



**LG**

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# **LED MONITOR**

# **SERVICE MANUAL**

**CHASSIS : LM33A**

**MODEL : 32GR93U**

## **CAUTION**

BEFORE SERVICING THE CHASSIS, READ THE SAFETY PRECAUTIONS IN THIS MANUAL.

P/NO : MFL69413856(2305-REV00)

# 1. General Specification

- \*: 직접 작성하는 Item.
- \*: 목록에서 선택하는 Item. (선택항목이 목록에 없을시 담당자에게 추가 요청하여 Template Update)
- 파생모델 추가 시, Sheet 복사하여 추가 후 Sheet 명 변경. ex) 1. General Spec(파생모델명)

- \*: Item to write directly.
- \*: Item you select from the list. (If the selected item is not on the list, ask the person in charge to add it and update the template)
- When adding a derivative model, change the name of the sheet after copying and adding the sheet. ex) 1. General Spec (derivative model name)

No	Category	Item	Data	*Remark
1	General	*Customer	Brand	
		*User Model Name	32GR93U	
		*Sales region	Worldwide	
		*Chassis Name	LM33A	
		*Main PCB P/N	EAX70070301	

No	Category	Item	Data	*Remark
2	Display	*Module List	EAJ65858001	ME315QUM-NF1 / BOE
		*Supply Type	Module	
		*Active Area Diagonal Size(mm)	32	
		*Active Area Hor. Size(mm)	698.112	
		*Active Area Ver. Size(mm)	392.688	
		*Native Resolution	3840x2160	
		*Refresh Rate(Max)	144Hz	
		*Refresh Rate(Recommended)	144Hz	
		*Variable Refresh Rate Range	48-144Hz	
		*Panel Type	AH-IPS	
		*Backlight Type	Edge	
		*Backlight Dimming	Global Dimming	
		*Aspect Ratio	16:9	
		*Brightness (Typ.)(cd/m²)	400	
		*Color Gamut(Typ.)	DCI-P3 95%	
		*Color Depth (Panel)	1.07B	
		*Color Bit (Panel)	10bit	8bit + 2bit FRC
		*Contast Ratio(Typ.)	1000:1	
		*Contast Ratio(Min.)	700:1	
		*Response Time(Off)	5ms	
		*Response Time(ms)	1 / 3 / 4	Panel Spec Faster / Fast / Normal
		*Uniformity	75%	
		*Curved	NO	
		*Multi EDID	NO	
		*PBP	NO	
		*PIP	NO	
		*HDR	DisplayHDR 400	
		*Flicker Free	YES	
*LBL	NO			
*VESA ClearMR	NO			

No	Category	Item	*Support	*Range		*Tier / Spec	*Remark
				Min	Max		
3	Gaming Option	AMD FreeSync™	YES	48	144	FreeSync Premium	
		NVIDIA G-Sync®	YES	48	144	G-SYNC® Compatible	
		VESA AdaptiveSync	NO				
		*Motion Blur Reduction Lighting	NO				
			YES			Hexagonal	

No	Category	Interface	*Support	*Standard Version	*Position	*Port quantity	*Charging Spec (Max)	*Remark
4	Input Interface (Display)	HDMI	YES	DSC / 2.1 / 2.0 / 1.4	Rear	2		
		DP	YES	DSC / 1.4 / 1.2	Rear	1		
		USB-C	NO					
		Thunerbolt	NO					
		DVI	NO					
		D-sub	NO					
5	Output Interface (Display)	RJ45	NO					
		HDMI	NO					
		DP	NO					
		USB-C	NO					
6	USB Support (Peripheral)	Thunderbolt	NO					
		USB-A (Downstream)	YES	USB3.2 Gen1	Rear	2	5V/0.9A	5Gbps
			NO					
		USB-B (Upstream)	YES	USB3.2 Gen1	Rear	1		5Gbps
			NO					
	NO							
	NO							
	NO							

No	Category	Item	*Support	*Position	*Specification	*Remark
7	Audio	Head Phone	YES	Bottom	Digital AMP	w/ MIC
		DTS Headphone X	YES			
		Speaker	NO			
		RichBass	NO			
		MAXX AUDIO	NO			
		Optical Digital Audio(Out)	NO			
		Line Out	NO			
8	Local Key	Audio In	NO			
		Joystic	YES	Bottom		Up / Down / Left / Right / OK
		Tact	NO			
		Wheel	NO			
9	KVM	LED Indicator	YES	Bottom	Red	
		USB-B & USB-C	NO			
10	Auto Pivot	Auto Pivot	NO			

No	Category	Item	*Support	Applied Type	*Remark
11	Sensor Option	ALS	NO		
		FAN	YES	Internal	
		TEMP	NO		
		IR	NO		
		Webcam	NO		
		Gyro	NO		

