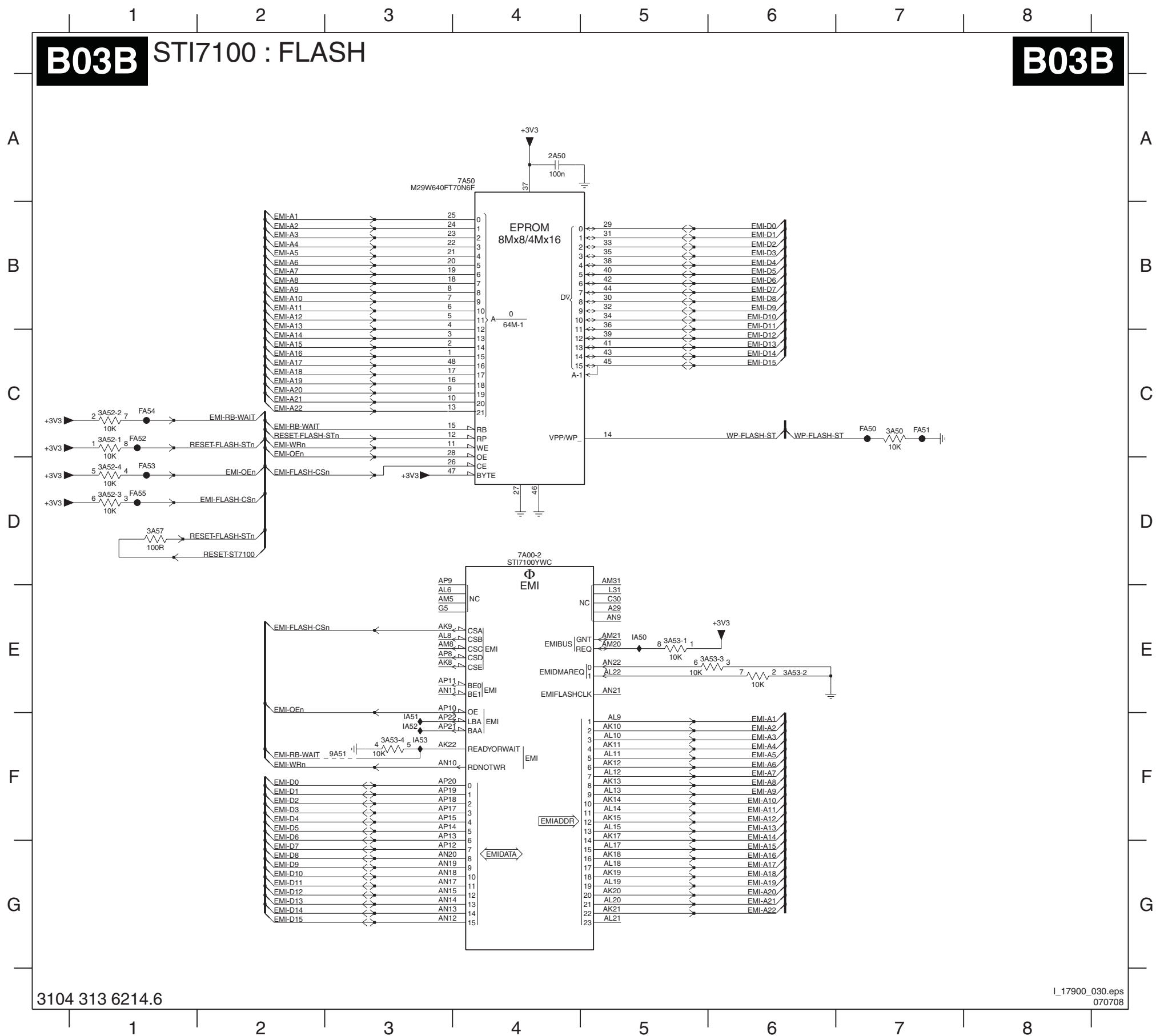
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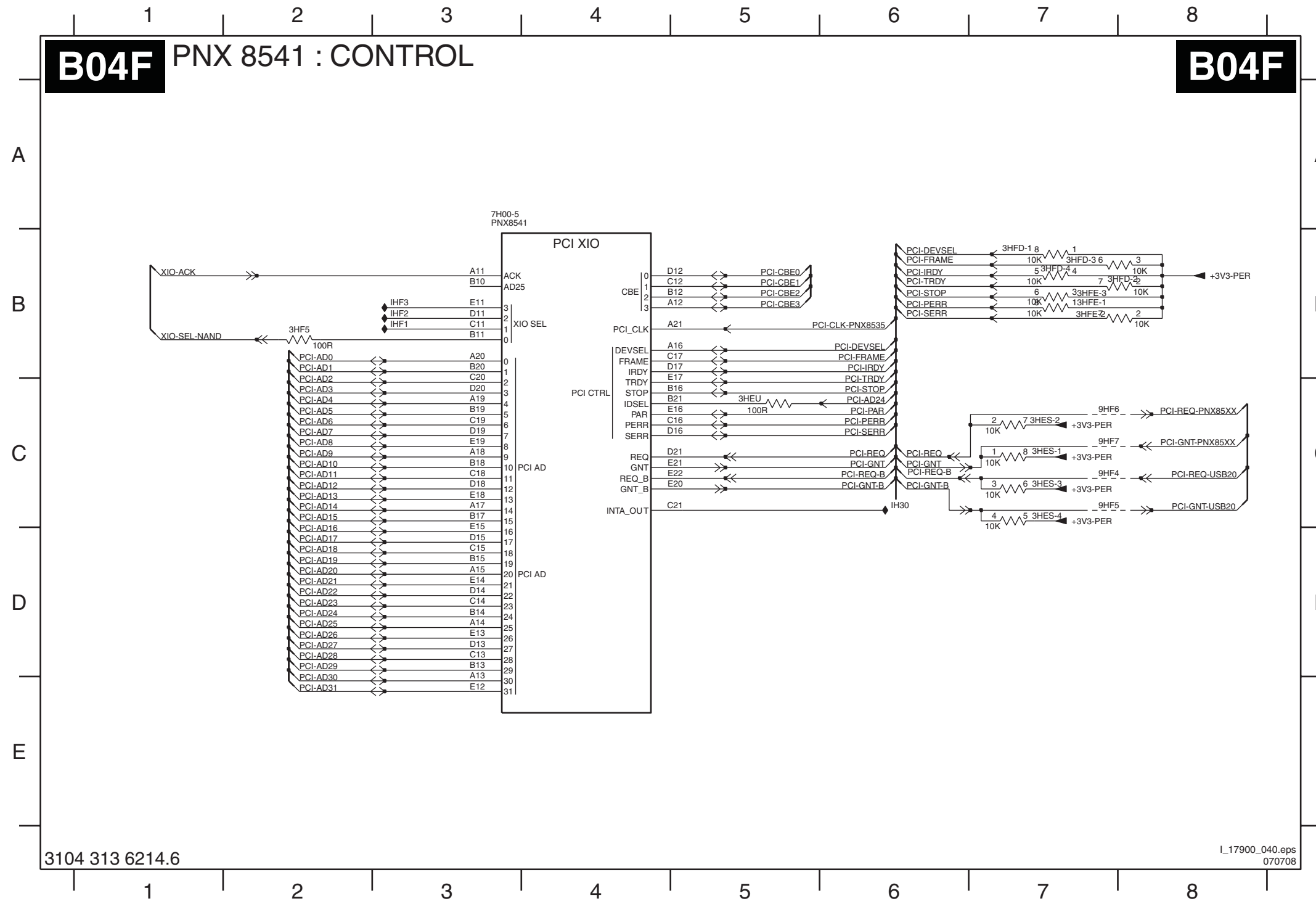
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SSB: STI7100: Flash



