HITACHI

No. 0504

CML170SXW

SERVICE MANUAL
MANUEL D'ENTRETIEN
WARTUNGSHANDBUCH

CAUTION:
Before servicing this chassis, it is important that the service technician read the "Safety Precautions" and "Product Safety Notices" in this service manual.

ATTENTION:
Avant d'effectuer l'entretien du châassis, le technicien doit lire les «Précautions de sécurité» et les «Notices de sécurité du produit» présentés dans le présent manuel.

VORSICHT:
Vor Öffnen des Gehäuses hat der Service-Ingenieur die „Sicherheitshinweise" und „Hinweise zur Produktsicherheit" in diesem Wartungshandbuch zu lesen.

Data contained within this Service manual is subject to alteration for improvement.

Les données fournies dans le présent manuel d'entretien peuvent faire l'objet de modifications en vue de perfectionner le produit.

Die in diesem Wartungshandbuch enthaltenen Spezifikationen können sich zwecks Verbesserungen ändern.

October 2000

ENGLISH

SAFETY PRECAUTIONS

WARNING: The following precautions must be observed.

ALL PRODUCTS

Before any service is performed on the chassis an isolation transformer should be inserted between the power line and the product.

1. When replacing the chassis in the cabinet, ensure all the protective devices are put back in place.
2. When service is required, observe the original lead dressing. Extra precaution should be taken to ensure correct lead dressing in any high voltage circuitry area.
3. Many electrical and mechanical parts in HITACHI products have special safety related characteristics. These characteristics are often not evident from visual inspection, nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified by marking with a ⚠ on the schematics and the replacement parts list.
   The use of a substitute replacement component that does not have the same safety characteristics as the HITACHI recommended replacement one, shown in the parts list, may create electrical shock, fire, X-radiation, or other hazards.
4. Always replace original spacers and maintain lead lengths. Furthermore, where a short circuit has occurred, replace those components that indicate evidence of overheating.
5. Insulation resistance should not be less than 2M ohms at 500V DC between the main poles and any accessible metal parts.
6. No flashover or breakdown should occur during the dielectric strength test, applying 3kV AC or 4.25kV DC for two seconds between the main poles and accessible metal parts.
7. Before returning a serviced product to the customer, the service technician must thoroughly test the unit to be certain that it is completely safe to operate without danger of electrical shock. The service technician must make sure that no protective device built into the instrument by the manufacturer has become defective, or inadvertently damaged during servicing.

CE MARK

1. HITACHI products may contain the CE mark on the rating plate indicating that the product contains parts that have been specifically approved to provide electromagnetic compatibility to designated levels.
2. When replacing any part in this product, please use only the correct part itemised in the parts list to ensure this standard is maintained, and take care to replace lead dressing to its original state, as this can have a bearing on the electromagnetic radiation/immunity.

PICTURE TUBE

1. The line output stage can develop voltages in excess of 25kV; if the E.H.T. cap is required to be removed, discharge the anode to chassis via a high value resistor, prior to its removal from the picture tube.
2. High voltage should always be kept at the rated value of the chassis and no higher. Operating at higher voltages may cause a failure of the picture tube or high voltage supply, and also, under certain circumstances could produce X-radiation levels moderately in excess of design levels. The high voltage must not, under any circumstances, exceed 29kV on the chassis (except for projection Televisions).
3. The primary source of X-radiation in the product is the picture tube. The picture tube utilised for the above mentioned function in this chassis is specially constructed to limit X-radiation. For continued X-radiation protection, replace tube with the same type as the original HITACHI approved type
4. Keep the picture tube away from the body while handling. Do not install, remove, or handle the picture tube in any manner unless shatterproof goggles are worn. People not so equipped should be kept away while picture tubes are handled

LASERS

If the product contains a laser avoid direct exposure to the beam when the cover is open or when interlocks are defeated or have failed.

FRANÇAIS
CONSIGNES DE SECURITE

AVERTISSEMENT: vous devez respecter les précautions suivantes

POUR TOUS LES PRODUITS

Avant d'effectuer une intervention d'entretien sur le châssis, vous devez insérer un transformateur d'isolement entre la ligne d'alimentation électrique et le produit.

1. Lors de la remontage du châssis dans le coffret, vérifiez que tous les dispositifs de protection sont remis en place.
2. Lorsqu'une intervention d'entretien s'avère nécessaire, respectez l'agencement d'origine des conducteurs. Vous devez prendre des précautions supplémentaires pour garantir un agencement correct des conducteurs dans toutes les zones où des circuits haute tension sont présents.
3. De nombreux composants électriques et mécaniques des appareils HITACHI ont des caractéristiques spéciales de sécurité. Bien souvent, ces caractéristiques ne sont pas évidentes lors d'un examen visuel et la protection qu'ils offrent n'est pas forcément garantie si vous utilisez des composants de rechange conçus, par exemple, pour une tension plus élevée, une puissance plus forte. Les pièces de rechange qui offrent des caractéristiques spéciales de sécurité sont identifiées par un repérage comportant le symbole ⚠ sur les schémas et sur la nomenclature des pièces de rechange. L'emploi d'un composant de rechange qui ne respecte pas les mêmes caractéristiques de sécurité que la pièce de rechange que recommande HITACHI et qui figure dans la nomenclature risque de provoquer un choc électrique, un incendie, des rayons X ou d'autres dangers.
4. Remettez toujours en place les entretoises d'origine et respectez la longueur des conduites. En outre, à la suite d'un court-circuit, remplacez les composants présentant des signes de surchauffe.
5. La résistance d'isolement doit être supérieure ou égale à 2 méga ohms à 500 V c.c. entre les pôles principaux et des composants métalliques accessibles, quels qu'ils soient.
6. Aucun claquage et aucune rupture ne doit se produire pendant l'essai de résistance diélectrique à la suite de l'application d'une tension de 3 kV c.a. ou de 4,35 kV c.c. pendant deux secondes entre les pôles principaux et des composants métalliques accessibles.
7. Avant de remettre au client un produit qui a fait l'objet d'un entretien, le technicien qui s'est chargé de cette intervention doit tester à fond cet ensemble pour s'assurer qu'il ne présente aucun danger opérationnel et aucun risque de choc électrique. Ce technicien doit s'assurer qu'aucun des dispositifs de protection intégrés à cet instrument par le fabricant n'est défectueux ou n'a été endommagé de façon accidentelle lors de l'entretien.

LABEL CE

1. Les produits HITACHI peuvent avoir reçu le label CE qui figure sur la plaque signalétique pour indiquer que cet ensemble contient des composants qui ont fait l'objet d'une homologation spécifique de respect des normes de compatibilité électromagnétique en fonction de niveaux bien spécifiés.
2. Lors du remplacement d'un des composants de ce produit, utilisez uniquement le composant correct identifié dans la nomenclature afin de maintenir le respect de cette norme ; en outre, vous devez également ramener l'agencement des conducteurs à son état d'origine car cela peut avoir une influence au niveau des rayonnements électromagnétiques et sur la protection contre ces rayons.

PICTURE TUBE

1. L'étage de sortie des lignes peut développer des tensions de plus de 25 kV ; s'il faut retirer le chapeau de protection contre les tensions extrêmement élevées, il convient de décharger l'anode contre le châssis par le biais d'une résistance de forte valeur avant de déposer ce chapeau du tube image.
2. La haute tension doit toujours se maintenir à la valeur nominale du châssis et ne pas dépasser cette dernière. Un fonctionnement à des températures élevées peut provoquer une défaillance du tube image ou l'entrée d'une tension élevée. Dans certains cas, cela peut même provoquer des rayons X d'un niveau légèrement supérieur aux valeurs de calcul. Cette haute tension ne doit en aucun cas dépasser 29 kV sur le châssis (à l'exception des téléviseurs de projection).
3. La principale source de rayons X de cet appareil est le tube image. Le tube image employé pour assurer la fonction susmentionnée dans ce châssis est spécialement construit pour limiter des rayons X. Pour maintenir cette protection contre les rayons X, il faut remplacer le tube d'origine d'un type agréé par HITACHI par un autre tube de même type.
4. Lors des manipulations, ne tenez jamais le tube image contre le corps. Pendant toutes les opérations d'installation, de dépose et de manipulation de ce tube image, quelle que soit la méthode employée, vous devez toujours porter des lunettes de sécurité anti-éclatements. Les personnes qui ne portent pas ce type de lunettes doivent se tenir à l'écart du tube image lors de la manipulation de ce dernier.

RAYONS LASER

Si ce produit contient un rayon laser, évitez toute exposition directe à ce faisceau lors de l'ouverture du couvercle ou lors de l'élimination des verrouillages de sécurité ou après défaillance de ces verrouillages.

DEUTSCH

SICHERHEITSVORKEHRUNGEN

WARNUNG: Die folgenden Vorkehrungen müssen eingehalten werden.

ALLE PRODUKTE

Bevor die Grundplatte gewartet wird, sollte ein Trenntrafo zwischen die Netzleitung und das Produkt eingebracht werden.

1. Wenn die Grundplatte in das Gehäuse zurückgestellt wird, stellen Sie sicher, dass alle Schutzvorrichtungen wieder an ihrem Ort sind.
2. Wenn Wartung erforderlich ist, halten Sie die originale Verdrahtungsart ein. Besondere Vorsicht ist nötig, um die korrekte Verdrahtungsart in jedem Hochspannungsstromkreis zu gewährleisten.
3. Viele elektrische und mechanische Teile von HITACHI Produkten haben besondere sicherheitsbezogene Eigenschaften. Diese Eigenschaften fallen oft nicht ins Auge, aber der durch sie gewährte Schutz kann nicht unbedingt erreicht werden, wenn man Ersatzteile benutzt, die für höhere Spannung, Leistung usw. ausgelegt sind. Ersatzteile, die diese besonderen Sicherheitsmerkmale haben, sind in den Prinzipskizzen und Ersatzteillisten an einem ⚠ zu erkennen.
   Der Gebrauch von Ersatzteilen, die nicht dieselben Sicherheitsmerkmale haben wie die empfohlenen HITACHI Ersatzteile, wie sie in der Ersatzteilliste aufgeführt sind, kann zu elektrischem Schlag, Feuer, Röntgenstrahlung und anderen Gefahren führen.
4. Immer die originalen Abstandsstücke ersetzen und die Leitungslängen beibehalten. Wo ein Kurzschluss passiert ist, die Teile ersetzen, bei denen Überhitzung nachzuweisen ist.
5. Der Isolierwert sollte bei 500 V Gleichstrom zwischen den Hauptpolen und allen zugänglichen Metallteilen nicht unter 2M Ohm liegen.
6. Bei der Prüfung auf Durchschlagsfestigkeit sollte kein Überschlag oder Durchschlag vorkommen, wenn zwei Sekunden lang 3 kV Wechselstrom oder 4,25 kV Gleichstrom zwischen den Hauptpolen und allen zugänglichen Metallteilen angelegt wird.
7. Bevor das gewartete Produkt dem Kunden zurückgegeben wird, muss der Wartungstechniker das Gerät gründlich prüfen, um sicherzustellen, dass es betriebssicher ist ohne das Risiko eines elektrischen Schlages. Der Wartungstechniker muss sicherstellen, dass keine vom Hersteller im Gerät eingebaute Schutzvorkehrung schadhaft geworden ist oder bei der Wartung unabsichtlich beschädigt wurde.

CE KENNZEICHEN

1. HITACHI Produkte enthalten eventuell das CE Kennzeichen auf dem Leistungsschild, welches angibt, dass das Produkt Teile enthält, die eigens zugelassen sind, um bis zu einem spezifizierten Niveau elektromagnetische Störfreiheit zu bewirken.
2. Wenn Sie irgendein Teil in diesem Produkt ersetzen, benutzen Sie bitte nur das korrekte Teil, das in der Ersatzteilliste aufgeführt ist, um sicherzustellen, dass dieser Standard eingehalten wird, und geben Sie acht, die Verdrahtungsart in ihren ursprünglichen Zustand zurück zu versetzen, weil das einen Einfluss auf die elektromagnetische Abstrahlung/Störsicherheit haben kann.

BILDRÖHRE

1. Die Leitungsausgangsstufe kann Spannungen von mehr als 25 kV entwickeln; wenn die Höchstspannungskappe entfernt werden muss, entladen Sie die Anode zum Gehäuse über einen hochohmigen Widerstand, bevor Sie sie aus der Bildröhre entfernen.
2. Hochspannung sollte immer auf den festgelegten Wert des Gehäuses beschränkt bleiben und nicht mehr. Betrieb bei höherer Spannung kann zum Versagen der Bildröhre oder zu hoher Spannungszufuhr führen und kann unter Umständen auch Röntgenstrahlung hervorbringen, die leicht über dem Konstruktionsniveau liegt. Die Hochspannung darf auf keinen Fall 29 kV am Gehäuse überschreiten (außer bei Projektionsfernsehern).
3. Die Hauptquelle der Röntgenstrahlung im Produkt ist die Bildröhre. Die Bildröhre, die für die oben erwähnte Funktion in diesem Gehäuse benutzt wird, ist eine Spezialkonstruktion zur Begrenzung der Röntgenstrahlung. Um den Schutz vor der Röntgenstrahlung zu behalten, ersetzen Sie bitte die Röhre durch denselben Typ wie den ursprünglichen von HITACHI zugelassenen.
8. Halten Sie die Bildröhre bei der Handhabung vom Körper weg. Sie dürfen die Bildröhre nur dann installieren, entfernen oder handhaben, wenn Sie eine nicht splitternde Schutzbrille tragen. Personen ohne derartigen Schutz sollten ferngehalten werden, solange Bildröhren gehandhabt werden.