No	Category	Item	*Provide	*Color	*Length	*Weight	*P/N	*Remark
12	Accessory	AccessoryBox	NO					
		Adapter	YES	Black			EAY63032212	19Vdc 5.79A 50~60Hz ADS-120QL-19A-3 190110E
		PSU	NO					
		Power Cord	YES	Black	1.55M		EAD62348835	
		Power Extention	NO					
		DP	YES	Black	1.8M		EAD65185308	Label : SK
		HDMI	YES	Black	1.8M		EAD65912803	HDMI 2.1 cable
		USB-C to C	NO					
		USB-A to B(2.0)	NO					
		USB-A to B(3.0)	YES	Black	1.8M		EAD65573101	
		Thunderbolt	NO					
		DVI	NO					
		D-Sub	NO					
		Remote Control Receiver	NO					
		Remote Controller	NO					
		Webcam Assembly	NO					
Color Calibrator	NO							
USB-C to A Gender	NO							

No	Category	Type	*Support	*Data	*Remark
13	Input Voltage			AC 100-240Vac~ 50/60Hz	
14	Power Rating	Adapter	YES	19V 5A	
		PSU	NO		

No	Category	Item	Data		*Remark
15	Reliability	MTBF	30,000 HRS with 90% confidence level		
		Using Altitude	10,000 feet(3,048m) for Reliability 40,000 feet(12,192m) for Storage / Shipment		
		Environment Condition	Operating	Temperature : 0°C - 40°C Humidity : Less than 80%	
Storage	Temperature : -20°C - 60°C Humidity : Less than 85%				

## 9. Signal Timing

↓ ↓ ↓ Place the cursor on the lower column (B4) and paste

### 1) HDMI

No.	Resolution	Horizontal Frequency (kHz)	Vertical Frequency (Hz)	polarity (H/V)	Remark	section	Dot Clock (MHz)	Total Period (E)	Display (A)	Front Porch (D)	Sync. (C)	Back Porch (B)
1	640 x 480	31.469	59.940	-/-		H(Pixels) V(Lines)	25.175	800	640	16	96	48
								525	480	10	2	33
2	800 x 600	37.879	60.317	+/+		H(Pixels) V(Lines)	40.000	1056	800	40	128	88
								628	600	1	4	23
3	1024 x 768	48.363	60.004	-/-		H(Pixels) V(Lines)	65.000	1344	1024	24	136	160
								806	768	3	6	29
4	1280 x 720	45.000	60.000	+/+		H(Pixels) V(Lines)	64.000	1440	1280	48	32	80
								741	720	3	5	13
5	1280 x 1024	79.976	75.025	+/+		H(Pixels) V(Lines)	135.000	1688	1280	16	144	248
								1066	1024	1	3	38
6	1920 x 1080	67.500	60.000	+/+		H(Pixels) V(Lines)	148.500	2200	1920	88	44	148
								1125	1080	4	5	36
7	1920 x 1080	66.587	59.934	+/-		H(Pixels) V(Lines)	138.500	2080	1920	48	32	80
								1111	1080	3	5	23
8	3840 x 2160	65.688	29.981	+/-	Recommended Timing - Input Compatibility Version : 1.4	H(Pixels) V(Lines)	262.750	4000	3840	48	32	80
								2191	2160	3	5	23
9	1920 x 1080	166.668	144.052	+/-		H(Pixels) V(Lines)	346.670	2080	1920	8	32	120
								1157	1080	63	8	6
10	2560 x 1440	182.996	119.998	+/-		H(Pixels) V(Lines)	497.750	2720	2560	48	32	80
								1525	1440	3	5	77
11	3840 x 2160	133.313	59.997	+/-	Recommend Timing - Input Compatibility Version : 2.1 (AV)	H(Pixels) V(Lines)	533.250	4000	3840	48	32	80
								2222	2160	3	5	54
12	2560 x 1440	222.268	144.050	+/-		H(Pixels) V(Lines)	604.570	2720	2560	8	32	120
								1543	1440	89	8	6
13	3840 x 2160	333.333	144.050	+/-	Recommend Timing - Input Compatibility Version : 2.1 (PC)	H(Pixels) V(Lines)	1333.330	4000	3840	8	32	120
								2314	2160	140	8	6