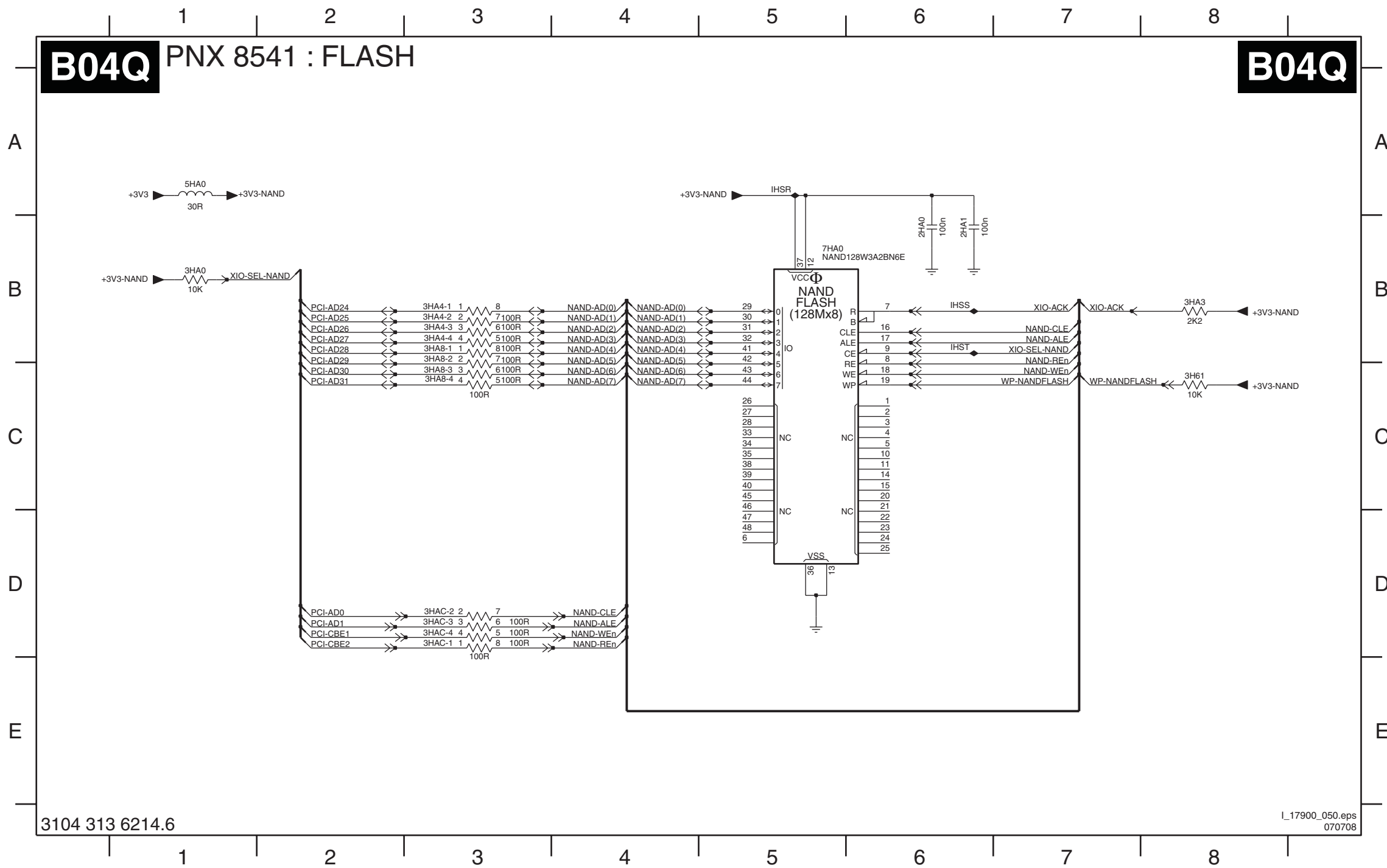
- 2A50 A4
- 3A50 C7
- 3A52-1 C1
- 3A52-2 C1
- 3A52-3 D1
- 3A52-4 D1
- 3A53-1 E5
- 3A53-2 E6
- 3A53-3 E6
- 3A53-4 F3
- 3A57 D1
- 7A00-2 D4
- 7A50 A4
- 9A51 F3
- FA50 C7
- FA51 C7
- FA52 C1
- FA53 D1
- FA54 C1
- FA55 D1
- IA50 E5
- IA51 F3
- IA52 F3
- IA53 F3