LASER

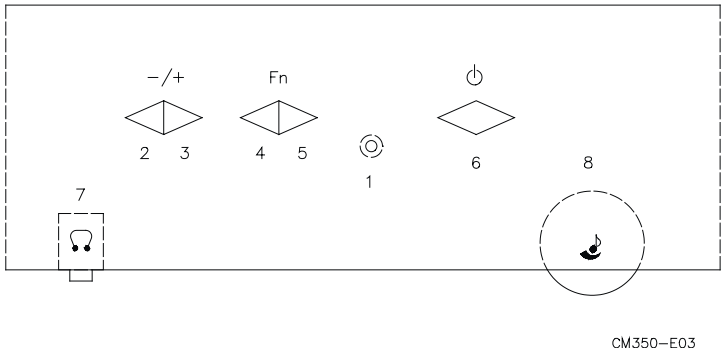
Wenn das Produkt einen Laser enthält, setzen Sie sich keinesfalls direkt dem Strahl aus, wenn die Abdeckung geöffnet ist oder wenn die Verriegelung versagt.

1. ELECTRICAL REQUIREMENTS

A. LCD Panel Specification

Display:	17 inch (17" viewable image size): active matrix: thin film transistor (TFT): liquid crystal display (LCD): 0.264 mm dot pitch: R.G.B. Vertical stripe 200 cd//m^2 white luminance, typical: 200:1 contrast ratio, Min.
Compatibility:	640 x 350: VGA-350 720 x 400: VGA text 640 x 400: VGA-GRAPH 640 x 480: VGA, 60Hz to 75 Hz vertical refresh rate 800 x 600: 56Hz to 75 Hz vertical refresh rate 1024 x 768 non-interlaced: 60Hz to 75 Hz vertical refresh rate 1280 x 1024 non-interlaced: 60Hz to 75 Hz vertical refresh rate
Synchronization Frequencies:	Horizontal: 24 kHz to 80 kHz Vertical: 56 Hz to 75 Hz Pixel Frequency: 21 Mhz 135 Mhz
Resolution:	Horizontal: 1280 dots Vertical: 1024 lines
Active Display Area:	Horizontal: 337.92 mm Vertical: 270.34 mm
Viewing Angles:	Up 40deg down 80deg (TYP) Left 60deg, Right 80deg (TYP) CR ≥ 10
Display Colors:	16,777,216 (with FRC)
Power Supply:	AC 100 to 240V worldwide input, 50 / 60Hz
Power Consumption:	Typical: 25W on mode +10 / -25%
Environmental:	Operating temperature: 0ºC to 50ºC Storage temperature: -20ºC to 65ºC Relative Humidity: 20%~80%

B. CONTROLS



B-1 Control panel (monitor front panel)

1. *Power LED*
2. *Adjust decrease.*
3. *Adjust increase.*
4. *Function select counter-clockwise.*
5. *Function select clockwise.*
6. *Power ON/OFF switch, push to ON and push to OFF. (toggle switch)*
7. *Ear phone jack.*
8. *Volume Control.*

C. Power Management

C-1 Power Management

1. Meet VESA DPMS proposal

2. Power Consumption

Meet VESA DPMS Proposal

On mode	54 Wmax	Green
Stand-by	5 Wmax	Yellow
Suspend	5 Wmax	Yellow
Off mode	5 Wmax	Yellow
DC power off	5 Wmax	Dark
disconnection	5 Wmax	Dark (DC power off) Yellow (DC power on)

- Power saving states are measured with speakers attached but not worked.
- The recovery time from stand by /suspend/off mode to on mode is 3 seconds maximun.

C-2 Power Consumption

Meet VESA DPMS Proposal

On mode	54 Wmax
Stand-by	5 Wmax
Suspend	5 Wmax
Off mode	5 Wmax
DC power off	5 Wmax
disconnection	5 Wmax

1. Measured from AC input end of AC power adapter.
2. Power saving states are measured with speakers attached but not worked.

D. Display Modes for Inspections

D-1 Supported Timing

TIMING	FH(KHZ) FV(HZ)	SYNC POLARITY	TOTAL (DOT/LINE)	ACTIVE (DOT/LINE)	SYNC WIDTH (DOT/LINE)	FRONT PORCH (DOT/LINE)	BACK PORCH (DOT/LINE)	PIXEL FOREQ.(MHZ)
640x350	31.469	+	800	640	96	16	48	25.175
VGA-350	70.087	-	449	350	2	37	60	
640x400	24.83	-	848	640	64	64	80	21.05
NEC PC9801	56.42	-	440	400	8	7	25	
640x400	31.469	-	800	640	96	16	48	25.175
VGA-GRAPH	70.087	+	449	400	2	12	35	
640x400	31.5	-	800	640	64	16	80	25.197
NEC PC9821	70.15	-	449	400	2	13	34	
640x480	31.469	-	800	640	96	16	48	25.175
VGA-480	59.94	-	525	480	2	10	33	
640x480	35	-	832	640	40	24	128	31.5
APPLE MAC-480	66.67	-	520	480	3	9	28	
640x480	37.861	-	832	640	40	16	120	31.5
VESA-480-72Hz	72.809	-	520	480	3	1	20	
640x480	37.5	-	840	640	64	16	120	31.5
VESA-480-75Hz	75	-	500	480	3	1	16	
720x400	31.469	-	900	720	108	18	54	28.322
VGA-400-TEXT	70.087	+	449	400	2	12	35	
832x624	49.725	-	1152	832	64	32	224	57.2832
APPLE MAC-800	74.55	-	667	624	3	1	39	
800x600	35.156	+	1024	800	72	24	128	36
SVGA	56.25	+	625	600	2	1	22	
800x600	37.879	+	1056	800	128	40	88	40
VESA-600-60Hz	60.317	+	628	600	4	1	23	
800x600	48.077	+	1040	800	120	56	64	50
VESA-600-72Hz	72.188	+	666	600	6	37	23	
800x600	46.875	+	1056	800	80	16	160	49.5
VESA-600-75Hz	75	+	625	600	3	1	21	
1024x768	48.363	-	1344	1024	136	24	160	65
XGA	60.004	-	806	768	6	3	29	
1024x768	53.964	+	1328	1024	176	16	112	71.664
COMPAQ-XGA	66.132	+	816	768	4	8	36	
1024x768	56.476	-	1328	1024	136	24	144	75
VESA-768-70Hz	70.069	-	806	768	6	3	29	
1024x768	60.023	+	1312	1024	96	16	176	78.75
VESA-768-75Hz	75.029	+	800	768	3	1	28	
1024x768	60.24	-	1328	1024	96	32	176	80
APPLE MAC-768	75.02	-	803	768	3	3	29	
1280x1024	64	+	1688	1280	112	48	248	108
VESA-1024-60Hz	60	+	1066	1024	3	1	38	
1280x1024	80	+	1688	1280	144	16	248	135
VESA-1024-75Hz	75	+	1066	1024	3	1	38	

If the input timing is not a supported timing listed above but within the supported frequency range (Horizontal:80KHz,Vertical:85Hz),this monitor will select a closest mode instead,But the display quality may not be optimized.

2. VL-701 DISPLAY CONTROL BOARD

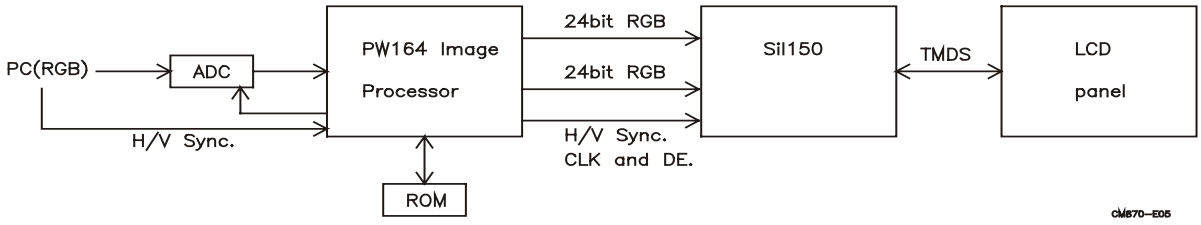
A. Description

The VL-701 display control board is design to directly convert the analog RGB signals from standard VGA display card to optimum LCD timing signals so as to construct a high display quality LCD monitor.

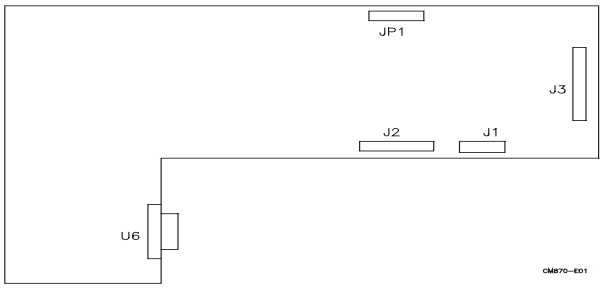
B. Features

- On board embedded micro-processor to detect display timings and control user functions.
- Using Pixelworks design to generate optimum LCD timings.
- Using E^2PROM to memorize every adjusted parameter.
- support up to 22 display modes from VGA to SXGA.
- Offer full screen expansion function on non-SXGA mode (automatic).
- flexible color temperature selection function including 9300,6500 and user mode.
- Support OSD functions.
- Support VESA DPMS function.
- Support DDC1/2B functions.
- Support 5 languages for OSD description.
- The longest time for mode change is 3 seconds.

C. BLOCK DIAGRAM



D. Connector Locations



E. Connector Type

Location	Type	Maker	Number of pins
U6	DZ11A91-L8 P1.524	FEMALE	15
JP1	85205-1200	ACES	12
J1	85205-1400	ACES	4
J2	85205-1000	ACES	10
J3	DF14A-25P P1.25	HRS	25

F. Connector pin assignment

F-1 U6

Pin NO.	Signal	Comment
1	R-Video	Red Video Input.
2	G-Video	Green Video Input.
3	B-Video	Blue Video Input.
4	N. C.	
5	PCDETECT	PCDETECT Input.
6	Ground	Ground.
7	Ground	Ground.
8	Ground	Ground
9	5VCC	DDC Power Input.
10	Ground	Ground.
11	NC	
12	SDA	DDC 1/2B
13	HS	Horizontal Sync Input.
14	VS	Vertical Sync Input.
15	SCL	DDC 2B

F-2 J3

Terminal No.	*Symbol*	*Function*
1	*VDD*	*5V POWER SUPPLY*
2	*VDD*	*5V POWER SUPPLY*
3	*VDD*	*5V POWER SUPPLY*
4	*VDD*	*5V POWER SUPPLY*
5	*VDD*	*5V POWER SUPPLY*
6	*VDD*	*5V POWER SUPPLY*
7	*NC*	*NC*
8	*GND*	*Ground*
9	*GND*	*Ground*
10	*TXC-*	*TMDS output data pairs*
11	*TXC+*	*TMDS output data pairs*
12	*GND*	*Ground*
13	*GND*	*Ground*
14	*TX0-*	*TMDS output data pairs*
15	*TX0+*	*TMDS output data pairs*
16	*GND*	*Ground*
17	*GND*	*Ground*
18	*TX1-*	*TMDS output data pairs*
19	*TX1+*	*TMDS output data pairs*
20	*GND*	*Ground*
21	*GND*	*Ground*
22	*TX2-*	*TMDS output data pairs*
23	*TX2+*	*TMDS output data pairs*
24	*GND*	*Ground*
25	*GND*	*Ground*

F-3 JP1

Pin NO.	Signal	Comment
1,2,3	12 VCC	Inverter Power Output.
4	BLON	Bright Light ON/OFF.
5,6,10,11,12	GND	GND
7,8	5 VCC	Inverter Power Output.
9	BRIGHT	Brightness Adjustment.

F-4 J1

Pin NO.	Signal	Comment
1	12 VCC	12 VCC Power Input
2	5 VCC	5V Power Input
3	GND	GND
4	GND	GND

F-5 J2

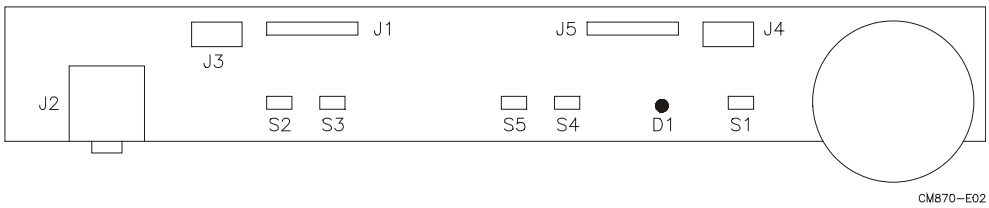
Pin NO.	Signal	Comment
1	MUTE	Volume adjust power input
2	LED-Y	Power saving mode
3	LED-G	Monitor is ON
4	GND	GND
5	KEY-UP	Function select counter-clockwise key
6	KEY-DOWN	Function select counter-clockwise key
7	KEY-R	Adjust up key
8	KEY-L	Adjust down key
9	KEY-POWER	Power ON/OFF key
10	GND	GND

3. VK-515 Control Panel and Audio Board

A. Description

The VK-515 is designed to offer an user interfaced control panel which passes and receives signals to and from VL-701 display control board. Also there is a stereo audio amplifier to drive a pair of speakers .When in power saving mode the audio circuit can be turned off by the control signal from VL-701 board.

