Order No. ITD1703902GE

Technical Guide

2017 - LCD TV / OLED TV

Model No. LCD-201703
OLED-201707

Ver. 3.0 (Jul-2017)

Circuit Operation and Troubleshoot

Panasonic®

Revision History

Version	Issued/Revised date	Revised content
Ver. 1.0	27th. Mar. 2017	First version
Ver. 2.0	26th. May. 2017	Add new model information (P.5, 8, 9, 14, 19, 21, 22, 38, 43, 47-50, 52, 55)
Ver. 3.0	7th Jul. 2017	Add OLED model information (P.5, 10, 16, 19, 21, 25, 42, 54-56, 58, 59, “5.Information for OLED Model” (P63- 78))

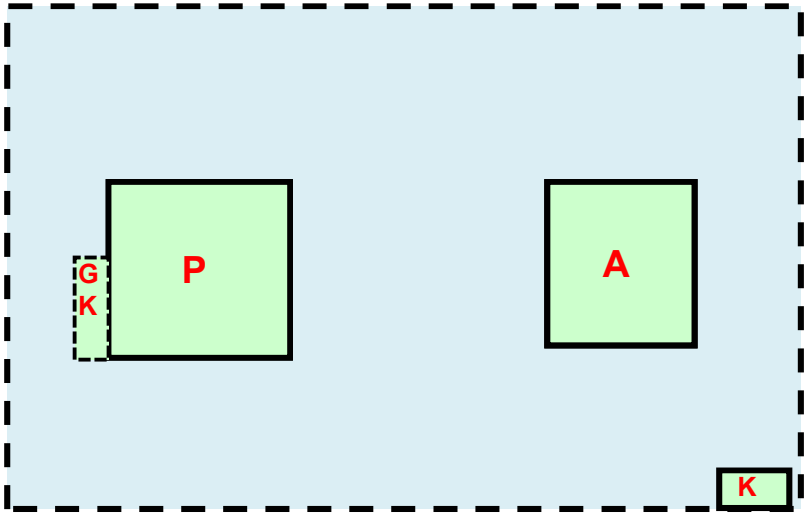
OLED

INDEX

1. Board Layout

Board Layout -1

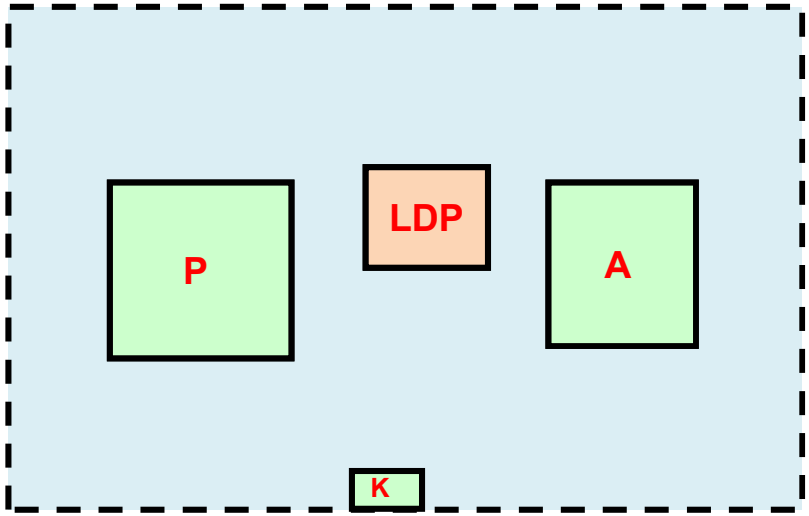
55/49/43/32/24ES*/E***,**
40ES*/E*** (Europe and Oceania)**



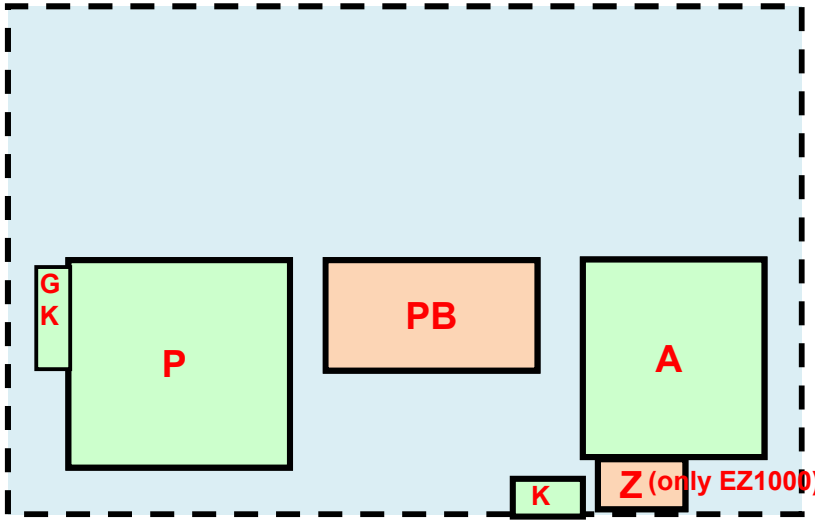
GK board is for only 40ES**/40E** inch model

55/49/43/40EX6
65/58/50/40EX7****

65EX6
75EX7****



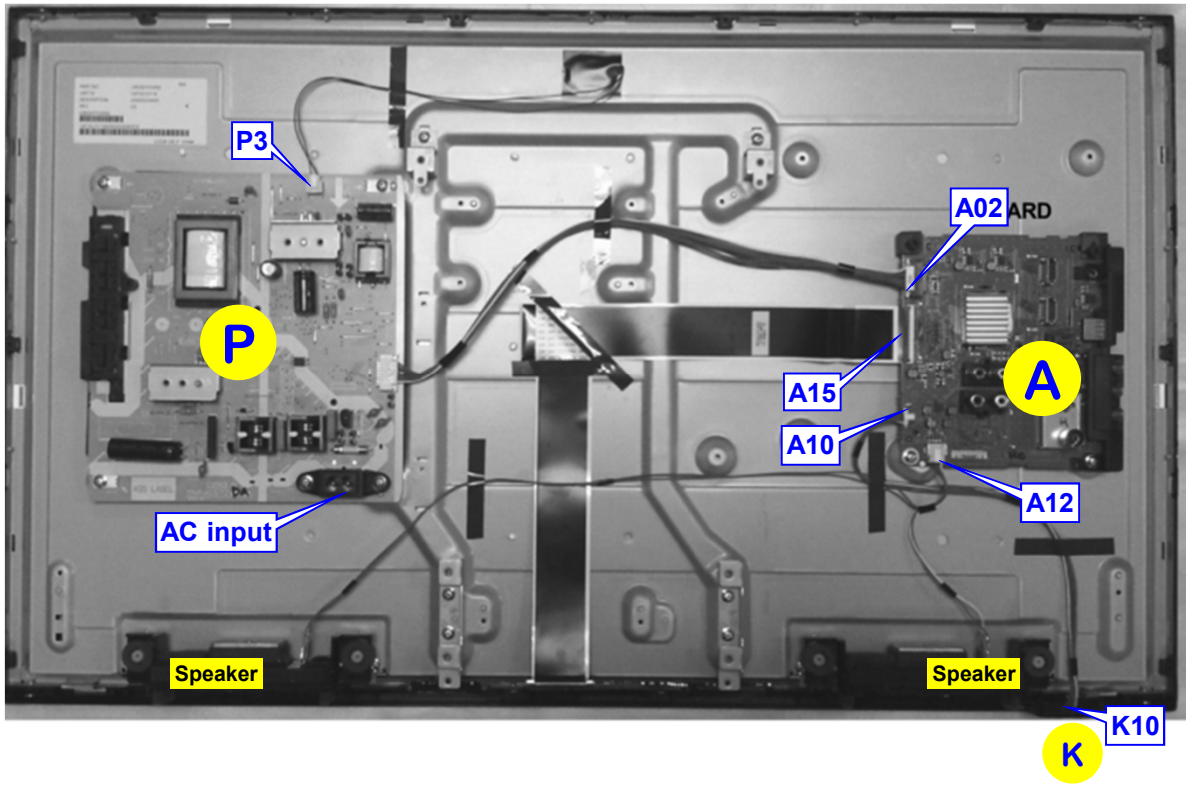
65/55EZ*** OLED



Board Layout -2

(A+P)

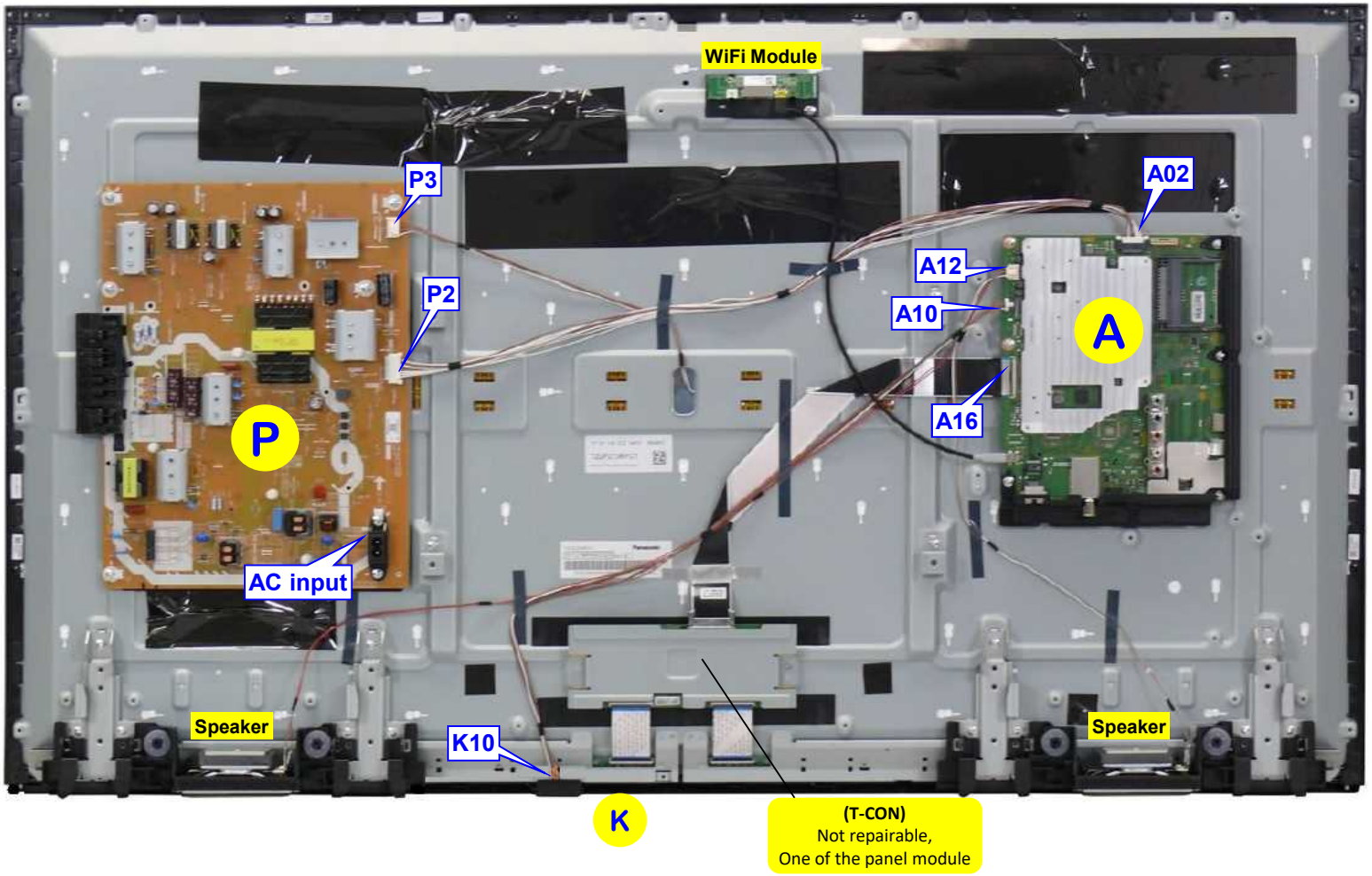
(32E410/400)



Board Name	Function
A-Board	Main Board
P-Board	Power supply, Backlight Drive, Power key, Control key
K-Board	Remote Receiver, Power LED

Board Layout -3

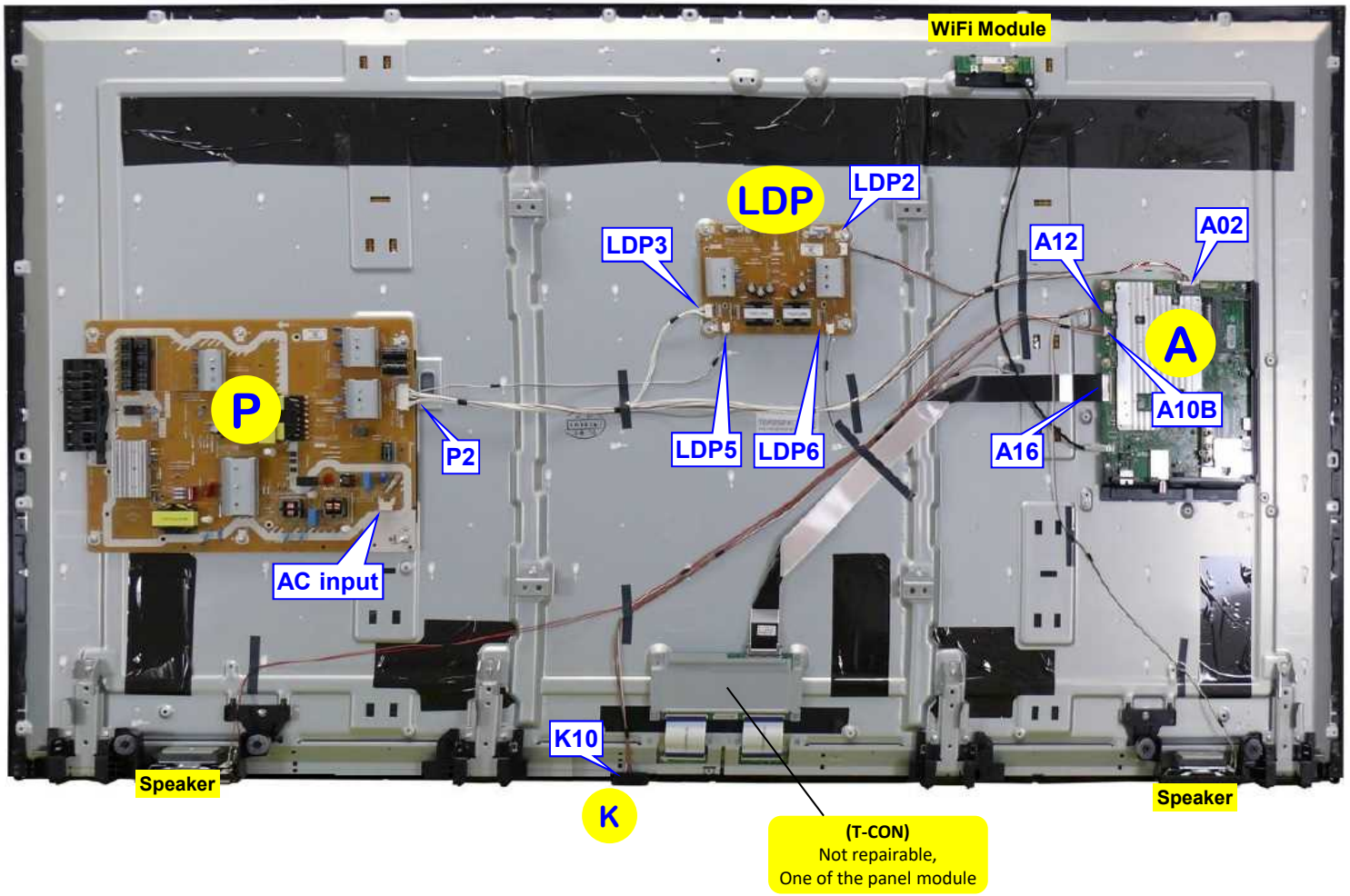
(A+P) (49EX600)



Board Name	Function
A-Board	Main Board
P-Board	Power supply, Backlight Drive, Power key, Control key
K-Board	Remote Receiver, Power LED

Board Layout -5

(A+P+LDP) (65EX600)



Board Name	Function
A-Board	Main Board
P-Board	Power supply for Signal Process

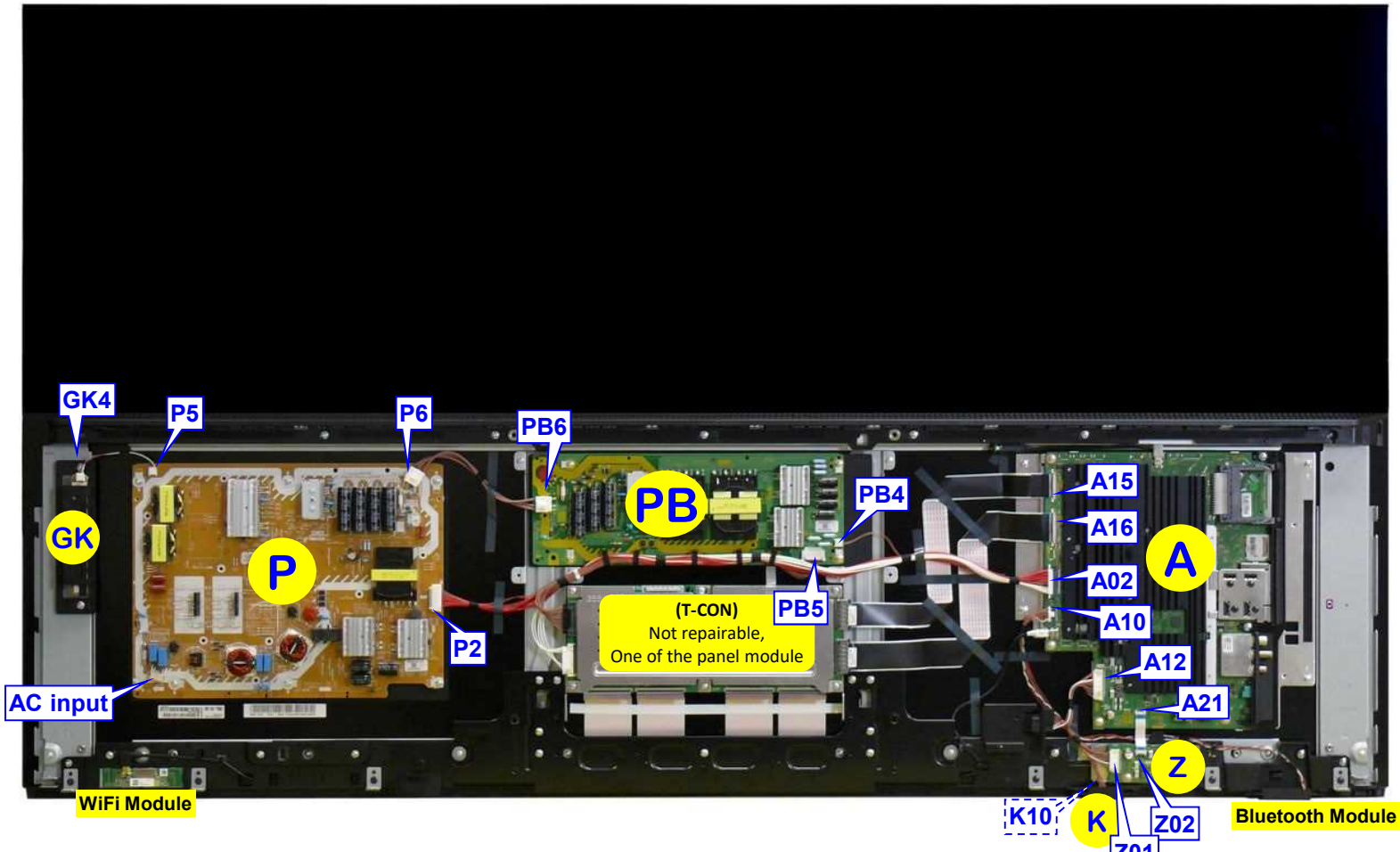
Board Name	Function
LDP-Board	Power supply for Backlight Drive
K-Board	Remote Receiver, Power LED

Board Layout -6

OLED

(A+P+PB)

(65EZ1000)



Board Name	Function
A-Board	Main Board
P-Board	Power supply for Signal Process
PB-Board	Power supply for Panel

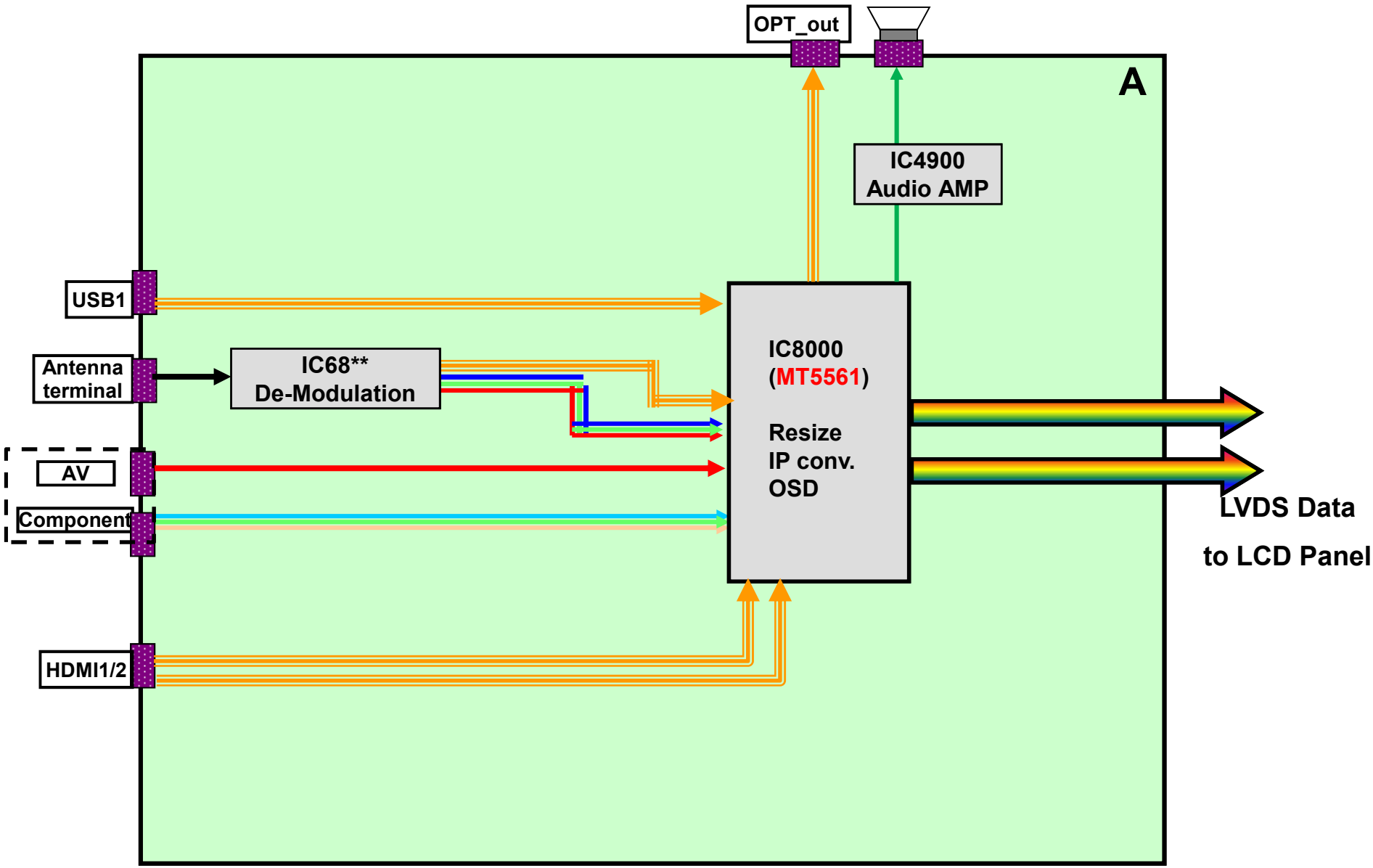
(The Speaker of EZ1000 is separated.)