SSB: PNX8541: Control



- 3HES-1 C7
- 3HES-2 C7
- 3HES-3 C7
- 3HES-4 C7
- 3HEU C5
- 3HF5 B2
- 3HFD-1 B7
- 3HFD-2 B8
- 3HFD-3 B7
- 3HFD-4 B7
- 3HFE-1 B7
- 3HFE-2 B7
- 3HFE-3 B7
- 7H00-5 A3
- 9HF4 C7
- 9HF5 C7
- 9HF6 C7
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- IHF2 B2
- IHF3 B2

SSB: PNX8541: Flash

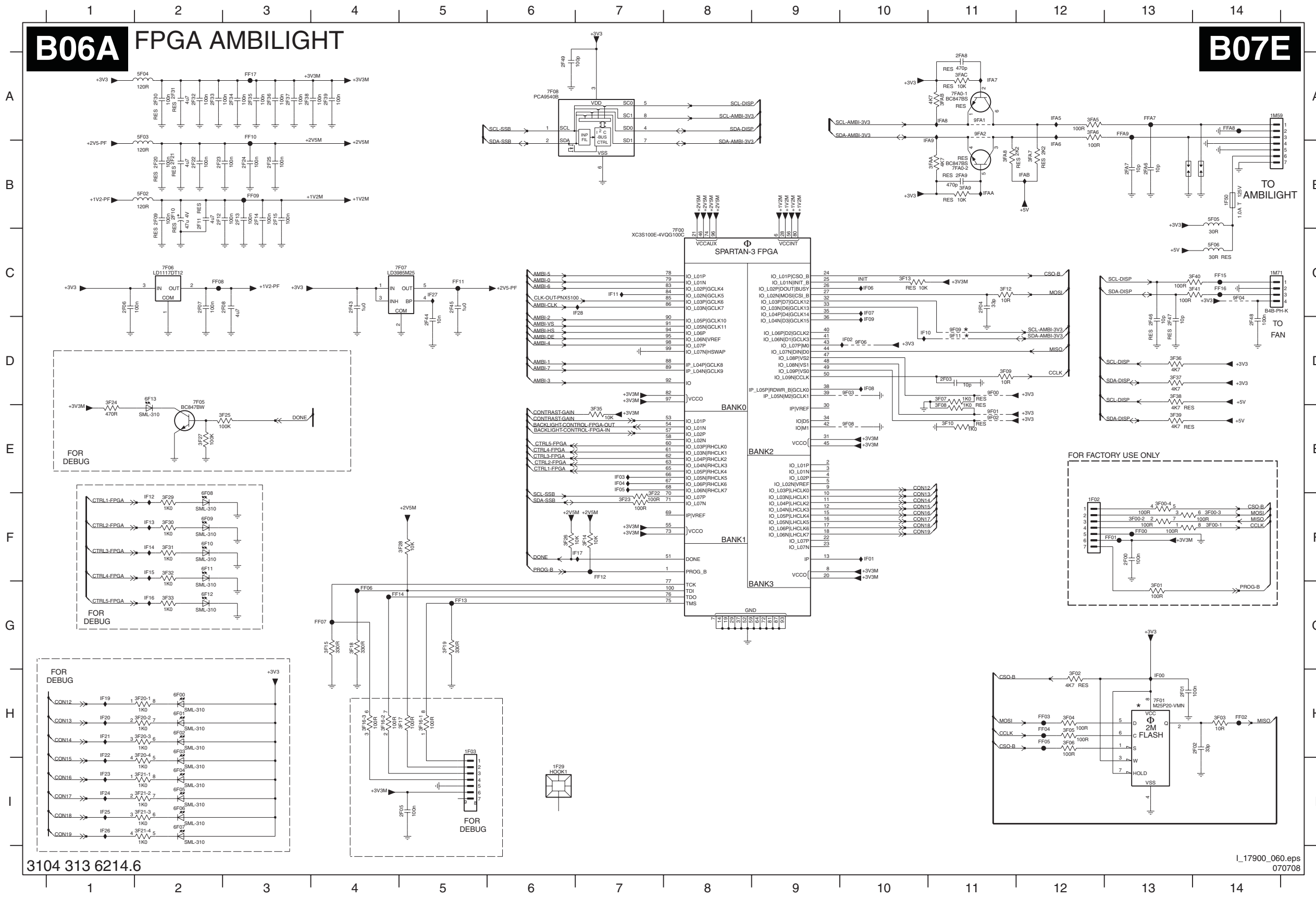


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- 3H61 C8
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- 3HA3 B8
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- 3HA4-4 B3
- 3HA8-1 B3
- 3HA8-2 B3
- 3HA8-3 C3
- 3HA8-4 C3
- 3HAC-1 D3
- 3HAC-2 D3
- 3HAC-3 D3
- 3HAC-4 D3
- 5HA0 A1
- 7HA0 B5
- IHSR A5
- IHSS B6
- IHST B6

