IMAGE ENCODER

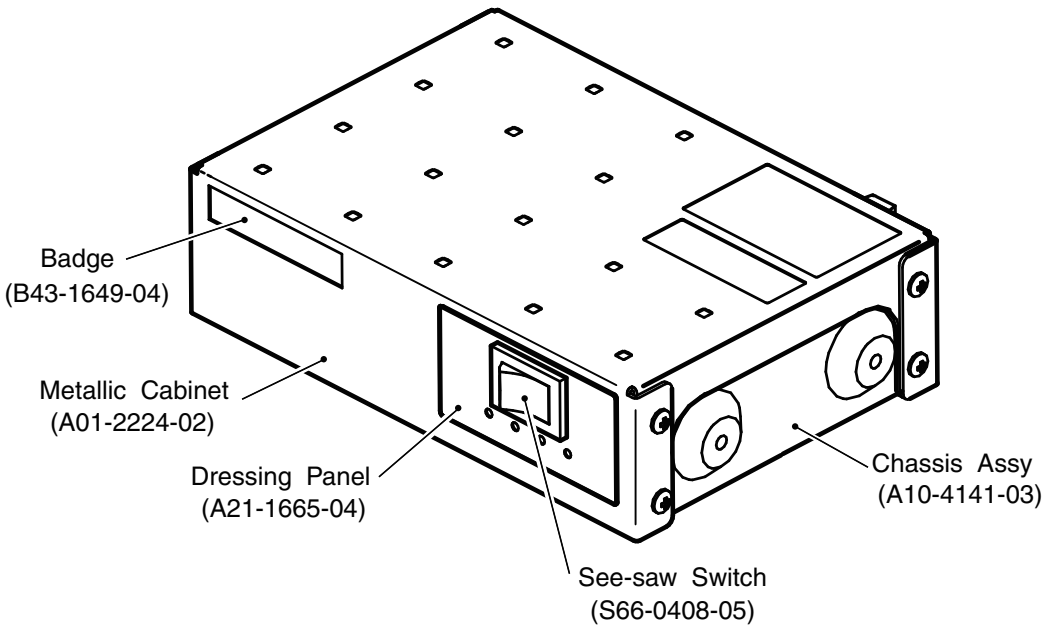
KVT-11

SERVICE MANUAL

KENWOOD

Kenwood Corporation

B51-8929-00 (Y) 362



CONTENTS

This product complies with the **RoHS** directive for the European market.

This product uses Lead Free solder.

Disclaimer

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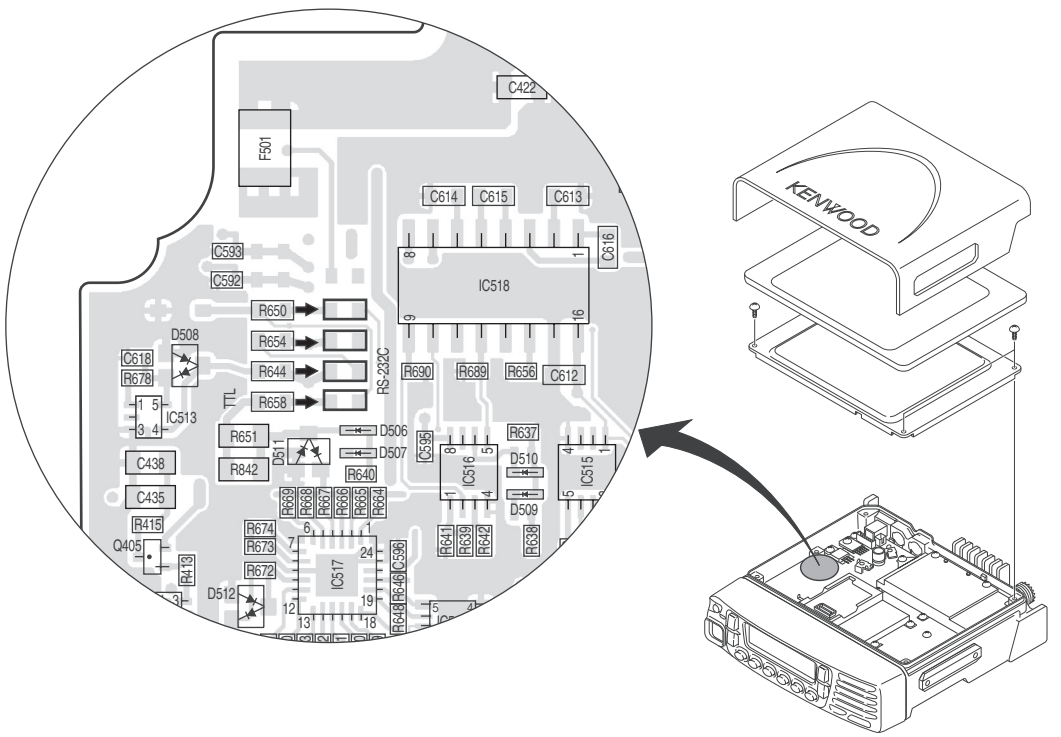
INFORMATION

1. Modify the NX-700/800

It is necessary to modify the NX-700/800 to operate this system as follows.

Remove the 4 chip-resistors (R644, R650, R654, R658) (0Ω) from left space to right space.



DISASSEMBLY FOR REPAIR

1. Precautions for Disassembly

■ Cabinet Disassembly

1. When removing the cabinet, first remove the nine screws from the right, left and rear sides.
2. Then, take care that the power cable soldered to the power switch is not cut.

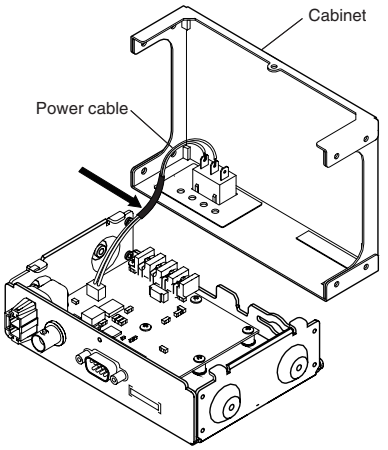


Fig. 1

■ Power supply connector Disassembly

1. Before removing the PCB, release the lock pushing the spring of the power supply connector.
2. Then remove the power supply connector from inside the chassis.

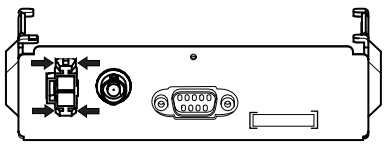


Fig. 2

Note: Take care when pulling out the power supply connector, as the clearance area of the coil on the PCB and the packing is small.

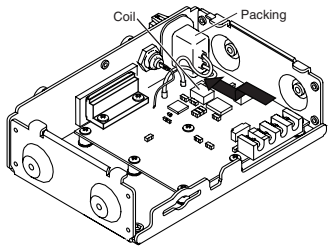


Fig. 3

■ Power switch Disassembly

When removing the power switch, push the switch out of the inside of the cabinet while pushing the spring right and left.

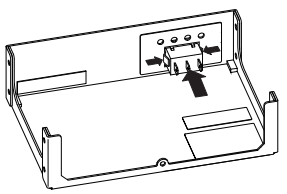


Fig. 4

■ PCB Disassembly

1. When removing the PCB, first remove the seven screws from the PCB and the two screws from the D-sub 9-pin connector.
2. Then pull out the PCB by lifting it to the front side.

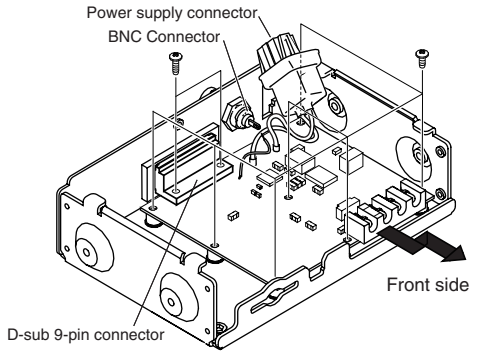


Fig. 5

Note: When removing the PCB, confirm that the power supply connector is removed from the chassis, and remove the solder from the BNC connector hot pin.

2. Precautions for Reassembly

■ Cabinet and Chassis Reassembly

When mounting the cabinet onto the chassis, align the corner of the back of the chassis and the cabinet, then slide the cabinet into place.

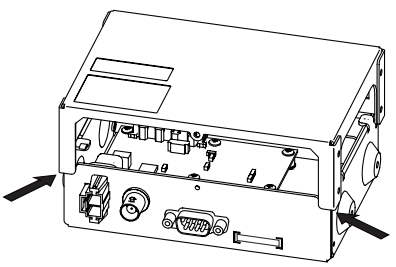


Fig. 6

3. Replacing the LED

When replacing the LED, cut the leg of the LED to 7.5 mm (0.3 inches) after bending it to 4.2 mm (green) or 5.6 mm (red) (0.17 or 0.22 inches).

RED : B30-2329-05 **GREEN : B30-2328-05**

Bend / Cutting size

A : RED 5.6mm(0.22 inches) / GREEN 4.2mm(0.17 inches)

B : 7.5mm

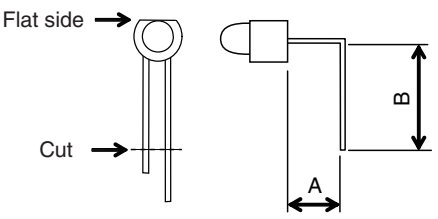


Fig. 7

CIRCUIT DESCRIPTION

1. Overview

This model is the Image Encoder which makes an image transmission possible, being connected with the between of the NEXEDGE terminal and the security camera and is the simple model only of the image transmission feature. The image transmission data can be displayed in Image Viewer Software by NEXEDGE terminal connected PC.

2. Control unit

CONTROL unit (X53-4500-20) consists of the following circuits:

2-1. DSP circuit

The Core in DSP (IC11) is Xtensa of Tensilica, equipped with peripheral function. DSP is 33.330 MHz (X2) operated and PLL inside works at 200 MHz.DSP operates at DC1.05V/1.85V/2.5V. The DSP receives the digital video signal on BT.656 from the video decoder (IC4). Then, the signal is encoded and are sent to it as the serial data. DSP transfers the program of serial FLASH(IC12) to DDR2(IC13) and DSP is working by DDR2. It controls the serial FLASH, DDR2, Video decoder, RS-232C driver(IC14).

The DSP carries out the following processes,

- Encode process: The signal input from the video decoder is compressed into the demanded data size, and it compresses it into the data size that can correspond to wireless transmission.
- Other function: The protocol to wireless transmit the image data is managed.

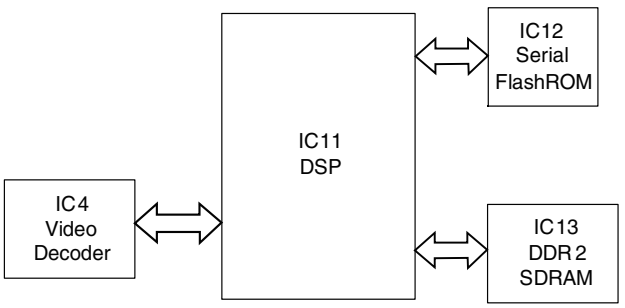


Fig. 1 DSP circuit

2-2. Memory circuit

Memory circuit consists of the DSP(IC11) and the DDR2(IC13), the serial FLASH(IC12).

- Flash memory

  The serial FLASH has capacity of 64Mbit that contains the program for the DSP and stores the data. It also stores the shipping data. This program can be easily written from external devices. The interface of serial FLASH is SPI.

- DDR2 (Double-Data-Rate2 Synchronous Dynamic Random Access Memory)

  The DDR2 has capacity of 512Mbit that contains work area and data area.