Board Name	Function
GK-Board	Key
K-Board	Remote Receiver, Power LED
Z-Board	Only for EZ1000 speaker Audio Signal Processing

2. Video Signal Processing

Video/Audio Signal Process - 1

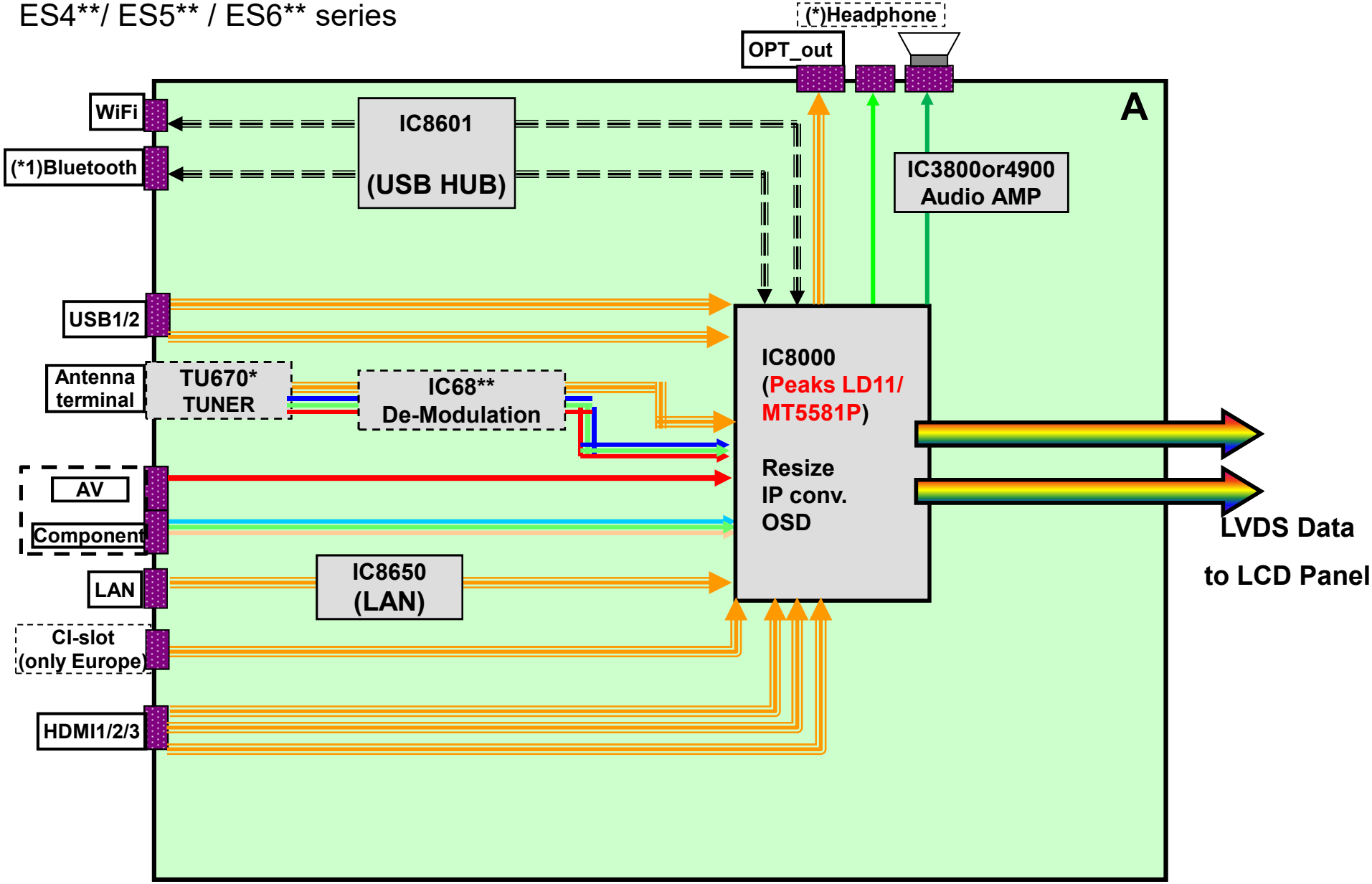
E4** series



The input terminals are different by the models or countries.

Video/Audio Signal Process - 2

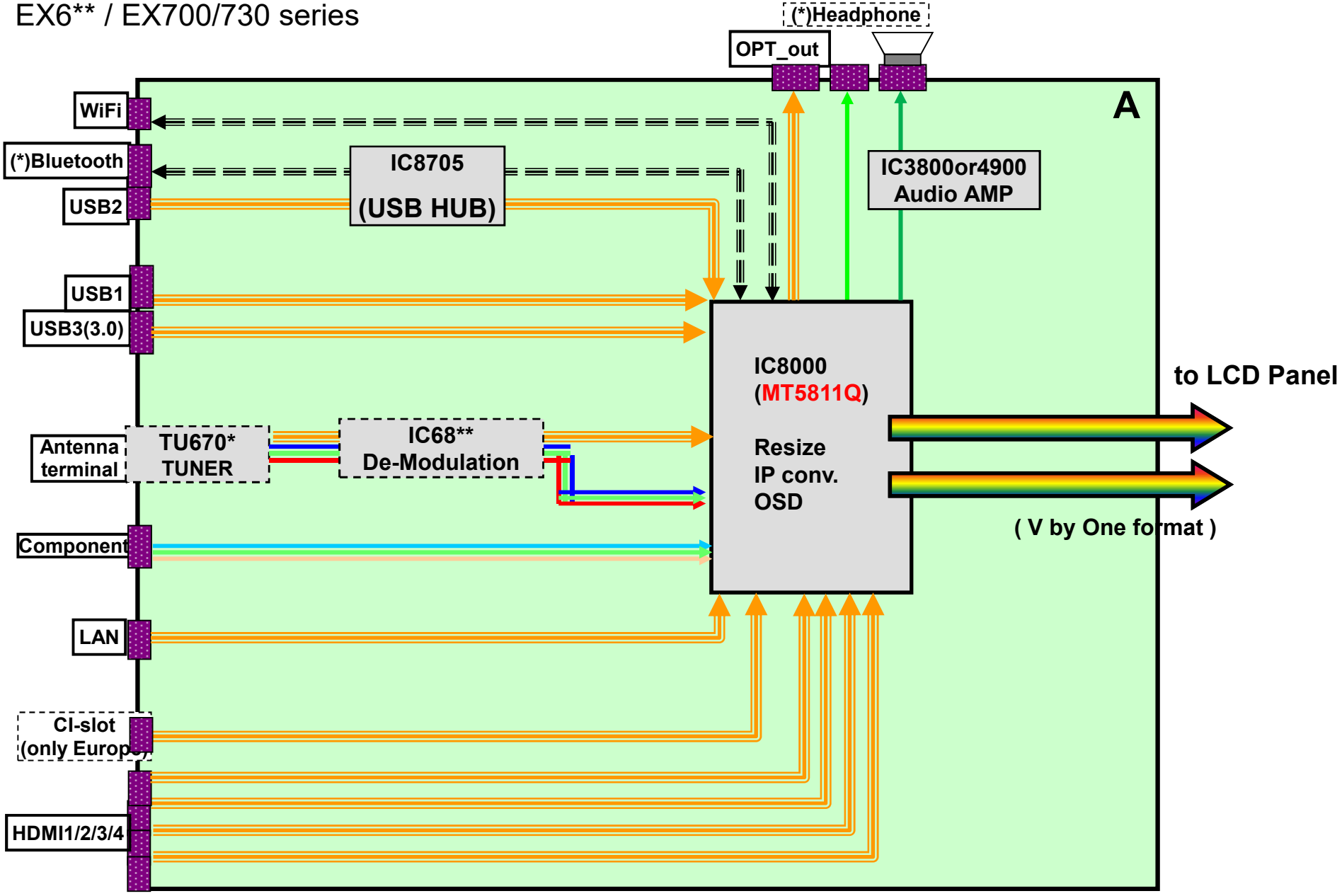
ES4**/ ES5** / ES6** series



The input terminals are different by the models or countries.

Video/Audio Signal Process - 3

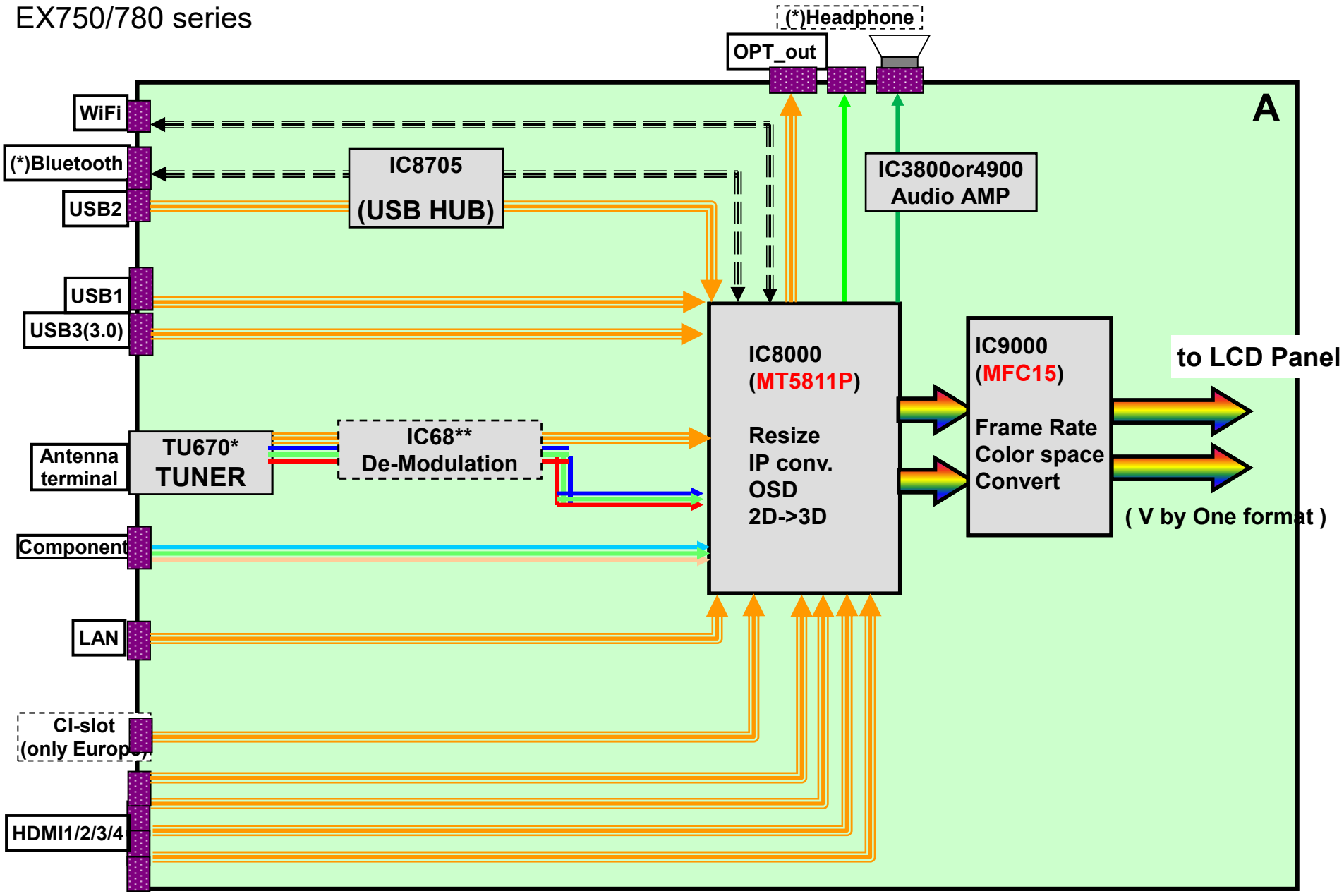
EX6** / EX700/730 series



(*) The input terminals are different by the models or countries.

Video/Audio Signal Process - 4

EX750/780 series

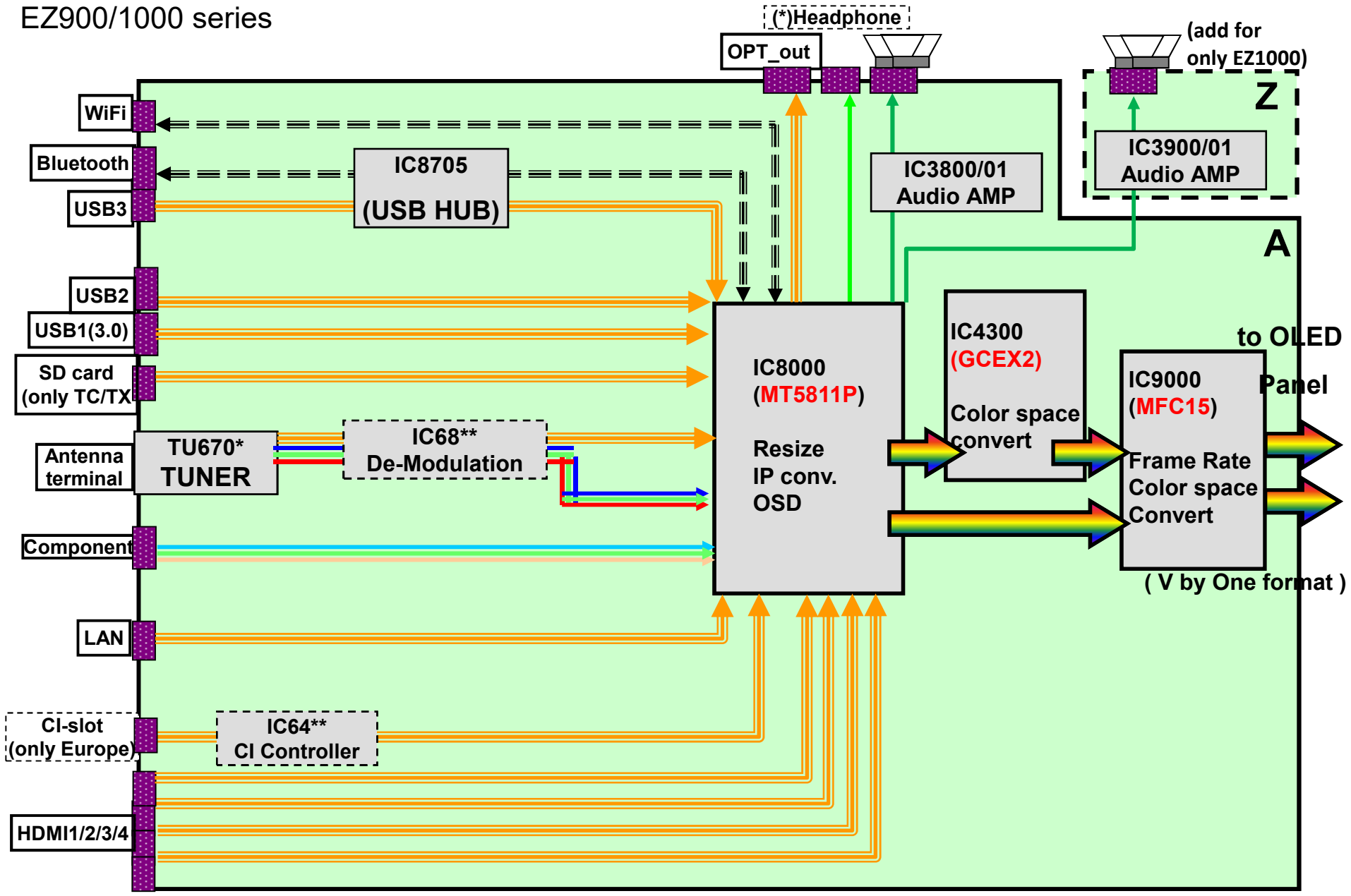


(*) The input terminals are different by the models or countries.

Video/Audio Signal Process - 5

OLED

EZ900/1000 series



(*) The input terminals are different by the models or countries.

Troubleshoot for Video Signal Problem

<LCD Panel Test Mode> :When abnormal picture is displayed, troubleshoot by the test pattern in LCD module.

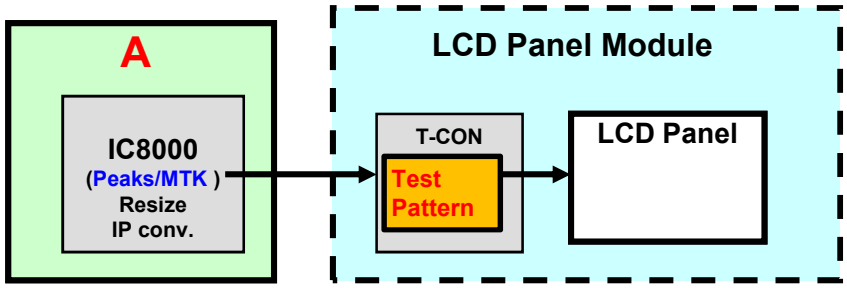
If the picture is no problem, A board must be defective.
If the picture is also abnormal, LCD panel module must be defective. Just in case, confirm the flat cable connection between A board and T-CON board.

How to enter :
While pressing "volume(-)" button of the TV unit,
press “Yellow(or option)" button of the remote control 3 times within 2 seconds.

How to exit :
Switch off the TV unit

#)The test pattern is created by the circuit in LCD Panel Module(T-CON board).

Some patterns are automatically changed. The patterns are depend on the LCD panel.



Troubleshoot for Video/Audio Signal Problem

<TV Self Test> : Customers also can check the picture and sound by internal data.
If the picture and sound is no problem, the reason of trouble is mostly not a TV.

How to display :
Menu → HELP → TV Self Test

#)The test pattern and test sound are created by the main IC on the A board.

(OK)

1) During this indication
"Self Check of Service Mode"
is working at the background.
2) If NG, indication is shown.
A board defective
3) If All OK, it shifts to picture
and sound test.

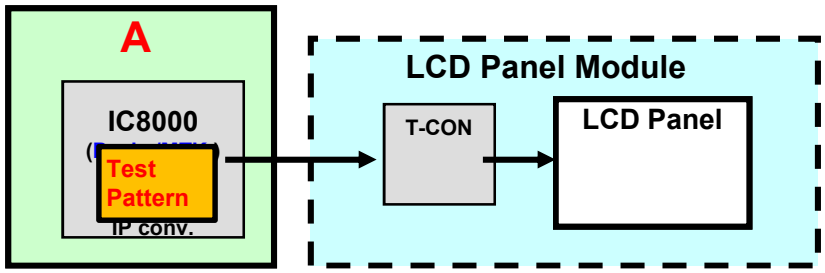
Yes

1.Antenna level low
2.Connection mistake
3.Input devices NG
4.Input select mistake

No

TV unit defective.
(A board, Panel or
Speaker)

***) E400/410 series do not support.**



System Information

You can check some information in Help menu.
MENU → Help → System information

System Information

Software Version	**: 3003-10000-000504-00200a060019**
Status1	**: 0e 0201-0003 0000-0800**
Status2	**: 0028-123-0012c8 0035-034-651g**
Status3	**: 00-000000-F000**
Status4	**: A00025-0000033-00000**
Status5	**: 00000-10000 17d010ff**
Status6	**: 03166502-1000030**
Status7	**: 00000-0751**
Status8	**: 00014-000014-00001-00001**
HDAVI Control	**: 5**

(*) These list is different from the models.

(There are lower items for leader models.)

Software version = ver. 3.003 (Main , STBY , GCEX, FRC)

Status1 : model ID

Status2 : LSI (Package/Release/data ver), AQ (Package/Release/data ver)

Status3 : 00 = Bad block in NAND Flash
00 = Main SOC Reboot counter
00 = System crash counter
00 = Emergency(SOS) counter
F000 = NAND maker ID

Status4 : A = Power on period(A<=100hrs, B<=200hrs, C>200hrs)
00025 = Power on time (hours)
0000033 = power on counter
00000 = (Fixed)

Status5 : 0 = SOS history (Latest)
0 = SOS history (last time)
0 = SOS history (last but one)
0 = SOS history (2nd time after shipping)
0 = SOS history (1st time after shipping)
1 = Self-check (0=never self check,
1= factory Self check by pressing “MENU”
2=indication Self check by pressing “Blue (or OK)”
0000 = (Fixed)
17d010ff = Panel ID

Status6 : Main SOC EEPROM version , STM EEPROM version

Status7 : STM ROMCOR version , AJAX CE version

Status8 : 00014= Starting Count of Panel Maintenance-1
(for OLED) 00014= Completed Count of Panel Maintenance-1
00001= Starting Count of Panel Maintenance-2
00001= Completed Count of Panel Maintenance-2

HDAVI version : 5 = Viera Link version

3. Power Supply

3-1. Power Board Structure

Board Structure

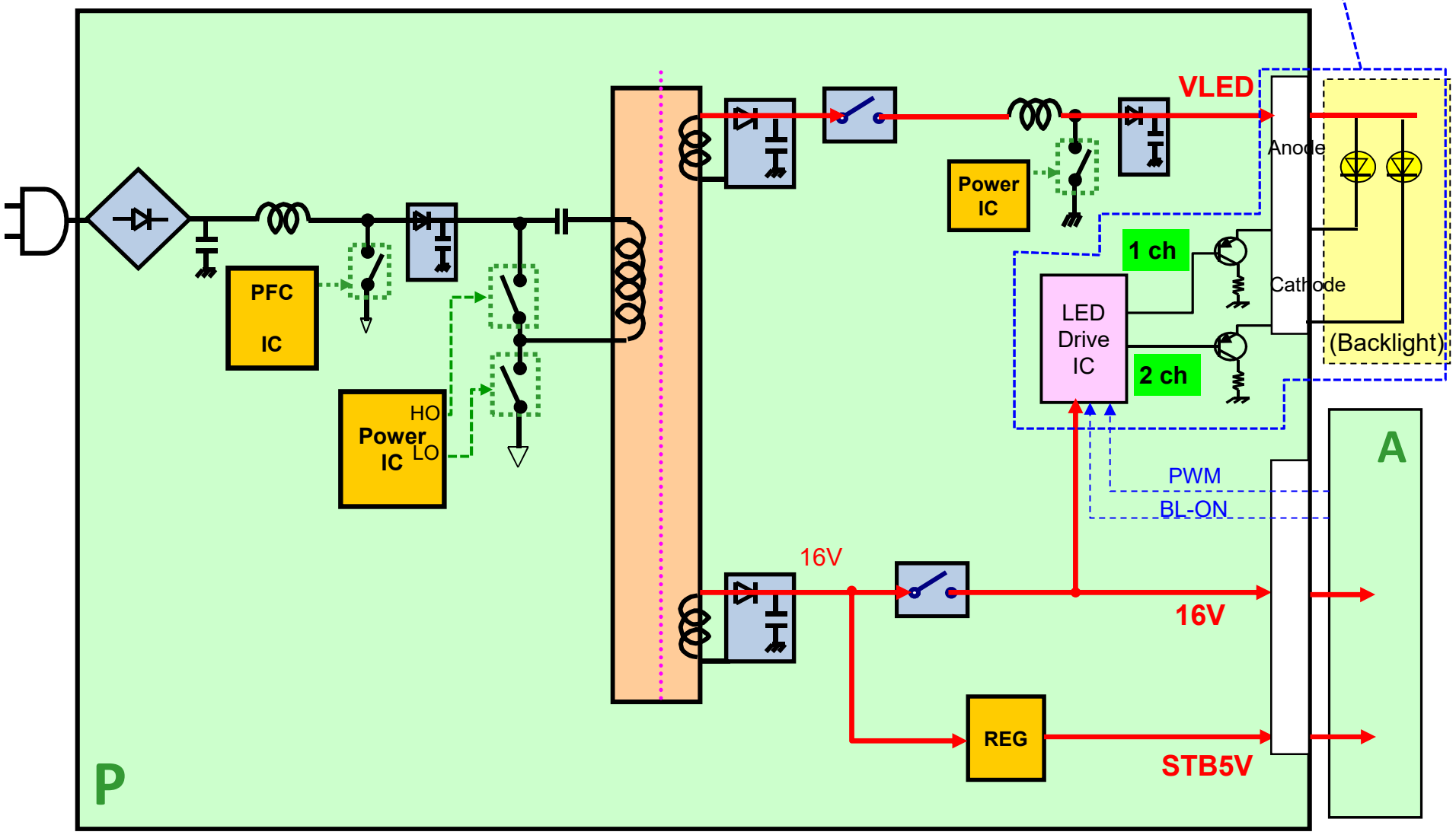
	E4**	ES4**/5**/6**	EX6** (4K)	EX7** (4K)	EZ*** (OLED)
24inch	A+P	A+P	---	---	---
32inch	A+P	A+P	---	---	---
43inch	A+P	A+P	A+P	---	---
49inch	A+P	A+P	A+P	---	---
50inch	---	---	---	A+P	---
55inch	A+P	A+P	A+P	---	A+P+PB
58inch	---	---	---	A+P	---
65inch	---	---	A+P+LDP	A+P	A+P+PB
75inch	---	---	---	A+P+LDP	---

Except K, GK boards

Power Board Structure -1 (P Board only)

< P >

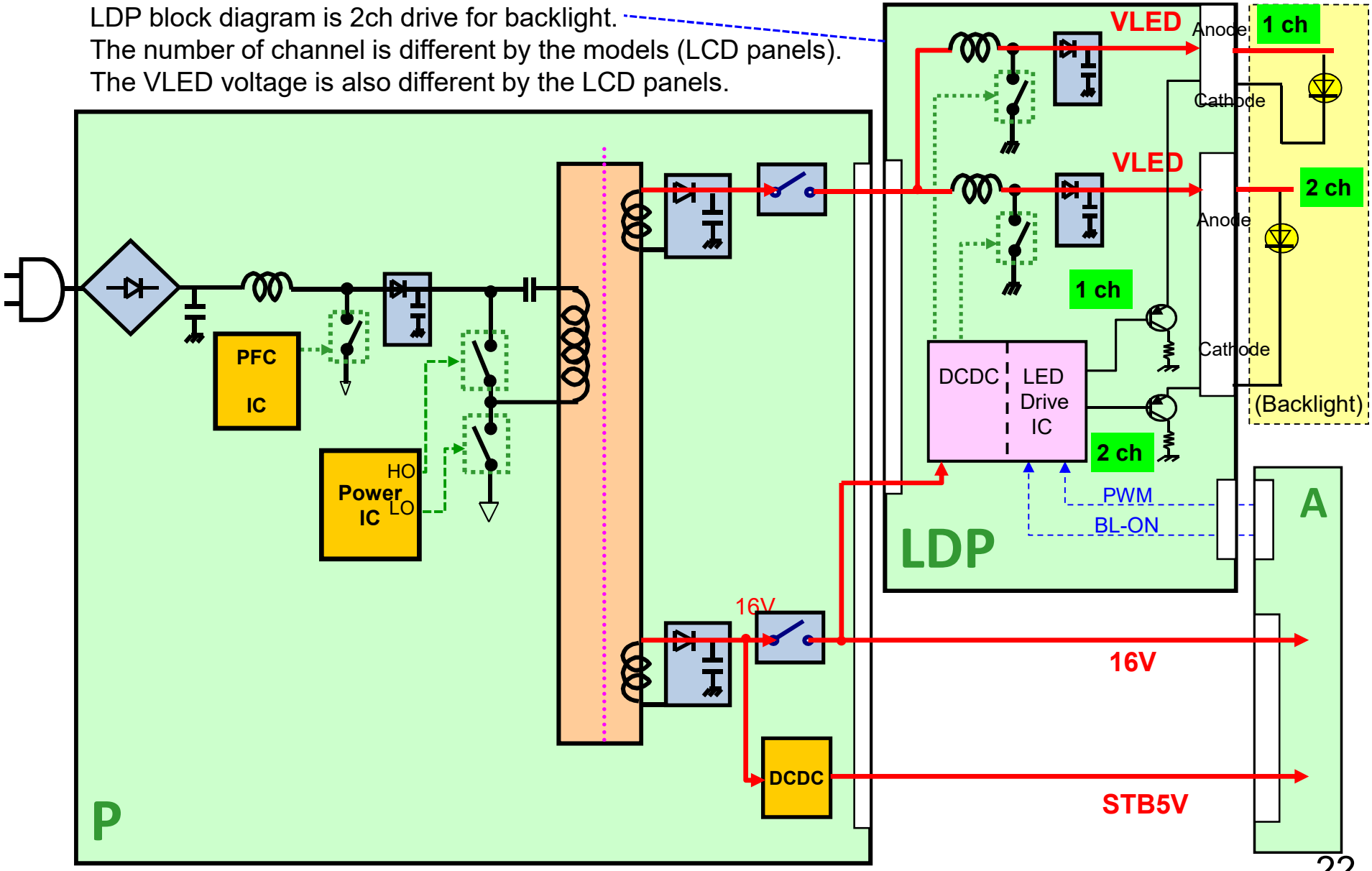
This block diagram is 2ch drive for backlight.
The number of channel is different by the models (LCD panels).
The VLED voltage is also different by the LCD panels.