3104 313 6214.6

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SSB: FPGA Ambilight

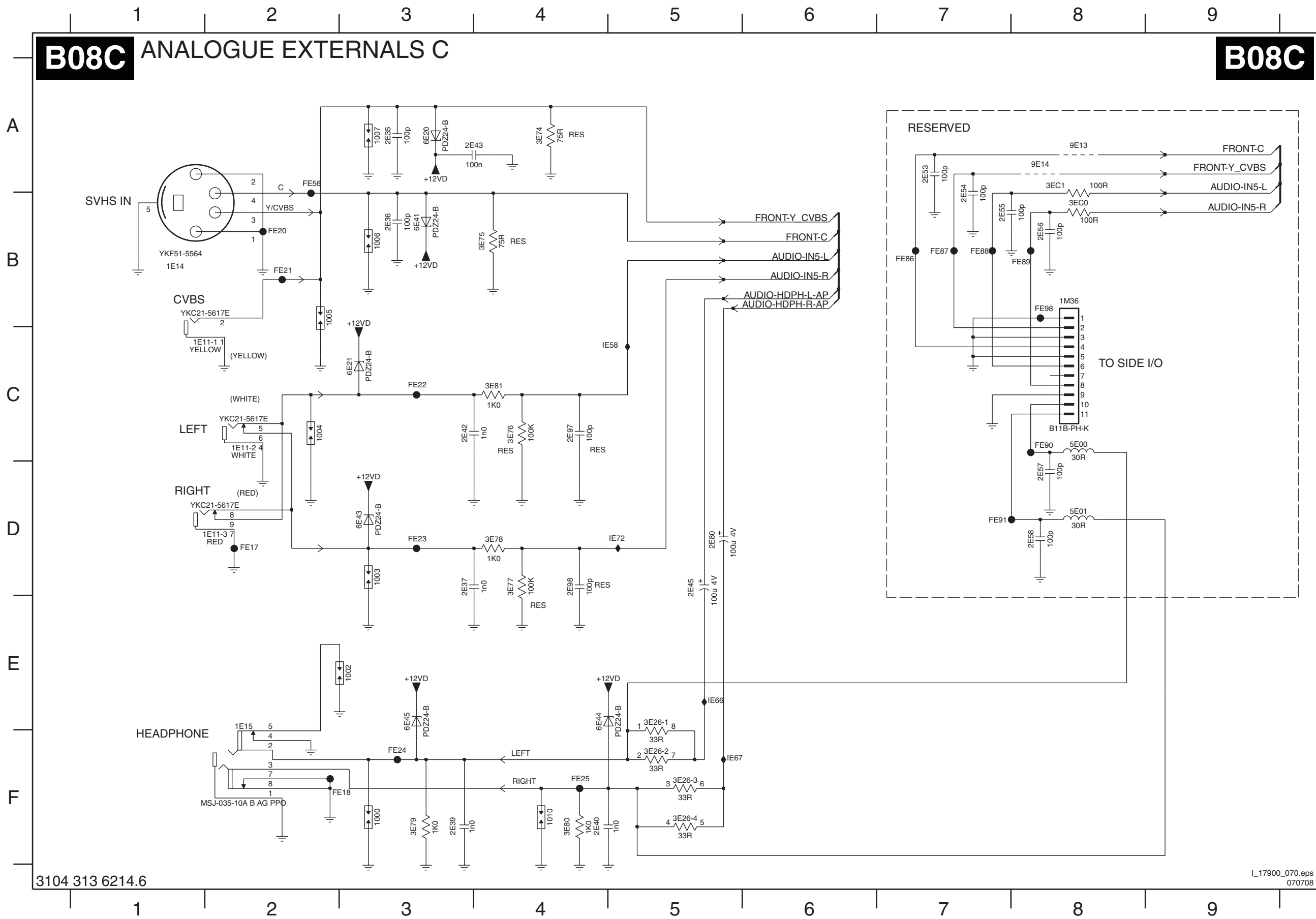


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- 2F10 B2
- 2F11 B2
- 2F12 B2
- 2F13 B3
- 2F14 B3
- 2F15 B3
- 2F20 B2
- 2F21 B2
- 2F22 B2
- 2F23 B2
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- 2F47 D13
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- 2F49 A6
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- 2FA7 B13
- 2FA8 A11
- 2FA9 B11
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- 3F00-2 F13
- 3F00-3 F14
- 3F00-4 F13