B. Connector and Switch Locations



C. Connector type

Location	Type	Maker	Number of pins
J1	96113-0813	E&T	8
J2	SCJ-0348-C	SC	9
J3	87502-0200	ACES	2
J4	87502-0200	ACES	2
J5	96113-1013	E&T	10

D. Connector pin Assignment

D-1 J1

Pin NO.	Signal	Comment
1	VOL	Audio Volume Adjust
2,5,8	GND	GND
3	OUTL -	Left side audio signal
4	OUTL +	Left side audio signal
6	OUTL -	Right side audio signal
7	OUTL +	Right side audio signal

D-2 J5

Pin NO.	Signal	Comment
1	MUTE	Volume adjust power input.
2	LED-Y	Power saving mode.
3	LED-G	Monitor on mode.
4,10	GND	
5	KEY-UP	Function select up to VL-701
6	KEY-DOWN	Function select down to VL-701
7	KEY-R	Function select right to VL-701
8	KEY-L	Function select left to VL-701
9	KEY-PWR	Power ON/OFF signal to VL-701

D-3 J3 and J4

Pin NO.	Signal	Comment
1	LO (RO)	Speaker out
2	OUTL - (OUTR-)	Speaker out

D-4 J2

Pin NO.	Signal	I/O Comment
1	GND	Ground
2	LI 2	Earphone out L
3	RI 2	Earphone out R
4	LI 1	Earphone out L
5	LO	Speaker out L
6	NC	No connector
7	RI 1	Earphone out R
8	RO	Speaker out R

D-5 Switch definition

Location	Definition
S1	Power ON/OFF
S2	Function select by clockwise direction
S3	Function select by counter-clockwise direction
S4	Adjust up
S5	Adjust down

D-6 LED definition

Location	Definition
D1	Green for ON mode; Dark for DC power off; Yellow for stand by; suspend; off mode.

D-7 Variable resistor

VR1:Volume control, clockwise for increasing; counter-clockwise for decreasing

D-8 Electrical characteristics (Tamb=25°)

Audio amplifier (Use Panasonic VP-7723A Audio Analyzor).

Item	Audio Input	Freq.	Spec.			Comment
			Min.	Typ.	Max.	
Input Voltage(V)			11.4	12	12.6	
Input Current(mA)				500	800	
Audio Voltage Gain	500mVrms	1KHz			14dB	Volume Max.,load 8 Ω
Frequency Response	100mVrms	50Hz~20KHz	-3dB		+3dB	Volume Max.,load 8 Ω
Signaal to Noise ratio	500mVrms	1KHz			-70dB	Volume Max.,load 8 Ω
Cross talk	100mVrms	1KHz			-60dB	Volume Max.,load 8 Ω
Distortion	500mVrms	1KHz			1%	Volume Max.,load 8 Ω
Output Watt.	500mVrms	1KHz			0.5W	Volume Max.,load 8 Ω
Volume Control						Analog

4. VM-515 POWER and AUDIO

A. Major Specification

Input voltage: 12V±5% from adapter (LSE 9901B1260)

Inout current: 5A max.

Output:

ITEM	Output Voltage	Max Load.	Min Load	Tolerance	Ripple & Noise(max)
VCC	+5.1V	1.9A	0.19A	±5%	150mVpp

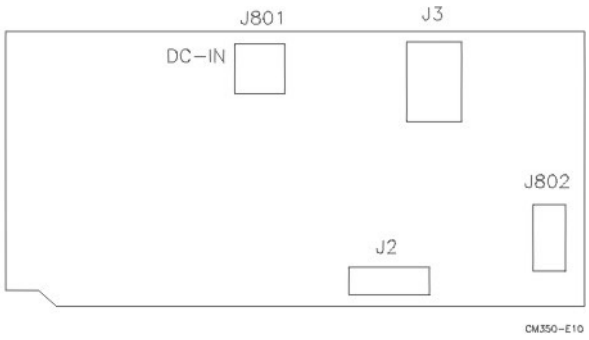
B. Description

The VM-515 is designed to supply the power to the VL-701 display control board. Under the control of VL-701, it can run into power saving mode so that saving the power of the whole monitor.

C. Efficiency:

80%min. at Maximum Load.

D. Connector Locations



E. Connector type

Location	Type	Maker	Number of pins
J801	DC-IN	SC	2
J802	B4B-XH-A	JST	4
J2	96113-0803	E&T	8
J3	SCJ-0345-1-X-S	SCJ	3

F. Connector pin Assignment

F-1 J801 DC 12V Input

Pin No	Signal	Comment
Pin 1	+12V	From adapter output cable
Pin 2	GND	From adapter output cable

F-2 J802 FOR I/F CKT

Pin No	Signal	Comment
Pin 1	+12V	From adapter +12V power
Pin 2	+5.1V	Supply for I/F CKT
Pin 3, 4	GND	GND

F-3 J2 FOR K/B SPEAKER

Pin No	Signal	Comment
Pin 1	VoL	Adjustment audio volume.
Pin 2, 5, 8	GND	GND
Pin 3	OUTL -	Audio output L -
Pin 4	OUTL +	Audio output L +
Pin 6	OUTR -	Audio output R -
Pin 7	OUTR +	Audio output R +

F-4 J3 AUDIO INPUT

Pin No	Signal	Comment
Pin 1	GND	GND
Pin 2	IN-R	Audio input R
Pin 3	IN-L	Audio input L

5. PK07006700/AMBIT T51I036.00 INVERTER BOARD

A. Description

The T51I036.00 Inverter board is designed for lighting up the back-lights of LCD module.

B. Electrical characteristics (FOR SAMSUNG PANEL/LT170E2-131)

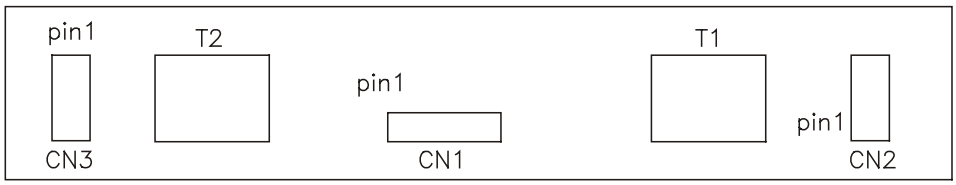
	MIN.	TYP.	MAX.	COMMENT
INPUT VOLTAGE	11.4V	12V	12.6V	12V±5%
INPUT CURRENT	--------	2A	--------	Vin=12V MAX. BRIGHTNESS Vbrite=0V
NO LOAD BACKLIGHT VOLTAGE	--------	690V rms.	--------	
LAMP CURRENT	6.2mA	13mA rms.	13.6mArms	
DRIVING FREQUENCY	40KHz	--------	60KHz	
EFFICIENCY	--------	78%	--------	Vin = 12V,max brightness
Operating Life Time	20,000	-------	--------	Hours (note)
PWM dimming frequency	120HZ	140HZ	160HZ.	
Brightness range	170cd/□	200cd/□	--------	
Vbrite	0V	--------	5V	0V, brightness max
Vin On/ OFF sequence	--------	0.5Sec	--------	
OLP Time	--------	1Sec	--------	Open Lamp protection time
Duty control	20%	--------	100%	
Strike voltage at 0° C	--------	--------	1420Vrms	
Strike voltage at 25° C	--------	--------	1100Vrms	

Note:

Life time(Hr) can be defined as the time in which it continues to operate under the condition:
Ta=25±2°C, I_L=13.0mArms until one of the following event occurs:

1. When the brightness becomes 50% above
2. When the startup voltage (Vs) at 0°C becomes higher than the maximal value of Vs specified above

C. Connector locations



CM870-E04

D. Connector pin Assignment

D-1 CN1(ACES, 85205-1200 12P)

Pin NO.	Signal	Comment
1,2,3	BP+	+12V
5,6,10,11,12	GND	GND
4	BLT_ON	Back-light ON/OFF control , high active(5V)
7	+5VS	+5VS
9	BRITE	BRITE Brightness (0-5V)control from I/F 0V for max. brightness
8	NC	NC

D-2 CN2,CN3 (JST SM04(4.0)B-BHS-14P)

Pin NO.	Signal	Comment
1	HV	High voltage for lamp
2	HV	High voltage for lamp
3	NC	NC
4	LV	Low voltage (common)

6. AC Adapter(LSE9901B1260)

A-1 Quick specification review

- Input voltage
  Single phase, 50/60HZ, 100VAC to 240VAC ±10%
- Input current
  1.5A (max), at 90VAC input and full load 0.75A (max), at 264 VAC input and full load.
- Inrush current @ cold start
  30A(0-peak)@ 110Vac ,50A(0-peak) @ 220Vac
- Output

	Tolerance	Output Current		Volt Tolerance
Output Volt	-	MIN	MAX	
+12Vdc	±5%	0A	5A	11.4~12.6Vdc

- Total output power: 60 Watt max.
- Efficiency
  80% min. @115V/230VAC, maximum load.
- Dimension: 110Lx63Wx31H

7. CIRCUIT DESCRPTION

A. Display-Controller

The U12 is image processor. The functions of the CHIP support as below:

1. Hight quality image scalar
2. On-Chip 16 bit Microprocessor
3. On screen display
4. Automatic image optimizer

B. Circuit of Plug and Play

Plug and play allows the serial communication of host PC and peripherals offering minimal configurations to end users. This monitor supports DDC2B communication protocal.

C. System Clock

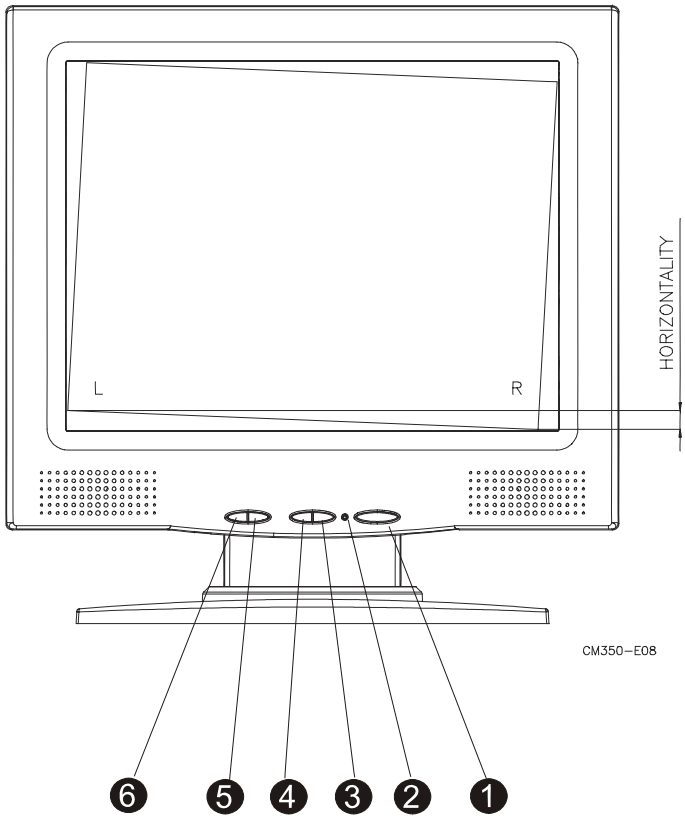
The U15(130MHz)&U16(96 MHz) support U12 reference clock.

D. Power Regulator

1. The U1 (AMC7585) & U3(AME 8800)are linear requlator that transfer input voltage from 5V to 3.3V.
2. The U2 (AMC317T) is linear requlator that transfer input voltage from 5V to 2.5V.

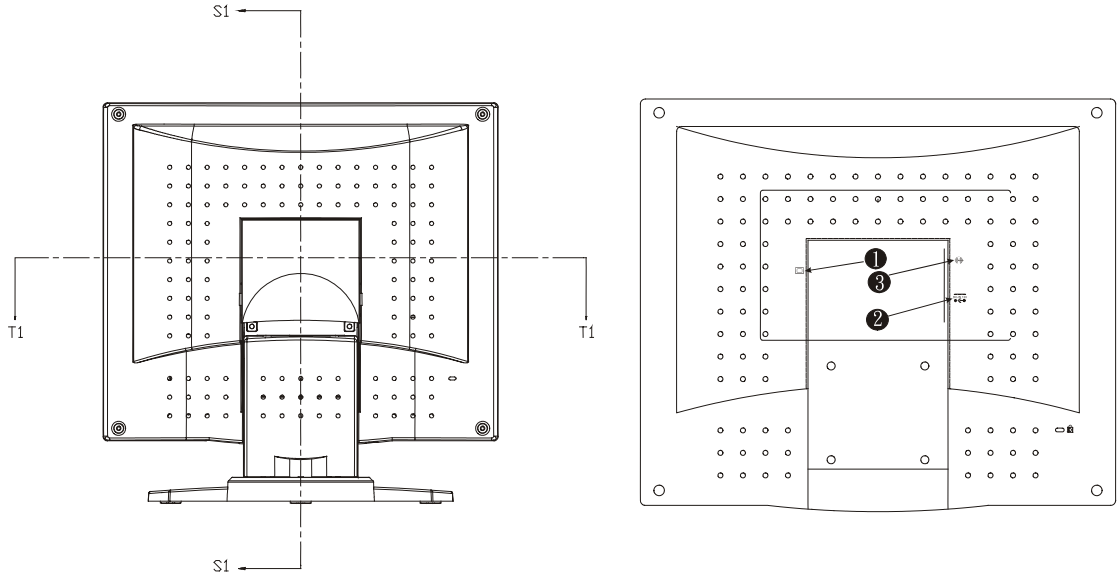
8. Introduction

A. Front Panel Control and Led



Front Panel Controls		
Item	**Control**	**Function**
1	Power Switch	Turns the monitor on and off.
2	Power LED	1. Green indicates monitor is turns on. 2. Dark indicates DC power off. 3. Yellow indicates stand-by, suspend, off mode.
3 4	Function Button	Launches OSD function menu circully
5	Plus Button	Selects and adjusts the functions
6	Minus Button	Selects and adjusts the functions