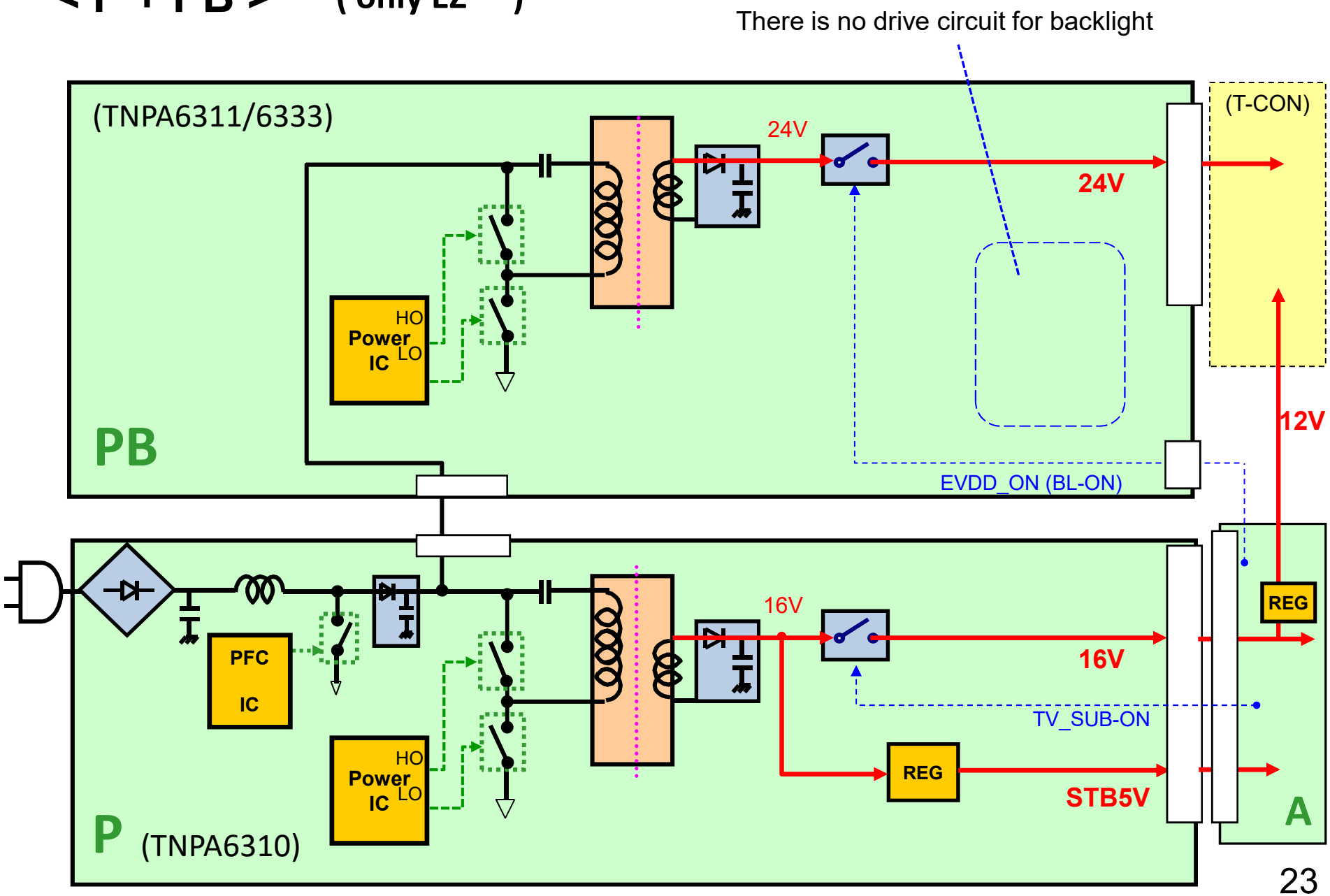
Power Board Structure -3 (P+LDP Boards)

< P + LDP > (only 65EX6**/75EX7**)

LDP block diagram is 2ch drive for backlight.
The number of channel is different by the models (LCD panels).
The VLED voltage is also different by the LCD panels.



< P + PB > (only EZ**)


There is no drive circuit for backlight
(TNPA6311/6333)
24V
24V
(T-CON)
HO
Power
IC
LO
PB
12V
EVDD_ON (BL-ON)
PFC
IC
16V
REG
16V
TV_SUB-ON
HO
Power
IC
LO
REG
STB5V
A
P (TNPA6310)

3-2. Stand by / Start up Operation

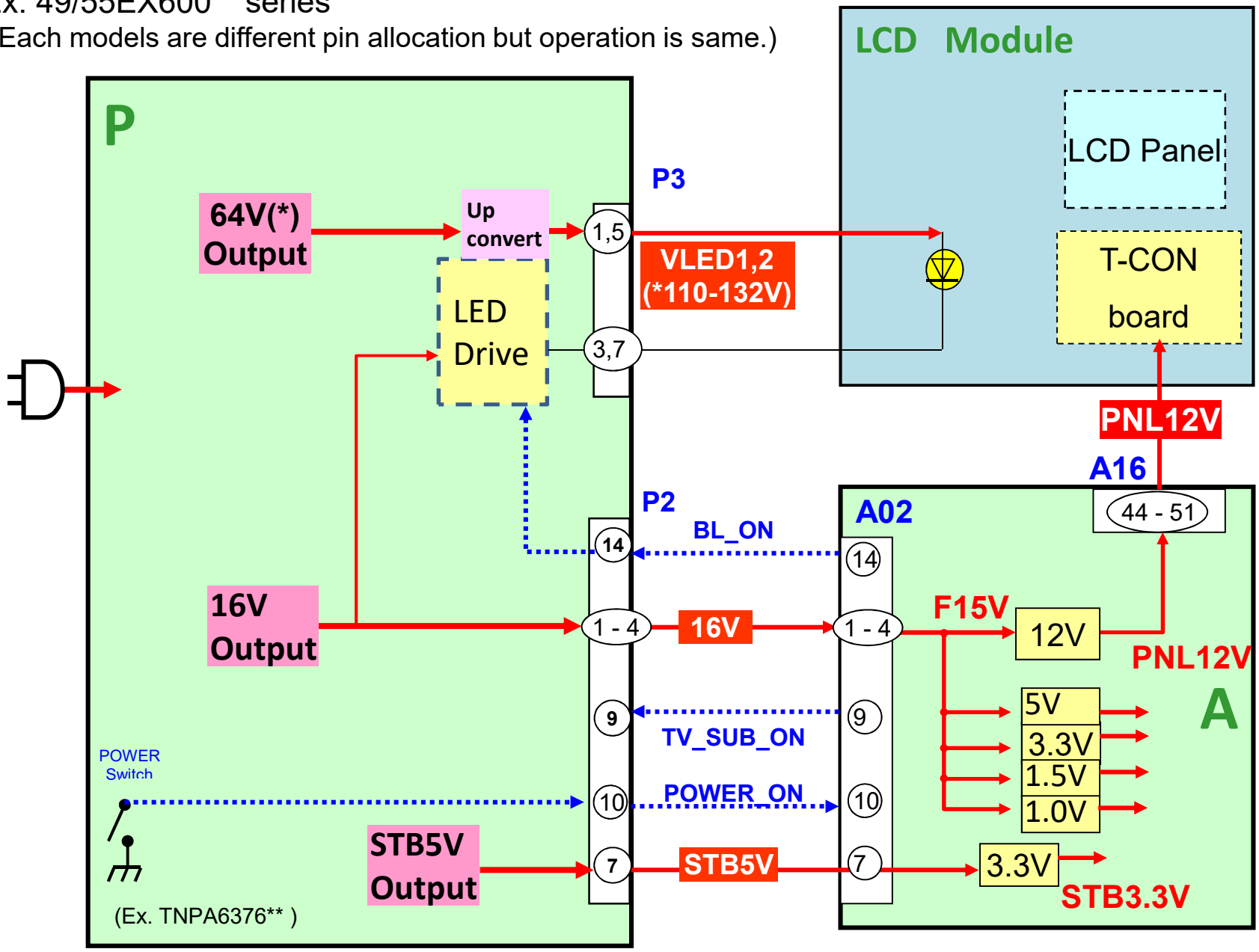
The explanation is for the case of “Power Board Structure -1 (P board only, ex.49/55EX600)”, but “LDP, P+LDP, P+PB” cases are basically same start up operation.

Voltage Distribution (A+P Boards)

<A+P>

Ex. 49/55EX600** series

(Each models are different pin allocation but operation is same.)

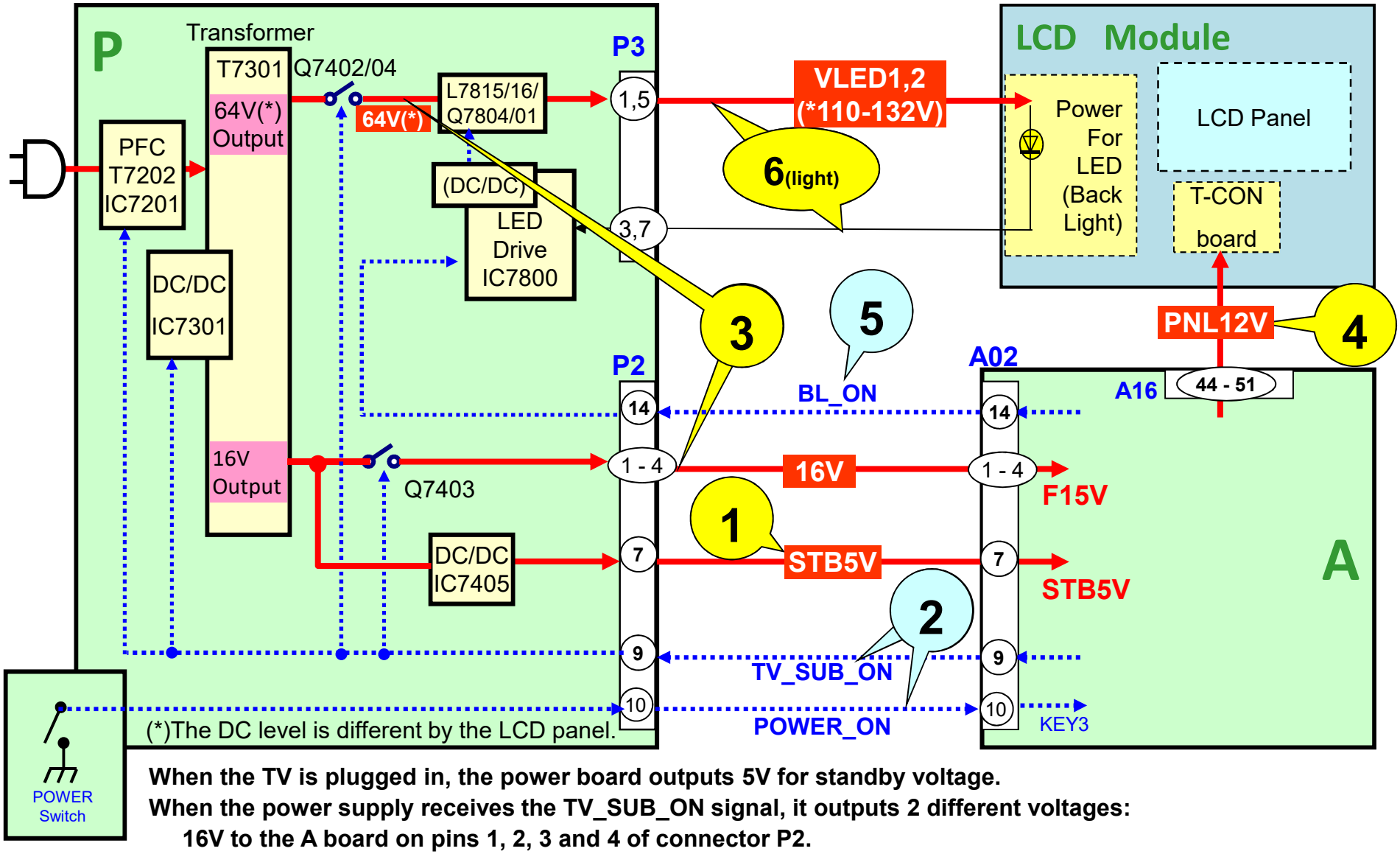


(*)The DC level is different by the LCD panel.

Start up Operation-1

<A+P>

Ex. 49/55EX600** series (Each models are different pin allocation but operation is same.)



When the TV is plugged in, the power board outputs 5V for standby voltage.

When the power supply receives the TV_SUB_ON signal, it outputs 2 different voltages:

16V to the A board on pins 1, 2, 3 and 4 of connector P2.

64V(*) to the LED backlight drive part.

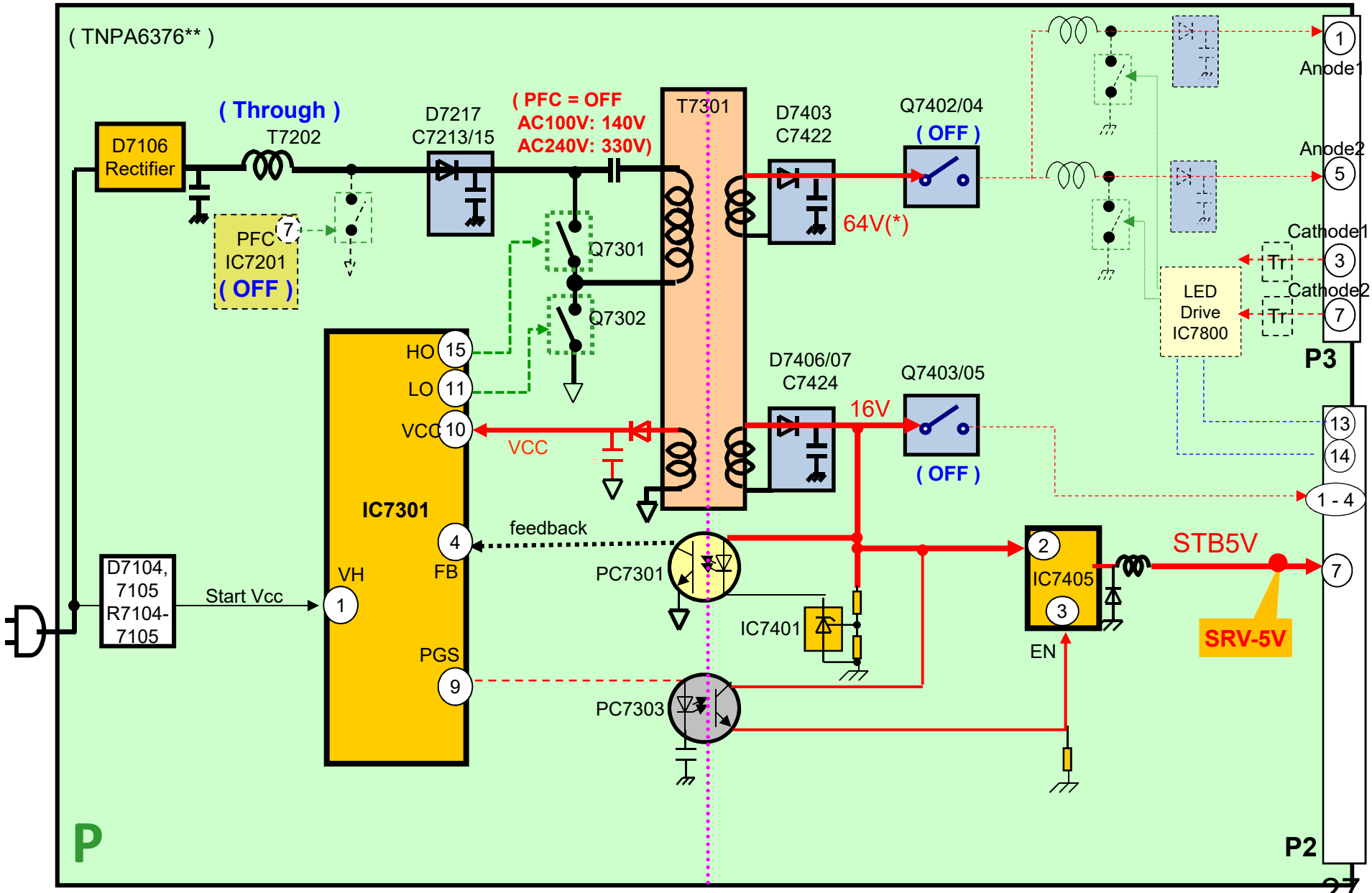
After A board is ready to display, it outputs Backlight_on command to P board.

P board output 110-130V(*) to the backlight of LCD panel on pins 3 and 7 of connecter P3

Start up Operation-2

<A+P>

< from AC plug in to (1) **: P board >** Ex. 49/55EX600** series



Start up Operation-3

<A+P>

< from AC plug in to (1) : P board >

When the TV is plugged in, the rectifier start to produce DC voltage which leads through PFC circuit directly to the power switches Q7301, Q7302. (PFC circuit IC7201 does not operate at this moment.) Besides this DC voltage is provided also for D7104, D7105 which provide start voltage to pin 1 of power supply IC 7301. When the voltage on pin 1 rise up to predefined value IC7301 starts supplyinng of switching pulses for Q7301, Q7302. Due to this current starts to lead through winding of T7301 which starts to generate output voltages. One of these voltages VCC is used for power supplying of the IC 7301 to its pin 10.

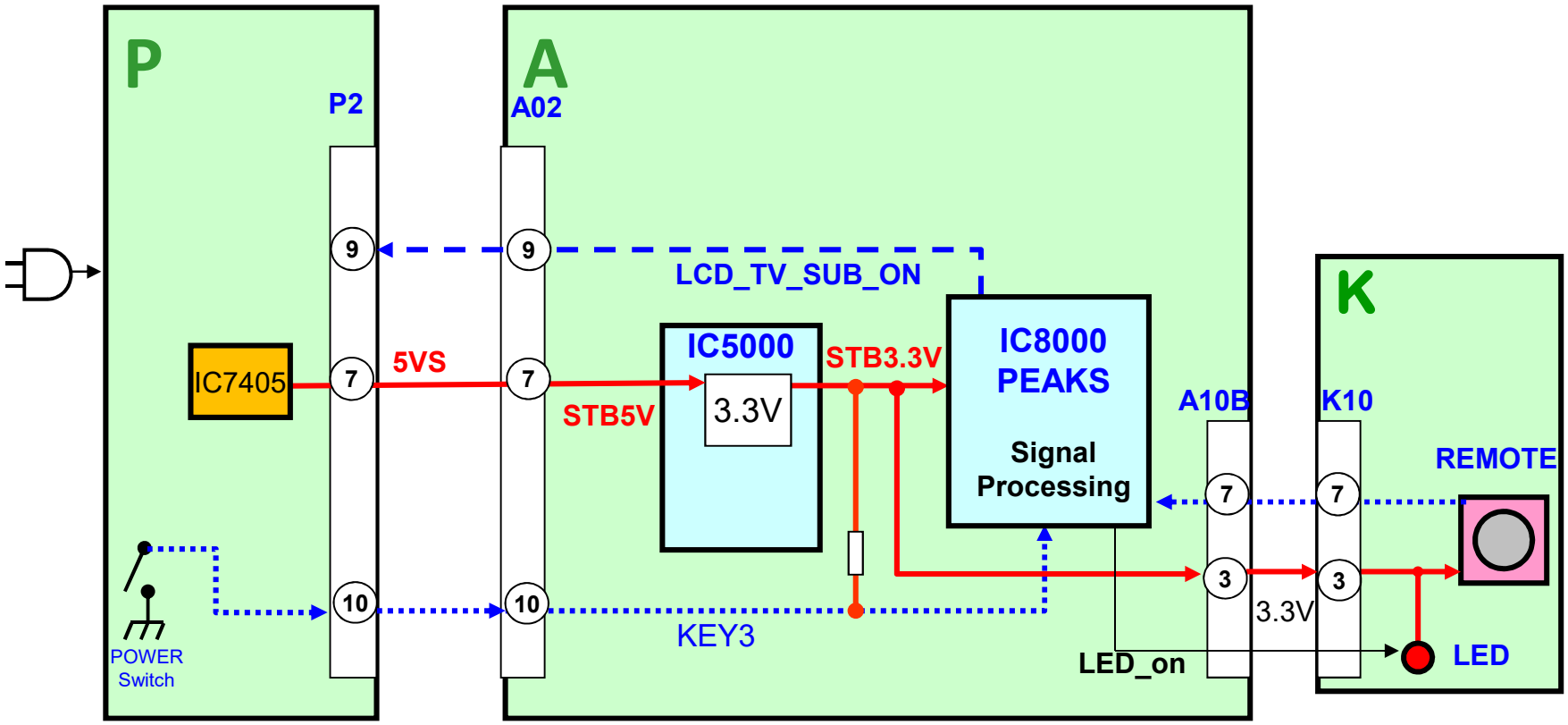
When the power supply starts up, the 16V is providing by D7406,07/C7424. This voltage leads to IC7405, which is 5 volts DCDC converter.

This voltage (STB5V) is provided to A board via connector P2 pin7. So if the TV is plugged in, STB5V is provided to A board without trigger signal.

Start up Operation-4

<A+P>

< from 1 to 2 : A board > Ex. 49/55EX600** series



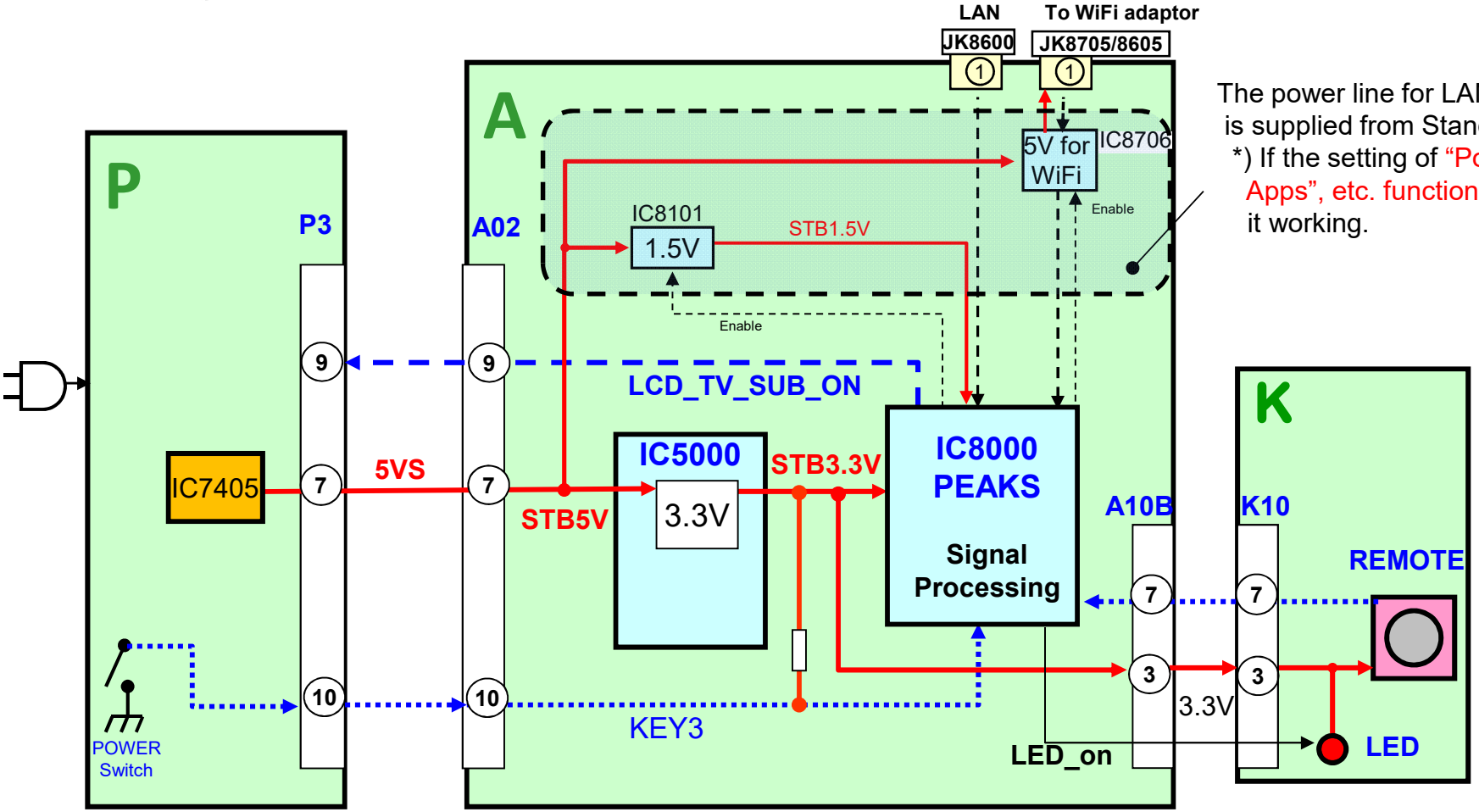
(Each models are different pin allocation but operation is same.)