- 3F01 G13
- 3F02 H12
- 3F03 H14
- 3F04 H12
- 3F05 H12
- 3F06 H12
- 3F07 D11
- 3F08 E11
- 3F09 D11
- 3F10 E11
- 3F11 C11
- 3F12 C11
- 3F13 C10
- 3F14 F7
- 3F15 G4
- 3F16-1 H5
- 3F16-2 H4
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- 3F17 H4
- 3F18 G4
- 3F19 G5
- 3F20-1 H2
- 3F20-2 H2
- 3F20-3 H2
- 3F20-4 H2
- 3F21-1 I2
- 3F21-2 I2
- 3F21-3 I2
- 3F21-4 I2
- 3F22 F7
- 3F23 F7
- 3F24 D1
- 3F25 E3
- 3F26 F6
- 3F27 E2
- 3F28 F4
- 3F29 F2
- 3F30 F2
- 3F31 F2
- 3F32 F2
- 3F33 G2
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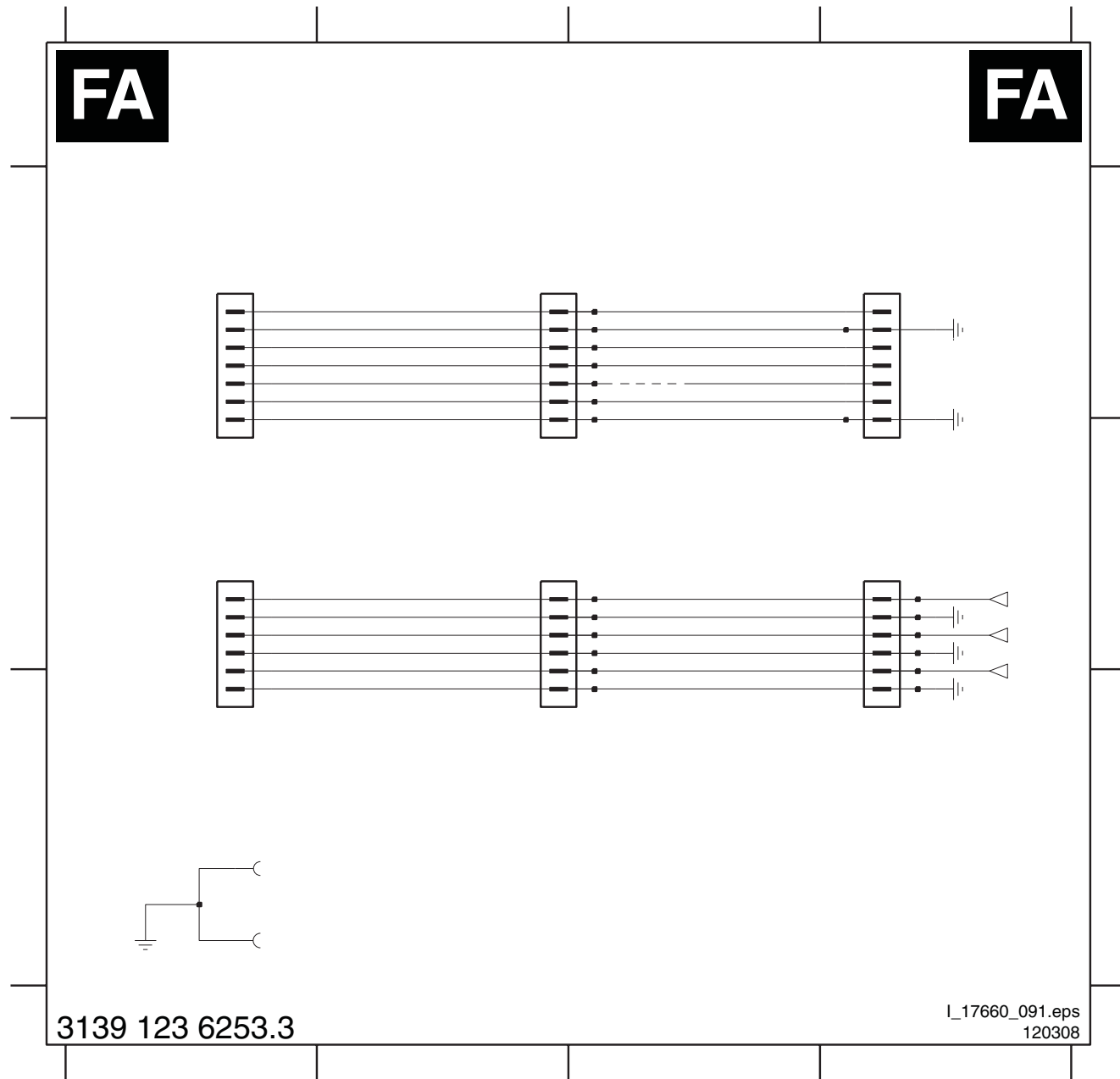