  When the power supply is off, the save data does break. Because there is not backed up by battery.

2-3. Video decoder circuit

Video decoder(IC4) has the function to convert the analog video signal of the NTSC/PAL method into ITU-R BT.601/BT.656 standard, digital format. The attenuator for the signal level adjustment and the low-pass filter that is appropriate for the video band are arranged in the input of the analog video signal. As for the video signal converted into a digital format, an external bus is passed to DSP(IC11) by running. Moreover, video decoder movement is controlled by DSP(IC11) through the I2C bus. The crystal oscillator of 32.000MHz(X3) is installed for video decoder operation.

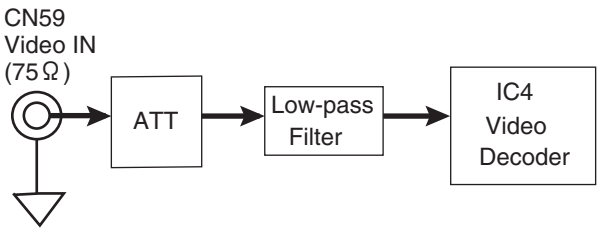


Fig. 2 Video decoder circuit

2-4. Serial interface circuit

To connect it with the NEXEDGE terminal, the serial communications port is prepared. The serial communications port is controlled by DSP(IC11), and to match the interface level, RS-232C driver(IC14) is installed. The connection with the NEXEDGE terminal is done by the transmission rate of 19.2kbps, and used to forward of the control command with the base station and to transmit the image data.

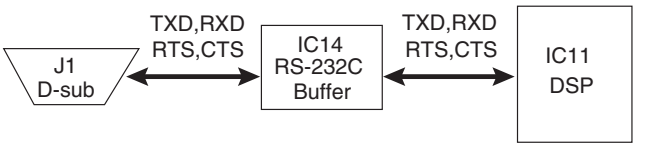


Fig. 3 Serial interface circuit

2-5. Power Supply circuit

The power supply from the outside corresponds from 6.5 to 16.0V. The DC/DC converter(IC2) is installed, and a wide range of the input power-supply voltage and efficiency are improved. Power supply regulator IC that supplies each power supply is installed corresponding to the power supply demand of various IC.

- +B is supplied to DC/DC converter.
- IC2 regulates +B voltage to 3.35V.
- LDO_2.85V(IC8), LDO_2.5V(IC6), LDO_1.85V(IC7), LDO_1.8V(IC16), DCDC_1.05V(IC5) are enabled while the 3.35V are operating.
- 2.85V provides the power to IC12(serial FLASH).
- 1.85V provides the power to IC11(DSP_DDR_I/O) and IC13(DDR2)
- 1.8V provides the power to IC4(Video decoder).

When the power switch is turned off, /POW_SW signal becomes low.

CIRCUIT DESCRIPTION

After detecting the /POW_SW signal, the DSP(IC11) changes the POW_CNT signal to low. Reset IC(IC10) has 3.1V detection(3.1VDET) as a power supply monitoring function. When the DC/DC converter output voltage becomes 3.1V or less from 3.35V, Reset IC makes reset signal to low.

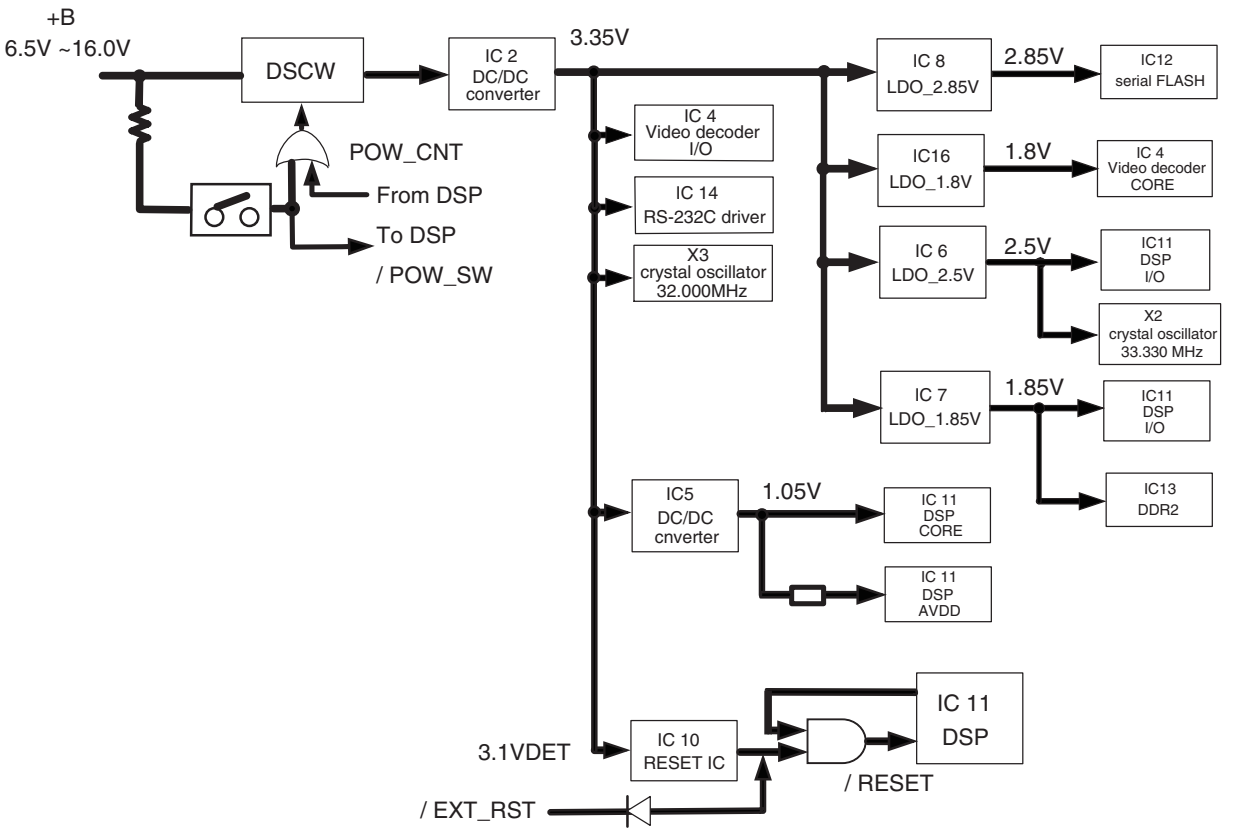


Fig. 4 Power supply circuit

2-6. Clock circuit (33.330MHz)

The crystal oscillator of 33.330MHz(X2) is installed for the operation clock of DSP(IC11). The clock supply to three terminals is necessary for the supply of the operation clock, and to supplement the drive ability, the clock buffer is installed. The operation clock is divided into three lines.

2-7. Other circuit

LED (display circuit) are installed as other peripheral circuitrys. The LED display circuit displays various of "POW"(D6) "TX"(D7) "RX"(D10) "VIDEO"(D11) to the outside.

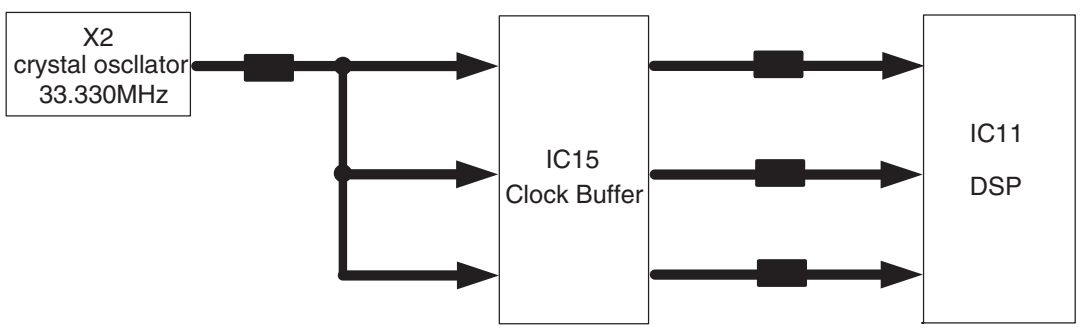


Fig. 5 Clock circuit

COMPONENTS DESCRIPTION

Control unit (X53-4500-20)

Ref.No.	Part Name	Description
IC2	IC	DC/DC converter (3.35V)
IC4	IC	Video decoder
IC5	IC	DC/DC converter (1.05V)
IC6	IC	Voltage regulator (2.50V)
IC7	IC	Voltage regulator (1.85V)
IC8	IC	Voltage regulator (2.85V)
IC9	IC	2 input AND gate
IC10	IC	Reset
IC11	IC	DSP
IC12	IC	Flash memory
IC13	IC	DDR2
IC14	IC	RS-232C driver/receiver
IC15	IC	Buffer
IC16	IC	Voltage regulator (1.80V)
Q7	FET	DC switch
Q8,9	Transistor	DC switch
Q10	Transistor	Power switch
Q11 ~ 14	Transistor	LED switch
D1	Varistor	Surge protector
D2	Diode	Reverse protection
D3	Poly switch	Current protector
D4	Diode	DC/DC converter
D5	Diode	Current discharge
D6	LED	Power
D7	LED	Transmission
D9	Zener diode	Current protector
D10	LED	Reception
D11	LED	Video
D12	Zener diode	Protect of reverse connection
D31	Varistor	Surge protector
D33	Varistor	Surge protector
D34	Diode	DC switch

PARTS LIST

∗New Parts. ⚠indicates safety critical components.
Parts without **Parts No.** are not supplied.
Les articles non mentionnes dans le **Parts No.** ne sont pas fournis.
Teile ohne **Parts No.** werden nicht geliefert.

L : Scandinavia **K** : USA **P** : Canada
Y : PX (Far East, Hawaii) **T** : England **E** : Europe
C : China **X** : Australia **M** : Other Areas

KVT-11
CONTROL UNIT (X53-4500-20)

Ref. No.	Address	New parts	Parts No.	Description	Destination
KVT-11					
1	1A	∗	A01-2224-02	METALLIC CABINET	
2	3A	∗	A10-4141-03	CHASSIS ASSY	
3	1A	∗	A21-1665-04	DRESSING PANEL	
5	1B	∗	B42-7070-04	STANDARD LABEL	
6	3D	∗	B42-7474-04	RATING LABEL(FUSE)	
7	1A	∗	B43-1649-04	BADGE(KENWOOD)	
8	2C	∗	B62-2273-00	INSTRUCTION MANUAL	
10	3B	∗	E04-0483-05	RF COAXIAL RECEPTACLE(BNC)	
11	2B		E30-3414-05	DC CORD	
12	3D		E30-7523-55	DC CORD ASSY ACCESSORY	
13	2B		E37-0905-15	LEAD WIRE WITH CONNECTOR	
14	2B		E37-1511-05	PROCESSED LEAD WIRE	
16	3B	∗	F20-3395-04	INSULATING SHEET	
17	3D	∗	F52-0020-05	FUSE(BLADE TYPE) 4A/32V	
19	3A	∗	G11-4534-04	RUBBER SHEET (BGA)	
20	3B		G13-2071-04	CONDUCTIVE CUSHION (CHASSIS)	
21		∗	G13-2311-04	CUSHION(CHASSIS)	
22	2B	∗	G13-2327-04	CUSHION(D-SUB)	
23	2B	∗	G53-1854-03	PACKING(DC CORD)	
25	2C		J29-0728-03	BRACKET ACCESSORY	
A	2B		N30-2608-43	PAN HEAD MACHINE SCREW(D-SUB)	
B		∗	N35-2605-43	BINDING HEAD MACHINE SCREW	
27	3D		N99-2039-05	SCREW SET ACCESSORY	
29	1A	∗	S66-0408-05	SEE-SAW SWITCH	
CONTROL UNIT (X53-4500-20)					
D6, 7		∗	B30-2329-05	LED(RED)	
D10, 11		∗	B30-2328-05	LED(GREEN)	
C1			CK73GB1H104K	CHIP C 0.10UF K	
C2			CC73GCH1H471J	CHIP C 470PF J	
C4			CC73GCH1H101J	CHIP C 100PF J	
C5			CK73GB1H104K	CHIP C 0.10UF K	
C7			CK73HB1A105K	CHIP C 1.0UF K	
C8		∗	CK73EB1C106M	CHIP C 10UF M	
C9			CK73HB1A104K	CHIP C 0.10UF K	
C10		∗	CK73EB1C106M	CHIP C 10UF M	
C11			CK73HB1H102K	CHIP C 1000PF K	
C12			C93-1810-05	CHIP C 4.7UF K	
C14			CK73GB1C225K	CHIP C 2.2UF K	
C15			C93-1810-05	CHIP C 4.7UF K	
C16		∗	C93-1827-05	CHIP C 22UF K	
C18			C93-1810-05	CHIP C 4.7UF K	
C19			CK73HB1E103K	CHIP C 0.010UF K	
C20			CK73GB1H104K	CHIP C 0.10UF K	
C23			CK73HB1H681K	CHIP C 680PF K	
C24		∗	C93-1825-05	CHIP C 0.10UF K	
C26			CK73HB1A104K	CHIP C 0.10UF K	
C27		∗	C93-1825-05	CHIP C 0.10UF K	