	OFF (It can receive only Power SW)	Standby (It can receive Power SW, Remote, Viera Link and so on)
North America	(Automatically) →	Power LED: OFF
Except North America	Power LED: OFF Power SW on →	Power LED: RED

(Reference) Start up Operation-4

<A+P>

< from 1 to 2 : A board >



The power line for LAN/WiFi is supplied from Standby power.
*) If the setting of "Power on by Apps", etc. function is enable, it working.

	OFF (It can receive only Power SW)	Standby (It can receive Power SW, Remote, Viera Link and so on)
North America	(Automatically) →	Power LED: OFF
Except North America	Power LED: OFF Power SW on →	Power LED: RED

Start up Operation-5

<A+P>

< from 1 to 2 : A board >

The STB5V from pin7 of connector P2 is applied to the Analog ASIC (IC5000) for supplying power to the Main CPU/PEAKS (IC8000) on the A board. The Analog ASIC (IC5000) converts the STB5V to STB3.3V. This voltage energize and prepare the microprocessor (CPU) for program execution. The STB3.3V from the Analog ASIC (IC5000) is also applied to the remote control receiver and the power LED on the K board through pin 3, 7 of connector A10(B)/K10.

When the Power Switch on, the key3 signal is grounded. (#1)

The IC8000 lights on the RED LED and is ready to power on the TV by receiving the Power switch on, Remote on, Viera Link and so on. This is a standby state.

(#1)Only North America model: Power switch on is no need, automatically this procedure is operated after the TV is plugged in. But the RED LED does not light.

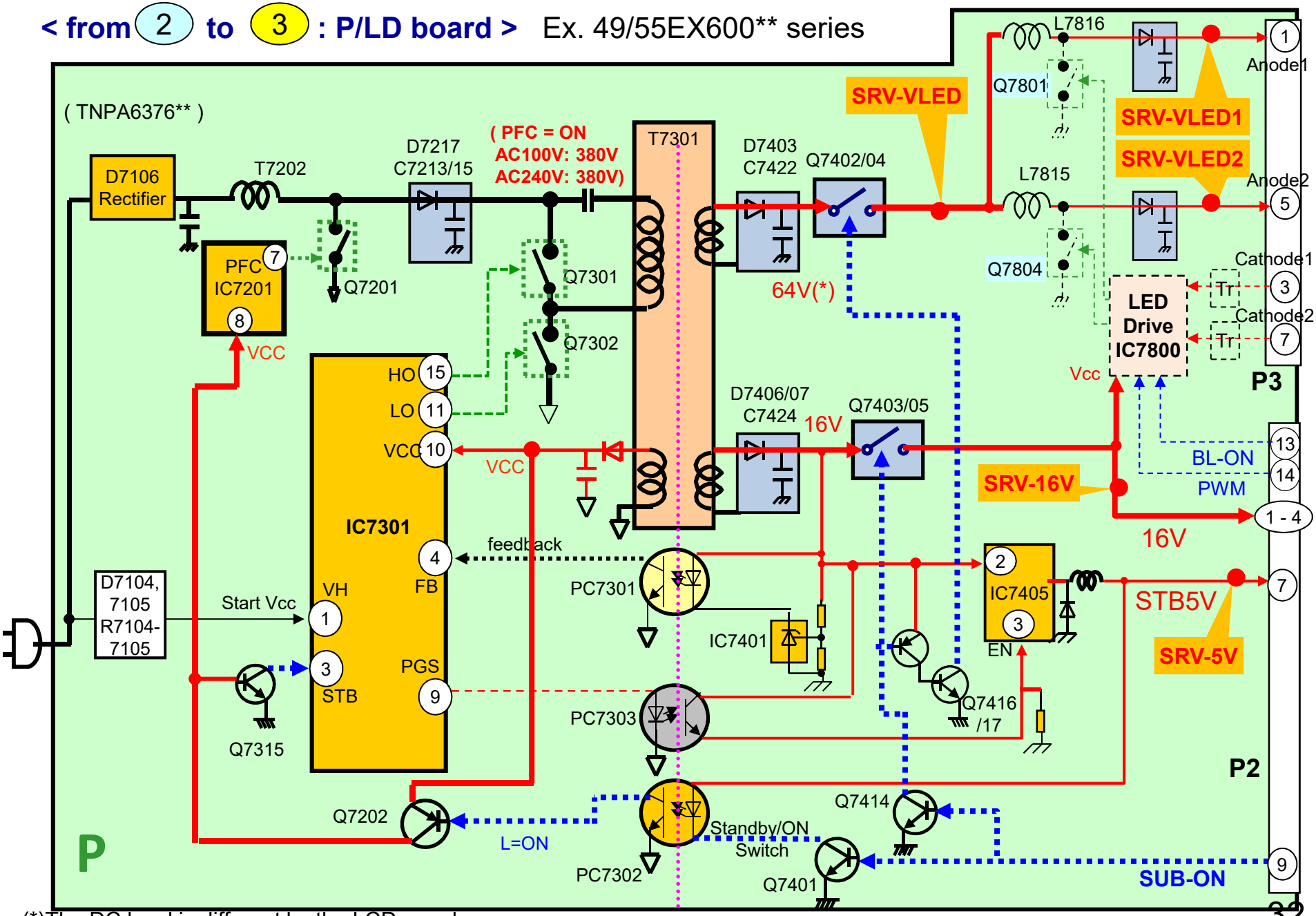
When the power on command from the power switch, the remote control and so on is provided to IC8000 PEAKS, IC8000 first outputs the “TV_SUB_ON” command. The “TV_SUB_ON” command is provided to power board via pin 9 of connector P2.

(*) Just after transition to Stand-by mode, the TV_SUB_ON(16V) output for few minutes.
(North America model : 10s)

Start up Operation-6

<A+P>

< from 2 to 3 : P/LD board > Ex. 49/55EX600** series



(*)The DC level is different by the LCD panel.

Start up Operation-7

<A+P>

< from 2 to 3 : P board >

When the power board receives the TV_SUB_ON signal from IC8000 via pin 9 of connector P2, it outputs 2 different voltages:

16V to the A board on pins 1, 2, 3 and 4 of connector P2.

64V(*) to the LED drive part.

TV_SUB_ON command is carried to the primary side by PC7302. This voltage is leaded to Q7202 which provide power supply VCC of PFC circuit. The PFC starts to operate.

Besides this voltage to go to Q7315 whcih provide the mode change signal to pin 3 of IC7301. The operation of the IC 7301 changes the switching frequency from standby state to working state because of providing high power current.

Output voltages from transformer T7301 start rising up until the moment when IC7401 started to operate. This IC measures the 16V line output in the secondary side. The output of this IC is provided by PC7301 to pin 4 of IC7301. IC7301 adjust the switching frequency by this feedback signal.

The TV_SUB_ON signal also switches on the Q7402/03/04/05 to provide output voltages (16V and 64V(*)). The 64V(*) is provided to the LED Backlight Drive. The 16V is provided to the A board.

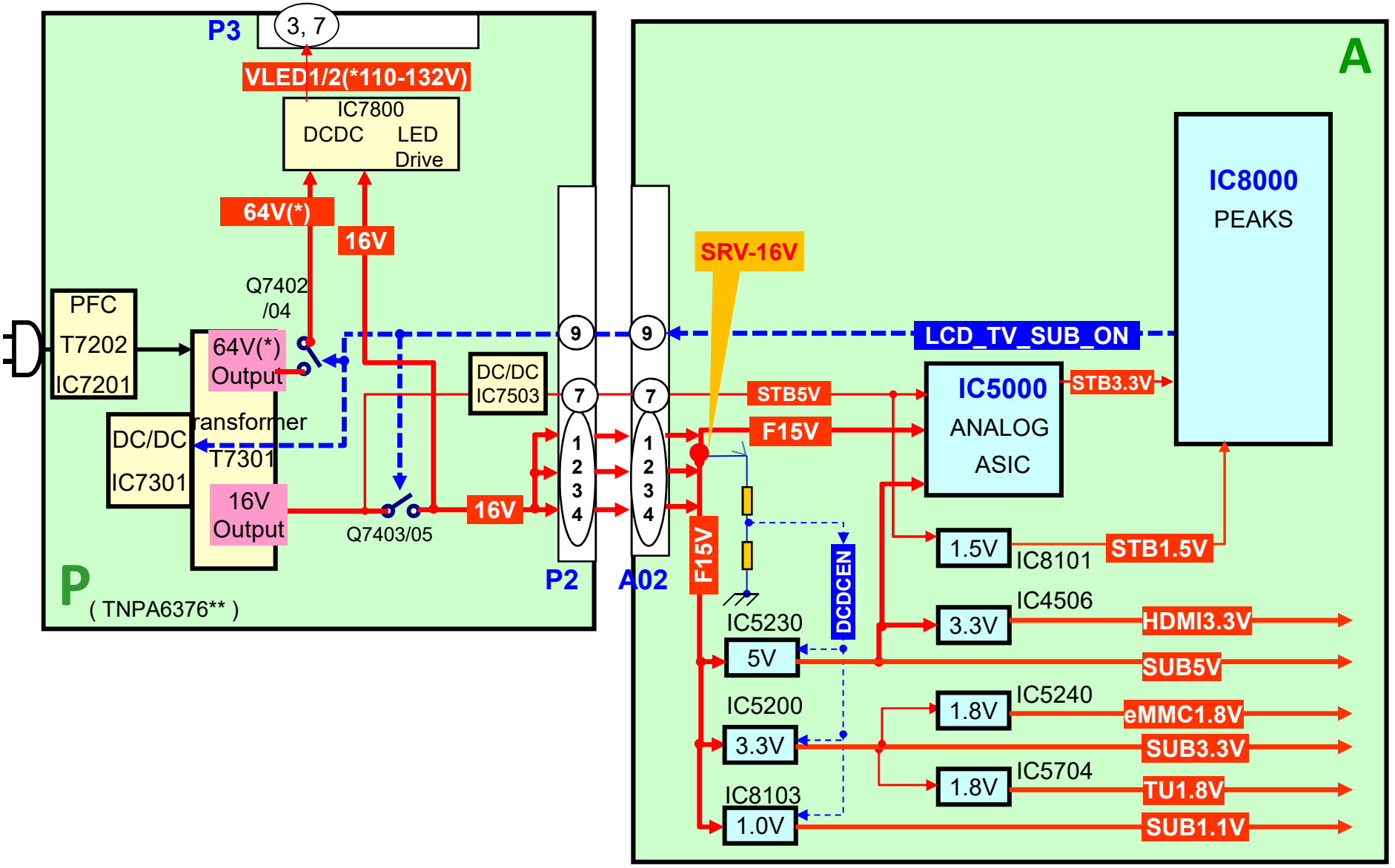
(*)The DC level is different by the LCD panel.

Start up Operation-8

<A+P>

< 3 : A board (SUB voltage) >

Ex. 49/55EX600** series



(*)The DC level is different by the LCD panel.

Start up Operation-9

<A+P>

< 3 : A board (SUB voltage) >

The 16V(F15V) from the P board via pin1-4 of connector A02 is applied to Analog ASIC IC5000 and ICs (Voltage regulators) on the A board to generate the SUB-Voltages used for signal processing operation.

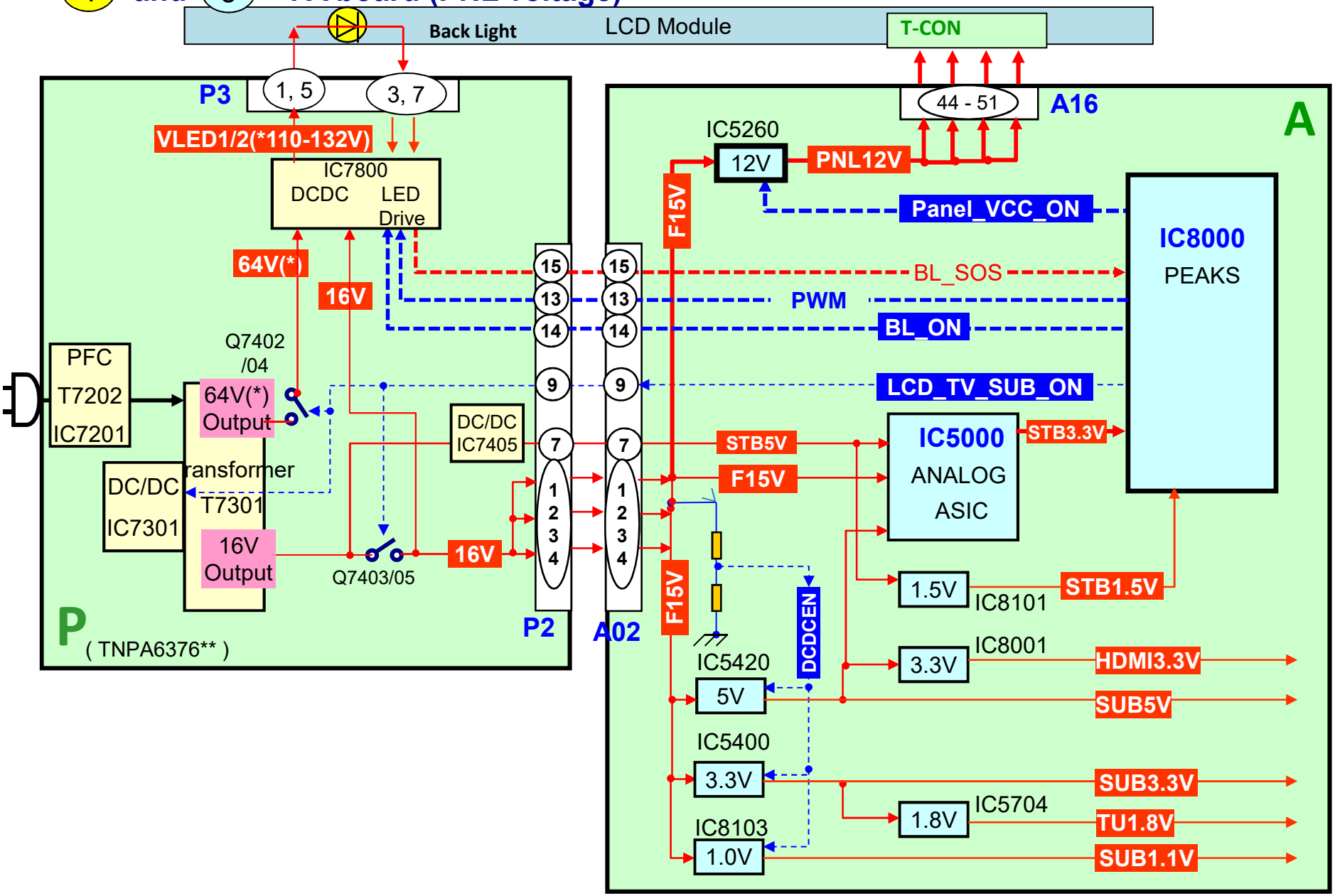
: SUB1.0V, 1.8V, 3.3V, 5V and HDMI3.3V, TU1.8V

Each voltage regulators start up by high state of DCDCEN signal which is pull up to F15V. So F15V is provided to A board, each SUB-voltage regulator ICs start output.

Start up Operation-10

<A+P>

< 4 and 5 : A board (PNL voltage) >



(*)The DC level is different by the LCD panel.

< 4 and 5 : A board (PNL voltage) >

The F15V is also used to generate the PNL-Voltage on A board. IC8000 outputs the Panel VCC On signal. IC5260 starts generating the PNL12V by this signal. The PNL12V is provided to T-con circuit of the LCD Module.

< 6 : P board (backlight drive) >

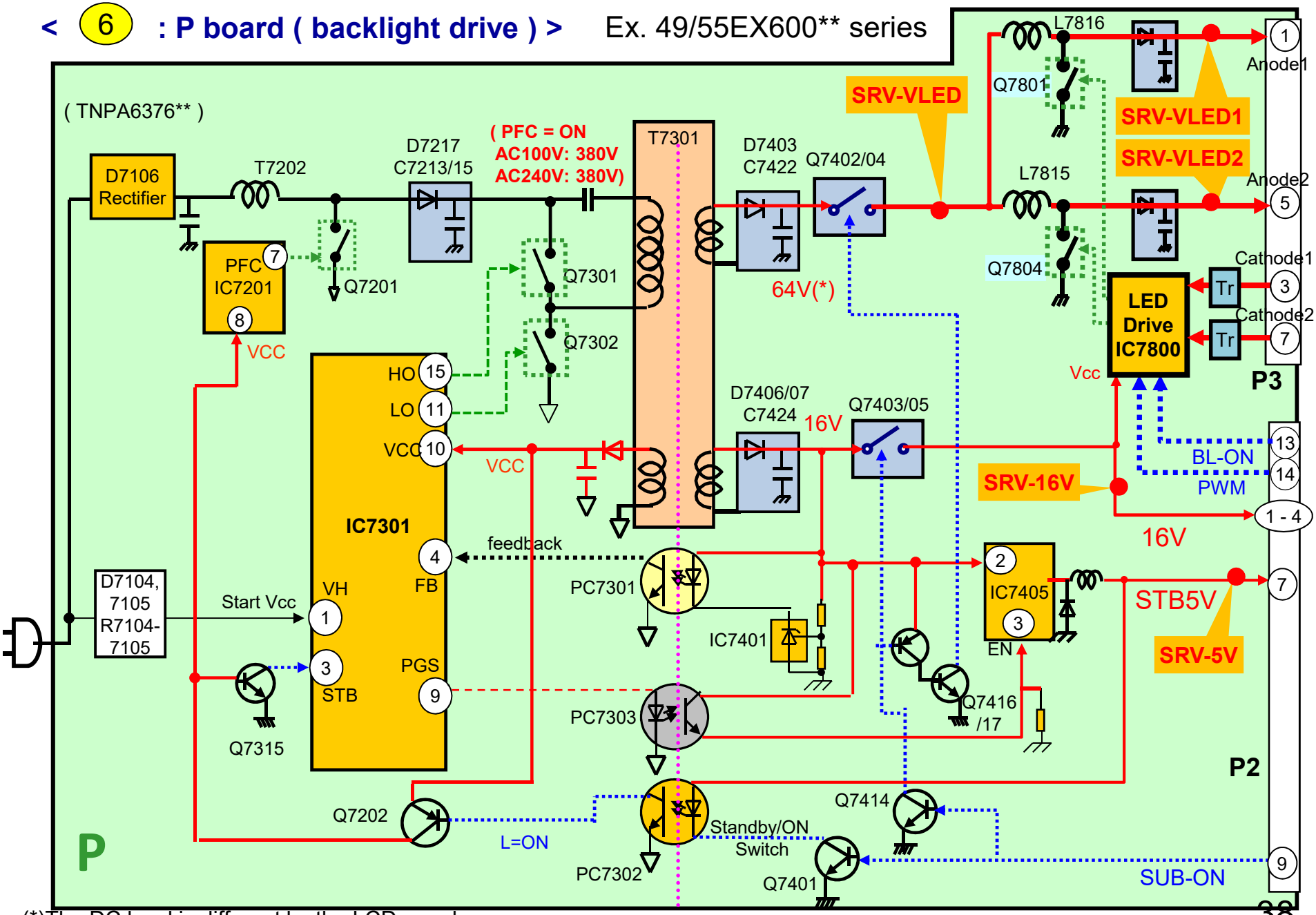
After that, IC8000 outputs the BL_ON command to the P board. The BL_ON command turns on the IC7800 for LED backlight drive. Then the 64V rise up over 110V(*) and output to the backlight on the LCD panel. The backlight starts lighting by PWM signals, and LCD panel displays the pictures.

If the backlight drive circuit does not work normally, the BL_SOS signal is informed to the IC8000. At that time, IC8000 stops outputting the TV_SUB_ON signal and blinks the red LED 1 times.

Start up Operation-12

<A+P>

< 6 : P board (backlight drive) > Ex. 49/55EX600** series



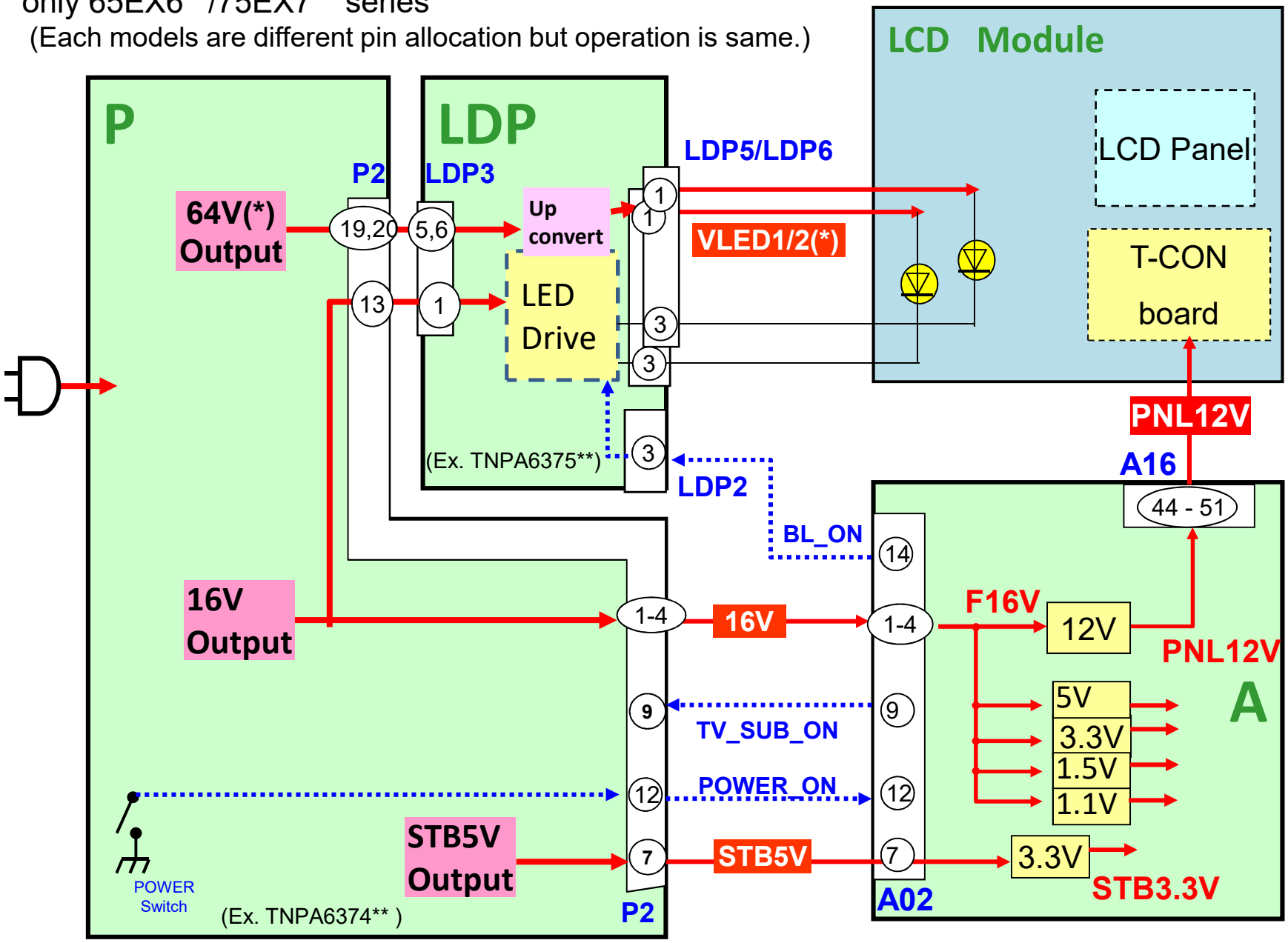
(*)The DC level is different by the LCD panel.

Reference: Voltage Distribution (A+P+LDP Boards)

<A+P+LDP>

only 65EX6**/75EX7** series

(Each models are different pin allocation but operation is same.)

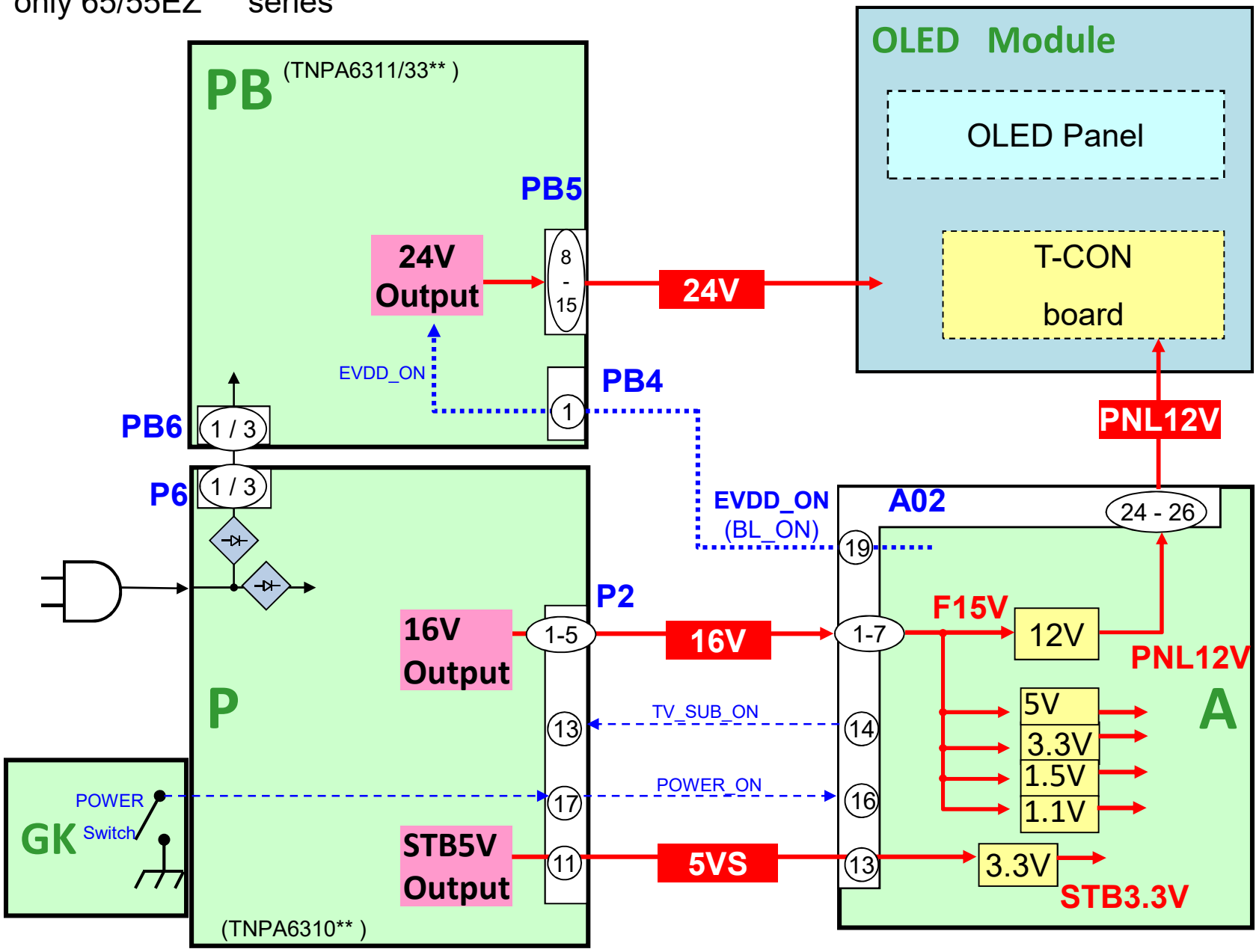


(*)The DC level is different by the LCD panel.