### 2) DP

No.	Resolution	Horizontal Frequency (kHz)	Vertical Frequency (Hz)	polarity (H/V)	Remark	section	Dot Clock (MHz)	Total Period (E)	Display (A)	Front Porch (D)	Sync. (C)	Back Porch (B)
1	640 x 480	31.469	59.940	-/-		H(Pixels) V(Lines)	25.175	800	640	16	96	48
								525	480	10	2	33
2	800 x 600	37.879	60.317	+/+		H(Pixels) V(Lines)	40.000	1056	800	40	128	88
								628	600	1	4	23
3	1024 x 768	48.363	60.004	-/-		H(Pixels) V(Lines)	65.000	1344	1024	24	136	160
								806	768	3	6	29
4	1280 x 720	45.000	60.000	+/+		H(Pixels) V(Lines)	64.000	1440	1280	48	32	80
								741	720	3	5	13
5	1280 x 1024	79.976	75.025	+/+		H(Pixels) V(Lines)	135.000	1688	1280	16	144	248
								1066	1024	1	3	38
6	1920 x 1080	67.500	60.000	+/+		H(Pixels) V(Lines)	148.500	2200	1920	88	44	148
								1125	1080	4	5	36
7	1920 x 1080	166.587	143.981	+/-		H(Pixels) V(Lines)	346.500	2080	1920	48	32	80
								1157	1080	3	5	69
8	3840 x 2160	133.313	59.997	+/-	Recommended Timing - Input Compatibility Version : 1.2	H(Pixels) V(Lines)	533.250	4000	3840	48	32	80
								2222	2160	3	5	54
9	2560 x 1440	222.151	143.973	+/-		H(Pixels) V(Lines)	604.250	2720	2560	48	32	80
								1543	1440	3	5	95
10	3840 x 2160	214.680	95.033	+/-		H(Pixels) V(Lines)	858.720	4000	3840	8	32	120
								2259	2160	85	8	6
11	3840 x 2160	268.438	119.999	+/-	Recommended Timing - Input Compatibility Version : 1.4	H(Pixels) V(Lines)	1073.750	4000	3840	8	32	120
								2237	2160	3	5	69
12	3840 x 2160	333.333	144.050	+/-	Recommended Timing - Input Compatibility Version : 1.4(DSC)	H(Pixels) V(Lines)	1333.330	4000	3840	8	32	120
								2314	2160	140	8	6

### 3) HDMI Video input (for Manual)

No.	Factory support mode (Preset Mode)	Horizontal Frequency (kHz)	Vertical Frequency (Hz)	VIC	Remark
1	480P	31.5	60	0x01	
2	720P	45	60	0x04	
3	1080P	67.5	60	0x10	
4	1080P	135	120	0x3F	
5	2160P	135	60	0x61	
6	2160P	255	120	0x76	

# SAFETY PRECAUTIONS

## IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by  $\triangle$  in the Exploded View.

It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent Shock, Fire, or other Hazards.

Do not modify the original design without permission of manufacturer.

### General Guidance

An **isolation Transformer should always be used** during the servicing of a receiver whose chassis is not isolated from the AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks.

It will also protect the receiver and its components from being damaged by accidental shorts of the circuitry that may be inadvertently introduced during the service operation.

If any fuse (or Fusible Resistor) in this TV receiver is blown, replace it with the specified.

When replacing a high wattage resistor (Oxide Metal Film Resistor, over 1 W), keep the resistor 10 mm away from PCB.

Keep wires away from high voltage or high temperature parts.

### Before returning the receiver to the customer,

always perform an **AC leakage current check** on the exposed metallic parts of the cabinet, such as antennas, terminals, etc., to be sure the set is safe to operate without damage of electrical shock.

### Leakage Current Cold Check(Antenna Cold Check)

With the instrument AC plug removed from AC source, connect an electrical jumper across the two AC plug prongs. Place the AC switch in the on position, connect one lead of ohm-meter to the AC plug prongs tied together and touch other ohm-meter lead in turn to each exposed metallic parts such as antenna terminals, phone jacks, etc.

If the exposed metallic part has a return path to the chassis, the measured resistance should be between 1 M $\Omega$  and 5.2 M $\Omega$ .

When the exposed metal has no return path to the chassis the reading must be infinite.

An other abnormality exists that must be corrected before the receiver is returned to the customer.

### Leakage Current Hot Check (See below Figure)

Plug the AC cord directly into the AC outlet.

### Do not use a line Isolation Transformer during this check.

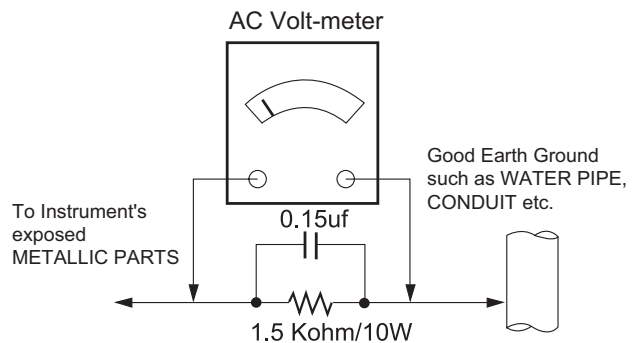
Connect 1.5 K / 10 watt resistor in parallel with a 0.15 uF capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.