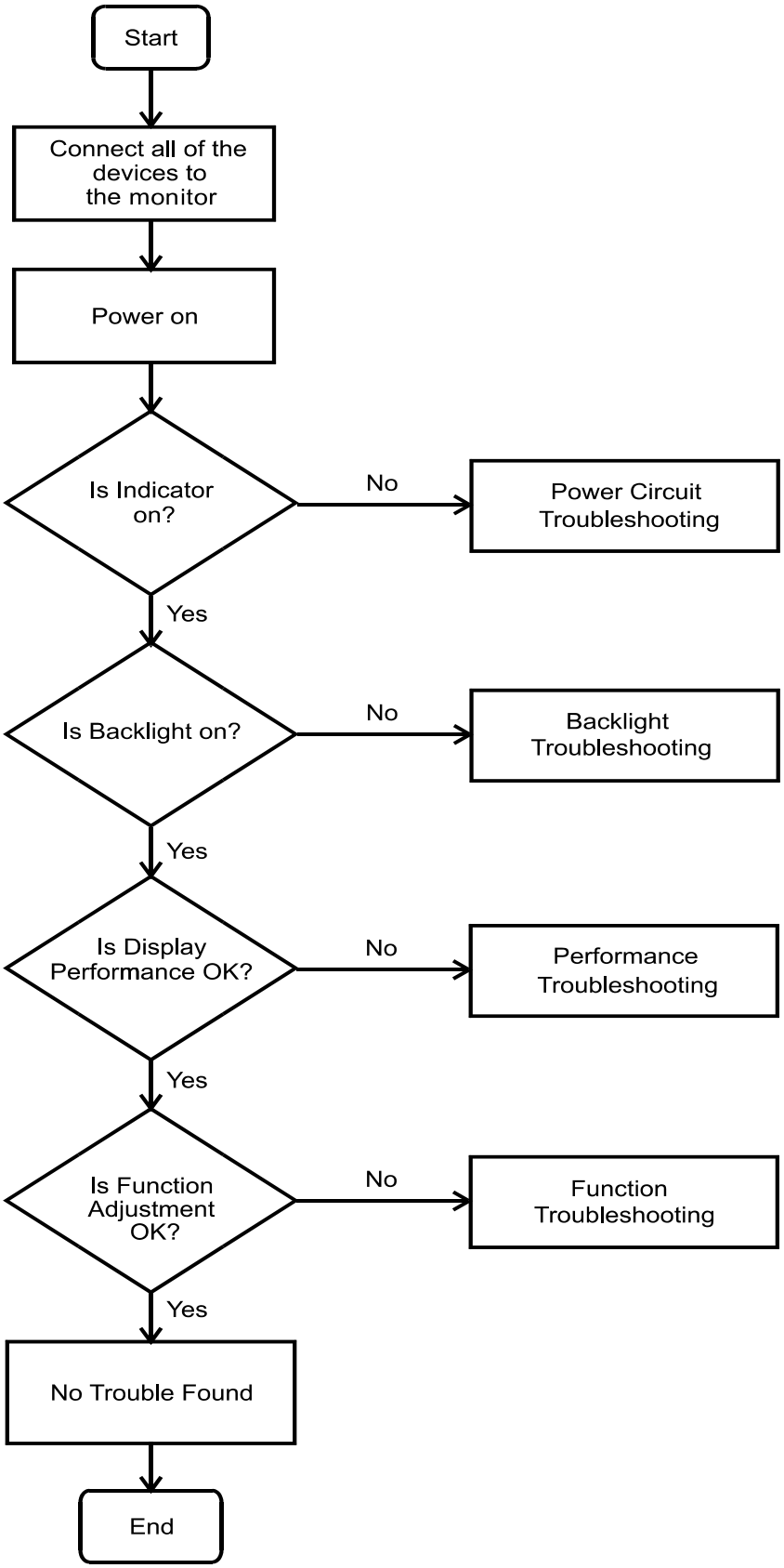
B. Rear Panel connector Input Signals



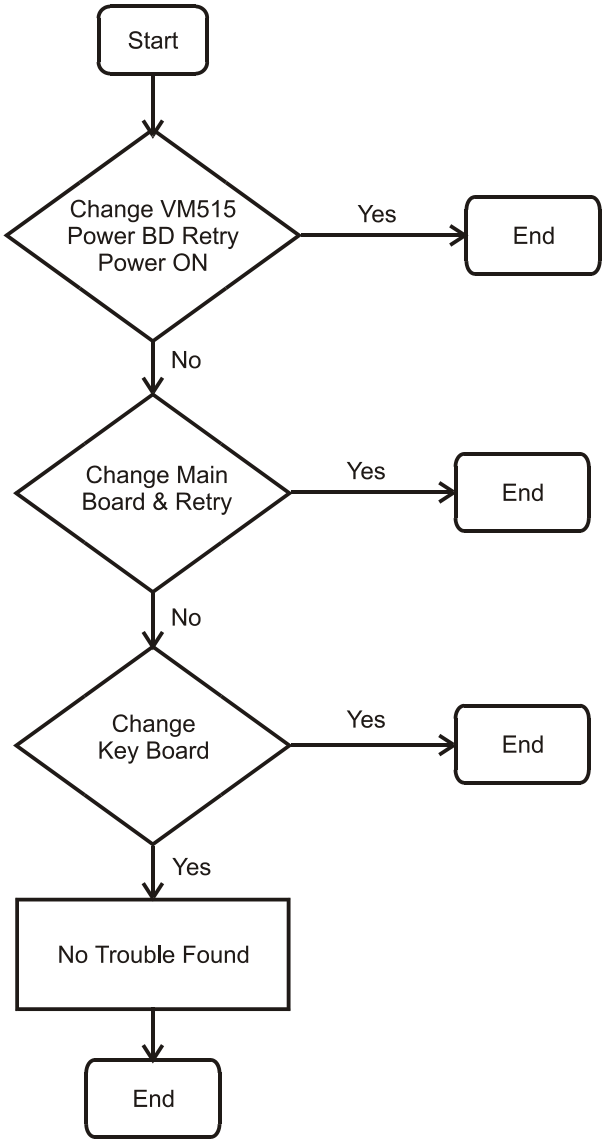
Rear Panel Cable and Connector		
Item	Cable / Connector	Function
1	Signal Connector	Connectors the video cable
2 DC-IN 12V	Power Connector	Connectors the adapter cable
3	Audio connector	Connector the audio cable