Reference: Voltage Distribution (A+P+PB Boards)

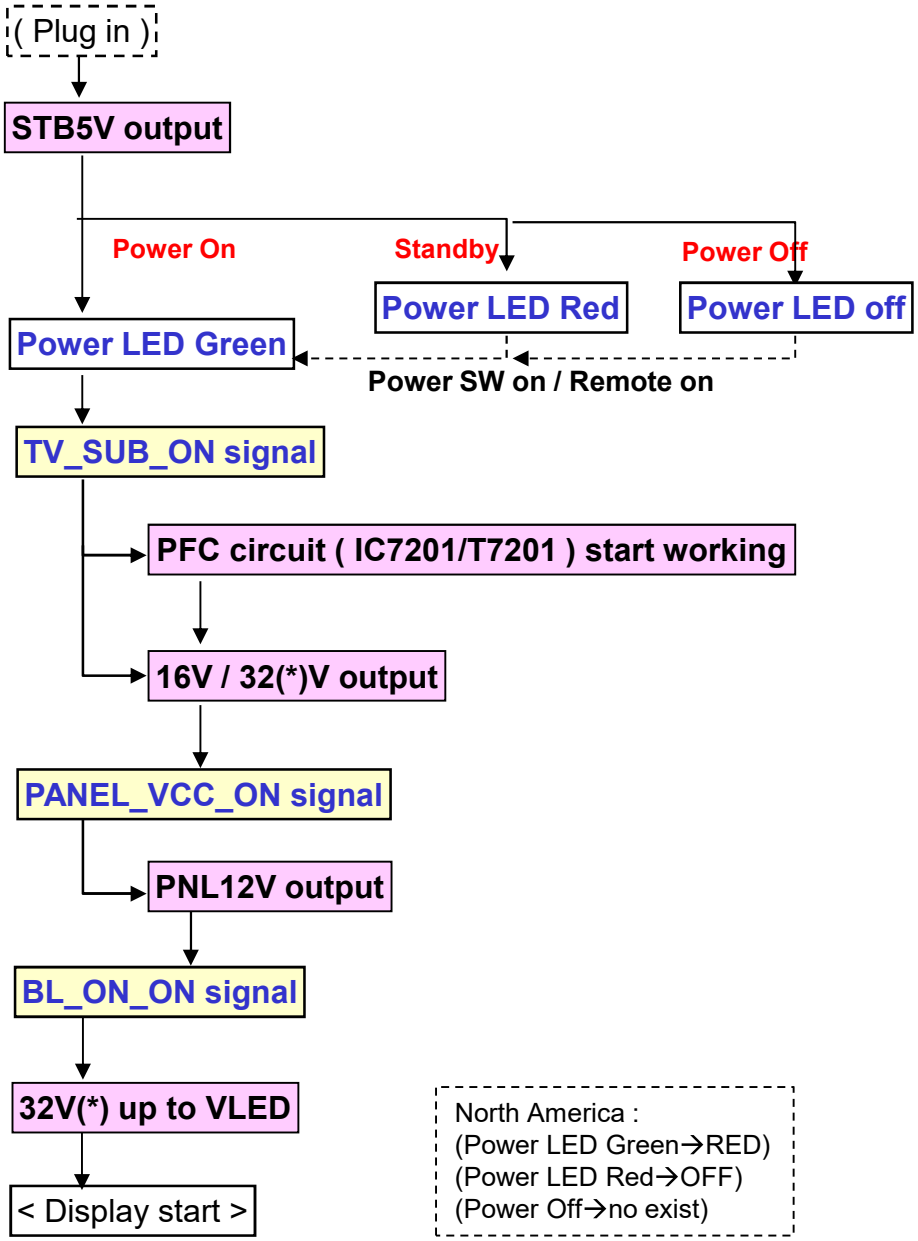
<A+P+PB> OLED

only 65/55EZ*** series

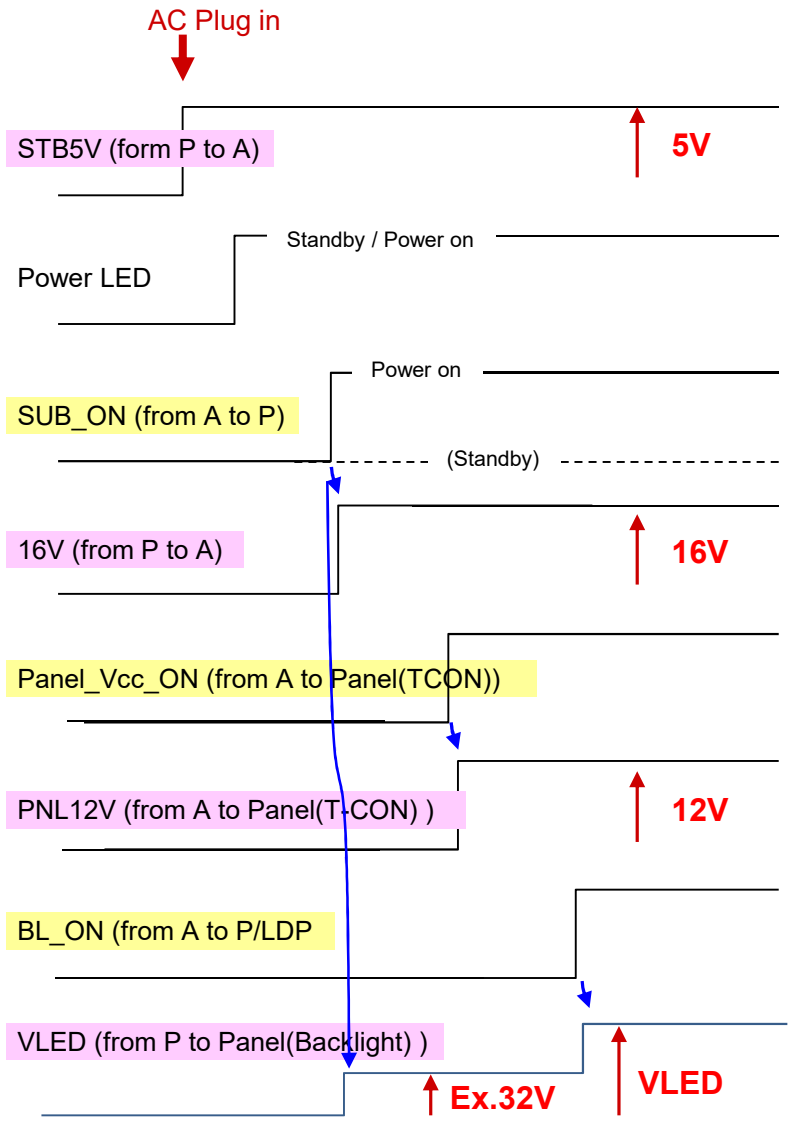


Simple Power On Sequence (E Series)

< E series >



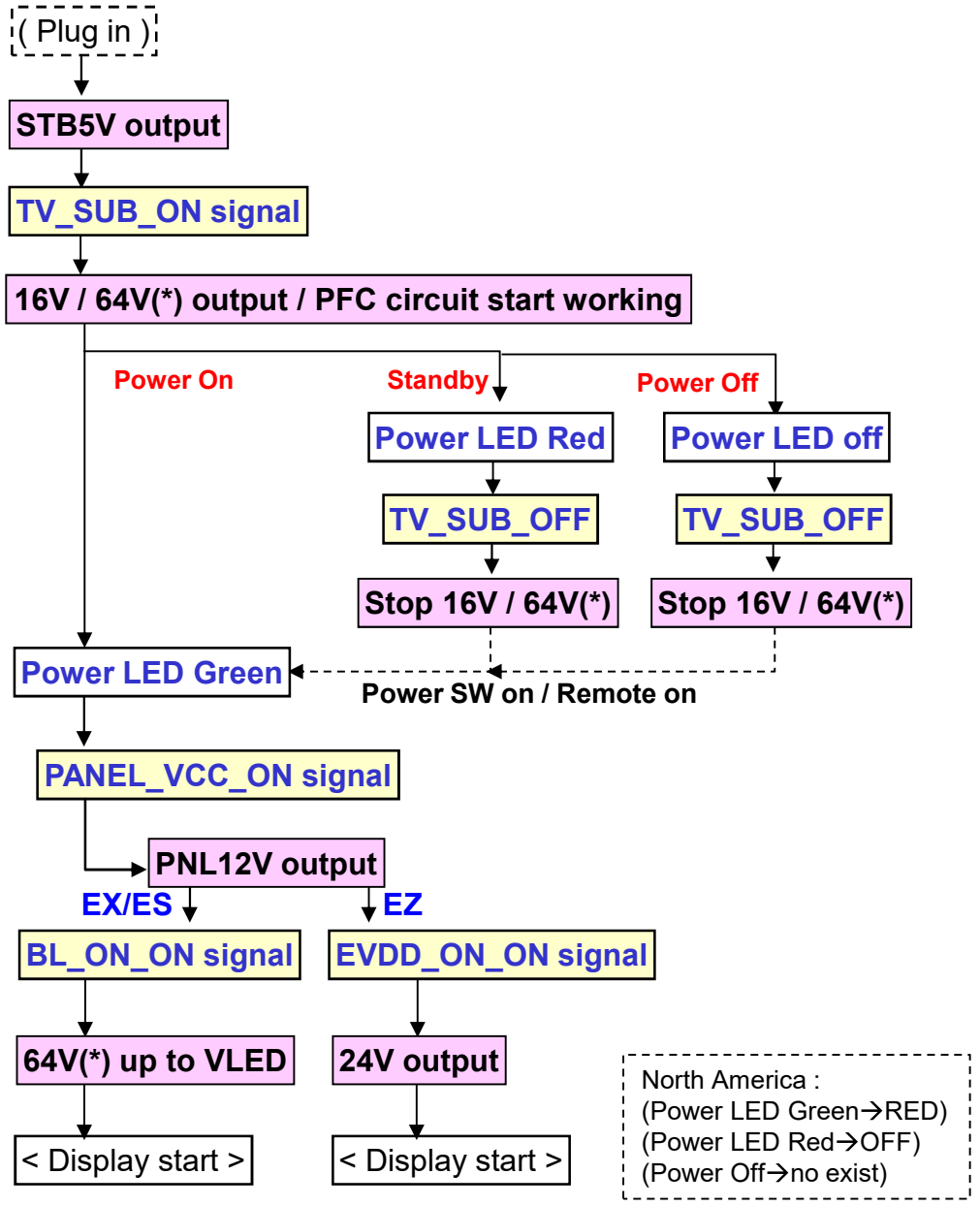
(*) The DC level is different by the LCD panel.

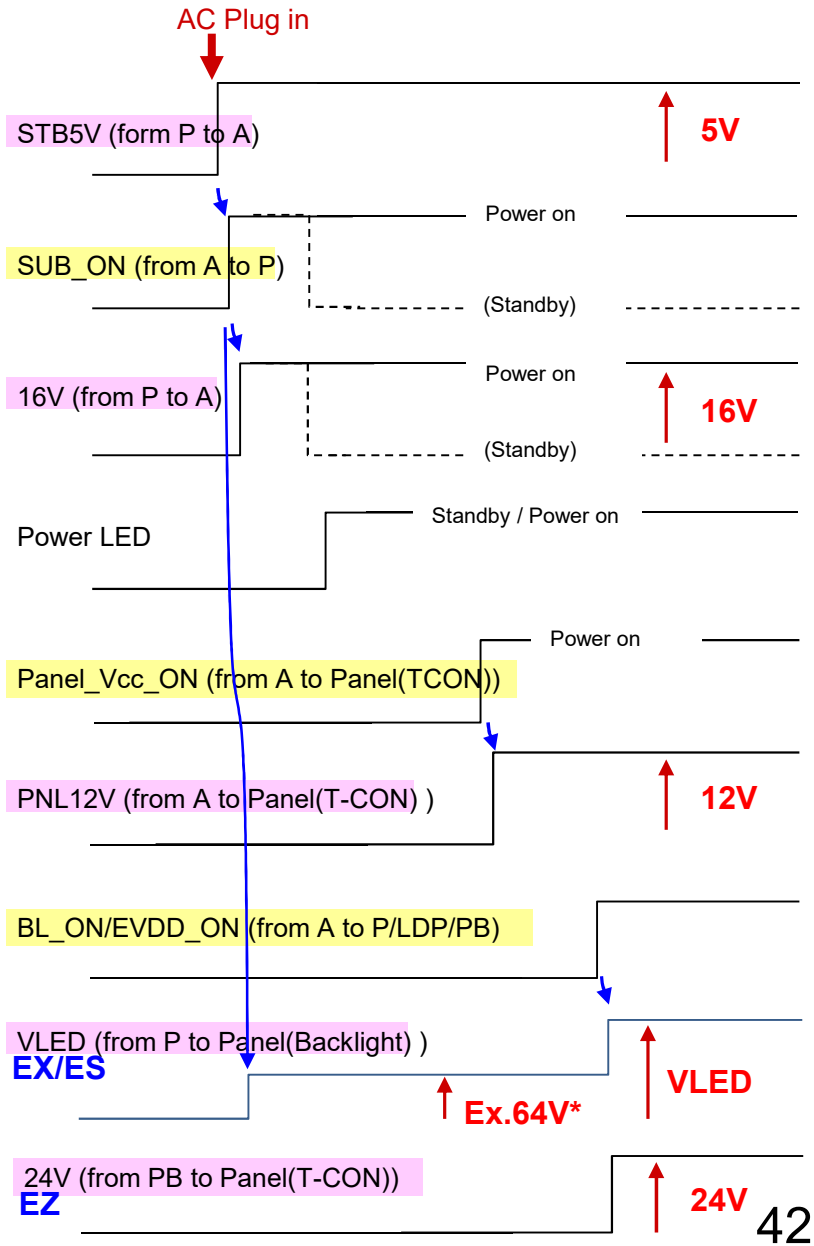


Simple Power On Sequence (EX/ES Series)

< EX/ES/EZ series > **Also 16V is necessary before Power LED.**

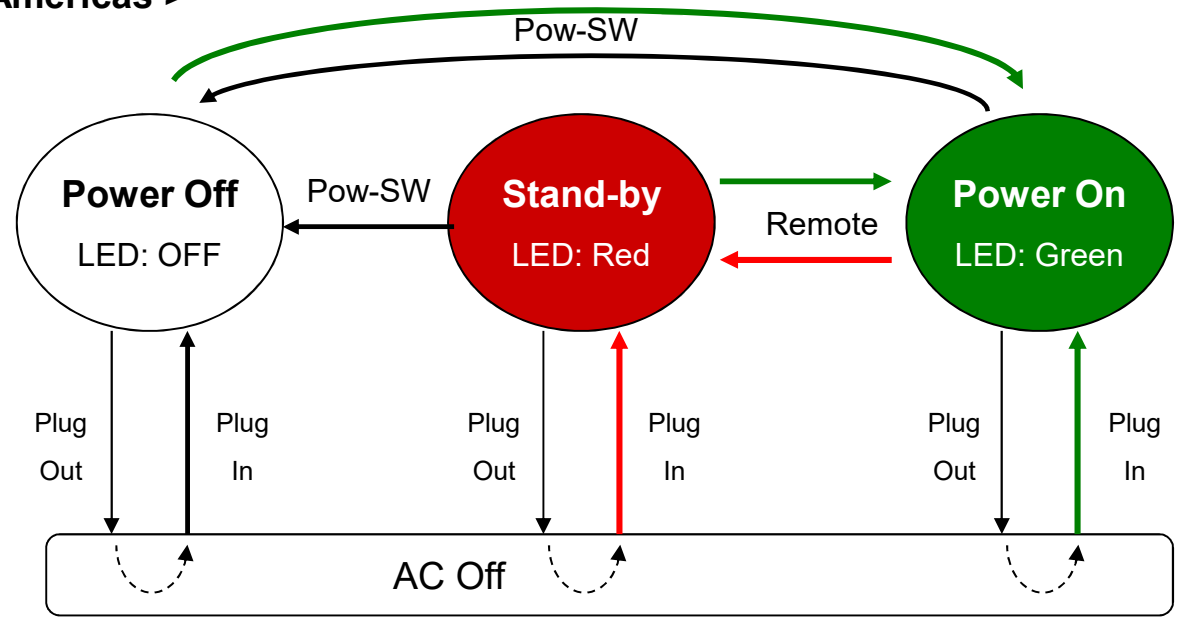
(*) The DC level is different by the LCD panel.



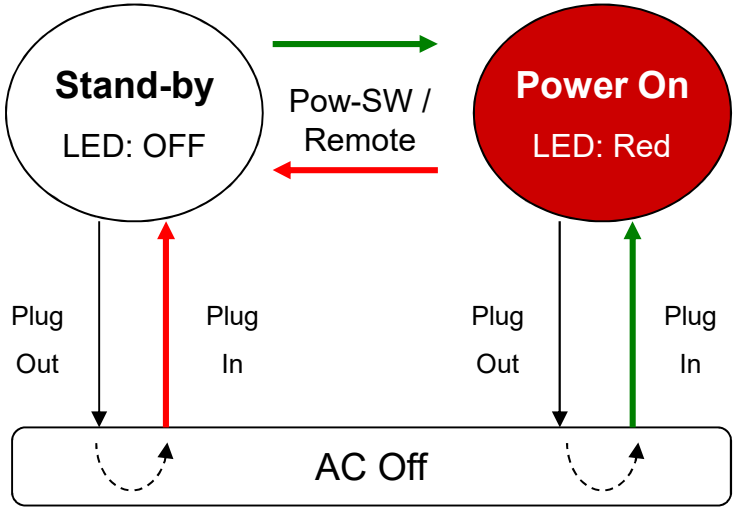


(Reference : State Transition Diagram)

< Except the Americas >



< The Americas >



4. SOS Protection Circuit and Troubleshooting

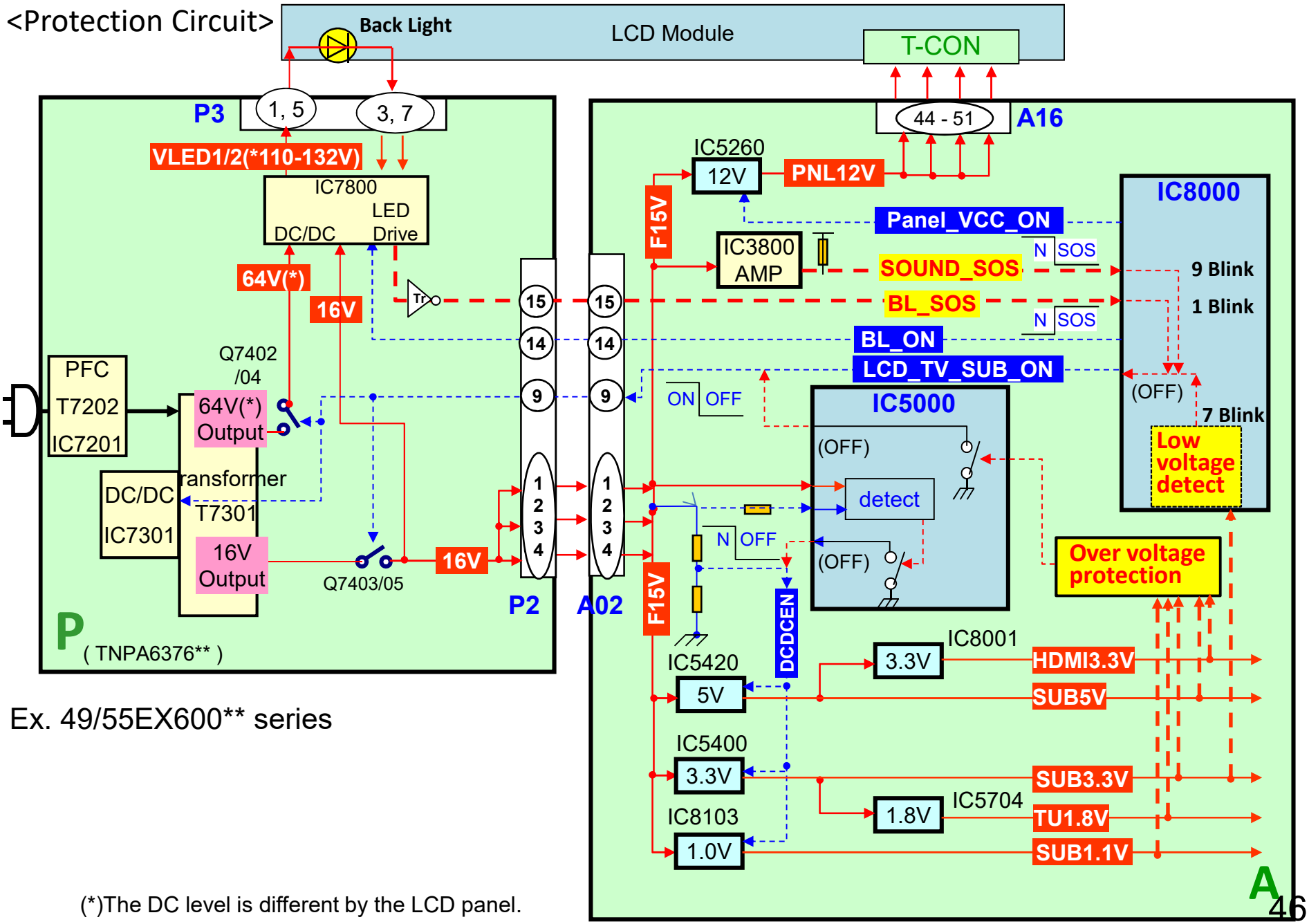
LED Blinking Summary

When an abnormality occurs in the unit, the “SOS Detect” circuit is triggered and the TV shuts down. Shut down means that the unit turns off the TV_SUB_ON signal. The power LED on the front panel will flash a pattern indicating the circuit area that has detected an abnormality.

	Blinking Time						Estimated Defect Board
Model / name / Detect content	MT5561 (E4**)	Peaks LD11 (Asia/Latin ES***)	MT5581P (Euro ES***)	MT5811Q (EX6**/ 700/730)	MT5811P (EX750/ 780)	MT5811P (EZ***) OLED	
BL_SOS (LED driver) EVDD_SOS (OLED panel power)	1	1 (occurred several sec later after power on)	1	1	1	1	Panel/P /PB
Power on problem (Error F15V/SUB3.3V voltage)	---	quick 1 (occurred soon after power on)	---	---	---	---	P/A
Power on problem (Error SUB5V/1.5V/1.1V voltage)		quick 3					P/A
OLED Panel (TCON) SOS	---	---	---	---	---	2	Panel/A
Memory (eMMC) read problem	---	quick 2, 4	---	---	---	---	A
No voltage SUB3.3V (after wake up once)	7	7	7	7	7	7	A
Audio amplifier: SOUND_SOS	9	9	9	9	9	9	A/ speaker
FRC_SOS (IC9000)	---	---	---	---	10	10	A
Emergency SOS	13	13	13	13	13	13	A
GCEX_SOS (IC4300)	---	---	---	---	---	16	A

Protection Circuit of A+P type

<A+P>



Ex. 49/55EX600** series

(*)The DC level is different by the LCD panel.

Troubleshooting for LED Blinking (1 time blink) for A+P type -1 <A+P>

LED blinks	Detail error	Board may defect
1	BL_SOS (LED driver)	Panel / P

(*)VLED : The DC level is different by the LCD panel.