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Layout Small Signal Board (Overview Top Side)

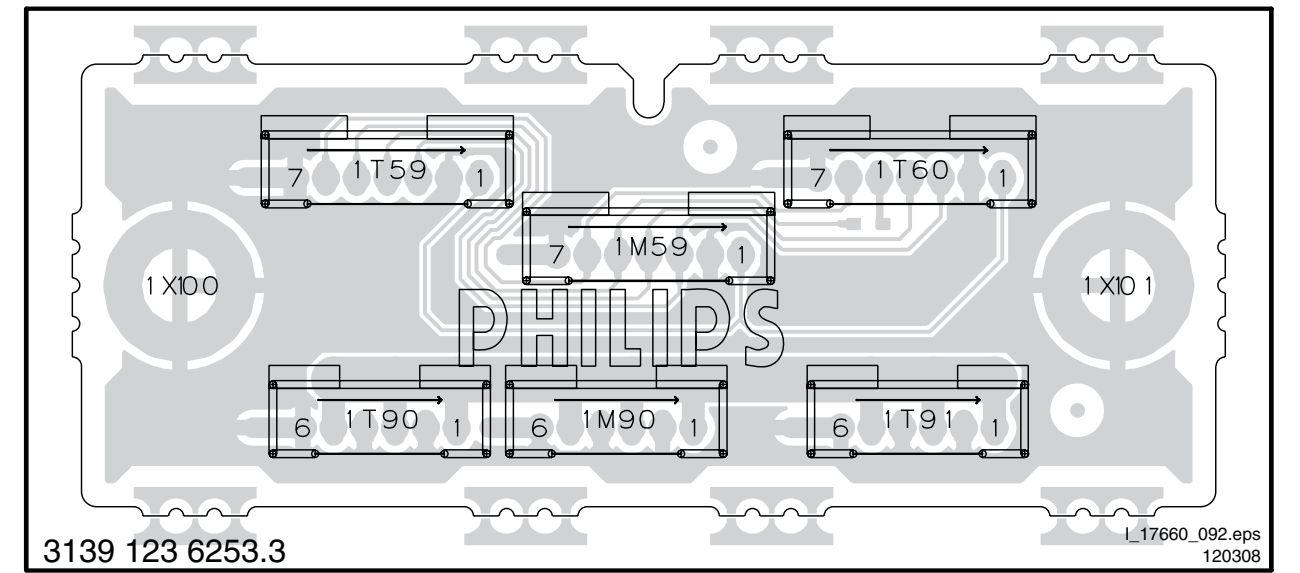
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AmbiLight Interface Panel