Measure the AC voltage across the resistor using AC voltmeter with 1000 ohms/volt or more sensitivity.

Reverse plug the AC cord into the AC outlet and repeat AC voltage measurements for each exposed metallic part. Any voltage measured must not exceed 0.75 volt RMS which corresponds to 0.5 mA.

In case any measurement is out of the limits specified, there is possibility of shock hazard and the set must be checked and repaired before it is returned to the customer.

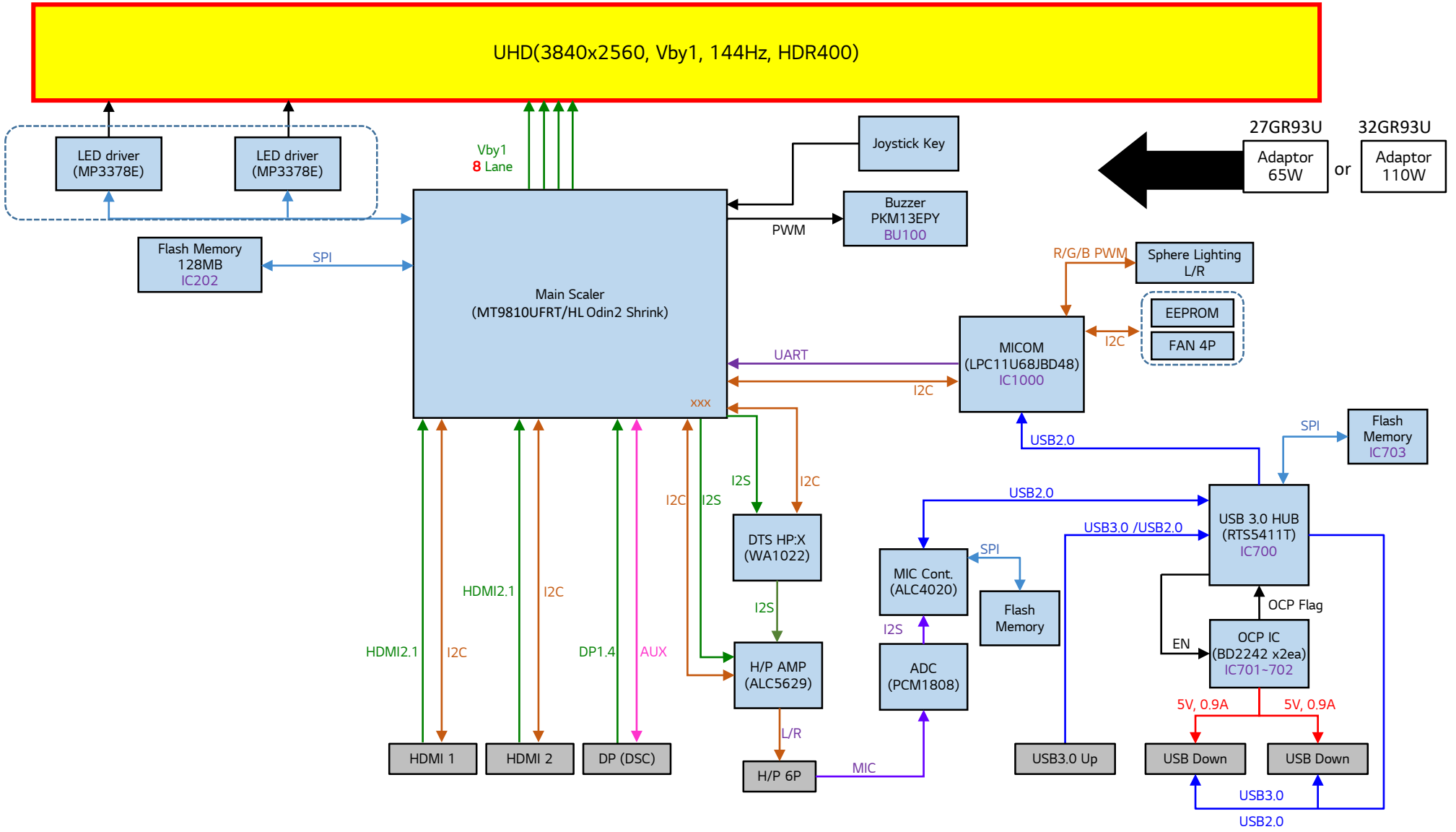
### Leakage Current Hot Check circuit



When 25A is impressed between Earth and 2nd Ground for 1 second, Resistance must be less than 0.1

\*Base on Adjustment standard

# Block Diagram – 27GR93U/32GR93U



# EXPLODED VIEW

## IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by  $\Delta$  in the EXPLODED VIEW.

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