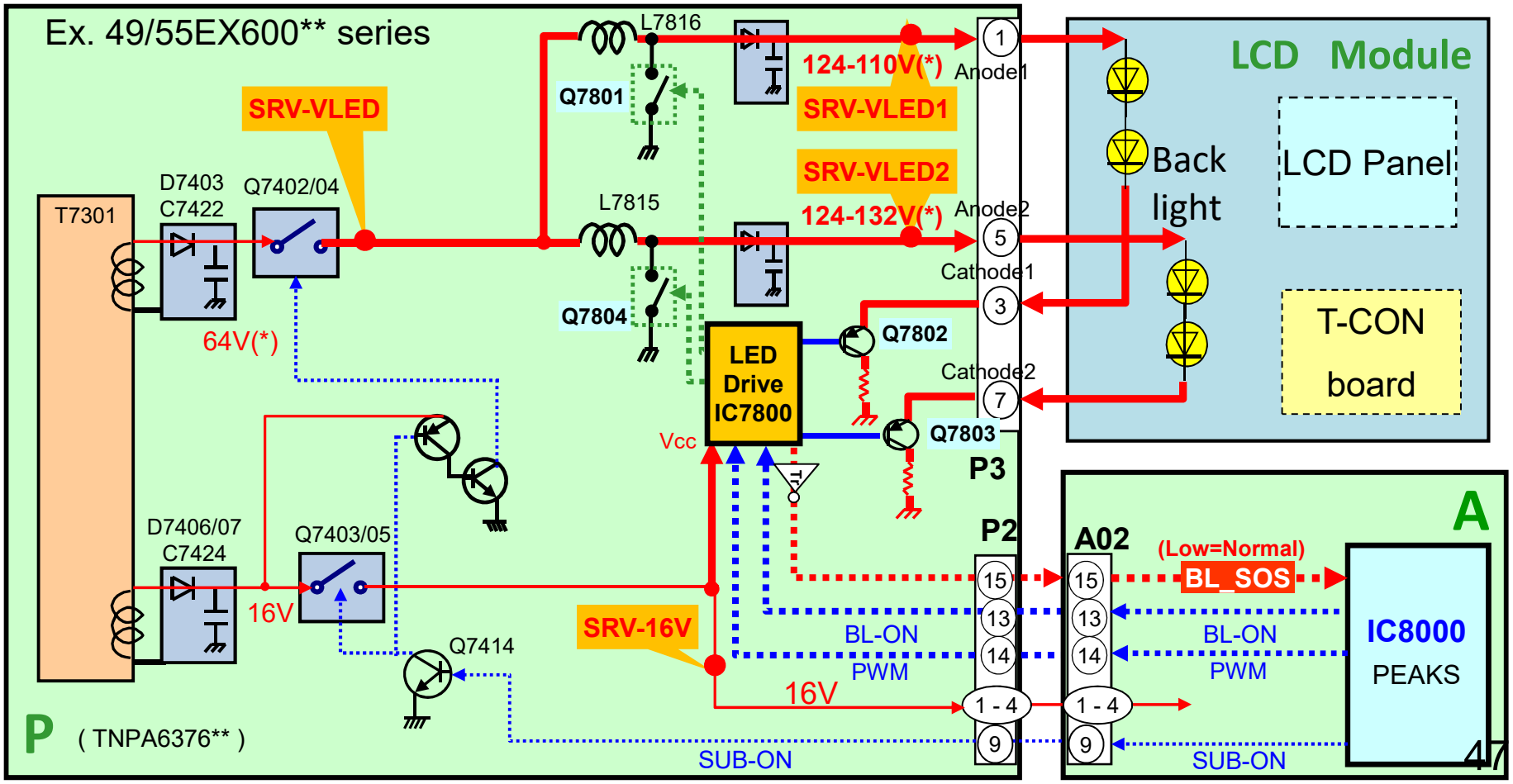
If the IC7800 detects

1.abnormal current of backlight LEDs (= Backlight LED broken or Low(No) VLED voltage)

2.abnormal DC/DC power supply of IC7800 (does not rise up the VLED voltage)

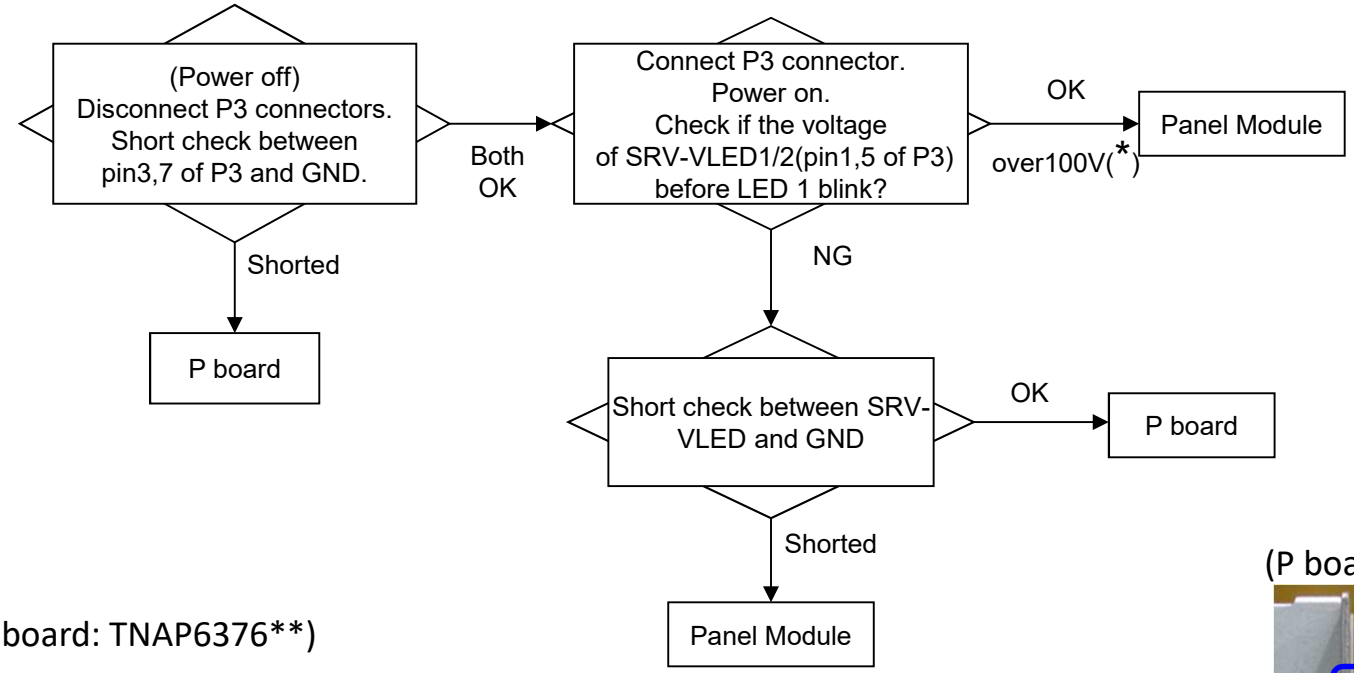
or the IC7800 does not work (No Vcc or No BL_ON/PWM signal or defect itself),

the IC7800 output BL_SOS signal to IC8000 → LED blink 1 time.

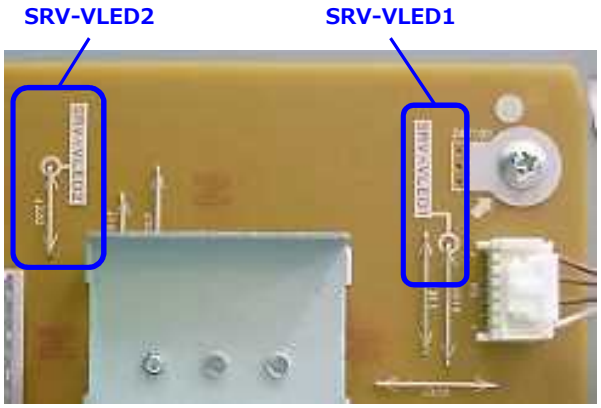


Troubleshooting for LED Blinking (1 time blink) for A+P type -2 <A+P>

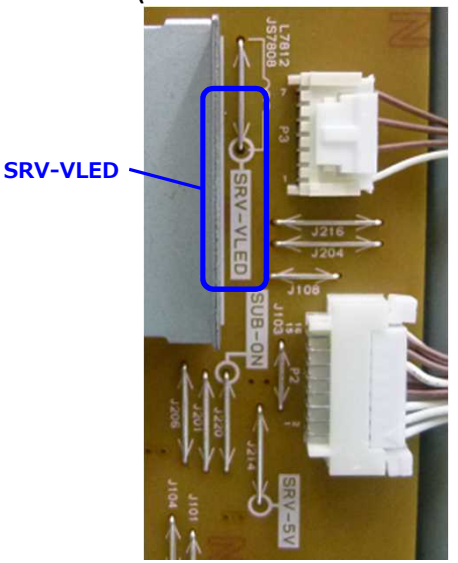
Ex. 49/55EX600** series



(P board: TNAP6376**)



(P board: TNAP6376**)

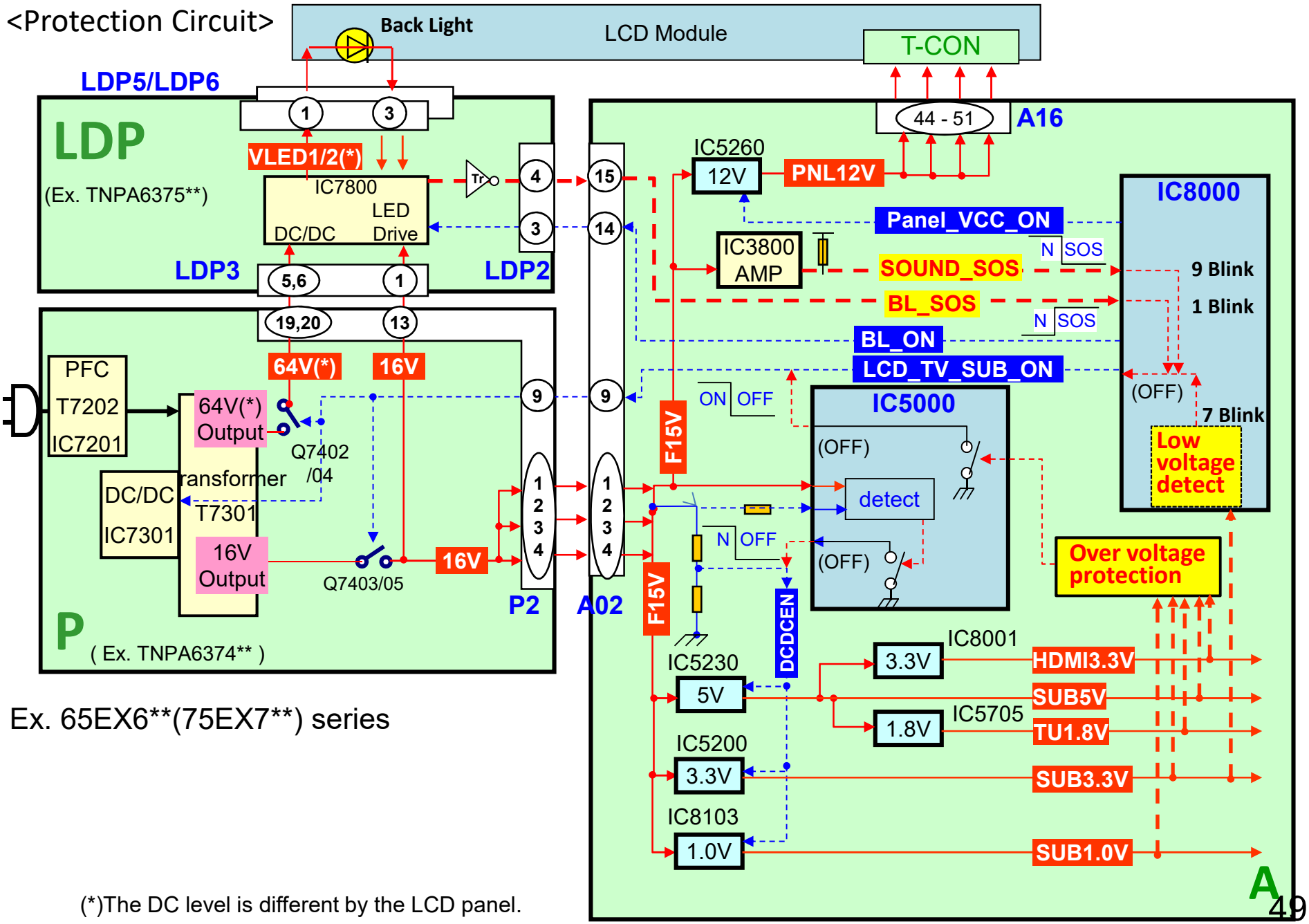


(*)VLED : The DC level is different by the model (LCD panel).

Protection Circuit of A+P+LDP type

<A+P+LDP>

<Protection Circuit>



Ex. 65EX6**(75EX7**) series

(*)The DC level is different by the LCD panel.

Troubleshooting for LED Blinking (1 time blink) for A+P+LDP type -1 <A+P+LDP>

LED blinks	Detail error	Board may defect
1	BL_SOS (LED driver)	Panel / LDP / P

(*)VLED : The DC level is different by the LCD panel.

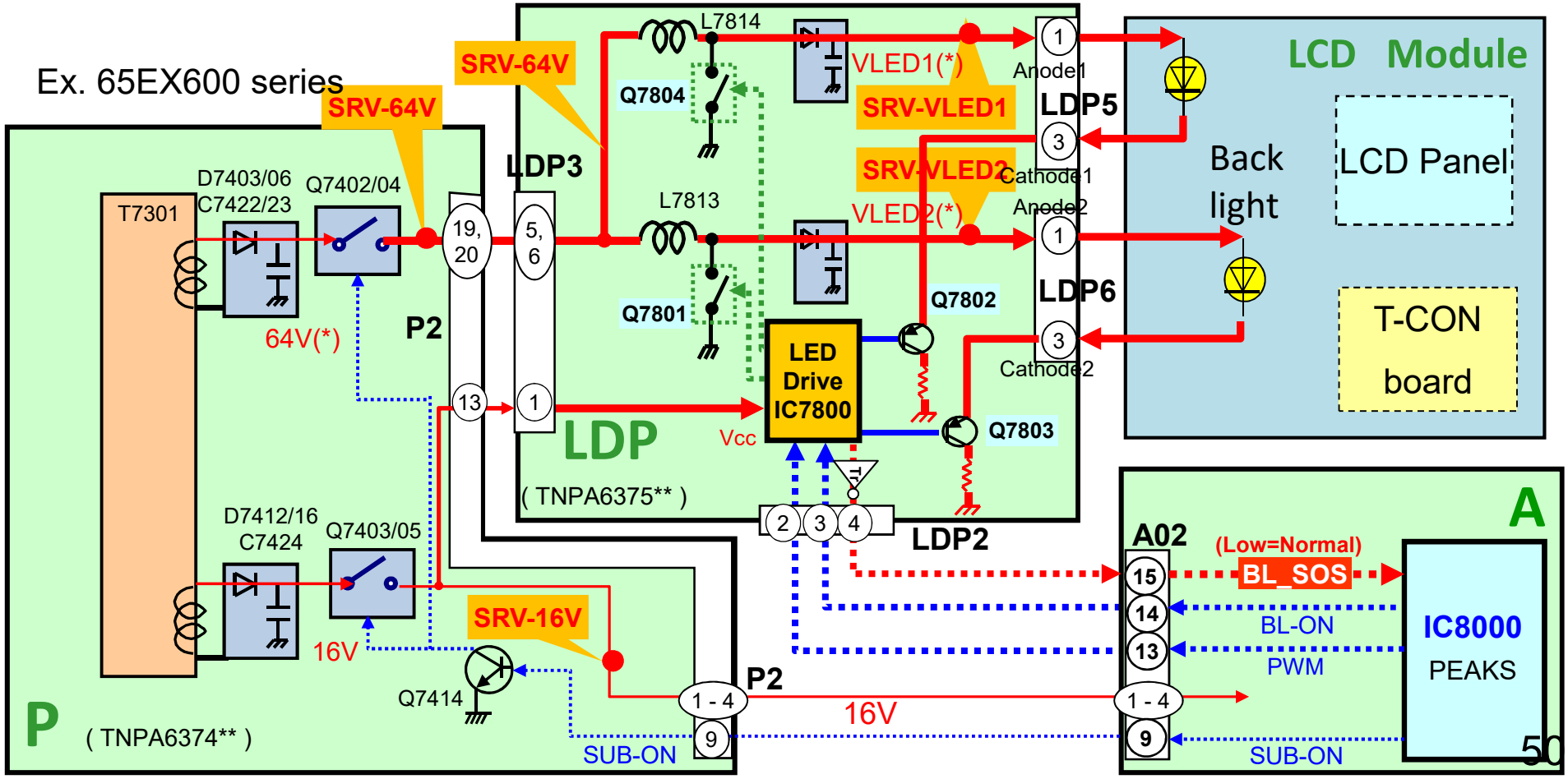
If the IC7800 detects

1.abnormal current of backlight LEDs (= Backlight LED broken or Low(No) VLED voltage)

2.abnormal DC/DC power supply of IC7800 (does not rise up the VLED voltage)

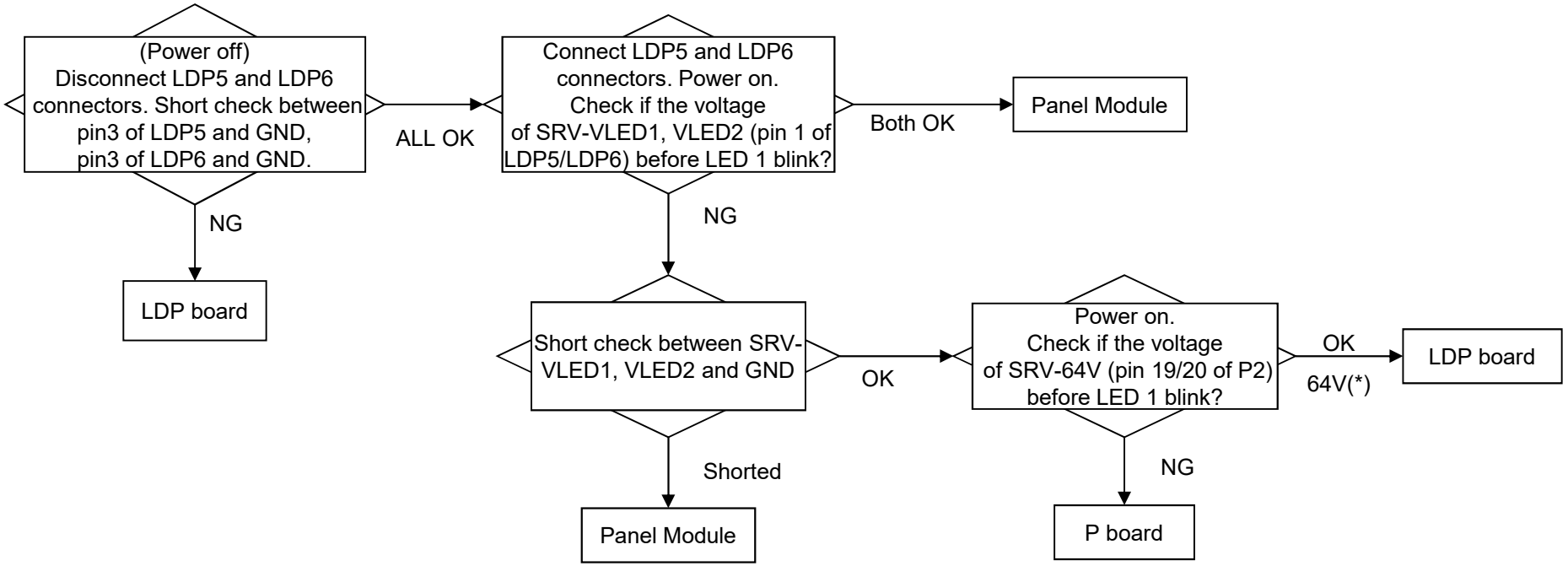
or the IC7800 does not work (No Vcc or No BL_ON/PWM signal or defect itself),

the IC7800 output BL_SOS signal to IC800 → LED blink 1 time.



Troubleshooting for LED Blinking (1 time blink) for A+P+LDP type -2 <A+P+LDP>

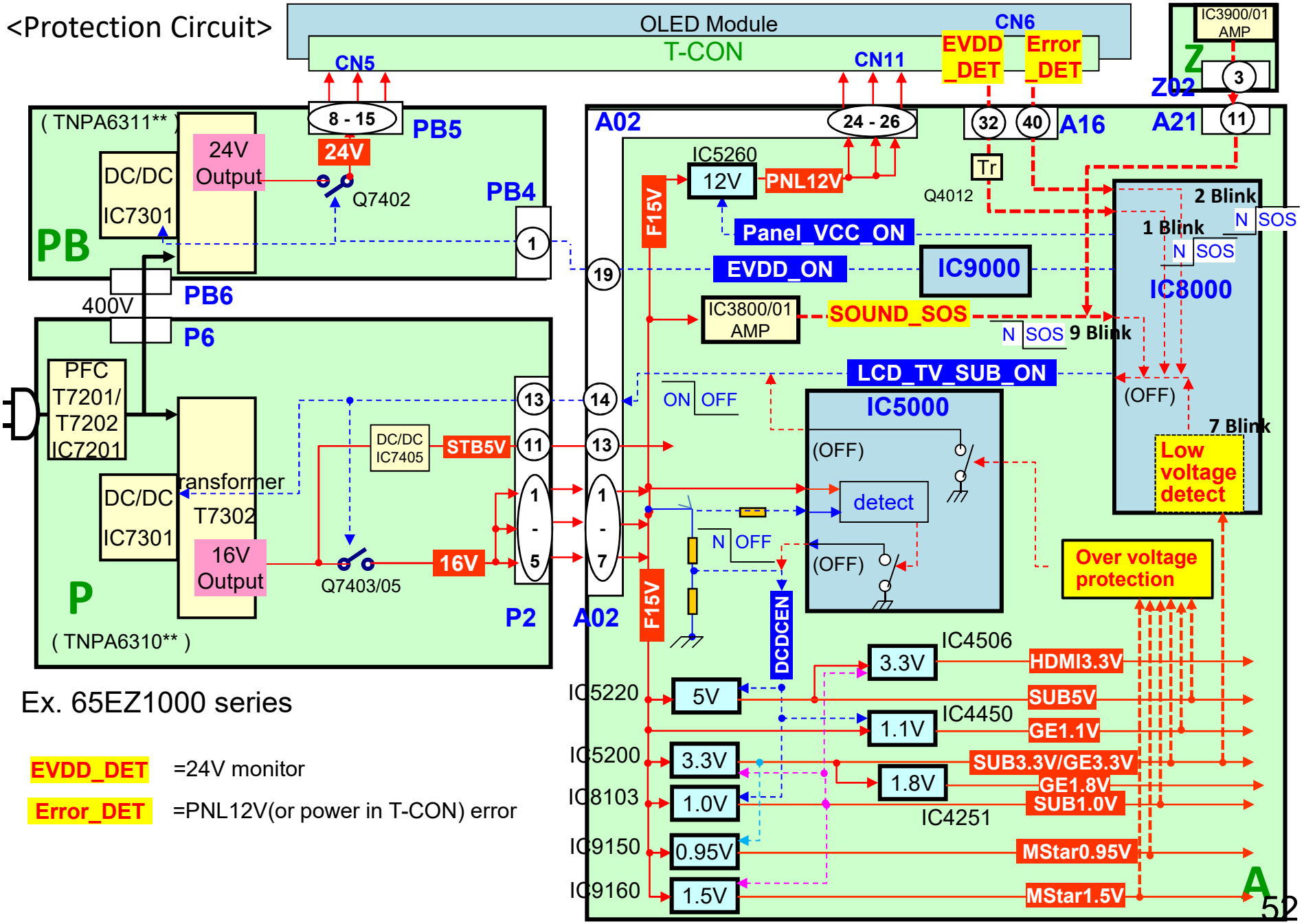
Ex. 65EX600 series



(*)VLED : The DC level is different by the LCD panel.

Protection Circuit of OLED

<A+P+PB> OLED



Ex. 65EZ1000 series

EVDD_DET =24V monitor

Error_DET =PNL12V(or power in T-CON) error

Troubleshooting for LED Blinking (1 / 2 time blink) for OLED -1

<A+P+PB> OLED

LED blinks	Detail error	Board may defect
1	EVDD_SOS (OLED panel power)	Panel / LDP / P
2	OLED Panel SOS (T-CON power)	Panel / A

If the T-CON board detects

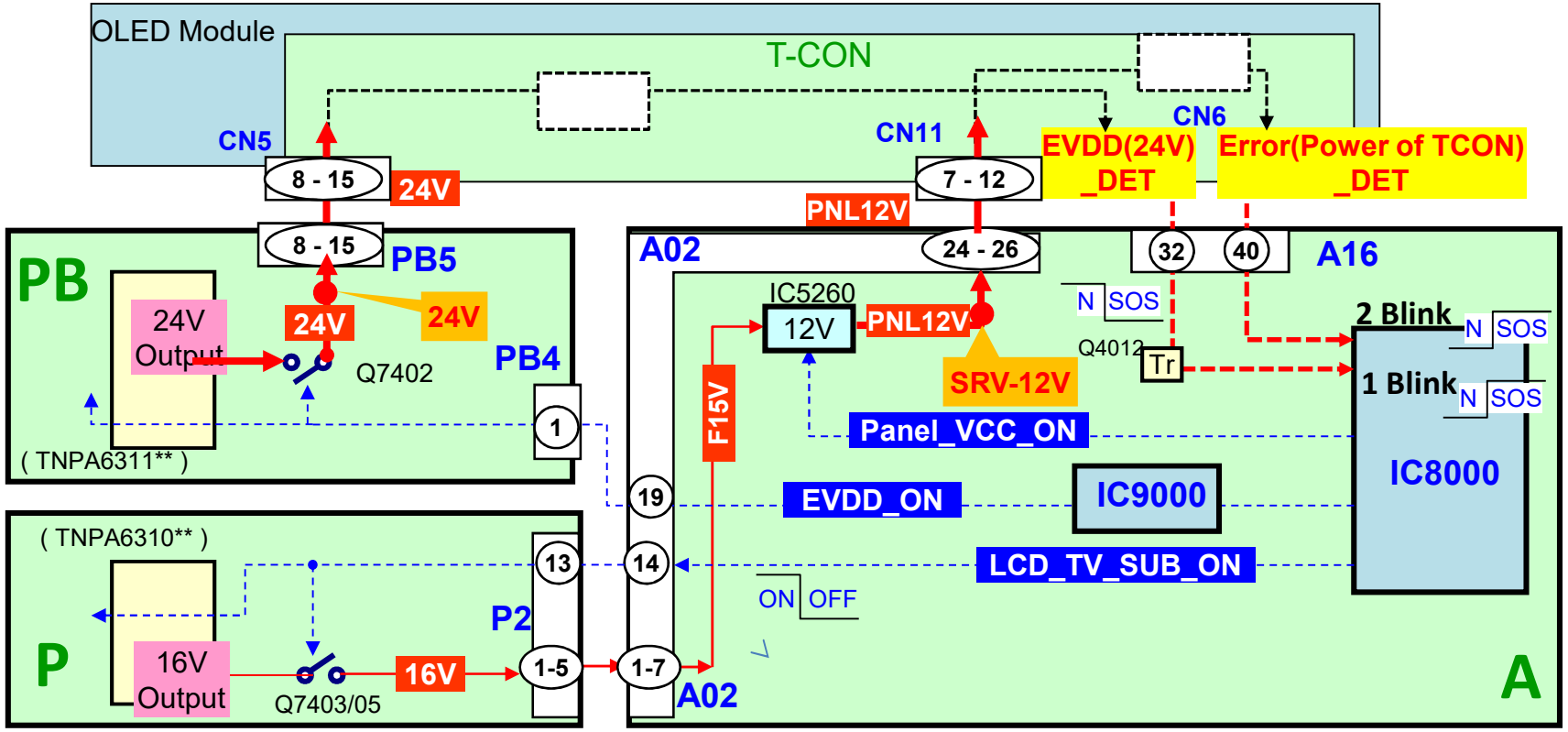
1.voltage error of 24V from PB board , the error

2.problem the power circuit in T-CON board (that is provided from PNL12V)

the error signal is output from T-CON board to A board.