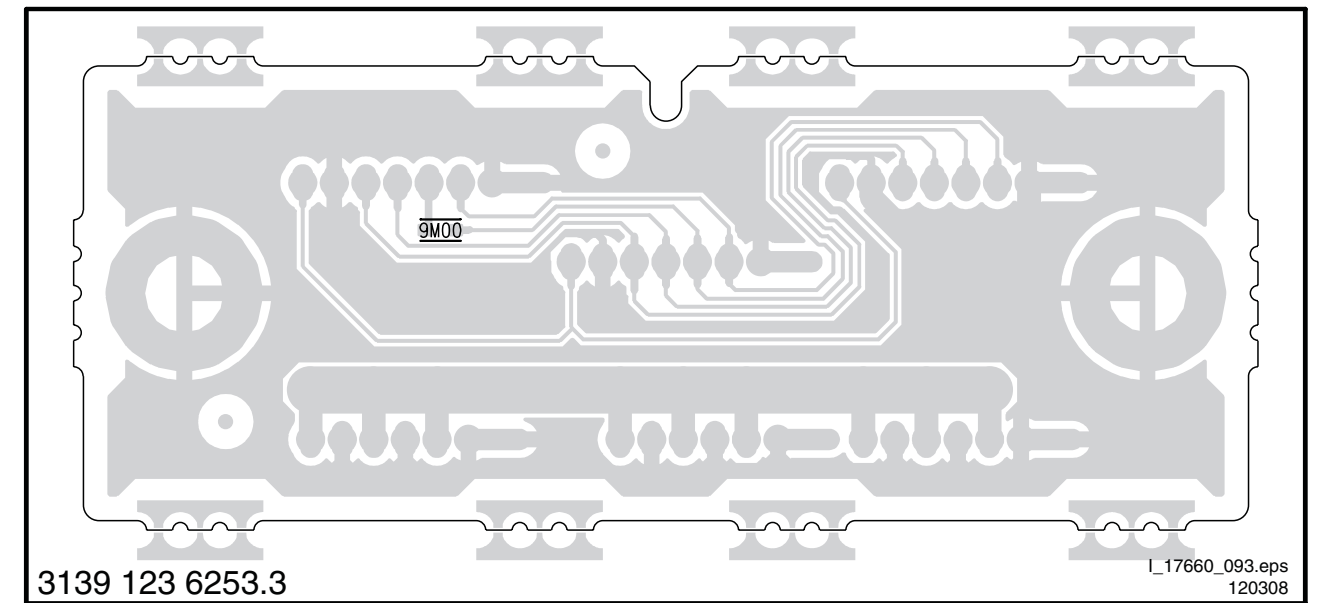
Layout AmbiLight Interface Panel (Top Side)

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 1M90 -- 1T60 -- 1T91 -- 1X01 --



Layout AmbiLight Interface Panel (Bottom Side)

9M00 --



Service Tips

- When a power MOS-FET is found defective, replace the other power MOS-FET as well.
- For a normal operation of the converter, it is important to check the switching frequency and the value of the boost voltage.

9.5 Front-End

Refer to figure “9-1 System architecture.” earlier in this chapter for details. Refer also to block diagrams B02A, B02B and B02C.

9.5.1 Device specifications**Tuner (TD1716)**

The tuner has the following specifications:

- Hybrid tuner with symmetrical IF output.
- Down conversion from RF to IF frequency (picture carrier 39.875 MHz at analogue reception, centre frequency 36.166 MHz at digital reception).
- AGC control signal is coming from master IF device (TDA9898).
- Only 5 V external supply needed (internal DC-DC conversion to 3.3 V).
- 4 MHz output is used by channel decoder (TDA10048) and master IF device (TDA9898).

The application in this chassis is as follows:

- I²C address C0.
- Broadband AGC, no IF section.
- I²C communication buffered via MUX.
- Gain to obtain optimised Master IF input level; AGC control is completely inside the tuner.
- Output level ca. 110 dB μ V (for strong input signal).

Repair tip: after replacement of the tuner, the option code should be checked, even when the set appears to function correctly! Refer also to chapter 5 “Service Modes, Error Codes, and Fault Finding”.

Master IF (TDA9898)

- Down conversion from IF to low-IF frequency.
- Down conversion from IF to SIF.
- CVBS output.

The application in this chassis is as follows:

- I²C address 0x86.
- Down conversion from IF to low-IF frequency (5.166 MHz centre frequency).
- Advanced filtering (for further rejection of adjacent channels).
- Gain to obtain optimised channel decoder level. Control signal is coming from channel decoder.

SAW filter**X6874D and X3451K**

- Analogue sound for BG, I, DK, L, L’.
- DVB-T (digital reception sound **and** video).