Ref. No.	Address	New parts	Parts No.	Description	Destination
C28			CK73EB1H474K	CHIP C 0.47UF K	
C29		∗	CK73HB1H153K	CHIP C 0.015UF K	
C30			CK73HB1E103K	CHIP C 0.010UF K	
C34			CK73GB1C225K	CHIP C 2.2UF K	
C35		∗	C93-1827-05	CHIP C 22UF K	
C36			CK73HB1H102K	CHIP C 1000PF K	
C37			CK73HB1E103K	CHIP C 0.010UF K	
C38			CK73GB0J106K	CHIP C 10UF K	
C39		∗	C93-1827-05	CHIP C 22UF K	
C40			CK73HB1E103K	CHIP C 0.010UF K	
C41			CK73HB1A105K	CHIP C 1.0UF K	
C42			CK73HB1E103K	CHIP C 0.010UF K	
C43			CK73HB1A105K	CHIP C 1.0UF K	
C44			CK73HB1A104K	CHIP C 0.10UF K	
C45			CK73GB0J106K	CHIP C 10UF K	
C47, 48			CK73HB1E103K	CHIP C 0.010UF K	
C49-53			CK73GB1C225K	CHIP C 2.2UF K	
C54-63			CK73HB1A104K	CHIP C 0.10UF K	
C64, 65		∗	C93-1828-05	CHIP C 22UF M	
C66-95			CK73HB1A104K	CHIP C 0.10UF K	
C96, 97			CK73GB1C225K	CHIP C 2.2UF K	
C98-102			CK73HB1A104K	CHIP C 0.10UF K	
C104, 105			CK73HB1A104K	CHIP C 0.10UF K	
C106		∗	CK73EB1C106M	CHIP C 10UF M	
C107, 108			CK73HB1E103K	CHIP C 0.010UF K	
C109			CK73HB1A104K	CHIP C 0.10UF K	
C110			CK73HB1E103K	CHIP C 0.010UF K	
C111			CK73HB1A104K	CHIP C 0.10UF K	
C113, 114			CK73GB1C225K	CHIP C 2.2UF K	
C115-117			CK73HB1A104K	CHIP C 0.10UF K	
C119-125			CK73HB1A104K	CHIP C 0.10UF K	
C126			CK73HB1E223K	CHIP C 0.022UF K	
C127			CK73HB1A104K	CHIP C 0.10UF K	
C128, 129		∗	CK73EB1C106M	CHIP C 10UF M	
C130-136			CK73HB1A104K	CHIP C 0.10UF K	
C137		∗	CK73EB1C106M	CHIP C 10UF M	
C138-141			CK73HB1A104K	CHIP C 0.10UF K	
C142			CK73GB1C225K	CHIP C 2.2UF K	
C143-147			CK73HB1A104K	CHIP C 0.10UF K	
C148			CK73GB1H104K	CHIP C 0.10UF K	
C149			CK73HB1A105K	CHIP C 1.0UF K	
C150			CK73GB1H104K	CHIP C 0.10UF K	
C151			CK73HB1A104K	CHIP C 0.10UF K	
C152-155			CK73GB1H104K	CHIP C 0.10UF K	
C156			CK73HB1H102K	CHIP C 1000PF K	
C157			CC73HCH1H101J	CHIP C 100PF J	
C158			CK73HB1H102K	CHIP C 1000PF K	
C159			CC73HCH1H101J	CHIP C 100PF J	
C160			CK73HB1H102K	CHIP C 1000PF K	
C161			CC73HCH1H101J	CHIP C 100PF J	
C162			CK73HB1H102K	CHIP C 1000PF K	
C163			CC73HCH1H101J	CHIP C 100PF J	
C165			CK73HB1E103K	CHIP C 0.010UF K	
C166			CK73HB1A104K	CHIP C 0.10UF K	
C167			CK73HB1A105K	CHIP C 1.0UF K	

PARTS LIST

CONTROL UNIT (X53-4500-20)

Ref. No.	Address	New parts	Parts No.	Description	Destination
C168			CK73HB1E103K	CHIP C 0.010UF K	
C180,181			CK73HB1H102K	CHIP C 1000PF K	
C182			CK73HB1A104K	CHIP C 0.10UF K	
C183		*	C93-1827-05	CHIP C 22UF K	
C190,191			CK73HB1A104K	CHIP C 0.10UF K	
C192,193		*	C93-1827-05	CHIP C 22UF K	
C194,195			CK73HB1A104K	CHIP C 0.10UF K	
C196,197			CK73EB1H474K	CHIP C 0.47UF K	
C201			CK73HB1H102K	CHIP C 1000PF K	
CN51			E41-2671-05	PIN ASSY	
J1			E59-0413-05	SUB PLUG(D)	
-		*	G13-2333-04	CUSHION	
L1			L92-0443-05	CHIP FERRITE	
L2		*	L79-1942-05	LINE FILTER	
L3			L40-1001-86	SMALL FIXED INDUCTOR(10UH)	
L6-9			L92-0443-05	CHIP FERRITE	
L10			L92-0467-05	CHIP FERRITE	
L11,12			L92-0443-05	CHIP FERRITE	
L15		*	L33-1532-05	SMALL FIXED INDUCTOR(4.7UH)	
L16			L92-0162-05	BEADS CORE	
L17,18			L92-0443-05	CHIP FERRITE	
L19,20			L92-0467-05	CHIP FERRITE	
L22-26			L92-0467-05	CHIP FERRITE	
L27			L92-0611-05	CHIP FERRITE	
L28,29			L92-0467-05	CHIP FERRITE	
L30			L92-0443-05	CHIP FERRITE	
L31			L92-0467-05	CHIP FERRITE	
L35,36			L92-0443-05	CHIP FERRITE	
L39,40			L92-0443-05	CHIP FERRITE	
L41			L92-0467-05	CHIP FERRITE	
L43			L92-0443-05	CHIP FERRITE	
L51			L92-0467-05	CHIP FERRITE	
X2		*	L77-3062-05	CRYSTAL OSCILLATOR(33.330MHZ)	
X3		*	L77-3063-05	CRYSTAL OSCILLATOR(32MHZ)	
CP1,2			RK74HB1J220J	CHIP-COM 22 J 1/16W	
R1			RK73HB1J103J	CHIP R 10K J 1/16W	
R2			RK73GB2A151J	CHIP R 150 J 1/10W	
R3,4			RK73GB2A121J	CHIP R 120 J 1/10W	
R5			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R7			RK73HB1J820J	CHIP R 82 J 1/16W	
R12			RK73HB1J103J	CHIP R 10K J 1/16W	
R13			RK73HB1J104J	CHIP R 100K J 1/16W	
R14			RK73HB1J220J	CHIP R 22 J 1/16W	
R15			RK73HB1J183J	CHIP R 18K J 1/16W	
R16			RK73HH1J683D	CHIP R 68K D 1/16W	
R19			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R20			RK73HH1J224D	CHIP R 220K D 1/16W	
R22			RK73HH1J683D	CHIP R 68K D 1/16W	
R23			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R25			RK73HH1J121D	CHIP R 120 D 1/16W	
R26			RK73HH1J102D	CHIP R 1.0K D 1/16W	
R27,28			RK73HB1J220J	CHIP R 22 J 1/16W	
R29-31			RK73HB1J103J	CHIP R 10K J 1/16W	
R32			RK73HB1J221J	CHIP R 220 J 1/16W	
R35			RK73HB1J220J	CHIP R 22 J 1/16W	

Ref. No.	Address	New parts	Parts No.	Description	Destination
R38			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R42			RK73HB1J103J	CHIP R 10K J 1/16W	
R44-52			RK73HB1J103J	CHIP R 10K J 1/16W	
R53			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R54-57			RK73HB1J103J	CHIP R 10K J 1/16W	
R59			RK73HB1J220J	CHIP R 22 J 1/16W	
R62			RK73HB1J220J	CHIP R 22 J 1/16W	
R63			RK73HB1J103J	CHIP R 10K J 1/16W	
R64,65			RK73HB1J100J	CHIP R 10 J 1/16W	
R66-73			RK73HB1J103J	CHIP R 10K J 1/16W	
R74			RK73HB1J100J	CHIP R 10 J 1/16W	
R76			RK73HB1J103J	CHIP R 10K J 1/16W	
R77			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R78-80			RK73HB1J103J	CHIP R 10K J 1/16W	
R82			RK73HB1J103J	CHIP R 10K J 1/16W	
R83,84			RK73HB1J472J	CHIP R 4.7K J 1/16W	
R85			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R86			RK73HH1J101D	CHIP R 100 D 1/16W	
R87,88			RK73HH1J152D	CHIP R 1.5K D 1/16W	
R89			RK73HB1J100J	CHIP R 10 J 1/16W	
R90			RK73HB1J103J	CHIP R 10K J 1/16W	
R99-102			RK73HB1J101J	CHIP R 100 J 1/16W	
R104			RK73GB2A151J	CHIP R 150 J 1/10W	
R106			RK73GB2A151J	CHIP R 150 J 1/10W	
R109,110			RK73GB2A181J	CHIP R 180 J 1/10W	
R112-115			RK73GB2A223J	CHIP R 22K J 1/10W	
R116,117			RK73GB2A103J	CHIP R 10K J 1/10W	
R118			RK73GB2A472J	CHIP R 4.7K J 1/10W	
R120,121			RK73GB2A223J	CHIP R 22K J 1/10W	
R122			RK73HB1J103J	CHIP R 10K J 1/16W	
R123-125			RK73HB1J101J	CHIP R 100 J 1/16W	
R126-148			RK73HB1J220J	CHIP R 22 J 1/16W	
R149-152			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R153-171			RK73HB1J220J	CHIP R 22 J 1/16W	
R172			RK73HB1J103J	CHIP R 10K J 1/16W	
R173			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R174			RK73HB1J220J	CHIP R 22 J 1/16W	
R175			RK73HB1J471J	CHIP R 470 J 1/16W	
R191,192			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R198			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R206			RK73HB1J000J	CHIP R 0.0 J 1/16W	
R208			RK73HH1J102D	CHIP R 1.0K D 1/16W	
R209			RK73GB2A000J	CHIP R 0.0 J 1/10W	
R211			RK73GB2A000J	CHIP R 0.0 J 1/10W	
R213			RK73HH1J681D	CHIP R 680 D 1/16W	
R215			RK73HB1J101J	CHIP R 100 J 1/16W	
R216			RK73HB1J000J	CHIP R 0.0 J 1/16W	
D1		*	AVRL161A1R1NB	VARISTOR	
D2			RB050L-40	DIODE	
D3		*	MINISMC150F24	VARISTOR	
D4			RB050L-40	DIODE	
D5			1SS388F	DIODE	
D9			EDZ18B	ZENER DIODE	
D12		*	KDZ36B	ZENER DIODE	
D31,33			AVRM1608OMAAB	VARISTOR	
D34			1SS416	DIODE	