1. → LED blink 1 time

2. → LED blink 2 time

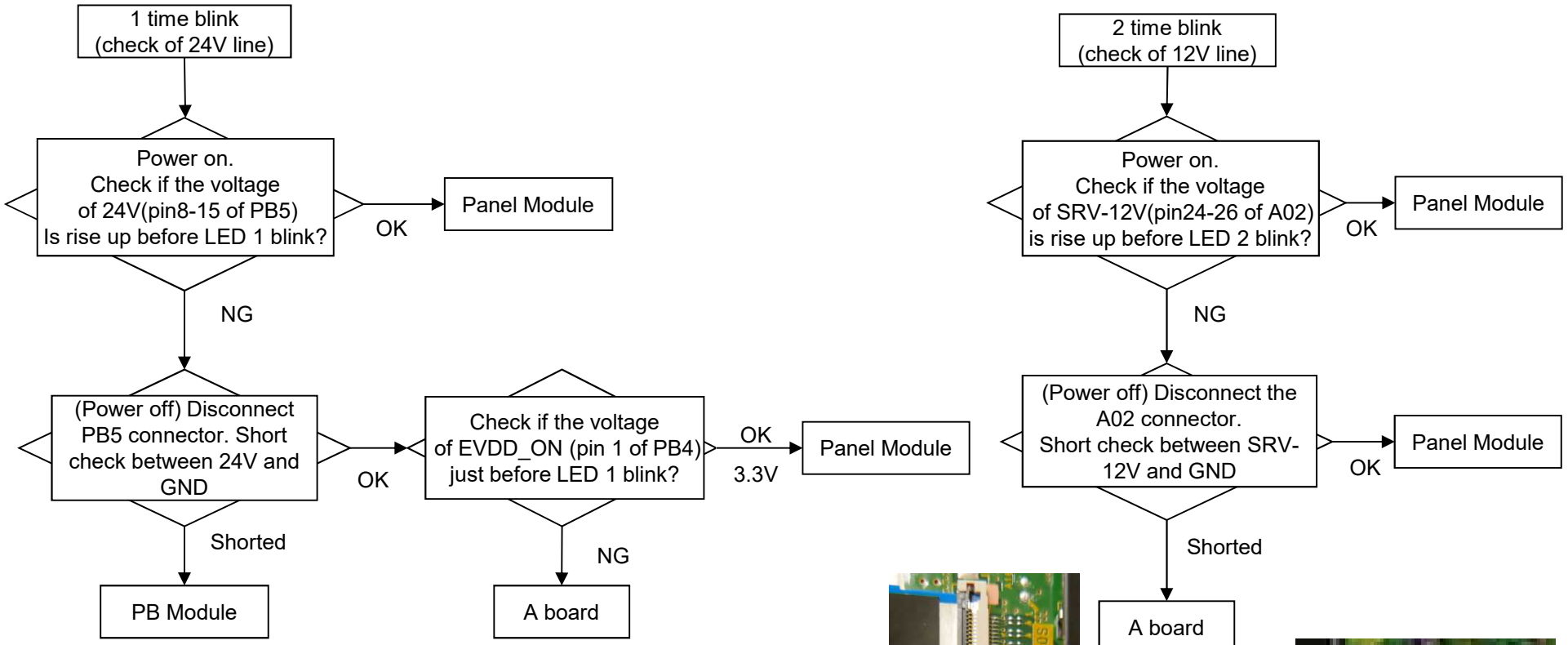


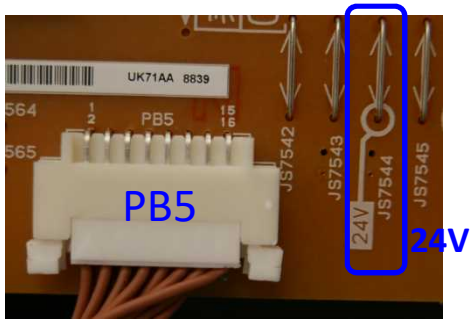
Troubleshooting for LED Blinking (1 / 2 time blink) for OLED -2

<A+P+PB> OLED

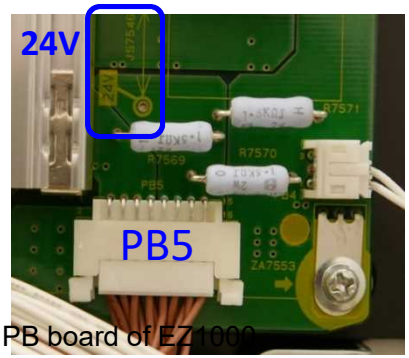
EZ series

Refer to the previous page block diagram.

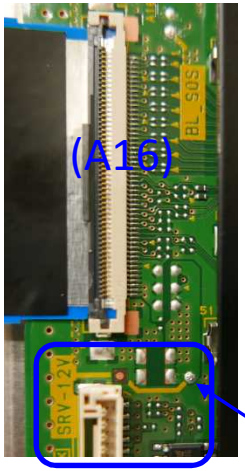




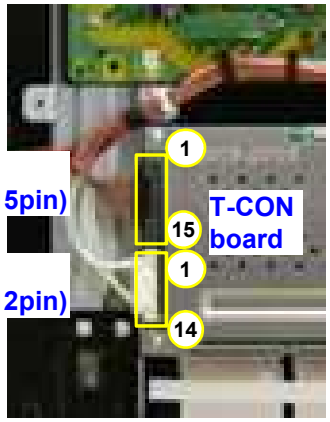
PB board of EZ950



PB board of EZ1000



(A02 is lower)



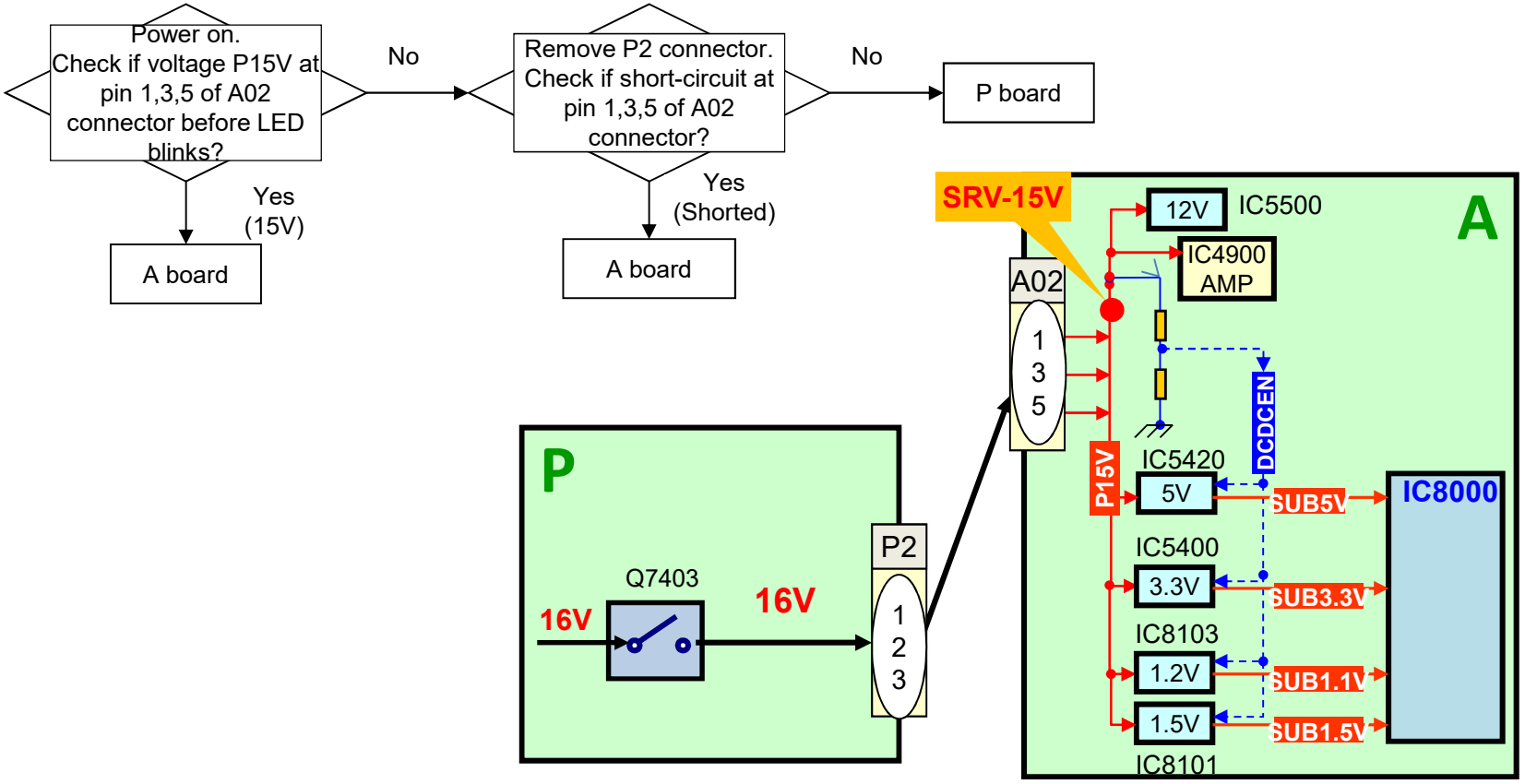
Troubleshooting for LED Blinking (Quick 1 / 3 time blink)

LED blinks	Detail error	Board may defect
Quick 1 / 3 **(only for Asia/Latin ES5**/6**)**	**Power on problem** **(No F15V/SUB3.3V/SUB1.5V voltage)**	**P/A**

F15V(16V) is supplied from P board. If the F15V /SUB voltage is not supplied

→ LED blinks quickly 1 or 3 times.

Ex. TH-**ES630** series

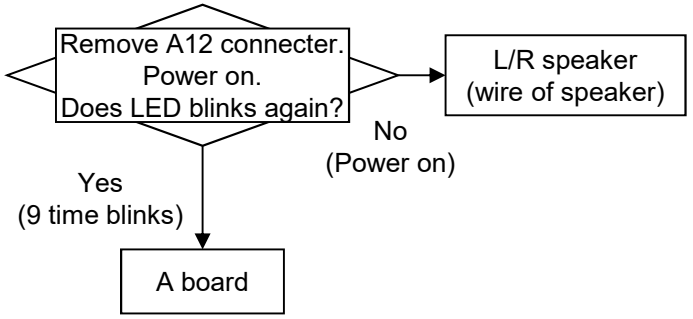


Troubleshooting for LED Blinking (9 time blink)

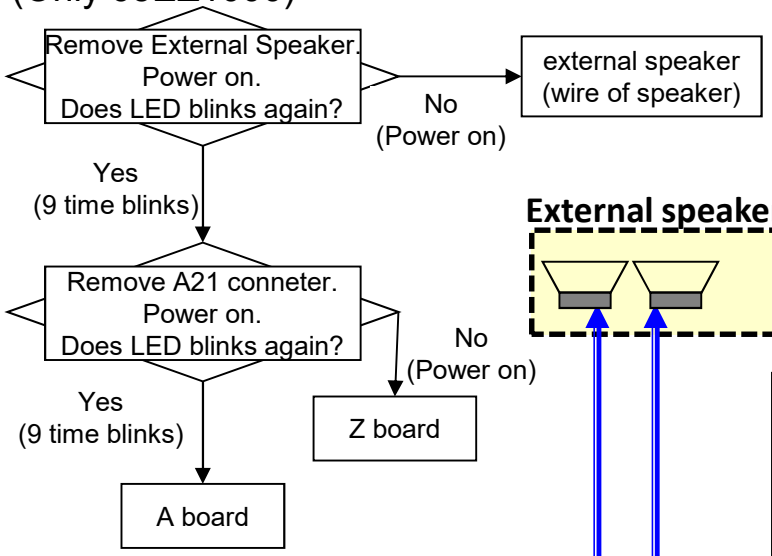
LED blinks	Detail error	Board may defect
9	Audio amplifier: SOUND_SOS	A/Speaker/Z

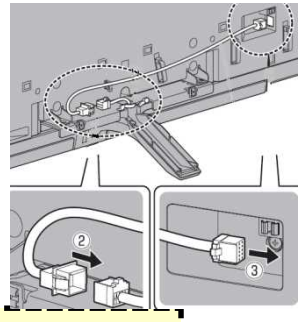
Audio amplifier is sourced power F15V from P board. If the amplifier work abnormally (may due to short-circuit or overload), the SOUND_SOS signal will go low level and be detected by IC8001 → LED blinks 9 times.

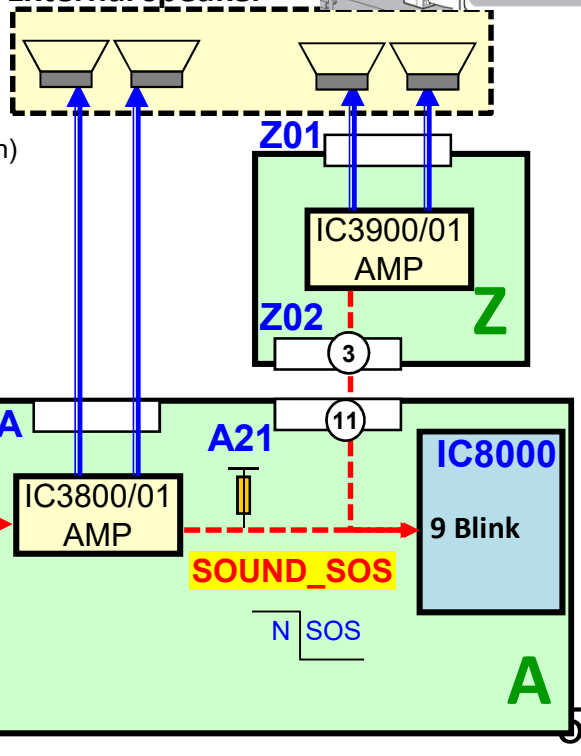
Ex. 49/55EX600**



(Only 65EZ1000)







Troubleshooting for LED Blinking (2/4/7/10/13/16 time blink)

LED blinks	Detail error	Board may defect
Quick 2 / 4 (only Asia/Latin ES5**/6**)	Memory (eMMC: IC8900) read problem	A (eMMC / Nand Flash)
7	No voltage SUB3.3V detected	A
10 (only EX750/780*, EZ* series)	FRC_SOS (Initialization of IC9000)	A (IC9000)
13	Emergency SOS	A (eMMC / Nand Flash)
16 (only EZ** series)	GCEX_SOS (IC4300)	A (IC4300)

Quick 2 / 4 blinks is problem about memory access (IC8900 or IC8000)

7 blinks is problem about the power line of SUB3.3V.

10 blinks is problem about initialization of FRC IC (IC9000).

13 blinks is problem about IC8000 and software issue.

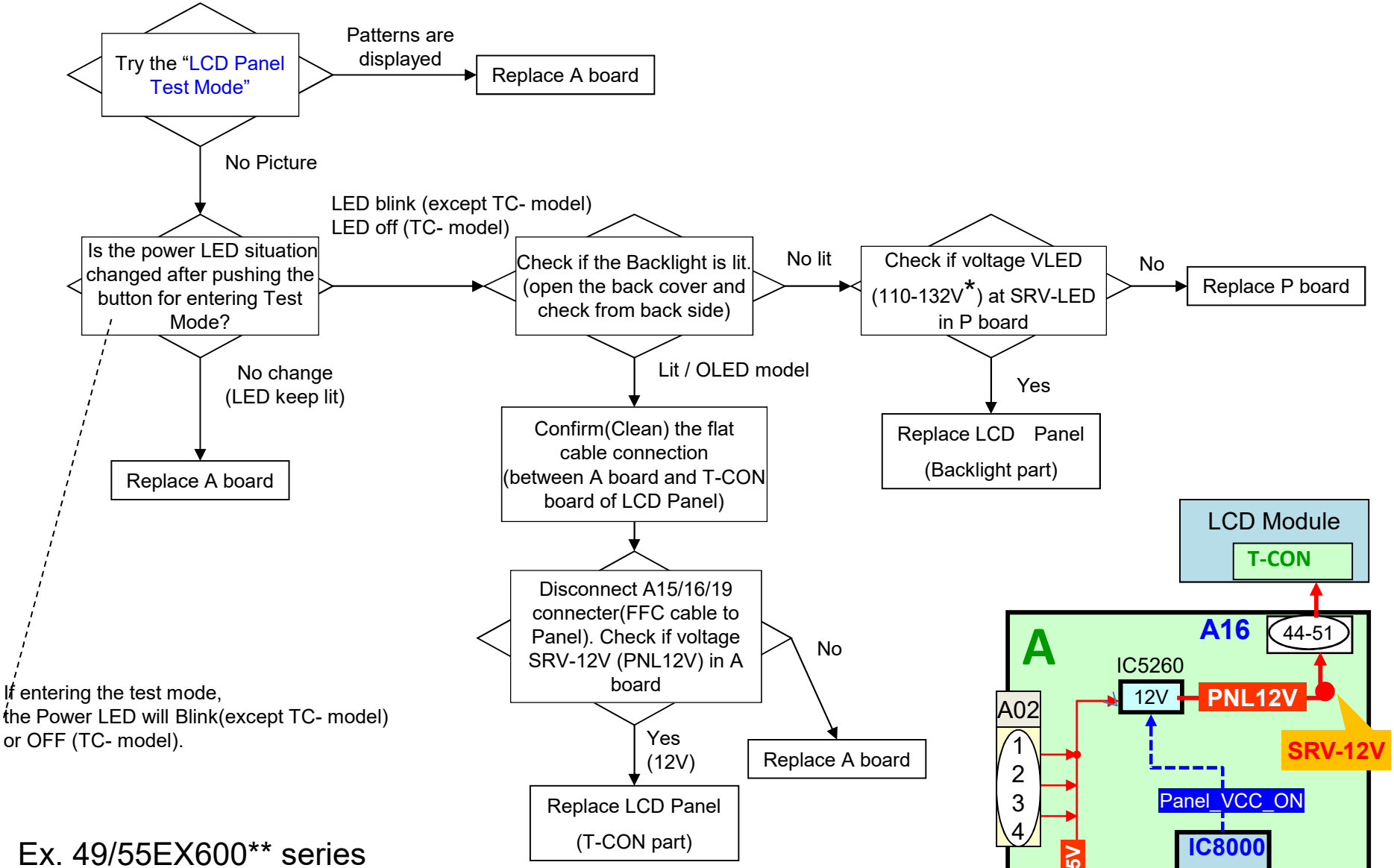
(mostly case **the memory (eMMC / NAND Flash) IC problem)**

16 blinks is problem about initialization of GCEX IC (IC4300).

IN THESE CASES, A BOARD DEFECTS

Troubleshooting for No Picture and No OSD (Power LED is lit = No blinking)

Refer to the block diagram of “Troubleshooting for LED Blinking (1 time blink)” page

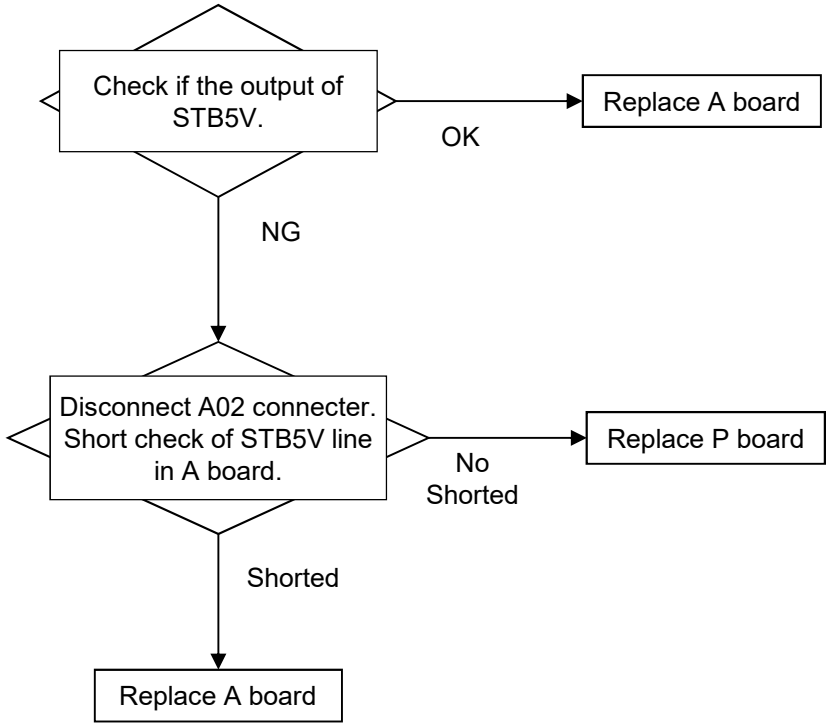


Ex. 49/55EX600** series

(*) The voltage of VLED is different by the LCD panel.

Troubleshooting for No Power On (Power LED is off = No blinking) -1

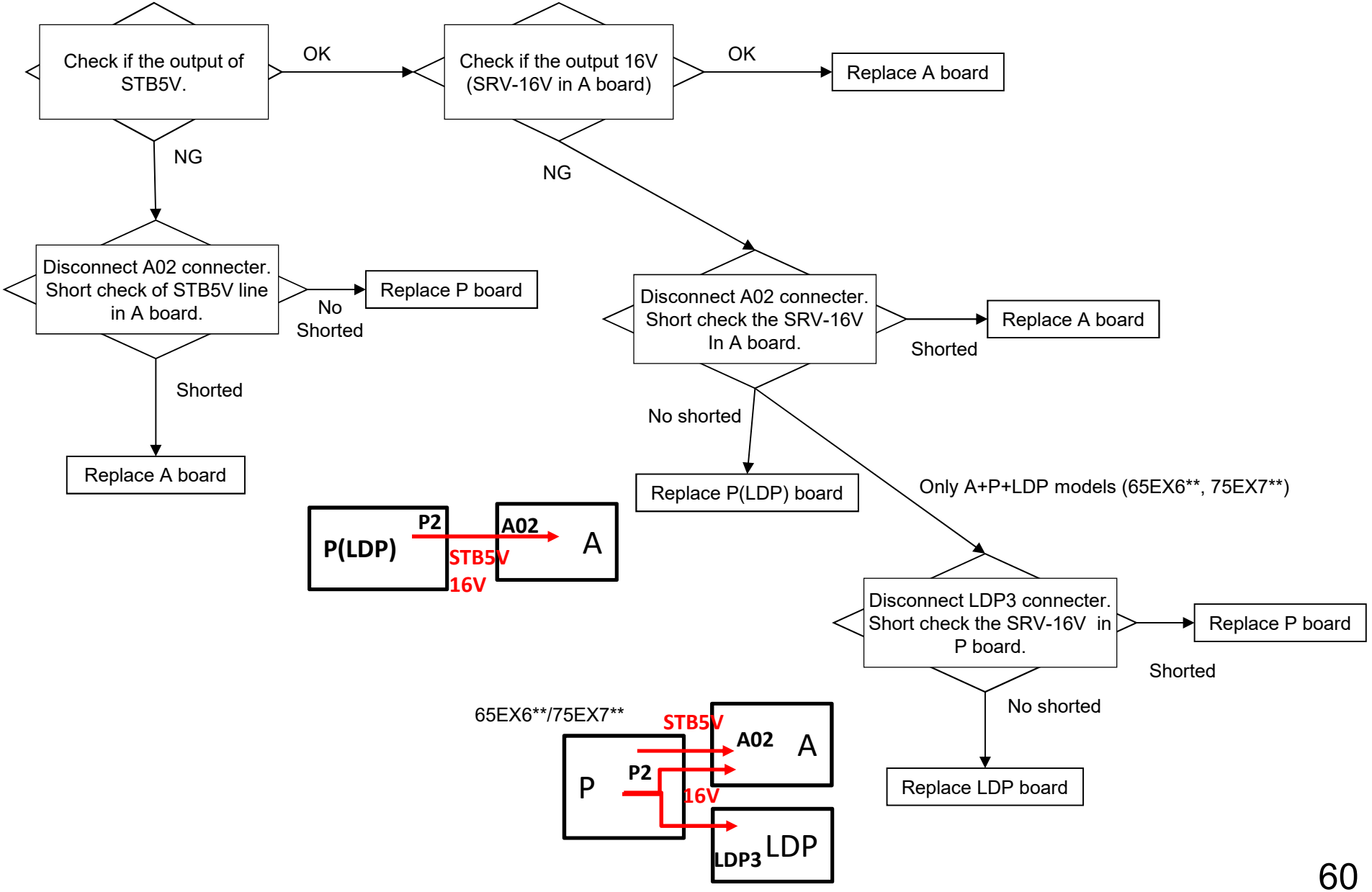
< E series >



Troubleshooting for No Power On (Power LED is off = No blinking) -2

< EX/ES/EZ series >

Both of STB5V and 16V are necessary before lighting power LED.
(refer to page 42 of “Simple Power On Sequence (EX/ES Series)”)



5. Information of OLED model

About OLED -1

OLED

■What is OLED?