9. TROUBLESHOOTING

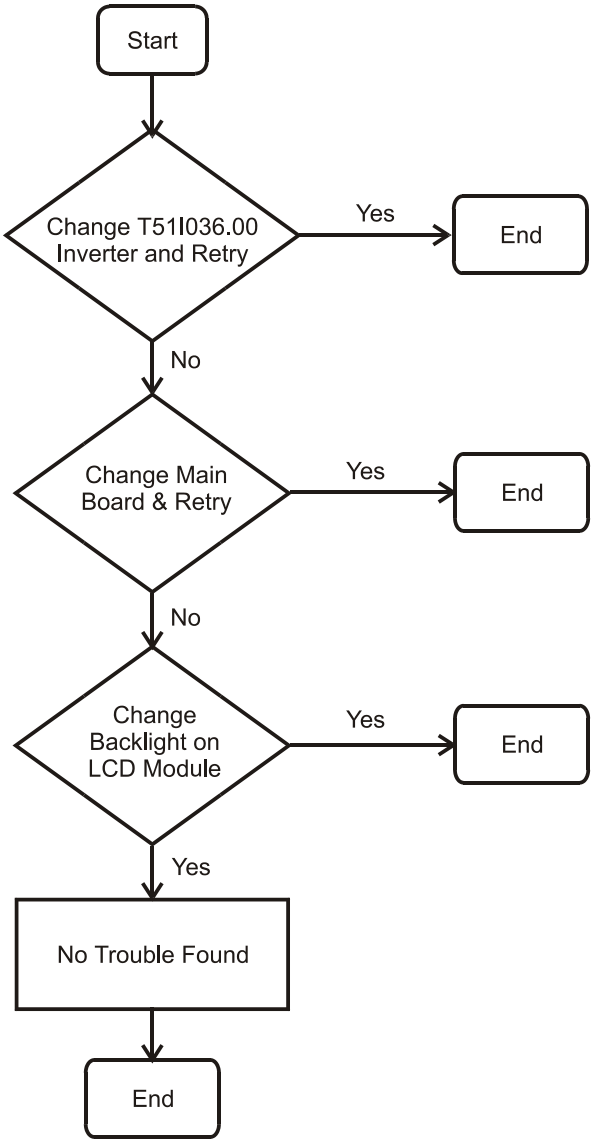
A. Main Procedure



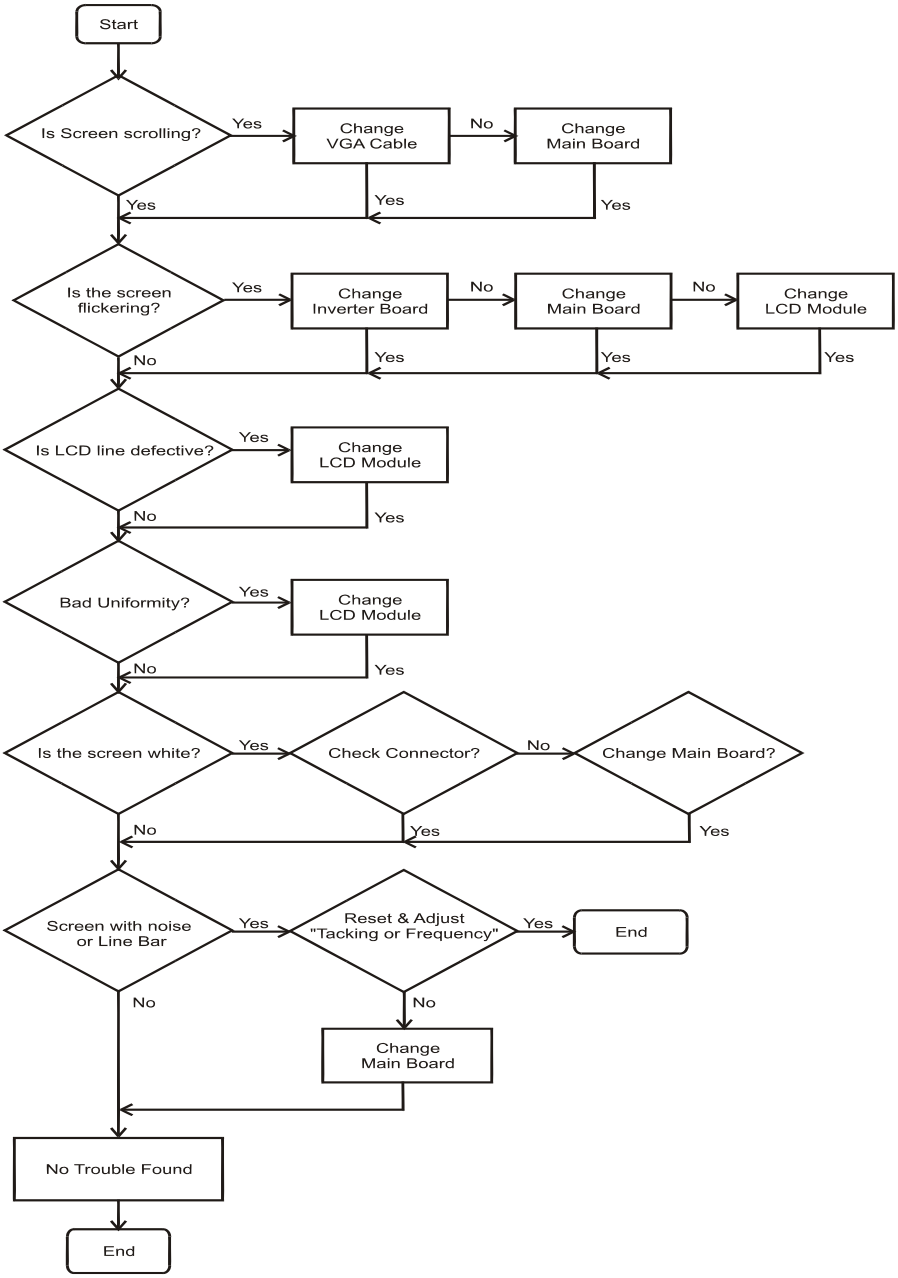
A-1 Power Circuit Troubleshooting



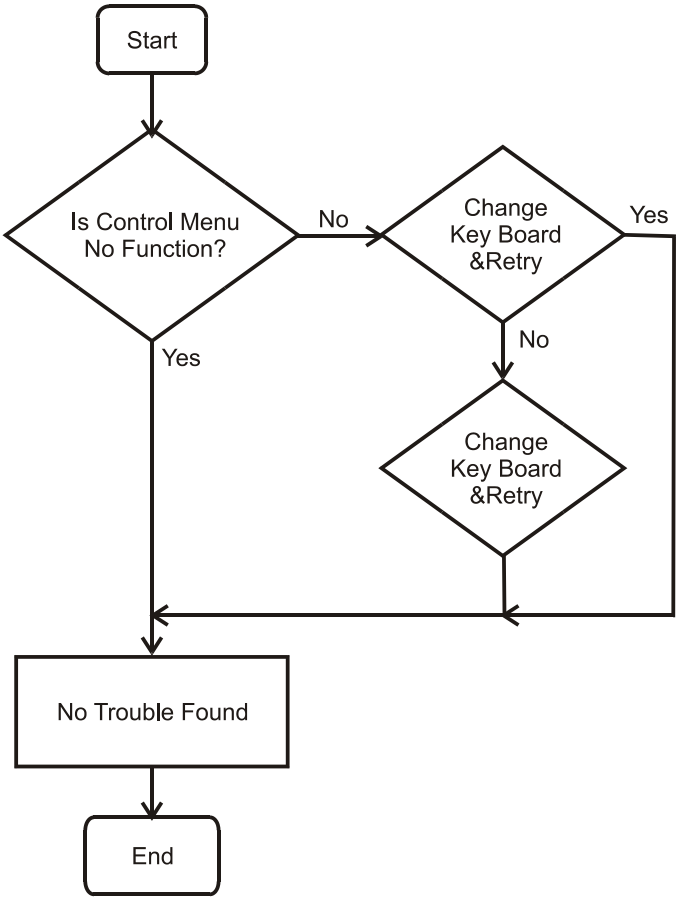
A-2 Backlights Troubleshooting



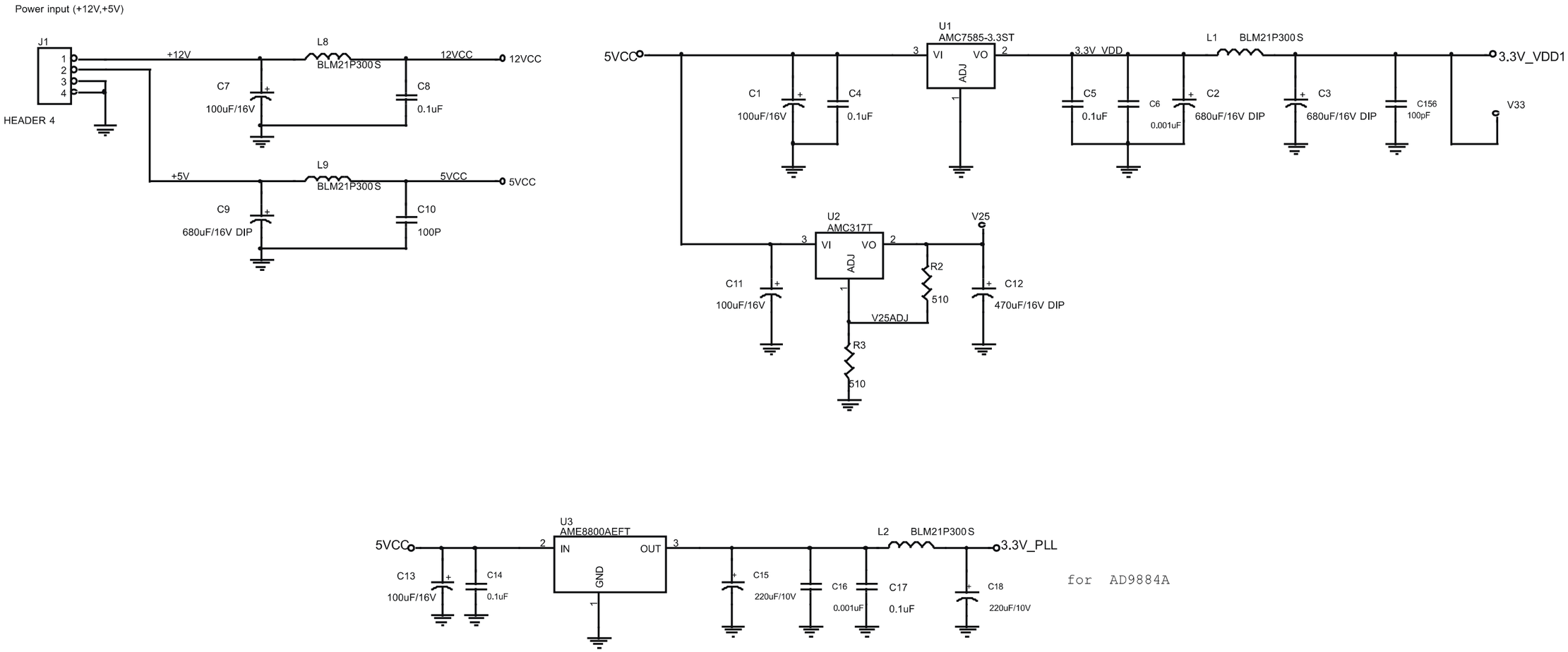
A-3 Performance Troubleshooting

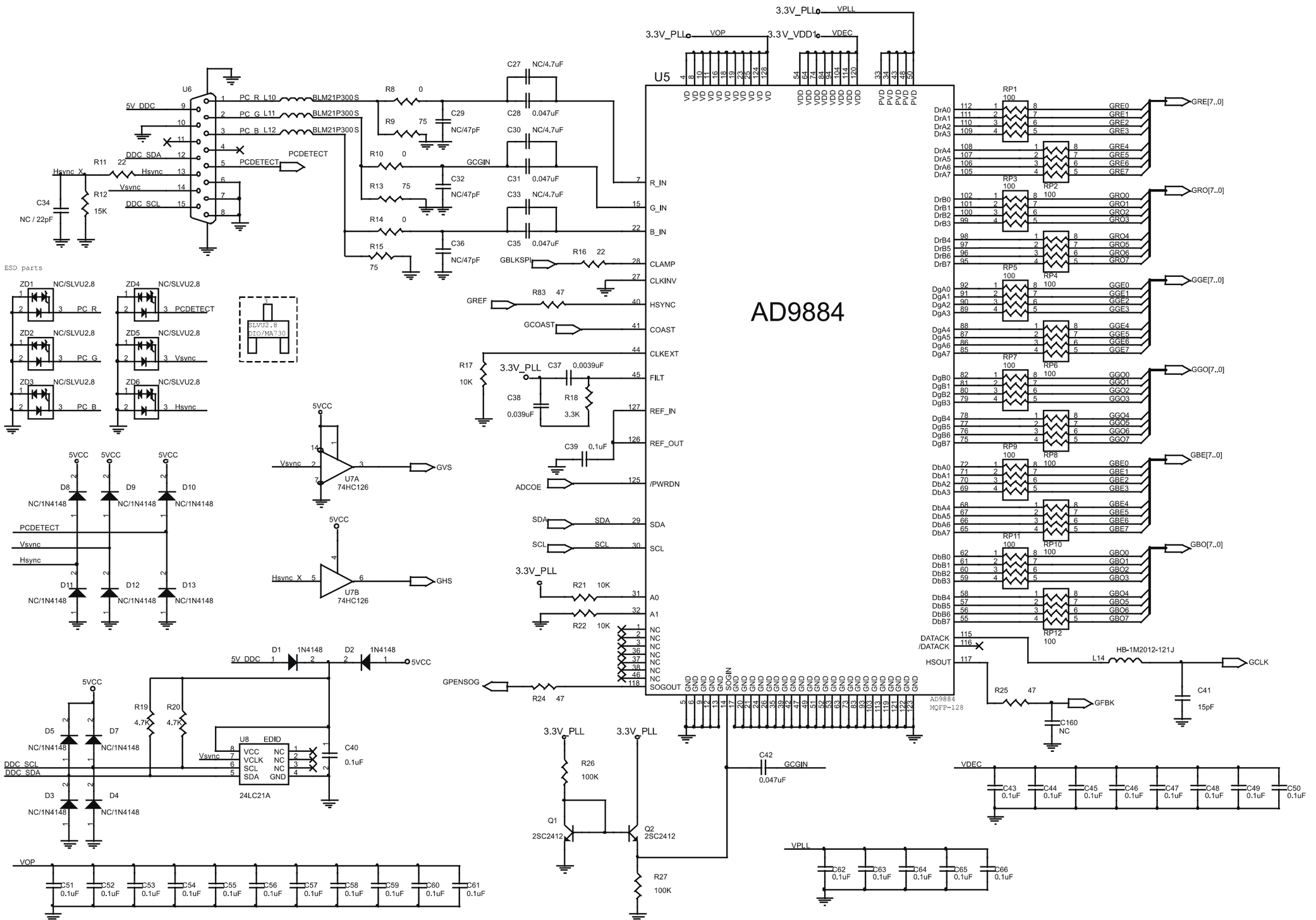


A-4 Function Troubleshooting

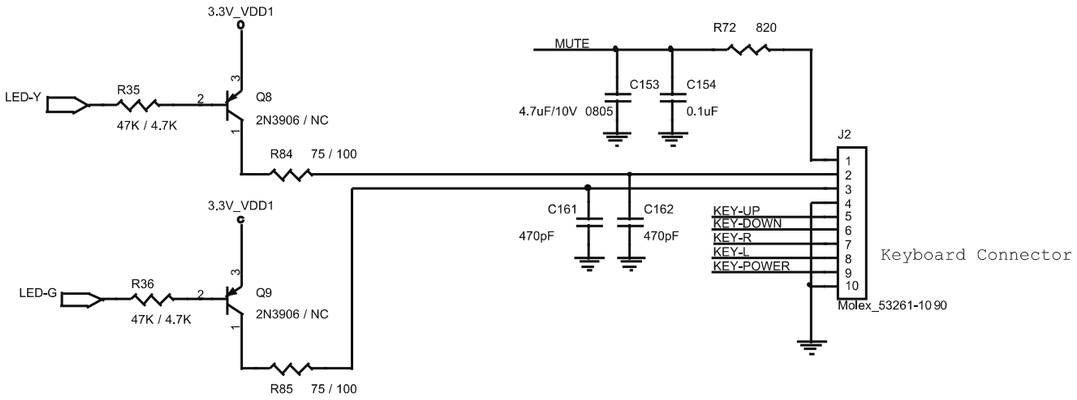


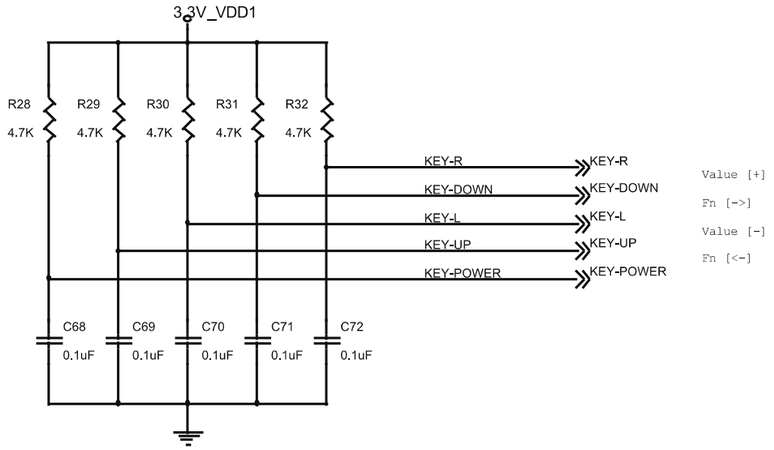
SCHEMATIC CIRCUITS

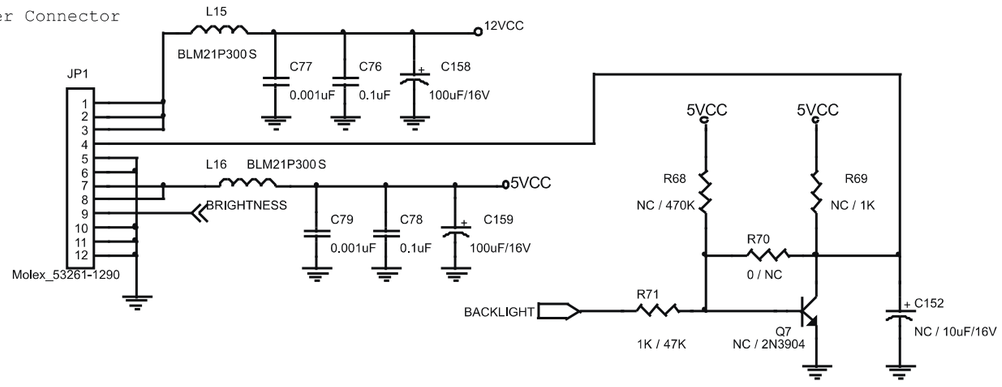

Power input (+12V,+5V)
J1
1
2
3
4
HEADER 4
+12V
L8
BLM21P300S
12VCC
12VCC
C7
100uF/16V
C8
0.1uF
+5V
L9
BLM21P300S
5VCC
5VCC
C9
680uF/16V DIP
C10
100P
5VCC
U1
AMC7585-3.3ST
VI
VO
ADJ
3
2
1
C1
100uF/16V
C4
0.1uF
3.3V_VDD
L1
BLM21P300S
3.3V_VDD1
C5
0.1uF
C6
0.001uF
C2
680uF/16V DIP
C3
680uF/16V DIP
C156
100pF
V33
U2
AMC317T
V25
C11
100uF/16V
R2
510
C12
470uF/16V DIP
V25ADJ
R3
510
U3
AME8800AEFT
IN
OUT
GND
5VCC
C13
100uF/16V
C14
0.1uF
L2
BLM21P300S
3.3V_PLL
C15
220uF/10V
C16
0.001uF
C17
0.1uF
C18
220uF/10V
for AD9884A