PARTS LIST

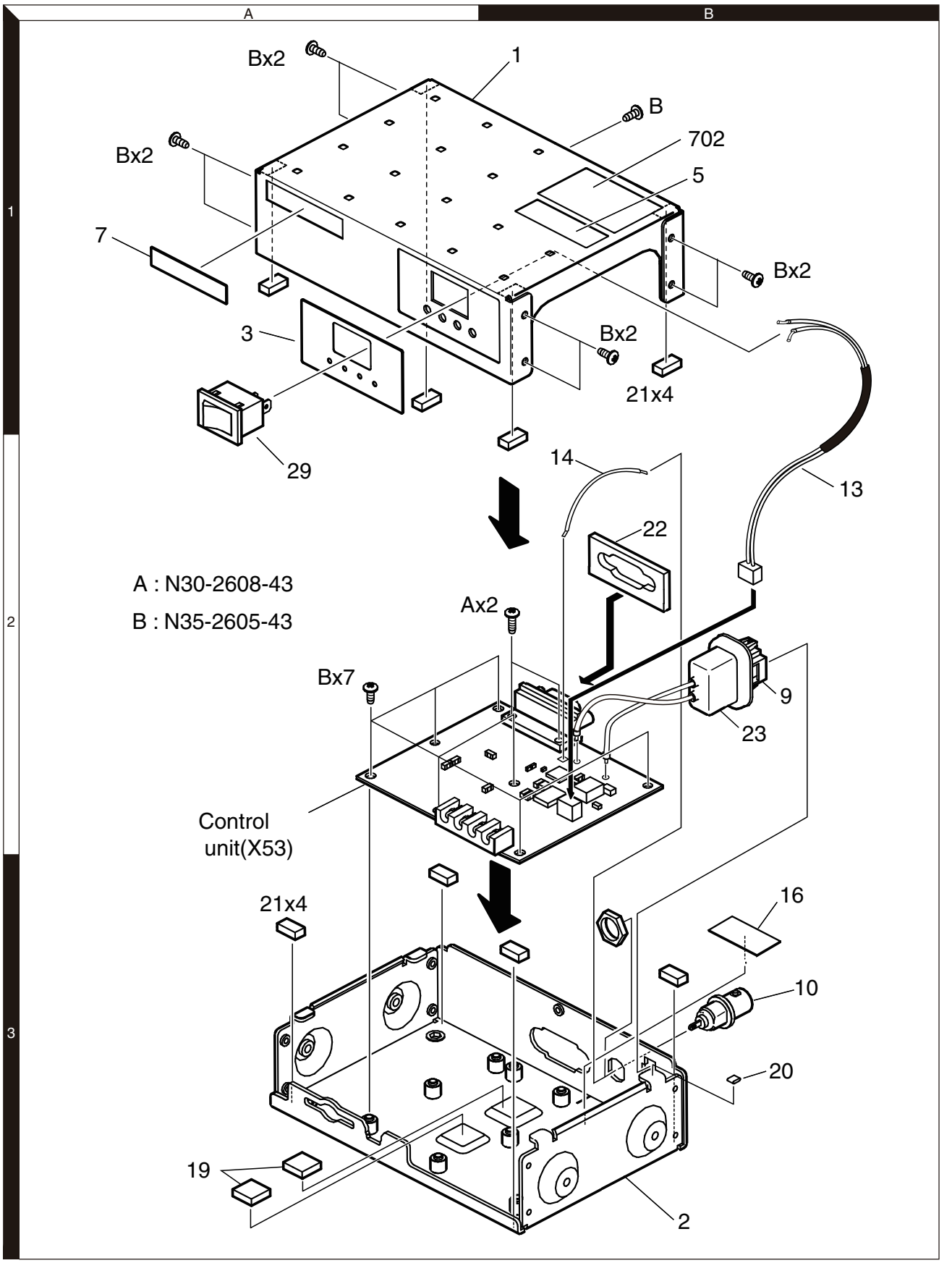
CONTROL UNIT (X53-4500-20)

Ref. No.	Address	New parts	Parts No.	Description	Destination
IC2			LT3680EMSE	ANALOGUE IC	
IC4		*	ML86V76651T03	MOS-IC	
IC5		*	EN5336QI	ANALOGUE IC	
IC6		*	XC6221B252M-G	ANALOGUE IC	
IC7		*	XC6222B18BP-G	ANALOGUE IC	
IC8		*	XC6221B28AM-G	ANALOGUE IC	
IC9		*	TC7WZ08FU-F	MOS-IC	
IC10		*	XC6108N31BM-G	ANALOGUE IC	
IC11		*	**Note 1(BGA)**	MCU	
IC12		*	ST2564C80KDVA	ROM IC	
IC13		*	**Note 1(BGA)**	DRAM IC	
IC14			ADM3202ARUZ	MOS-IC	
IC15		*	TC74VCX125FK	MOS-IC	
IC16		*	XC6221B182M-G	ANALOGUE IC	
Q7		*	SFT1342-E	FET	
Q8-10			2SC2713-F	TRANSISTOR	
Q11-14		*	RT1N234C-T112	TRANSISTOR	

Ref. No.	Address	New parts	Parts No.	Description	Destination

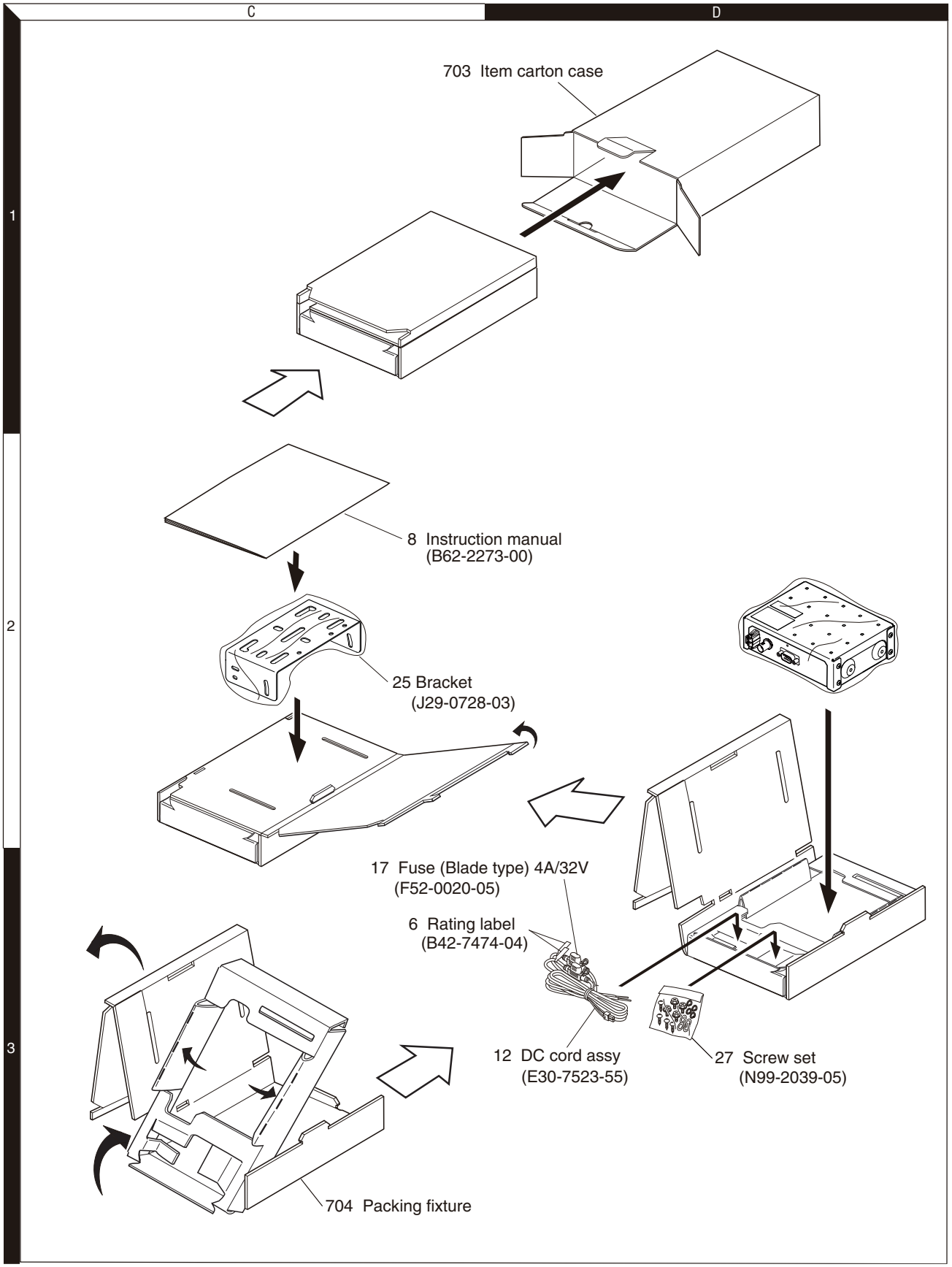
Note 1: This part cannot be replaced. Therefore, this part is not supplied as a service part.

EXPLODED VIEW



Parts with the exploded numbers larger than 700 are not supplied.

PACKING



Parts with the exploded numbers larger than 700 are not supplied.

TROUBLE SHOOTING

Fault diagnosis of the BGA (Ball Grid Array) IC

■Overview:

A flowchart for determining whether or not the KVT-11 can be powered on (When everything is corresponding to the following condition) due to broken BGA parts.

『This is the flow chart when meeting the bad condition of everything.』

■Conditions

1. When the illumination pattern of LED doesn't apply to any in Table 1.
2. When you cannot read camera ID by using KAS-11.

■BGA parts

・DSP (IC11)
・DDR2 (IC13)

Table1.LED illumination pattern

Pattern	Error situation	LED situation			
		PWR	TX	RX	▶■
Pattern 1	Normality	Lighting	※	※	※
Pattern 2	Error of IC11 or IC13	Blinking	Lighting	Turning off	Turning off
Pattern 3	Error of IC11 or IC4	Blinking	Lighting	Turning off	Lighting
Pattern 4	Error of IC11 or IC4	Blinking	Turning off	Lighting	Lighting

※ Changes depending on the software control.

●Checking power supply voltage

Checking voltage

Check No	Points to be checked	Normal voltage
1	+B IC2(4pin)	Input voltage
2	3.35V $R180	3.35V
3	2.50V IC6（5pin）	2.50V
4	1.85V IC7（5pin）	1.85V
5	1.05V IC5（8pin）	1.05V

When an abnormal value is confirmed →

Checking for an abnormal point.
【Case of +B has an abnormal voltage】
Step 1. Remove D3 to check the voltage of the Q7 side of D3.
⇒When +B was the normal voltage, the possibility IC2 is broken large.
⇒When +B was the abnormal voltage, the possibility previous circuit from input of D3 is broken large.
【Case of 3.35V has an abnormal voltage】
Step 1. Remove L19.
⇒When 3.35V was the normal voltage, the possibility IC7 or IC8 is broken large.
⇒Do step 2, when 3.35V was the abnormal voltage.