OLED (Organic Light Emitting Diode)

Using an organic compound in the luminescent material, it is a kind of light-emitting element using a phenomenon called “Organic EL (organic electroluminescence)”.

The OLED is deposited organic materials to electrodes formed on a glass substrate, has a sandwiched structure with the electrodes, it is able to control the intensity with the current flow from the electrode.

Compared to the LCD, the advantages are,

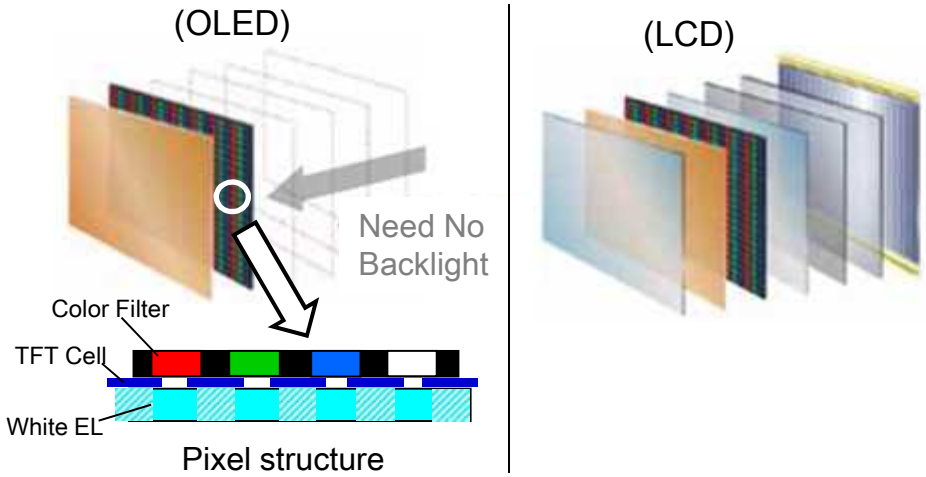
① Contrast improvement by self-luminous

② Lower power consumption

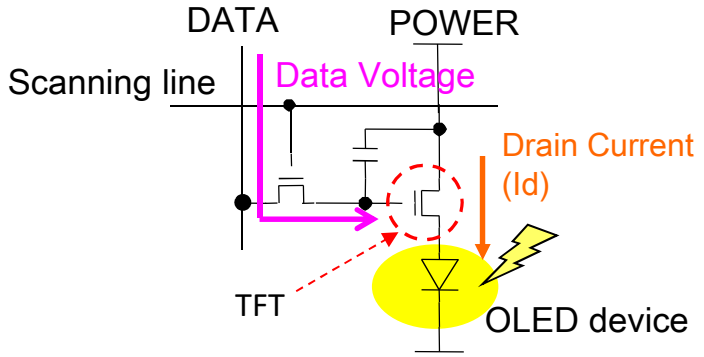
③ Excellent Response speed

■Panel structure

Slim & light-weight without backlight



■Light-emitting theory of OLED



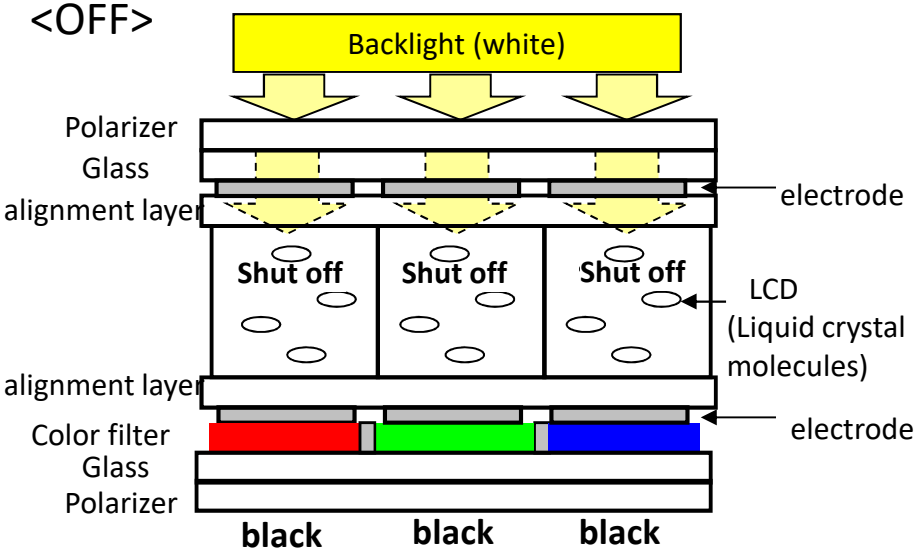
Each voltage supplied to "data line" and the "power line“ makes TFT "ON", the current flows to the OLED device and it emit light. Brightness of the device is controlled by the current value.

About OLED -2 (Difference of Structure between LCD and OLED)

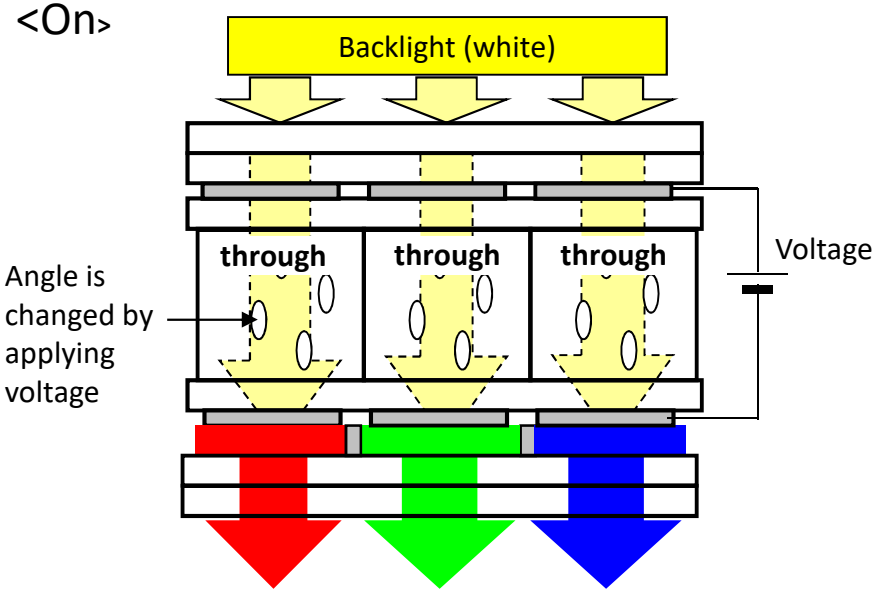
OLED

LCD/LED

<OFF>



<On>

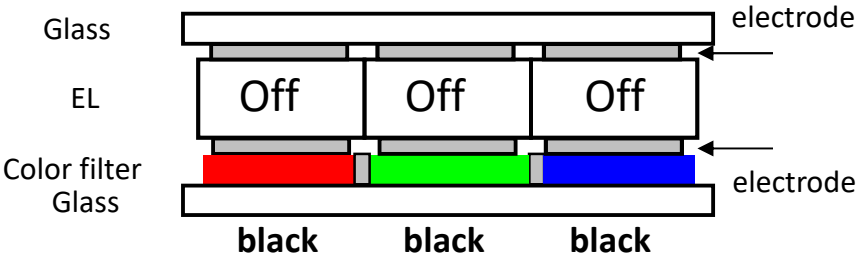


Backlight go through the LCD.

OLED

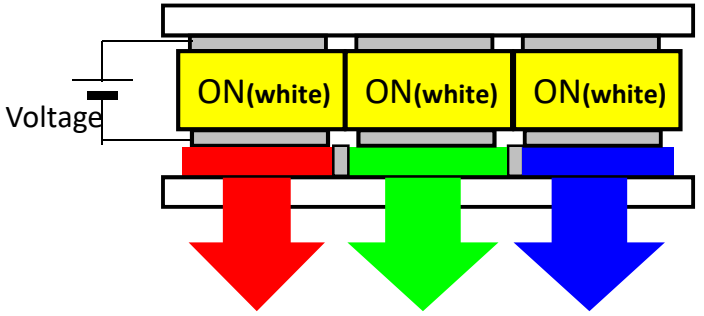
<OFF>

(No Backlight)



<On>

(No Backlight)



Material is lighting directly

Handling of OLED TV

OLED

1. Notes of handling the OLED TV

The thickness of the OLED TV is much thinner than that of LCD. The minimum thickness of OLED TV is about 7mm.
(There is no rear cover at top side.)
So the shape of OLED TV(panel) bends or undulates more easily than that of LCD.
When setting or moving OLED TV, it is necessary to handle politely and carefully.

2. Handling rule for Service

Handling area : Rear cover area (= Area where reinforcement parts are mounted on the back of panel)

EZ1000	EZ950
 (Handling NG) Panel upper side area w/o reinforcement parts (Handling OK) Rear cover area w/ reinforcement parts	 (Handling NG) Panel upper side area w/o reinforcement parts (Handling OK) Rear cover area w/ reinforcement parts

Handling NG

Example 1

*Not to move OLED TV (panel) in parallel position.

Example 2

*Not to move OLED TV (panel) with one hand grasping at upper side.

Panel Maintenance function-1

OLED

OLED model have Panel Maintenance function to reduce “image retention”.

1. What is Panel Maintenance function?

The use of the OLED panel for a long period causes no uniformity of charge in each OLED cell or degeneration of OLED light emission elements, and these are possible causes of "image retention“.
To reduce the "image retention", OLED models have Panel Maintenance function.
The Panel Maintenance works as necessary. There are two modes depending on TV operating time (“3 hours” or “1500 hours”).
Both modes are activated in stand-by mode after turned off the TV. During the panel maintenance, LED turns to orange.

2. Panel Maintenance function

2-1. Panel Maintenance-1 mode

This mode can reduce “image retention” caused by no uniformity of charge in each OLED cell. It reset the charge of each cell.

(Condition for activating Panel Maintenance-1 mode)

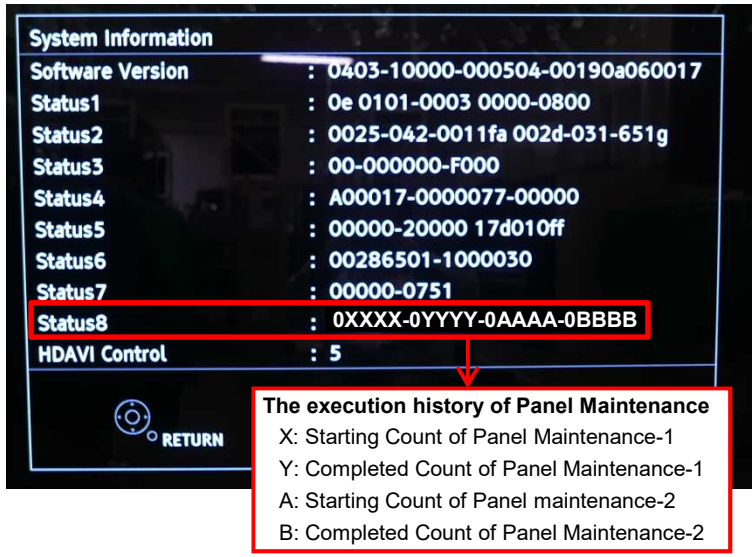
1. Whenever TV operating time passes total 3 hours or more and TV turns off by remote control, this mode is activated automatically.
2. When you select “Panel Maintenance” in Menu, this mode is always activated.

2- 2. Panel Maintenance-2 mode

This mode can reduce “image retention” caused by degeneration of OLED light emission elements. It revise the current for each cell.

(Condition for activating Panel Maintenance-2 mode)

1. Whenever TV operating time passes total 1500 hours or more, this mode can be activated once.
2. When you select “Panel Maintenance” in Menu, this mode is always activated.



Note: The execution history(Starting / Completed Count) of Panel Maintenance function can be confirmed in Main Menu > Help > System Information > Status8.

Panel Maintenance function-2

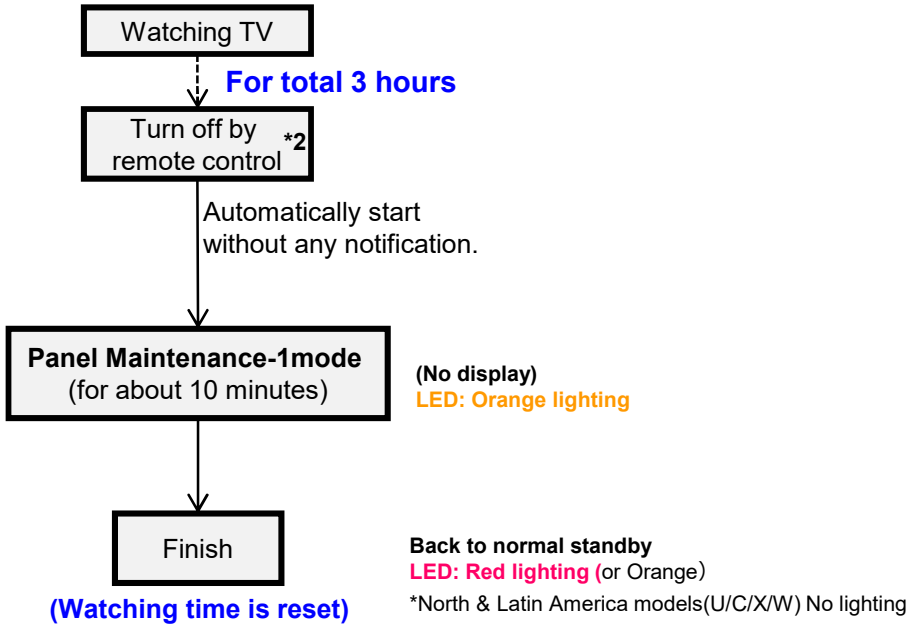
OLED

3. How to activate the Panel Maintenance function

3-1. Flow of Panel Maintenance-1 mode (It takes about 10 min.):

The Panel Maintenance-1 mode is automatically activated when the TV is turned off with remote control after watching TV for 3 hours or more.

1. TV turns off by remote control after watching TV for total 3 hours or more *1



*1: When TV operating time after Panel Maintenance-1 mode is within 3 hours, this mode is not activated.
*2: When the TV is turned off with mains power switch, this mode is not activated.

The customer don't notice about this mode. (Just LED is orange lighting.)

Panel Maintenance function-3

OLED

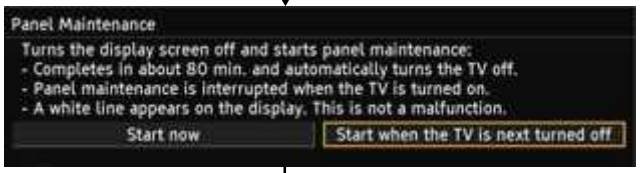
3-2. Flow of Panel Maintenance-2 mode (It takes about 80 min.) :There are 2 flows. One is executing manually from Menu.

The other is automatically activated when the TV is turned off with remote control after watching TV for 1500 hours or more.

If you have customer complaints for “image retention”, please activate the Panel Maintenance in Menu.

1. Menu of Panel Maintenance

Main Menu → Picture → Screen Settings → **“Panel Maintenance”**



Panel Maintenance-1 mode (for about 10 minutes)

(No display)
Power LED: Orange lighting

1 hour later
(Because of Panel cooling)

Panel Maintenance-2 mode (for about 1minute)

(screen)

LED: Orange lighting

Finish

(Watching time is reset)
(Power on next)

If power on after complete.

Panel maintenance is complete.

If power on before complete. *3

Panel maintenance has been interrupted. Please start again from the Panel Maintenance menu.

Back to normal standby
LED: Red lighting (or Orange)
*North & Latin America models(U/C/X/W) No lighting

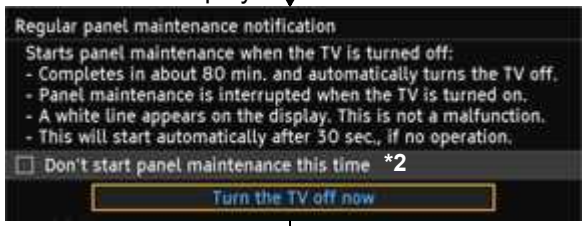
2. TV turns off by remote control after watching TV for total 1,500 hours or more

Watching TV

For total 1500 hours

TV turns off by remote control *1

The Notification is displayed



TV turns off automatically

(Note)
*1: When the TV is turned off with mains power switch, this mode is not activated.
*2: If checked “Don’t start… “, this OSD isn’t displayed when TV turns off until TV is operated for 1500 hours again.
*3: When the TV is turned on during activating this mode, this mode is stopped and cancelled.

Other Protect Function for Image Retention

OLED

>To avoid image retention, the screen saver may be activated (OLED logo moves) or the on-screen message may move after a few minutes if no signals are sent or no operations are performed.

>To avoid image retention, the screen may become dim when the motionless image is displayed.
The brightness of the screen returns to the previous level when the active image is displayed.

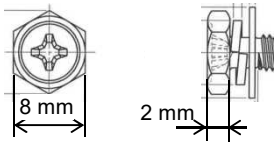
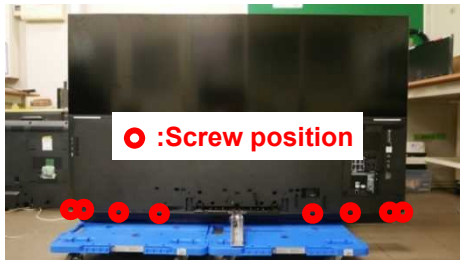
>The screen image is shifted by dot unit automatically when the “Pixel Orbiter” in setting menu is set to On.
(Main Menu→Picture→Screen Settings→ Pixel Orbiter : Shipping condition is On.)

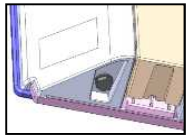
Service Information of OLED TV (Bottom Screw) -1

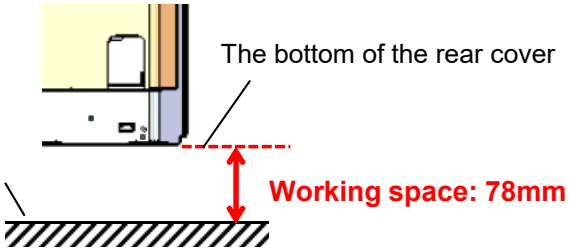
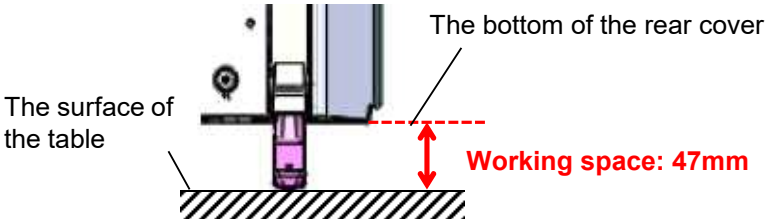
OLED

It is necessary to pay attention to handling to prevent OLED panel bending. We recommend standing position with pedestal when repairing. Some screws are placed on the bottom of the rear cover, it is difficult to remove them when standing with pedestal. We propose how to remove bottom screws in next page.

1. Specifications of Bottom screws

<table>
<tr><th></th><th>65EZ1000</th><th>65/55EZ950</th></tr>
<tr><td>Screw Type</td><td colspan="2">Cross recessed hexagon head screw (New)
 
</td></tr>
<tr><td>Specification of Bottom screws</td><td> 

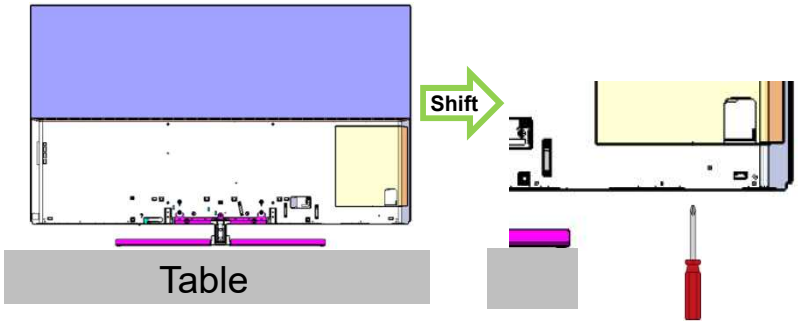
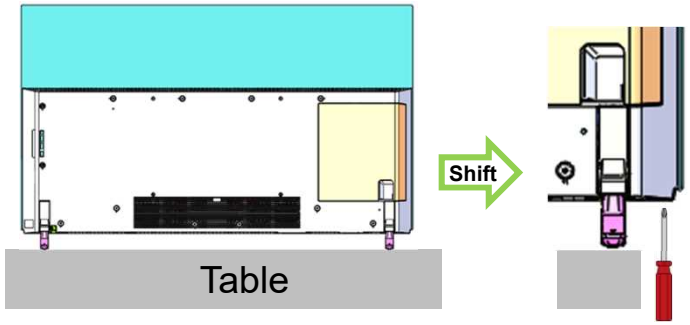
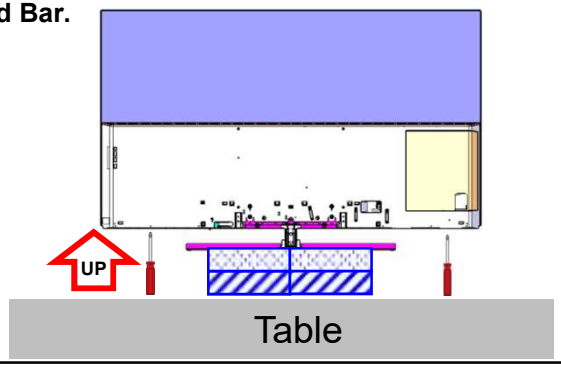
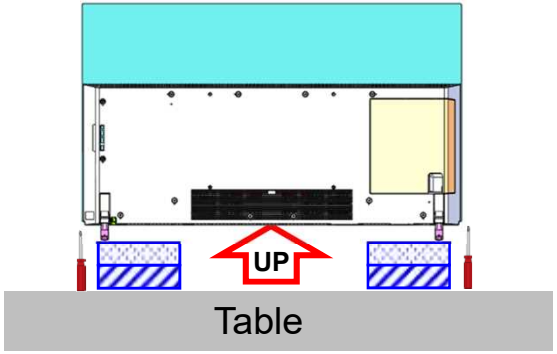
Total 8 pcs</td><td> 
 

Total 2 pcs</td></tr>
<tr><td>Working space</td><td>About 78mm
 
</td><td>About 47mm
 
</td></tr>
</table>

Service Information of OLED TV (Bottom Screw) -2

OLED

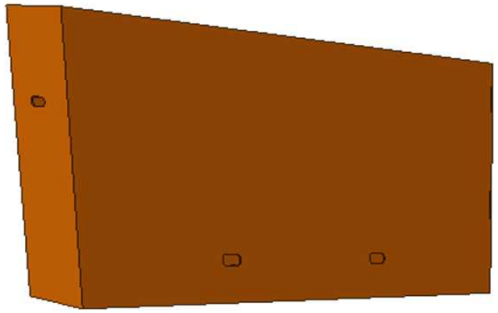
2. How to enlarge working space to remove the bottom screws

	65EZ1000	65/55EZ950
Example1 (2 person)	Lift one side of EZ1000 w/o Sound Bar 	Lift one side of EZ950 
Example2	Use ratchet type driver/wrench  	
Example3	Shift EZ1000 to the edge of the table w/o Sound Bar 	Shift EZ950 to the edge of the table 
Example4	Insert objects that become step between EZ1000 and the table w/o Sound Bar. 	Insert objects that become step between EZ950 and the table. 

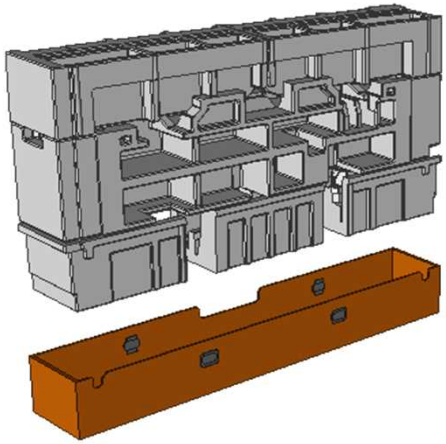
Package of the OLED Panel Module

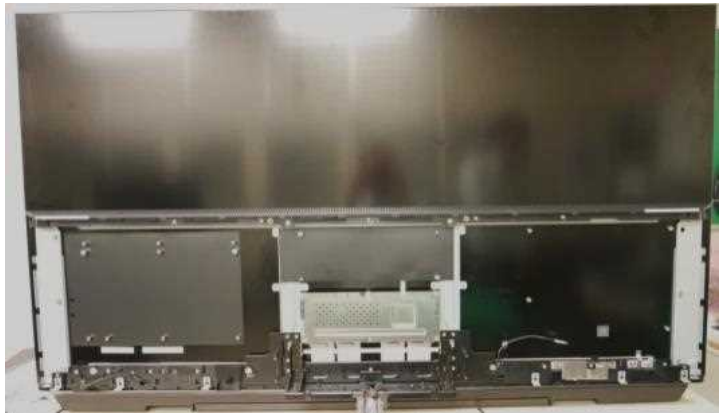
OLED

The package is same as that of product for avoiding the damage. Please take care about handling of panel module same as product.
The dummy rear cover is assembled, but it is only for protect purpose. Don’t use it for repair parts. The base metal parts are also assembled, it can be apply to repair .



Same as product package





Metal Parts