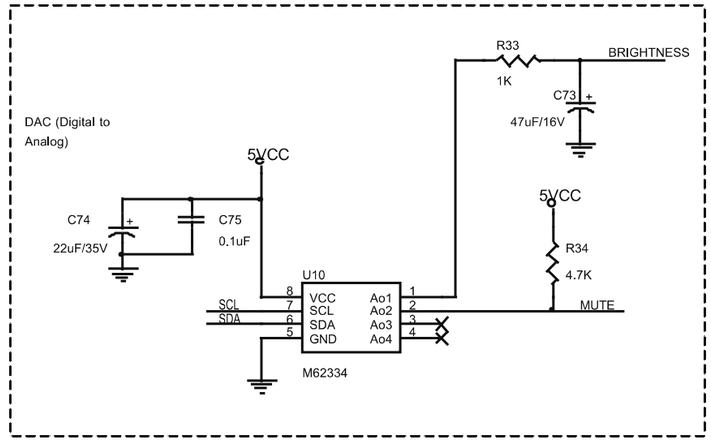


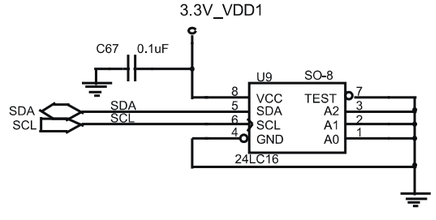
No. 0504	Control Board VL-701	HITACHI

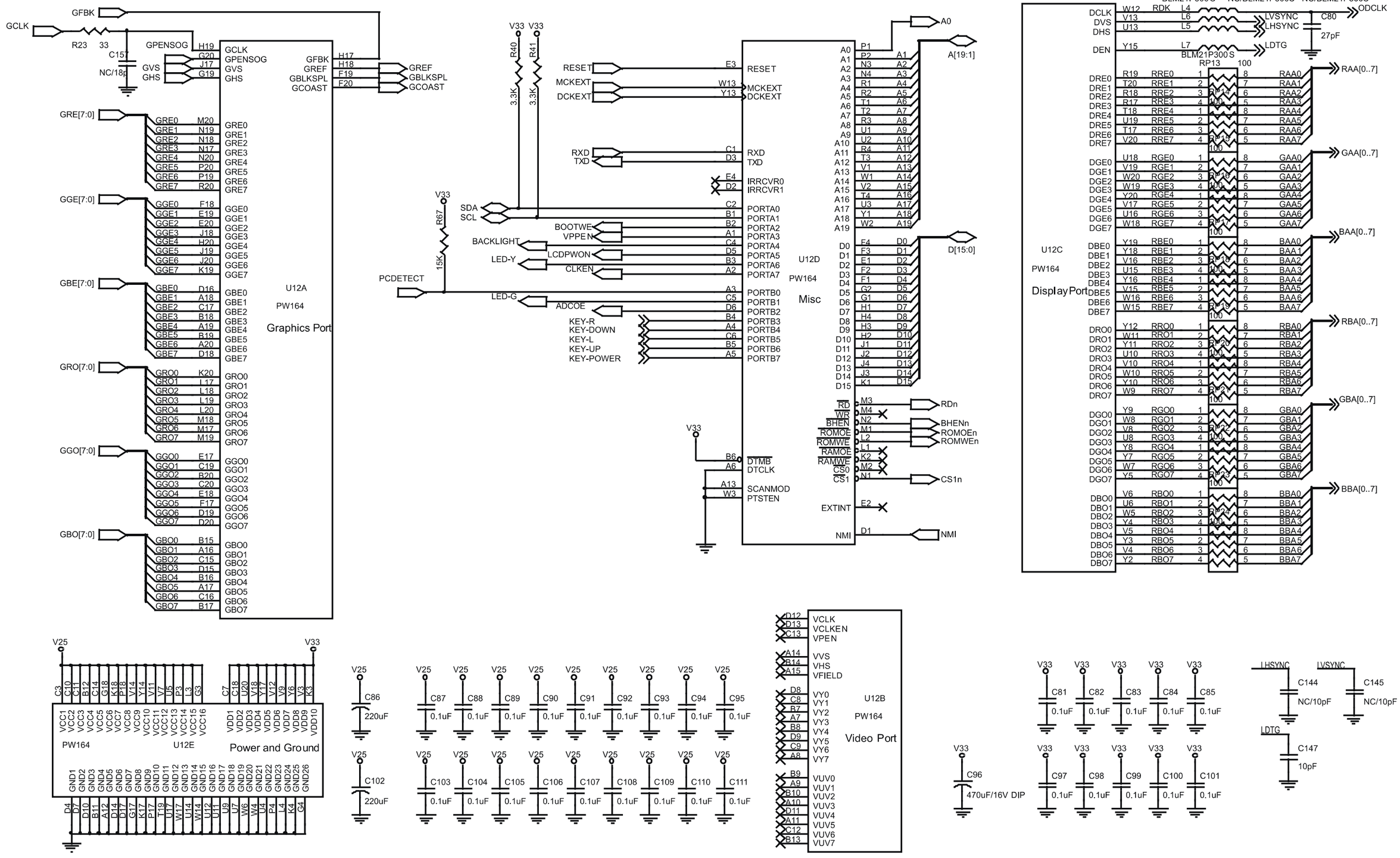

3.3V_VDD1
LED-Y
R35
47K / 4.7K
Q8
2N3906 / NC
R84 75 / 100
3.3V_VDD1
LED-G
R36
47K / 4.7K
Q9
2N3906 / NC
R85 75 / 100
MUTE
R72 820
C153
4.7uF/10V 0805
C154
0.1uF
C161
470pF
C162
470pF
KEY-UP
KEY-DOWN
KEY-R
KEY-L
KEY-POWER
J2
1
2
3
4
5
6
7
8
9
10
Molex_53261-1090
Keyboard Connector

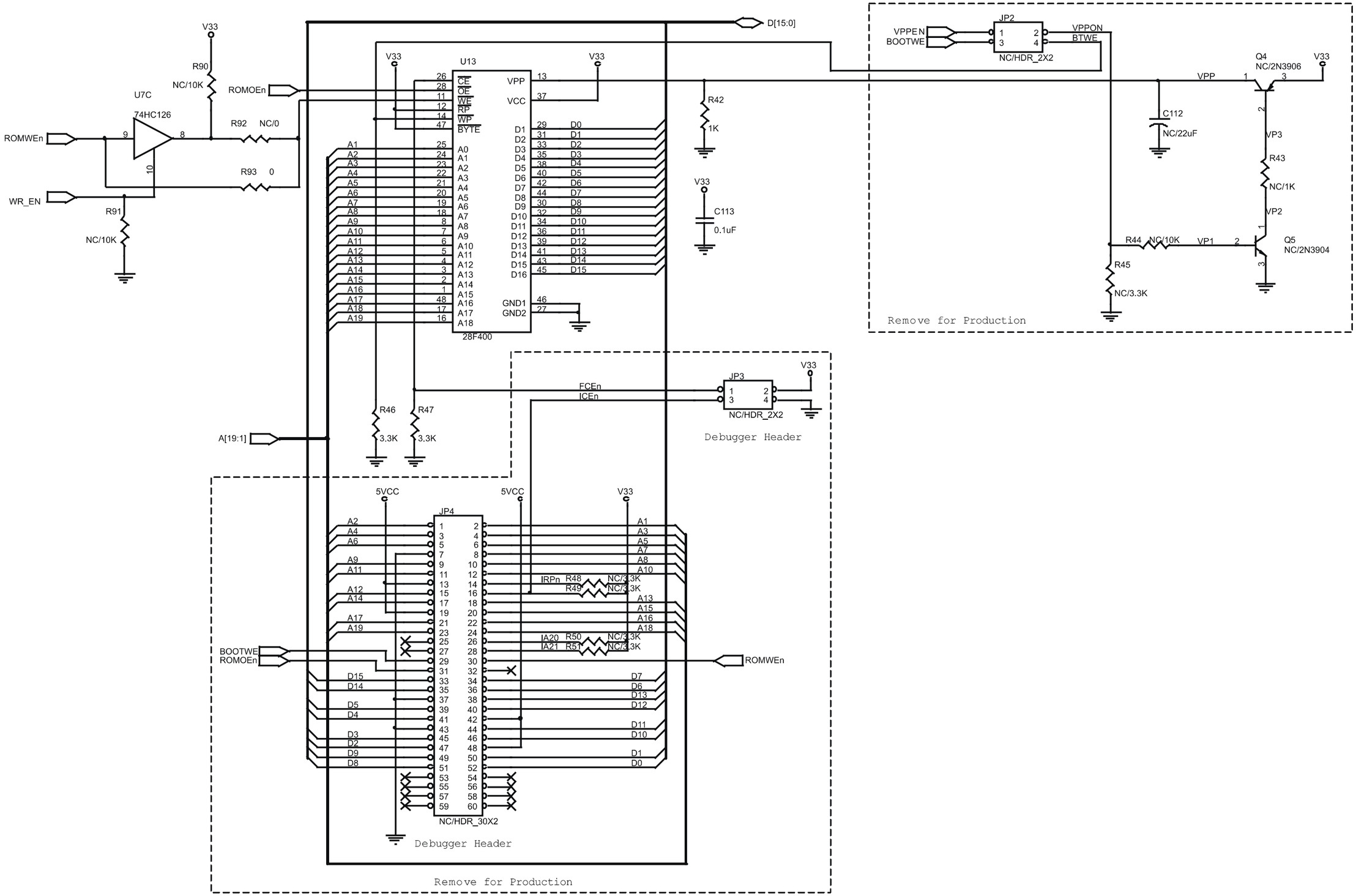

3.3V_VDD1
R28 4.7K
R29 4.7K
R30 4.7K
R31 4.7K
R32 4.7K
KEY-R
KEY-DOWN
KEY-L
KEY-UP
KEY-POWER
C68 0.1uF
C69 0.1uF
C70 0.1uF
C71 0.1uF
C72 0.1uF
Value [+]
Fn [->]
Value [-]
Fn [<-]

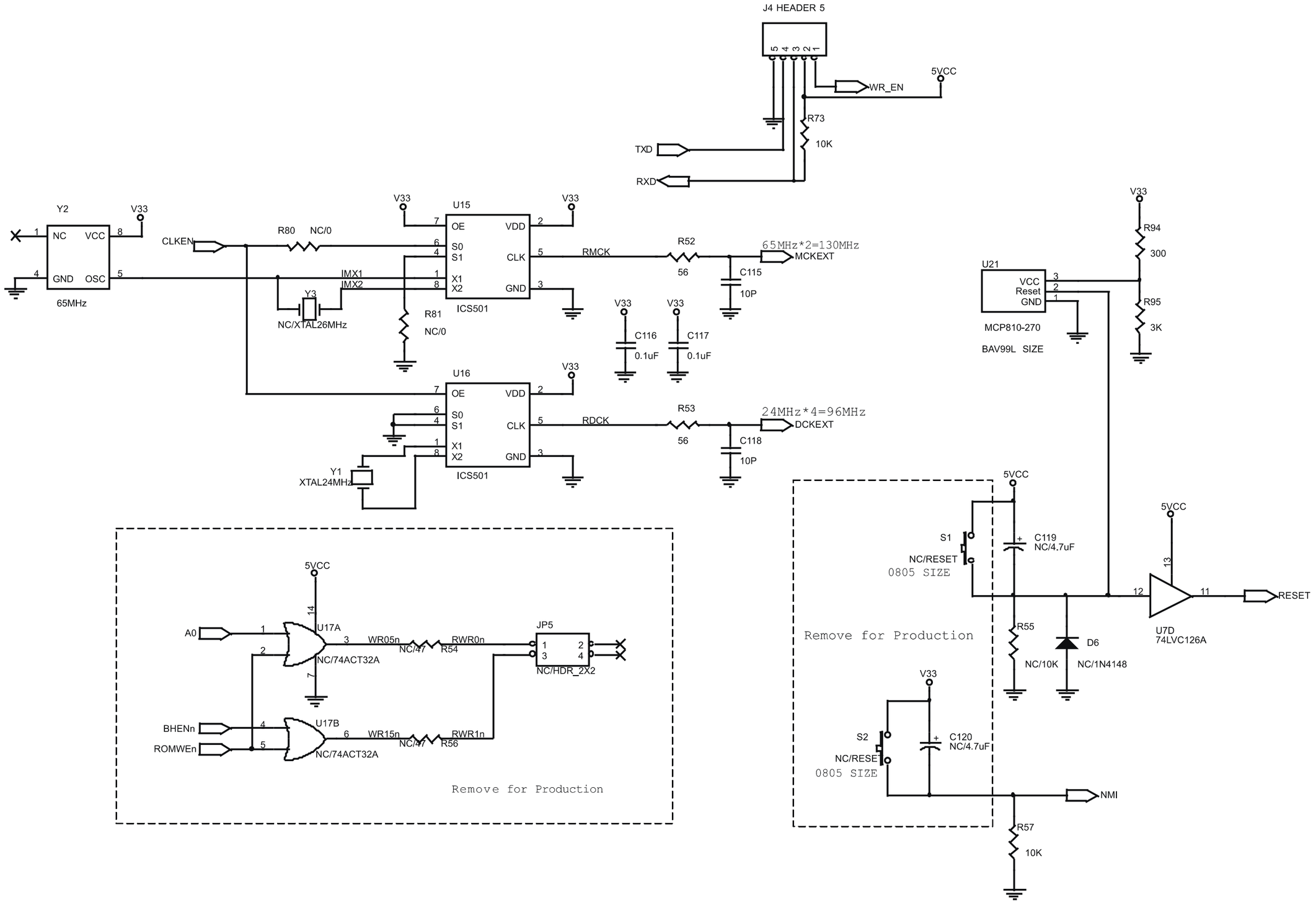

Inverter Connector
L15
BLM21P300S
12VCC
C77 0.001uF
C76 0.1uF
C158 100uF/16V
JP1
1
2
3
4
5
6
7
8
9
10
11
12
Molex_53261-1290
L16 BLM21P300S
5VCC
BRIGHTNESS
C79 0.001uF
C78 0.1uF
C159 100uF/16V
5VCC
5VCC
R68 NC / 470K
R69 NC / 1K
R70 0 / NC
BACKLIGHT
R71 1K / 47K
Q7 NC / 2N3904
C152 NC / 10uF/16V