Step 2. Remove L29.
⇒When 3.35V was the normal voltage, the possibility IC14 is broken large.
⇒Do step 3, when 3.35V was the abnormal voltage.

Step 3. Remove L31.
⇒When 3.35V was the normal voltage, the possibility LED circuit is broken large.
⇒Do step 4, when 3.35V was the abnormal voltage.

Step 4. Remove L20.
⇒When 3.35V was the normal voltage, the possibility IC6 is broken large.
⇒Do step 5, when 3.35V was the abnormal voltage.

Step 5. Remove L51.
⇒When 3.35V was the normal voltage, the possibility IC10 is broken large.
⇒Do step 6, when 3.35V was the abnormal voltage.

Step 6. Remove L17.
⇒When 3.35V was the normal voltage, the possibility X3 is broken large.
⇒Do step 7, when 3.35V was the abnormal voltage.

↓ When a normal value is confirmed

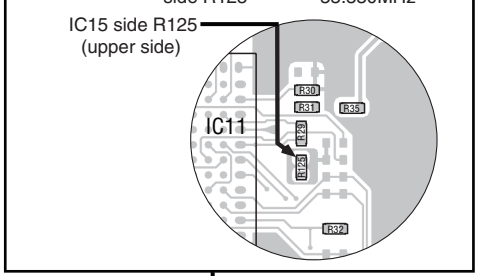
Next page

Next page

TROUBLE SHOOTING

●Checking the clock

Points to be checked	Normal Oscillation
33.330MHz IC15 side R123	33.330MHz
side R124	33.330MHz
side R125	33.330MHz



When an abnormal Oscillati on is confirmed

Step1. Remove the R123 R124 and R125.
⇒When 33.330MHz was the abnormal oscillation, the possibility IC15 is broken large.
⇒When 33.330MHz was the normal oscillation, the DSP is broken.

When a normal Oscillation is confirmed

●Checking the reset/control signal

Points to be checked	Normal voltage
RESET IC9（3pin）	2.50V
/POW_SW Q10(3pin)	0V

When an abnormal value is confirmed

【Case of RESET has an abnormal voltage】
Step 1. Remove R38.
⇒When RESET was the abnormal voltage, the possibility IC9 is broken large.
⇒When RESET was the normal voltage, the DSP is broken.

【Case of /POW_SW has an abnormal voltage】
Step 1. Exchange Q10 to check the voltage of R192(0Ω).
Normal voltage: Input voltage(+B)
⇒When input voltage was the abnormal voltage, the possibility previous circuit
from input of Q10 is broken large.
⇒Do step 2, when input voltage was the normal voltage.

Step 2. Check the voltage of Q10 (3pin).
⇒When /POW_SW was the abnormal voltage, the DSP is broken.

When a normal value is confirmed

Next page

Step 7. Remove L10.
⇒When 3.35V was the normal voltage, the possibility IC16 is broken large.
⇒Do step 8,when 3.35V was the abnormal voltage.

Step 8. Remove L6.
⇒When 3.35V was the normal voltage, the possibility IC4 is broken large.
⇒Do step 9,when 3.35V was the abnormal voltage.

Step 9. Remove IC5.
⇒When 3.35V was the normal voltage, the possibility IC5 is broken large.
⇒When 3.35V was abnormal voltages, it is broken excluding BGA.

【Case of 2.5V has an abnormal voltage】
Step 1. Remove L18.
⇒When 2.5V was the normal voltage, the possibility X2 is broken large.
⇒Do step 2,when 2.5V was the abnormal voltage.

Step 2. Remove L43.
⇒When 2.5V was the normal voltage, the possibility IC15 is broken large.
⇒Do step 3,when 2.5V was the abnormal voltage.

Step 3. Remove IC9.
⇒When 2.5V was the normal voltage, the possibility IC9 is broken large.
⇒Do step 4,when 2.5V was the abnormal voltage.

Step 4. Exchange IC6.
⇒When 2.5V was the abnormal voltage, the DSP is broken.

【Case of 1.85V has an abnormal voltage】
Step 1. Exchange IC7 to check the voltage of the 1.85V.
⇒When 1.85V was the abnormal voltage, the DSP or DDR2 is broken.

【Case of 1.05V has an abnormal voltage】
Step 1. The direct current resistance is measured.
⇒Turn off power when you measure the direct current resistance.

Points to be checked	Normal direct current resistance
Between IC5(8pin) and IC5(32pin)	800.0Ω
Between IC5(32pin) and $R190	2.0kΩ

⇒The resistance value in case of with the abnormal direct current resistance value between
the IC5(8pin) and the IC5(32pin),the possibility R213 or R25 is broken.
⇒The resistance value in case of with the abnormal direct current resistance value between
the IC5(32pin) and the $R190,the possibility R208 or R26 is broken.
⇒Do step2, when direct current resistance is normal resistance.

Step 2. Exchange IC5 to check the voltage of the 1.05V.
⇒When 1.05V was the abnormal voltage, the DSP is broken.

TROUBLE SHOOTING

●Checking the flash memory

Points to be checked	Voltage of the normal access
SPI_CLK IC11 side R65	2.50V→0V→2.50V(Accessing)
/SPI0_CS IC11 side R74	2.50V→0V→2.50V(Accessing)
SPI_SDI IC12（8pin）	2.85V→0V→2.85V(Accessing)
SPI_SDO IC11 side R64	2.50V→0V→2.50V(Accessing)

※A voltage of the normal access can confirm only several ms from the power on.

When a abnormal value is confiemed →

【The voltage in case of when SPI_CLK is abnormal during access.】
Step1.Remove R65.
⇒When SPI_CLK was the abnormal voltage, the DSP is broken.
⇒When SPI_CLK was the normal voltage, the possibility IC12 is broken large.

【The voltage in case of when /SPI0_CS is abnormal during access】
Step1.Remove R74.
⇒When /SPI0_CS was the abnormal voltage, the DSP is broken.
⇒When /SPI0_CS was the normal voltage, the possibility IC12 is broken large.

【The voltage in case of when SPI_SDI is abnormal during access】
Step1.Remove R89.
⇒When SPI_SDI was the normal voltage, the DSP is broken.
⇒When SPI_SDI was the abnormal voltage, the possibility IC12 is broken large.

【The voltage in case of when SPI_SDO is abnormal during access】
Step1.Remove R64.
⇒When SPI_SDO was the abnormal voltage, the DSP is broken.
⇒When SPI_SDO was the normal voltage, the possibility IC12 is broken large.

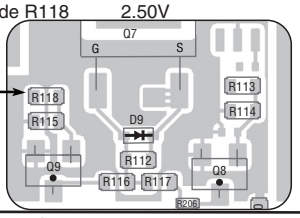
When a normal value is confirmed

Note: Please confirm this item after switching the power supply off → on.

●Checking the output signal of DSP

Points to be checked: POW_CNT IC11 side R118 — Normal voltage: 2.50V

IC11 line (left side)



When a abnormal value is confiemed →

Step1.Remove R118 .
⇒When POW_CNT was the abnormal voltage,the DSP or DDR2 or IC12 is broken.

When a normal value is confirmed

●LED control

Points to be checked	Normal voltage
LED_POW Q11（1pin）	2.50V

→

Step 1. Remove Q11.
⇒When LED_POW was the abnormal voltage, the DSP is broken.

When a normal value is confirmed

It is unlikely that the BGA parts are broken.

Note: Explanation of signal

- RESET(The signal name is undescribed in the schematic diagram.) : Reset signal of DSP: Active low
- /POW_SW : Power signal of SW : Active low
- SPI_CLK : Output clock for Flash memory : low → high → low (repetition)
- /SPI0_CS : Output control signal for Flash memory : low → high → low (repetition)
- SPI_SDI : Input data from Flash memory : low → high → low (repetition)
- SPI_SDO : Output data for Flash memory : low → high → low (repetition)
- POW_CNT : Control signal for power supply circuit : Active high
- LED_POW : Control signal of Power LED : Active high

LED display when Initial-Check

●Parts that do Initial-Check

- DSP (IC11)
- DDR2 (IC13)
- Video decoder IC (IC4)

●Function of LED

1. “ PWR ” : Power on(Red)
2. “ TX ” : Transmission(Red)
3. “ RX ” : Reception(Green)
4. “ Video mark ” : Video(Green)

Table1.LED illumination pattern

Pattern	Error situation	LED situation			
		PWR	TX	RX	▶■
Pattern 1	Normality	Lighting	※	※	※
Pattern 2	Bus error of DSP - DDR2	Blinking	Lighting	Turning off	Turning off
Pattern 3	Bus error of DSP – Video	Blinking	Lighting	Turning off	Lighting
Pattern 4	I2C error of DSP - Video	Blinking	Turning off	Lighting	Lighting

Note:
1. ※ Changes depending on the software control.
2. A high-ranking pattern number is given to priority when two or more errors are detected.
3. The cycle of blinking is a repetition of “ ON : 500ms ” and “ OFF:500ms ” .

TROUBLE SHOOTING

Check Procedure after Repairs

1. Connect the KVT-11 to the external interface

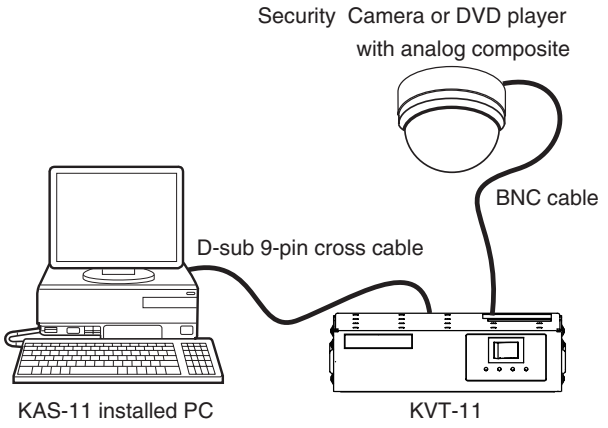


Fig.1 Connection diagram

Note: When connecting the KVT-11 to a PC, use the following D-sub 9-pin Cross Cable allocation.

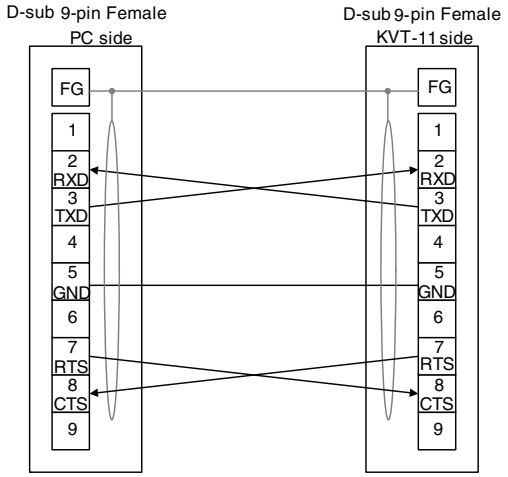


Fig. 2 Cable assignments

2. Power supply

Confirm that the power supply is set to 13.6V (6.5V ~ 16V), then turn on the power supply.

3. KVT-11 LED Status

PWR : lights RED
TX : OFF
RX : OFF
Video : lights GREEN

After the power has been turned on for five seconds, if the LED is different from any of the above, it may be damaged.