For digital reception, the application in this chassis is as follows:

- Rejection of adjacent channels.
- Switching is done by Master IF (3 inputs).
- One SAW covering both 7 and 8 MHz channels.

X6774D

- Analogue video for BG, I, DK, L, L’.

Channel decoder (TDA10048) DVB-T

The channel decoder has the following specifications:

- I²C address 0x10.
- Decoding from low-IF to MPEG transport stream.
- During decoding: de-modulation, de-interleaving and error correction.
- External clock buffer required.
- No start-up requirements.
- AGC monitor.

Channel decoder (TDA10023) DVB-C

The channel decoder has the following specifications:

- I²C address 0x1C.
- Decoding from low-IF to MPEG transport stream.
- During decoding: de-modulation, de-interleaving and error correction.
- External clock buffer required.
- No start-up requirements.
- AGC monitor.

9.5.2 Digital signal processing (front-end)

Refer to figure “9-7 DVB-C signal broadcast reception block diagram” and “9-8 DVB-T signal broadcast reception block diagram” for details of digital signal processing.

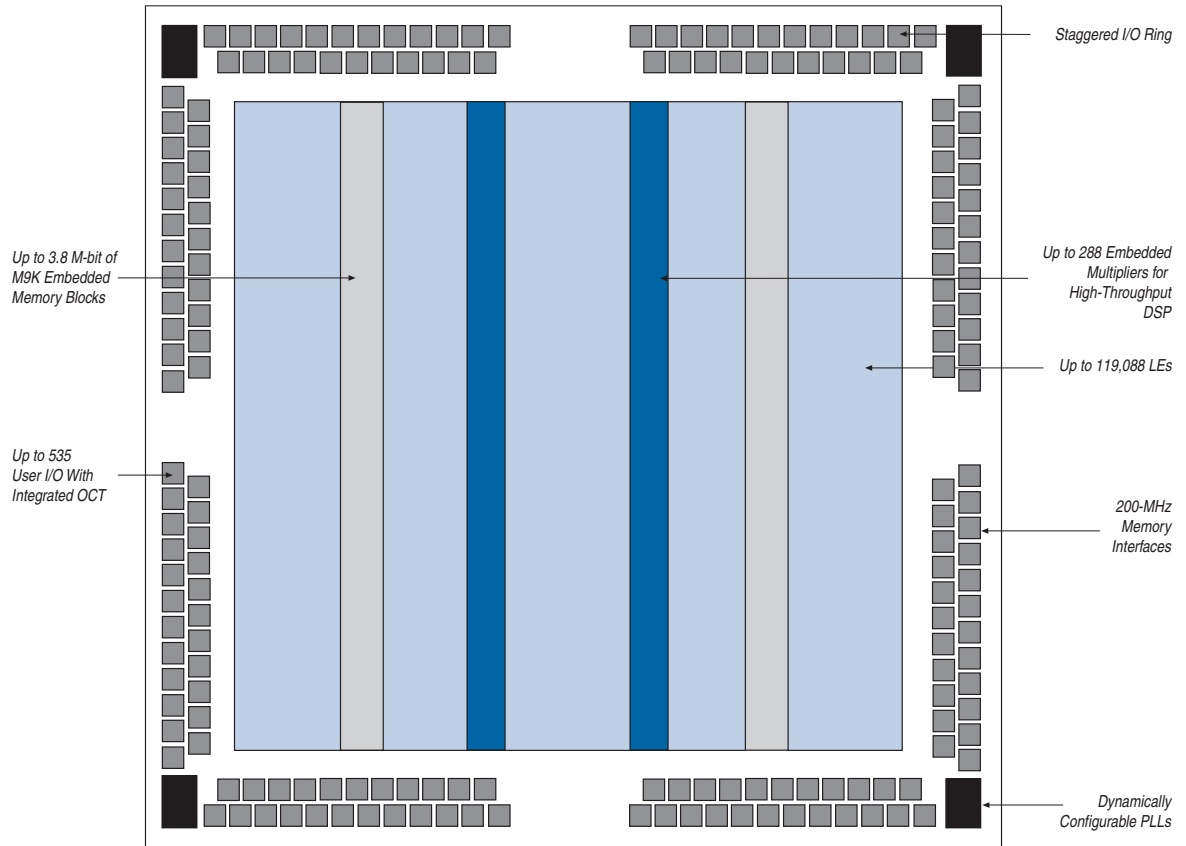
9.12 IC Data Sheets

This section shows the internal block diagrams and pin configurations of ICs that are drawn as “black boxes” in the electrical diagrams (with the exception of “memory” and “logic” ICs).

9.12.1 Diagram AB, EP3C40F484C7N (IC 7F18)

Block Diagram

Cyclone III Device Architecture Overview Note (1)



Note 1:
 (1) EP3C5 and EP3C10 have only two PLLs

Figure 9-14 Internal block diagram

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