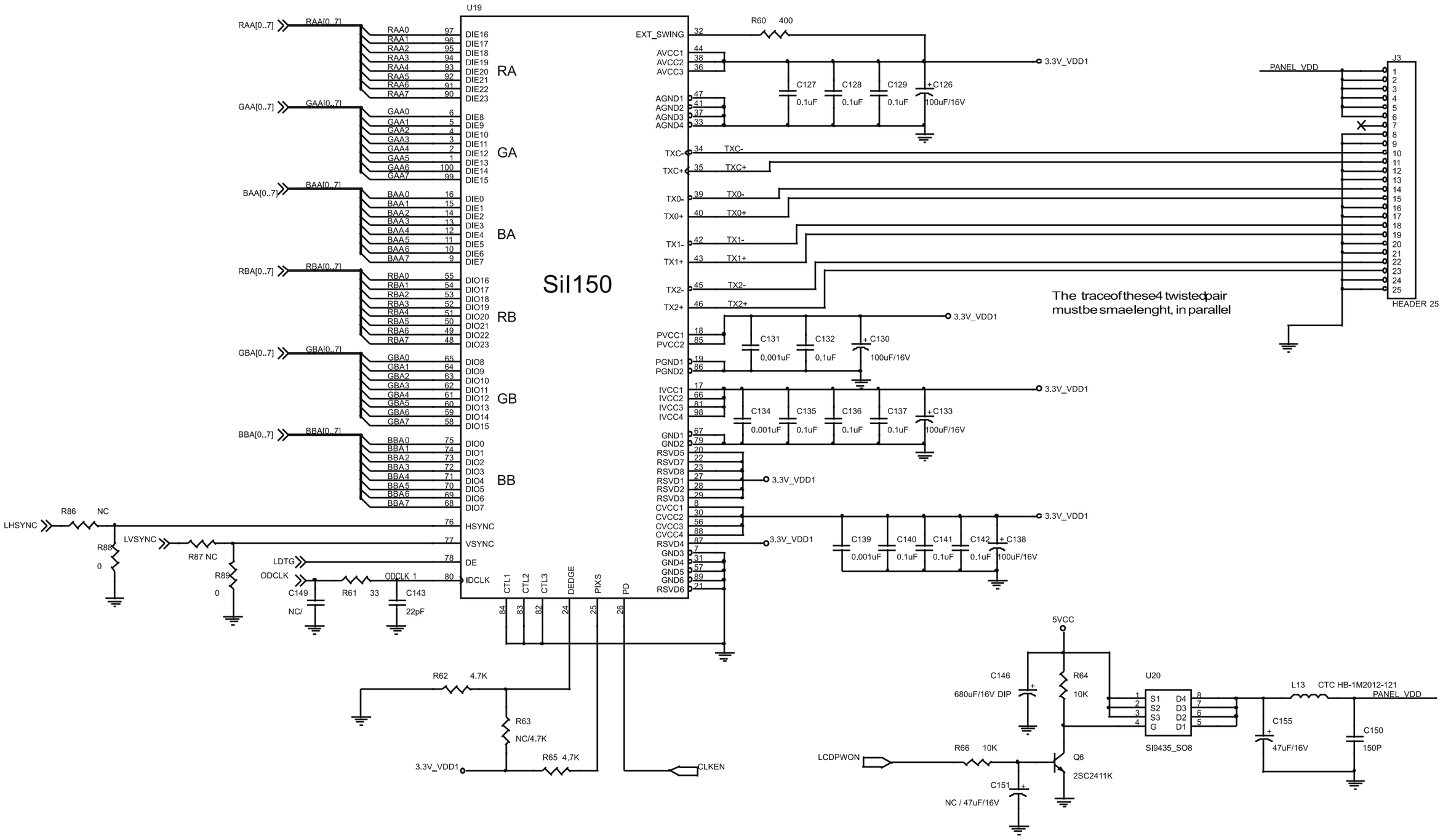

DAC (Digital to Analog)
R33 1K
BRIGHTNESS
C73 47uF/16V
5VCC
C74 22uF/35V
C75 0.1uF
5VCC
R34 4.7K
MUTE
U10
VCC
SCL
SDA
GND
Ao1
Ao2
Ao3
Ao4
SCL
SDA
M62334


3.3V_VDD1
C67 0.1uF
U9 SO-8
VCC
SDA
SCL
GND
TEST
A2
A1
A0
SDA
SCL
24LC16


GFBK
GCLK
R23 33
C157
NC/18p
GVS
GHS
GPENSOG
GCLK
GPENSOG
GVS
GHS
GFBK
GREF
GBLKSPL
GCOAST
GREF
GBLKSPL
GCOAST
GRE[7:0]
GGE[7:0]
GBE[7:0]
GRO[7:0]
GGO[7:0]
GBO[7:0]
U12A
PW164
Graphics Port
V33
R40 3.3K
R41 3.3K
RESET
MCKEXT
DCKEXT
RXD
TXD
IRRCVR0
IRRCVR1
SDA
SCL
BOOTWE
VPPEN
BACKLIGHT
LED-Y
CLKEN
R67
15K
PCDETECT
LED-G
ADCOE
KEY-R
KEY-DOWN
KEY-L
KEY-UP
KEY-POWER
PORTA0
PORTA1
PORTA2
PORTA3
PORTA4
PORTA5
PORTA6
PORTA7
PORTB0
PORTB1
PORTB2
PORTB3
PORTB4
PORTB5
PORTB6
PORTB7
U12D
PW164
Misc
DTMB
DTCLK
SCANMOD
PTSTEN
EXTINT
NMI
A0
A[19:1]
D[15:0]
RDn
BHENn
ROMOEn
ROMWEn
CS1n
BLM21P300S
NC/BLM21P300S
NC/BLM21P300S
ODCLK
C80
27pF
LVSYNC
LHSYNC
LDTG
DEN
RP13
100
RAA[0..7]
GAA[0..7]
BAA[0..7]
RBA[0..7]
GBA[0..7]
BBA[0..7]
U12C
PW164
DisplayPort
V25
V33
C3 C10 C11 B12 C14 G18 K18 P18 V14 Y14 V11 V7 U5 P3 L3 G3
C7 C18 U20 V18 Y17 V12 V9 Y6 V3 K3
VCC1 VCC2 VCC3 VCC4 VCC5 VCC6 VCC7 VCC8 VCC9 VCC10 VCC11 VCC12 VCC13 VCC14 VCC15 VCC16
VDD1 VDD2 VDD3 VDD4 VDD5 VDD6 VDD7 VDD8 VDD9 VDD10
GND1 GND2 GND3 GND4 GND5 GND6 GND7 GND8 GND9 GND10 GND11 GND12 GND13 GND14 GND15 GND16 GND17 GND18 GND19 GND20 GND21 GND22 GND23 GND24 GND25 GND26
D4 D7 D10 B11 A12 D14 D17 G17 K17 P17 T19 U17 W17 U14 W14 U12 U11 U9 U7 W6 W4 U4 P4 L4 K4 G4
PW164
U12E
Power and Ground
C86 220uF
C102 220uF
C87 C88 C89 C90 C91 C92 C93 C94 C95 0.1uF
C103 C104 C105 C106 C107 C108 C109 C110 C111 0.1uF
D12 D13 C13
VCLK
VCLKEN
VPEN
A14 B14 A15
VVS
VHS
VFIELD
D8 C8 B7 A7 B8 D9 C9 A8
VY0 VY1 VY2 VY3 VY4 VY5 VY6 VY7
B9 A9 B10 A10 D11 A11 C12 B13
VUV0 VUV1 VUV2 VUV3 VUV4 VUV5 VUV6 VUV7
U12B
PW164
Video Port
C96 470uF/16V DIP
C81 C82 C83 C84 C85 0.1uF
C97 C98 C99 C100 C101 0.1uF
LHSYNC
LVSYNC
C144 NC/10pF
C145 NC/10pF
LDTG
C147 10pF

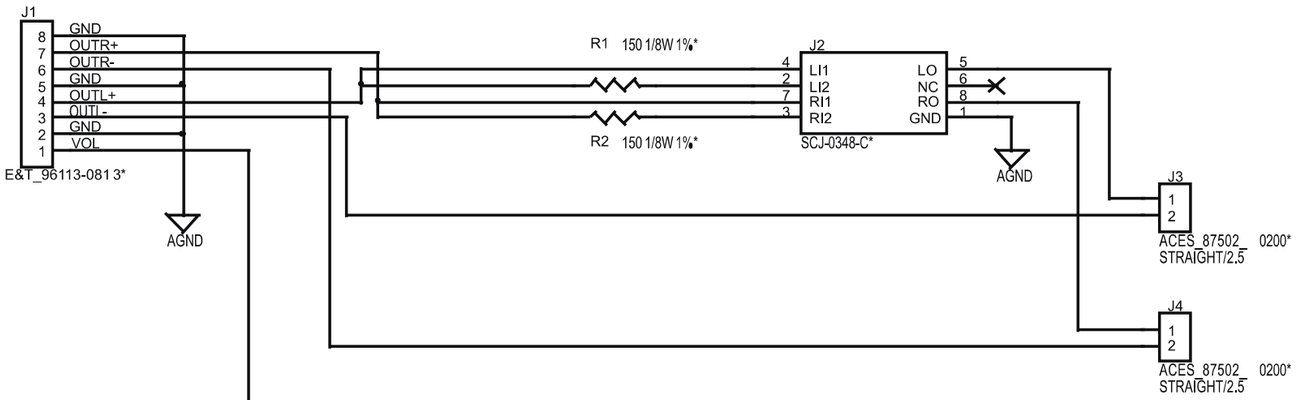

D[15:0]
V33
R90
NC/10K
ROMOEn
U7C
74HC126
ROMWEn
R92 NC/0
R93 0
WR_EN
R91
NC/10K
U13
28F400
R42
1K
C113
0.1uF
JP2
VPPEN
BOOTWE
VPPON
BTWE
NC/HDR_2X2
Q4
NC/2N3906
C112
NC/22uF
VPP
VP3
R43
NC/1K
VP2
R44 NC/10K
VP1
Q5
NC/2N3904
R45
NC/3.3K
Remove for Production
R46
3.3K
R47
3.3K
A[19:1]
FCEn
ICEn
JP3
NC/HDR_2X2
Debugger Header
5VCC
JP4
IRPn R48 NC/3.3K
R49 NC/3.3K
IA20 R50 NC/3.3K
IA21 R51 NC/3.3K
BOOTWE
ROMOEn
ROMWEn
NC/HDR_30X2
Debugger Header
Remove for Production

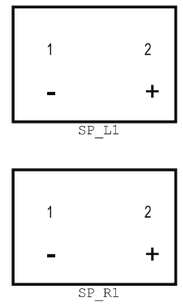

J4 HEADER 5
5 4 3 2 1
5VCC
WR_EN
R73
10K
TXD
RXD
Y2
V33
1 NC VCC 8
4 GND OSC 5
65MHz
CLKEN
R80 NC/0
U15
V33
V33
7 OE VDD 2
6 S0
4 S1
CLK 5
1 X1
8 X2
GND 3
ICS501
IMX1
IMX2
Y3
NC/XTAL26MHz
R81
NC/0
RMCK
R52
56
65MHz*2=130MHz
MCKEXT
C115
10P
V33
V33
C116
0.1uF
C117
0.1uF
U16
V33
7 OE VDD 2
6 S0
4 S1
CLK 5
1 X1
8 X2
GND 3
ICS501
Y1
XTAL24MHz
RDCK
R53
56
24MHz*4=96MHz
DCKEXT
C118
10P
V33
R94
300
U21
VCC 3
Reset 2
GND 1
MCP810-270
BAV99L SIZE
R95
3K
5VCC
S1
NC/RESET
0805 SIZE
C119
NC/4.7uF
5VCC
13
12
11
RESET
U7D
74LVC126A
R55
NC/10K
D6
NC/1N4148
Remove for Production
V33
S2
NC/RESET
0805 SIZE
C120
NC/4.7uF
NMI
R57
10K
5VCC
14
A0
1
2
U17A
3
7
NC/74ACT32A
WR05n
NC/47
R54
RWR0n
JP5
1 2
3 4
NC/HDR_2X2
BHENn
4
5
U17B
6
NC/74ACT32A
WR15n
NC/47
R56
RWR1n
Remove for Production