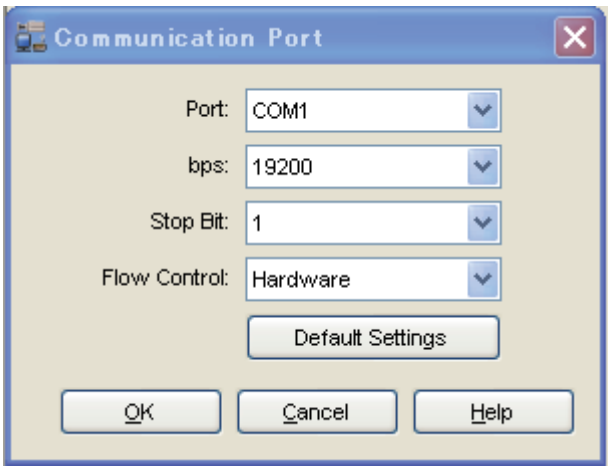
When the Video LED turns off, there is no image input; verify the operation of the image input equipment.

4. Starting up the KAS-11

Start up the KAS-11

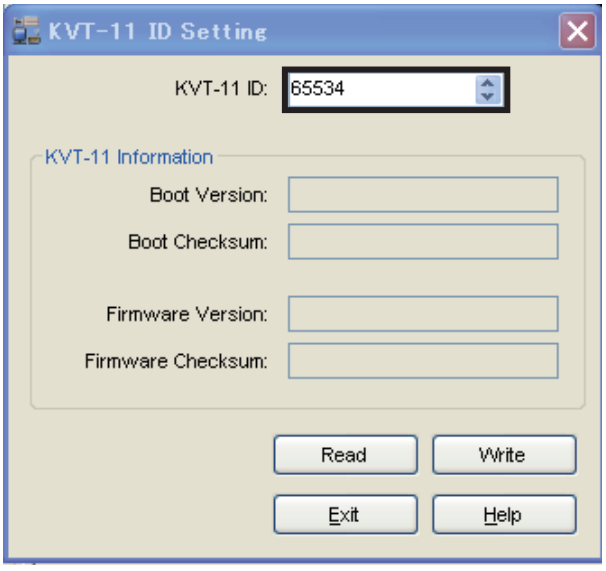
■ Check the port settings

1) Select "Setup" on the menu bar.
2) Click [Communication Port].
3) Confirm the connected port of the D-sub 9-pin serial cable.



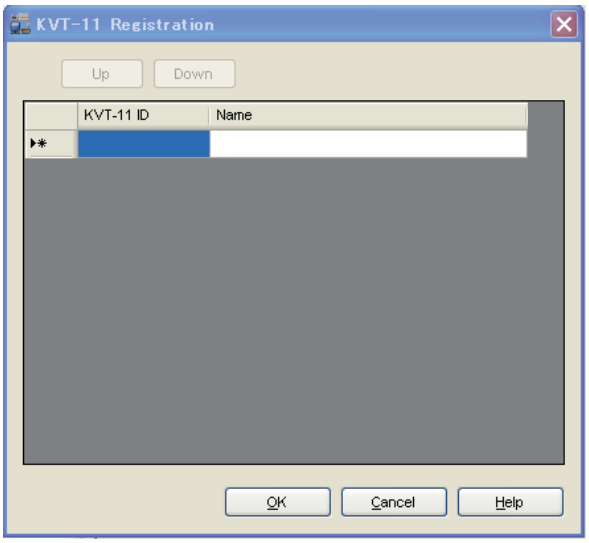
■ Confirm and set the KAS-11 ID with KAS-11

1) Select "Setup" on the menu bar.
2) Click [KVT-11 ID Setting].
3) Click [Read]. (Confirm the set ID)



TROUBLE SHOOTING

4) Select "Setup" on the menu bar.
5) Click [KVT-11 Registration]
Note: If read ID is not set, set it.



■ Set the Quality

1) Select "Setup" on the menu bar.
2) Click [Camera Settings]
3) Click [Read]
4) Click [Write] (Writes the settings of the KVT-11 to the KAS-11.)

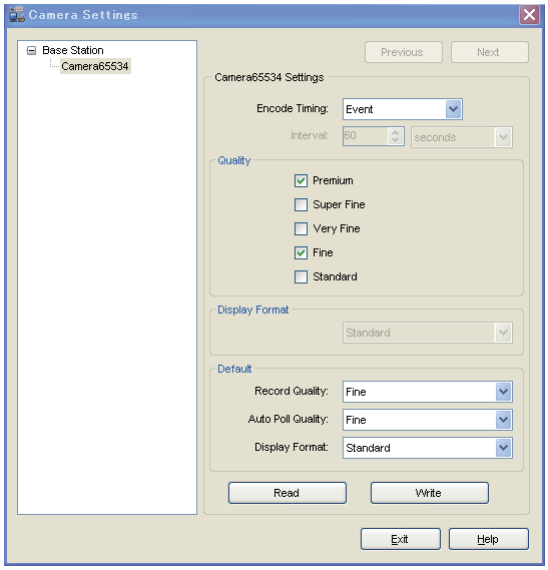
5. Importing KAS-11 images

Select a “Quality” level (Premium, Super Fine, Very Fine, Fine, Standard).

Click Record. If you are able to import images, then the repairs have been completed.

Note:

- If “Timeout Error” appears, there may be a communication error between the KVT-11 and KAS-11.
- If “No Camera is connected” appears, there is no image input. Confirm that the camera or DVD cable is properly connected.



TERMINAL FUNCTION

Control unit(X53-4500-20)

Pin No.	Name	I/O	Function
J1(COM 9-pin D-sub)			
1	-	-	Refer to "COM 9-pin D-sub connector specification"
2	RXD	I	
3	TXD	O	
4	-	-	
5	GND	-	
6	-	-	
7	RTS	O	
8	CTS	I	
9	RESET	I	
CN51(DC IN)			
1	POW_SW	O	Power switch signal
2	+B	I	Power input
CN59 (VIDEO1)			
-	VIDEO1	I	Analog composite video input

COM 9-pin D-sub connector specification

Pin No.	Pin Name	I/O	A/D	Rating and Condition				
				Parameter	Min	Typ	Max	Unit
1	-	-	-					
2	RXD	I	Digital	Input Voltage Range	-30		30	V
				Threshold Low	0.6	1.2		V
				Threshold High		1.6	2.4	V
				Baud Rate		115200		bps
3	TXD	O	Digital	Voltage Swing(3kΩ Load)	±5	±5.2		V
				Baud Rate		115200		bps
4	-	-	-					
5	GND	-	GND					
6	-	-	-					
7	RTS	O	Digital	Voltage Swing(3kΩ Load)	±5	±5.2		V
8	CTS	I	Digital	Input Voltage Range	-30		30	V
				Threshold Low	0.6	1.2		V
				Threshold High		1.6	2.4	V
9	RESET	I	-	VIH	2.5			V
				VIL			0.36	V

KVT-11 PC BOARD

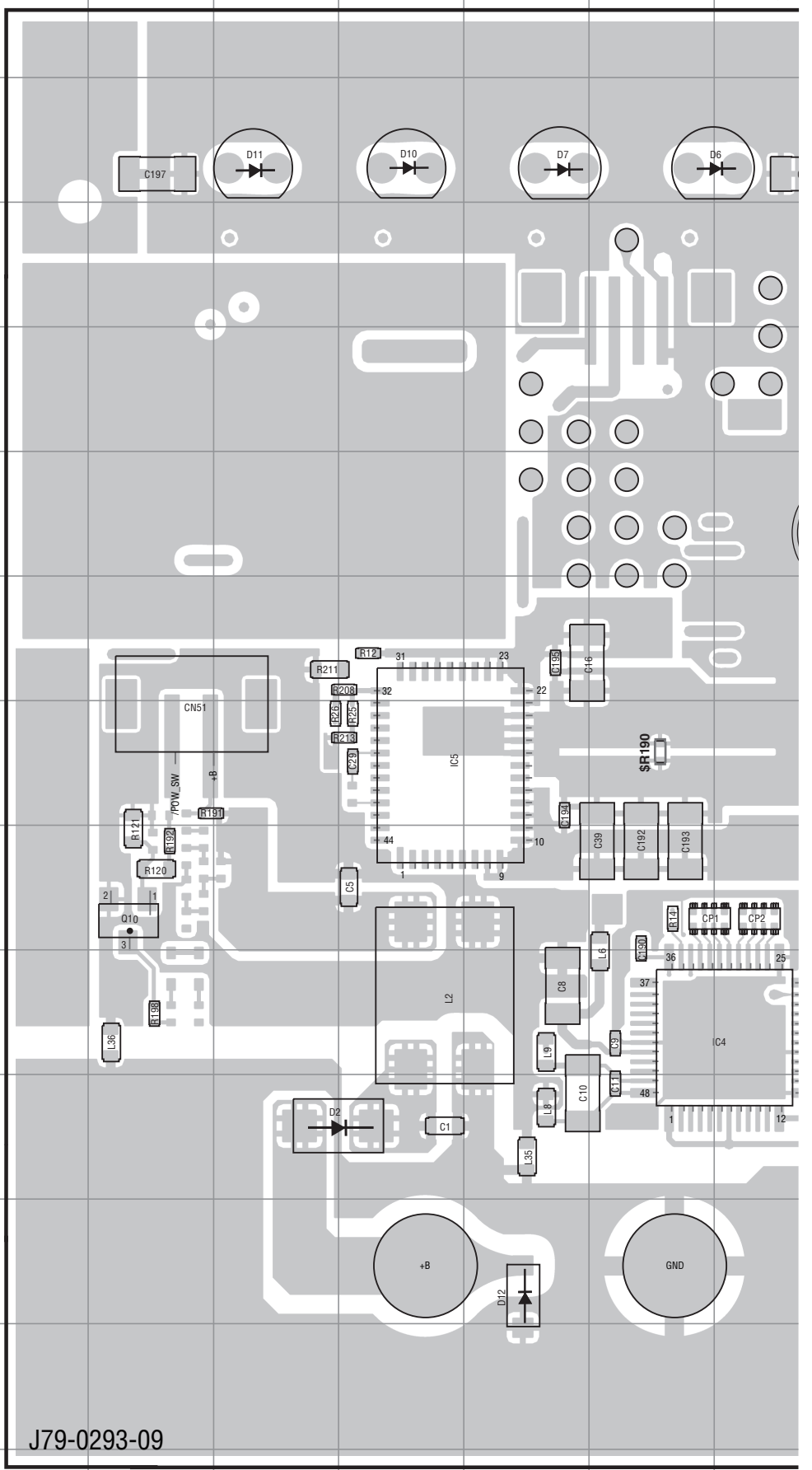
CONTROL UNIT (X53-4500-20)
Component side view (J79-0293-09)

Ref. No.	Address
IC4	10J
IC5	8G
Q10	9E
D1	11K
D2	11G
D6	3J
D7	3H
D10	3G
D11	3F
D12	11G
D31	12N
D33	12N
D34	12O

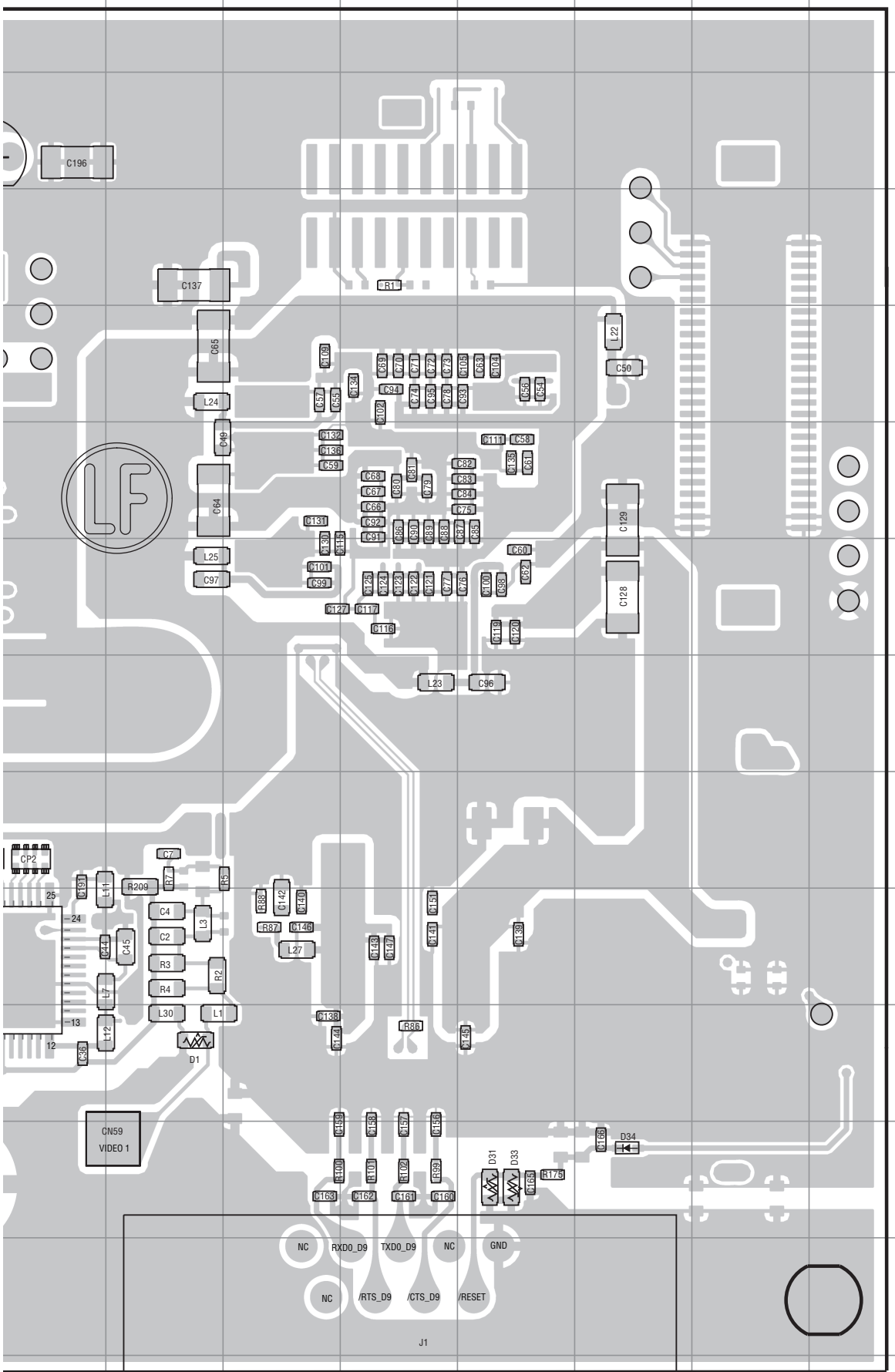
Component side

Layer 1	
Layer 2	
Layer 3	
Layer 4	
Layer 5	
Layer 6	
Layer 7	
Layer 8	

Foil side



CONTROL UNIT (X53-4500-20)
Component side view (J79-0293-09)



KVT-11 PC BOARD

CONTROL UNIT (X53-4500-20)

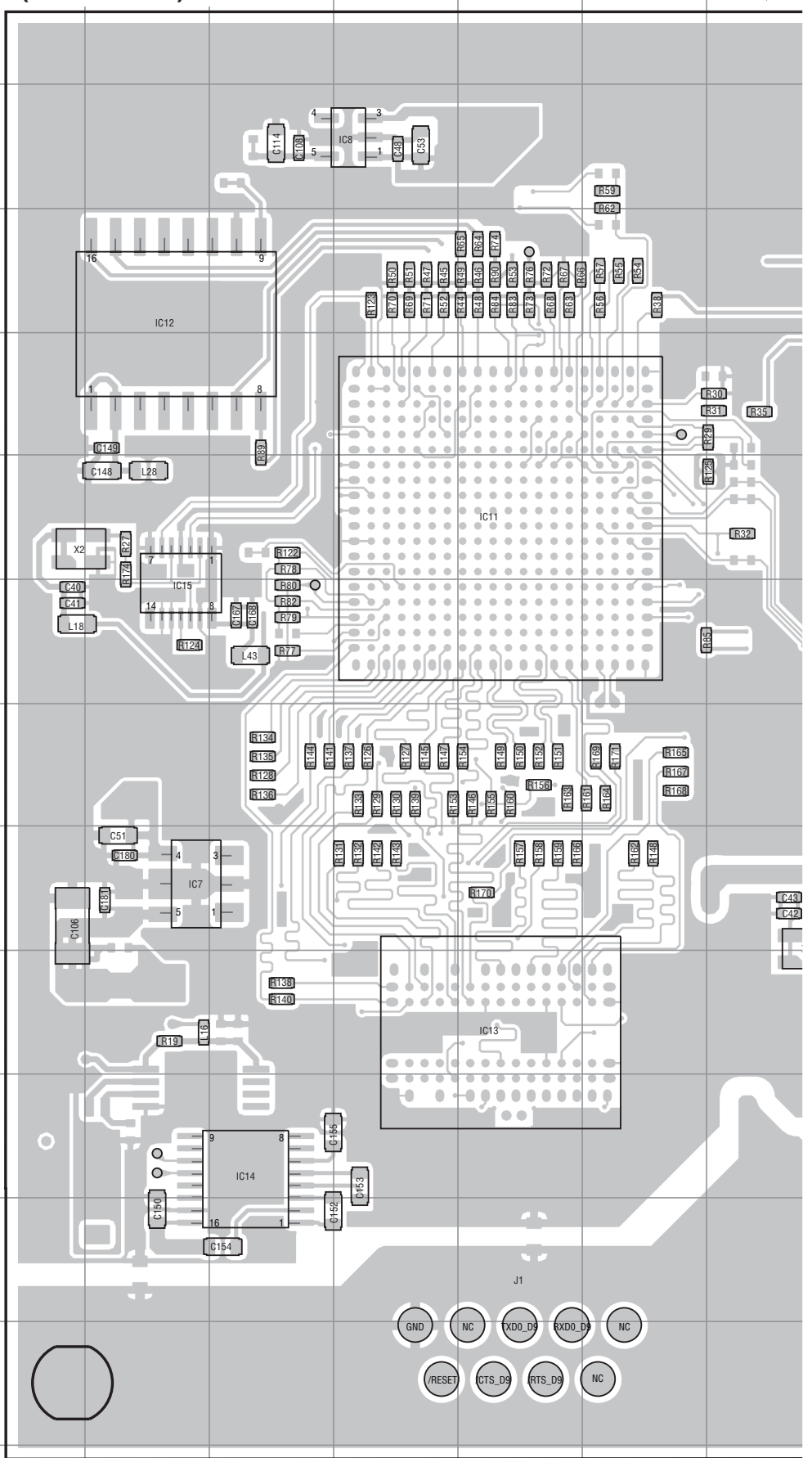
Foil side view (J79-0293-09)

Ref. No.	Address
IC2	5O
IC6	5L
IC7	9E
IC8	3G
IC9	4K
IC10	5L
IC11	6H
IC12	4E
IC13	10H
IC14	11F
IC15	7E
IC16	10M
Q7	8O
Q8	10P
Q9	10O
Q11	4K
Q12	4L
Q13	4M
Q14	4O
D3	7O
D4	7P
D5	5M
D9	10O