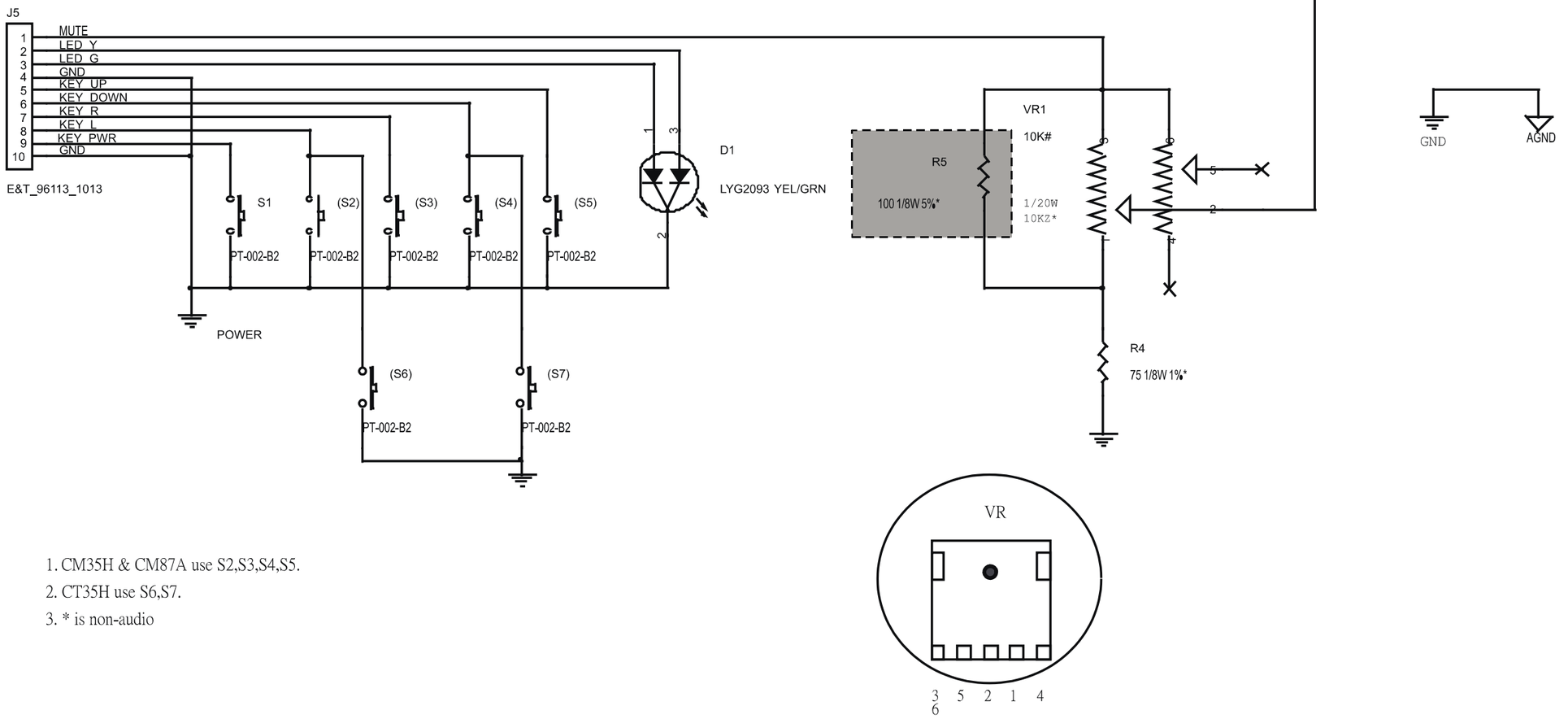
No. 0504	Control Board VL-701	HITACHI

Audio board connector



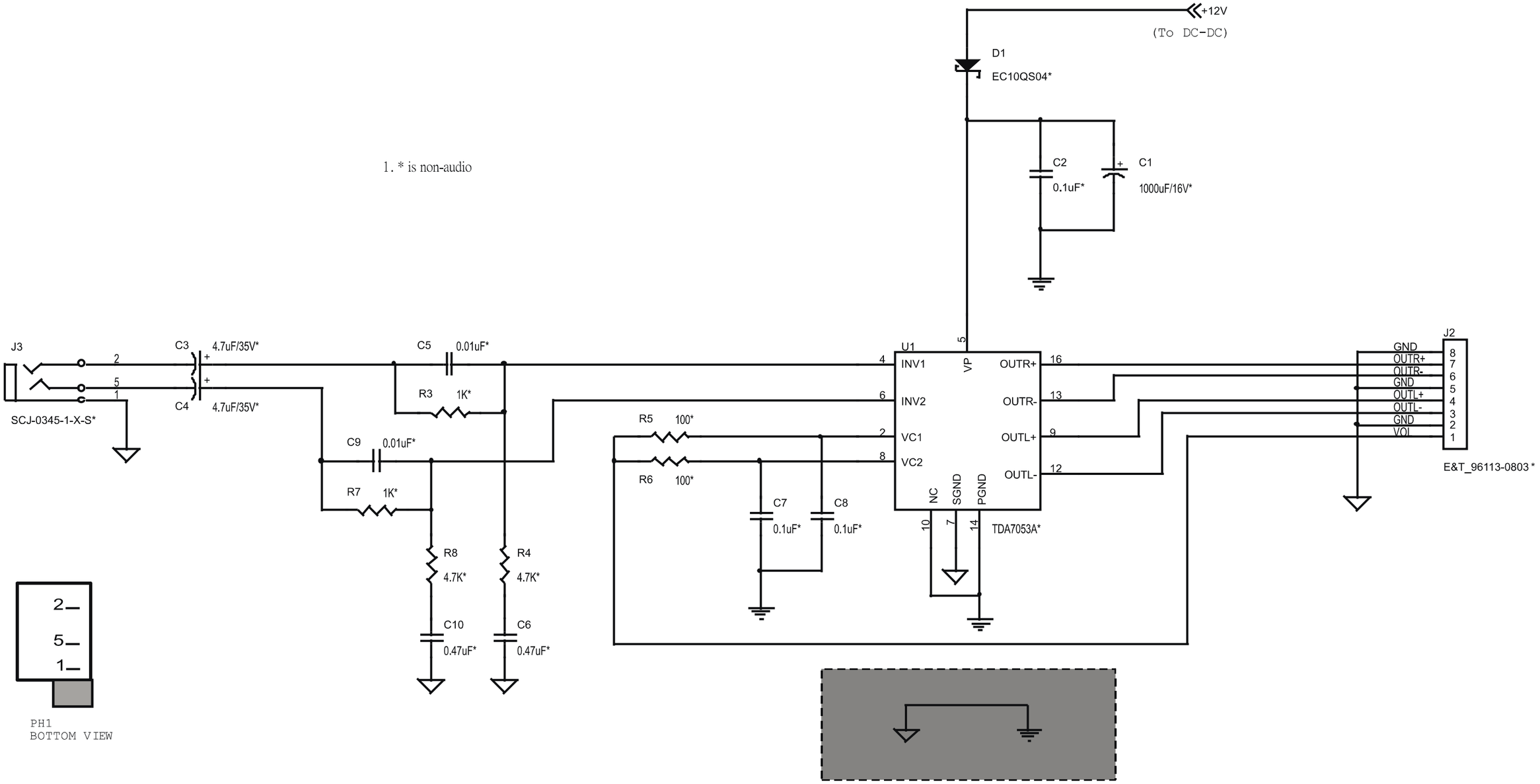


MainBoard connector

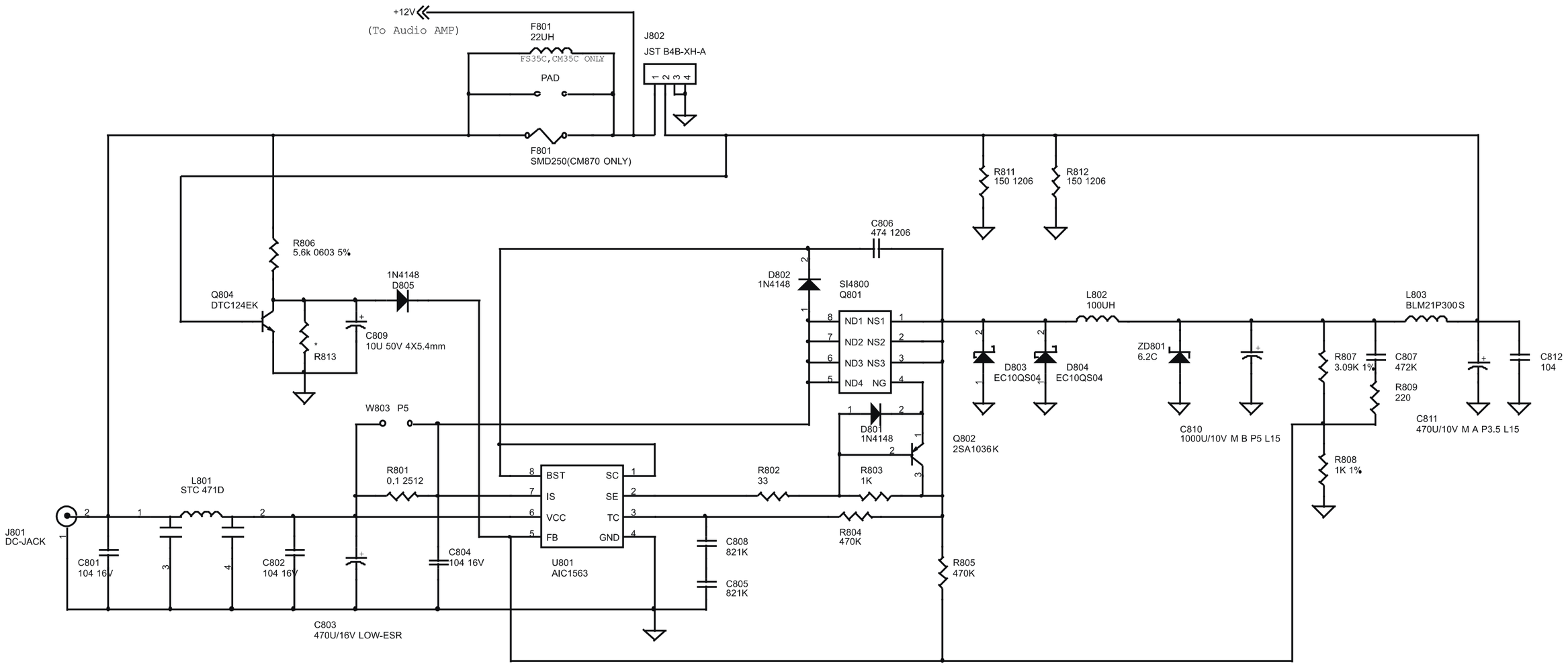


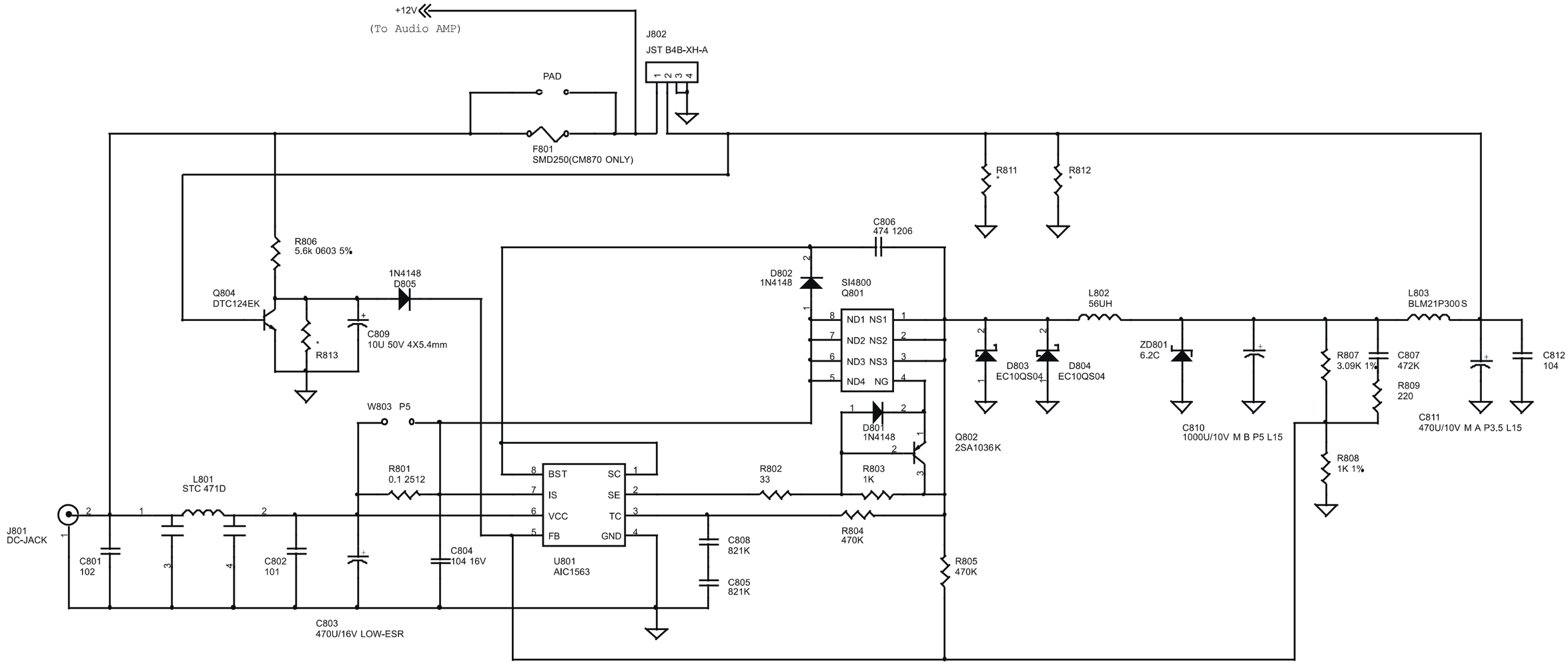
1. CM35H & CM87A use S2,S3,S4,S5.
2. CT35H use S6,S7.
3. * is non-audio

1. * is non-audio



PH1
BOTTOM VIEW


+12V
(To Audio AMP)
F801
22UH
FS35C,CM35C ONLY
PAD
F801
SMD250(CM870 ONLY)
J802
JST B4B-XH-A
1 2 3 4
R811
150 1206
R812
150 1206
C806
474 1206
R806
5.6k 0603 5%
1N4148
D805
Q804
DTC124EK
C809
10U 50V 4X5.4mm
R813
D802
1N4148
SI4800
Q801
ND1 NS1
ND2 NS2
ND3 NS3
ND4 NG
L802
100UH
L803
BLM21P300S
D803
EC10QS04
D804
EC10QS04
ZD801
6.2C
R807
3.09K 1%
C807
472K
R809
220
C812
104
C811
470U/10V M A P3.5 L15
C810
1000U/10V M B P5 L15
R808
1K 1%
W803 P5
D801
1N4148
Q802
2SA1036K
R803
1K
R802
33
R801
0.1 2512
L801
STC 471D
J801
DC-JACK
BST SC
IS SE
VCC TC
FB GND
U801
AIC1563
C808
821K
C805
821K
R804
470K
R805
470K
C801
104 16V
C802
104 16V
C804
104 16V
C803
470U/16V LOW-ESR



FOR CM870 ONLY

THE UPDATED PARTS LIST

FOR THIS MODEL IS

AVAILABLE ON ESTA

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