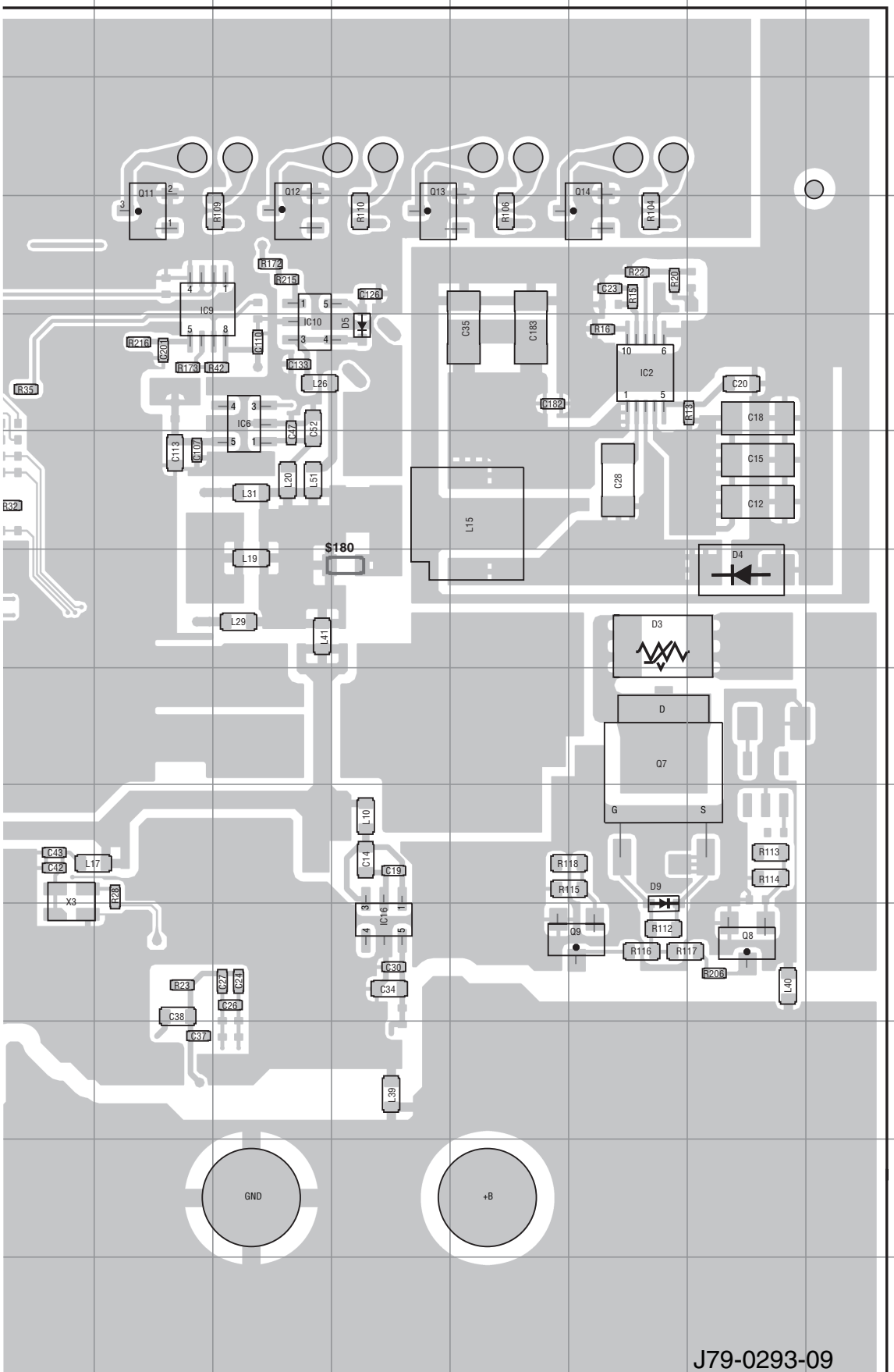
Component side

Layer 1	
Layer 2	
Layer 3	
Layer 4	
Layer 5	
Layer 6	
Layer 7	
Layer 8	

Foil side

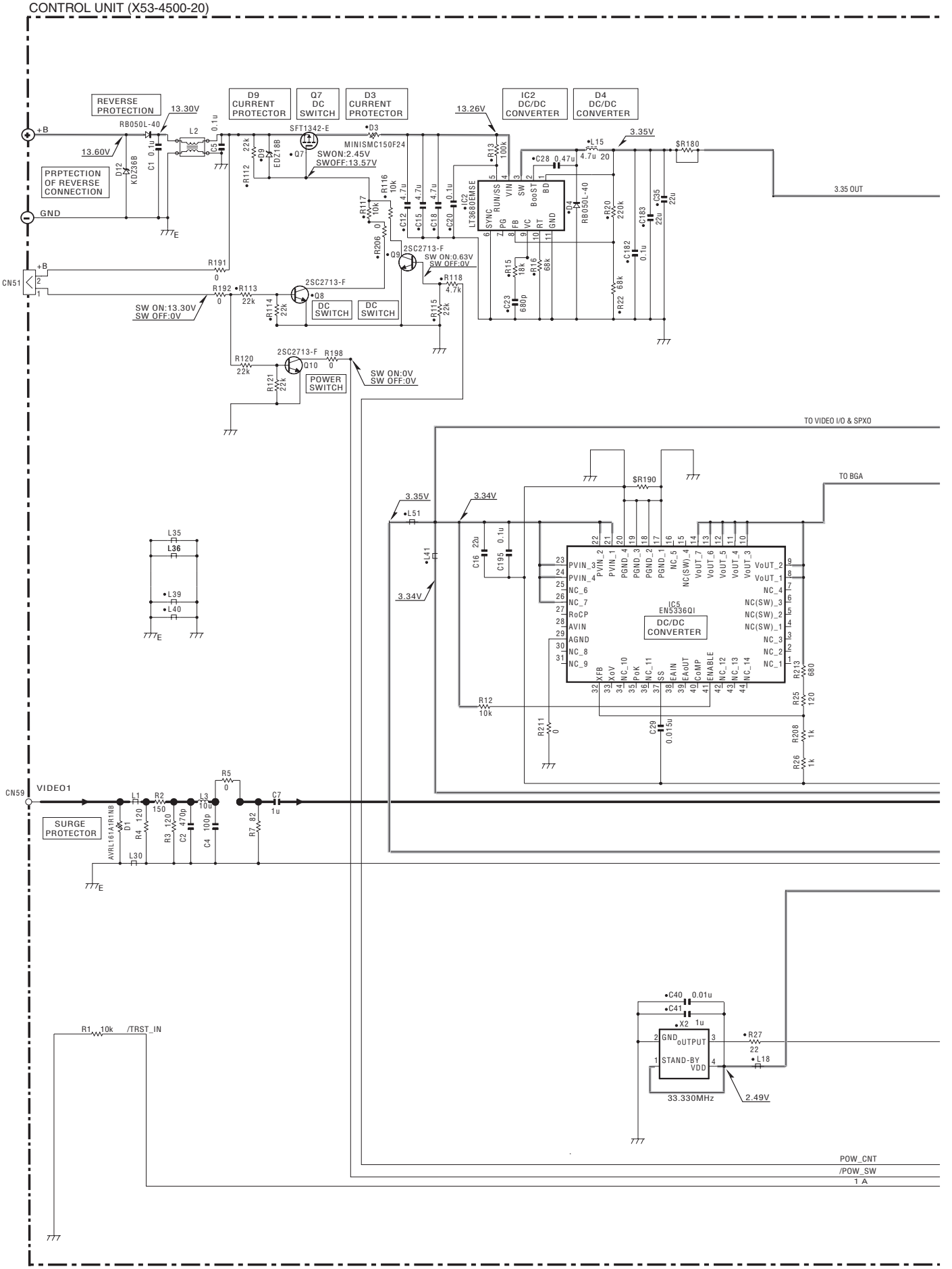


CONTROL UNIT (X53-4500-20)
Foil side view (J79-0293-09)



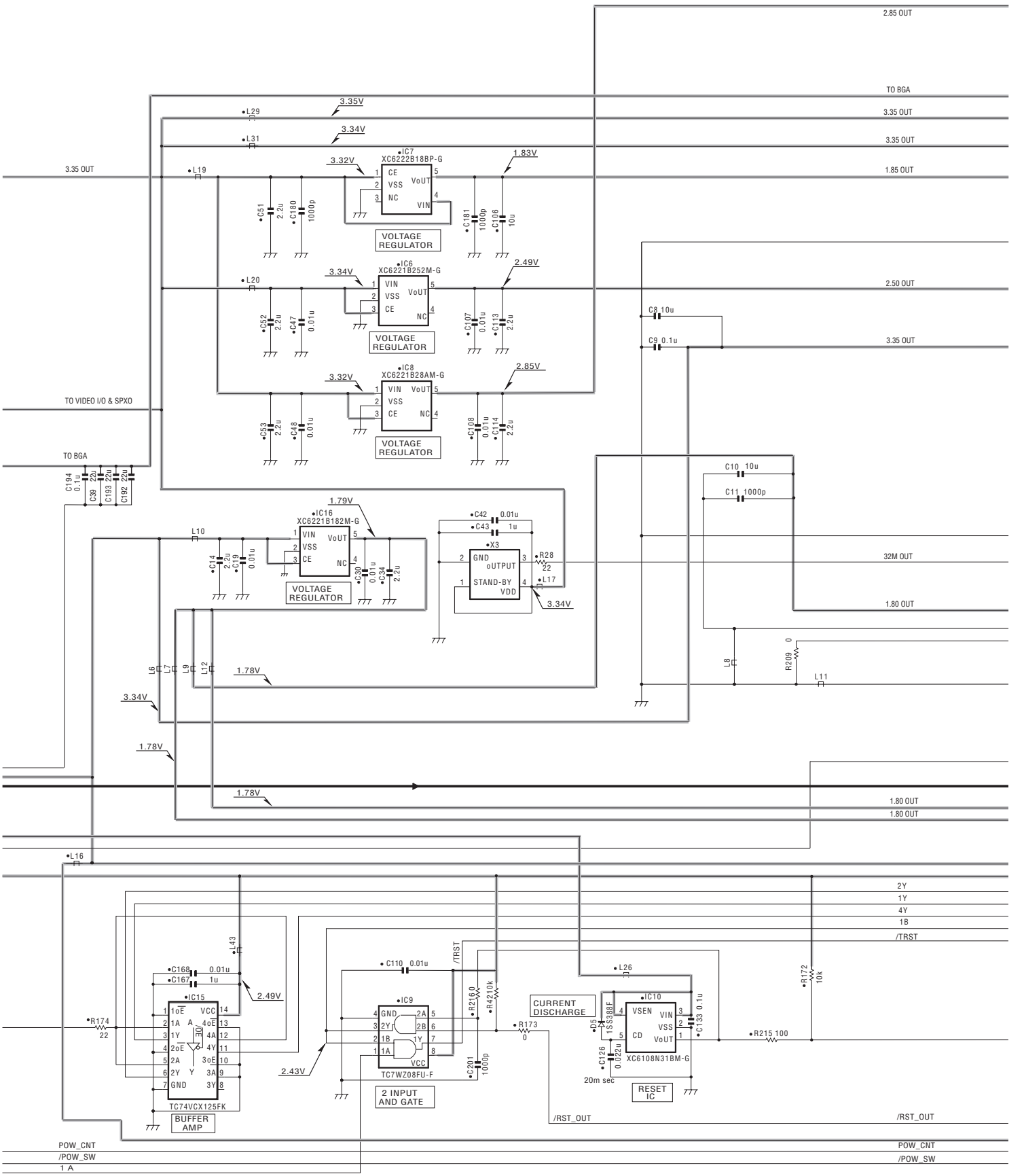
KVT-11 SCHEMATIC DIAGRAM

CONTROL UNIT (X53-4500-20)



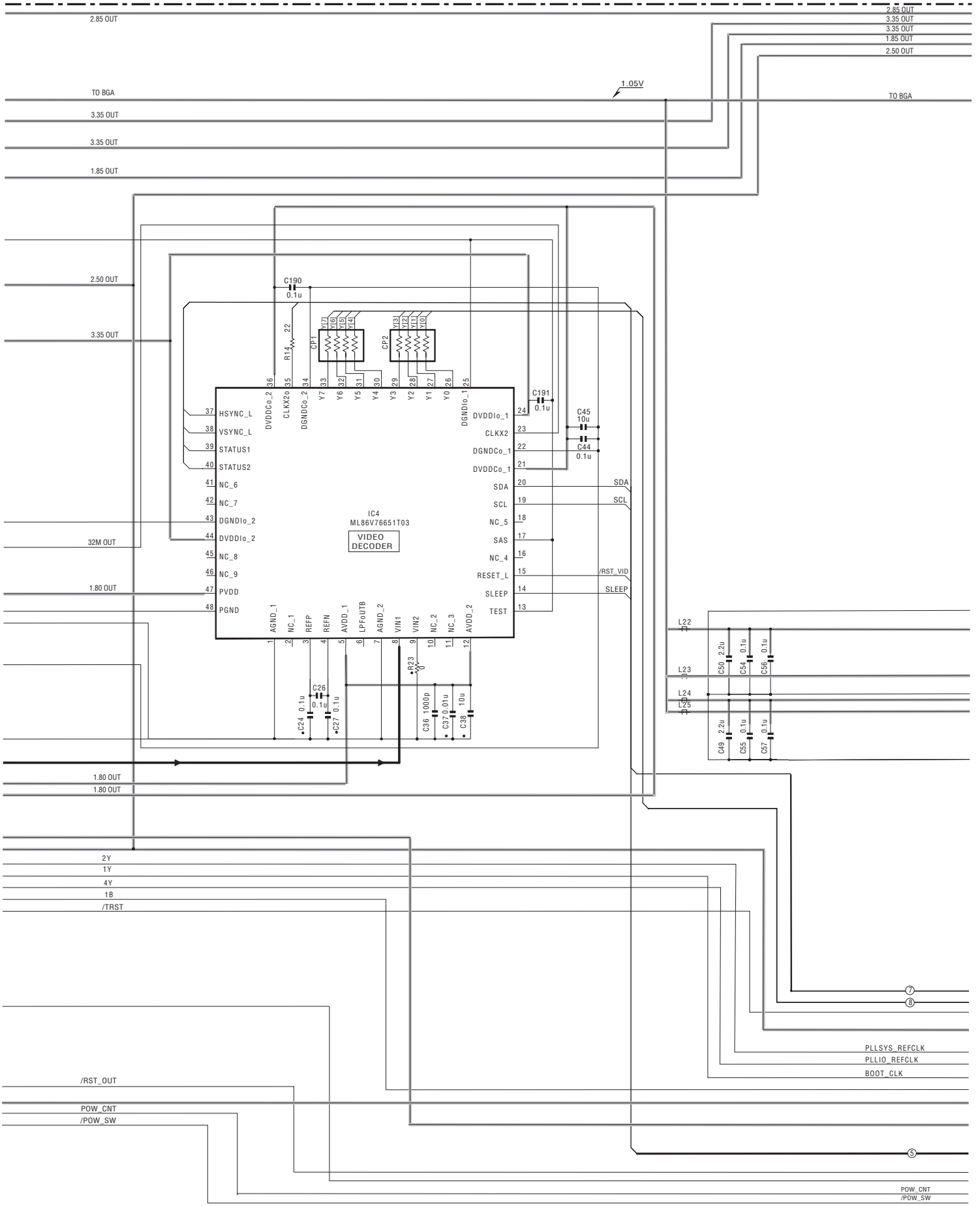
SCHEMATIC DIAGRAM KVT-11

CONTROL UNIT (X53-4500-20)



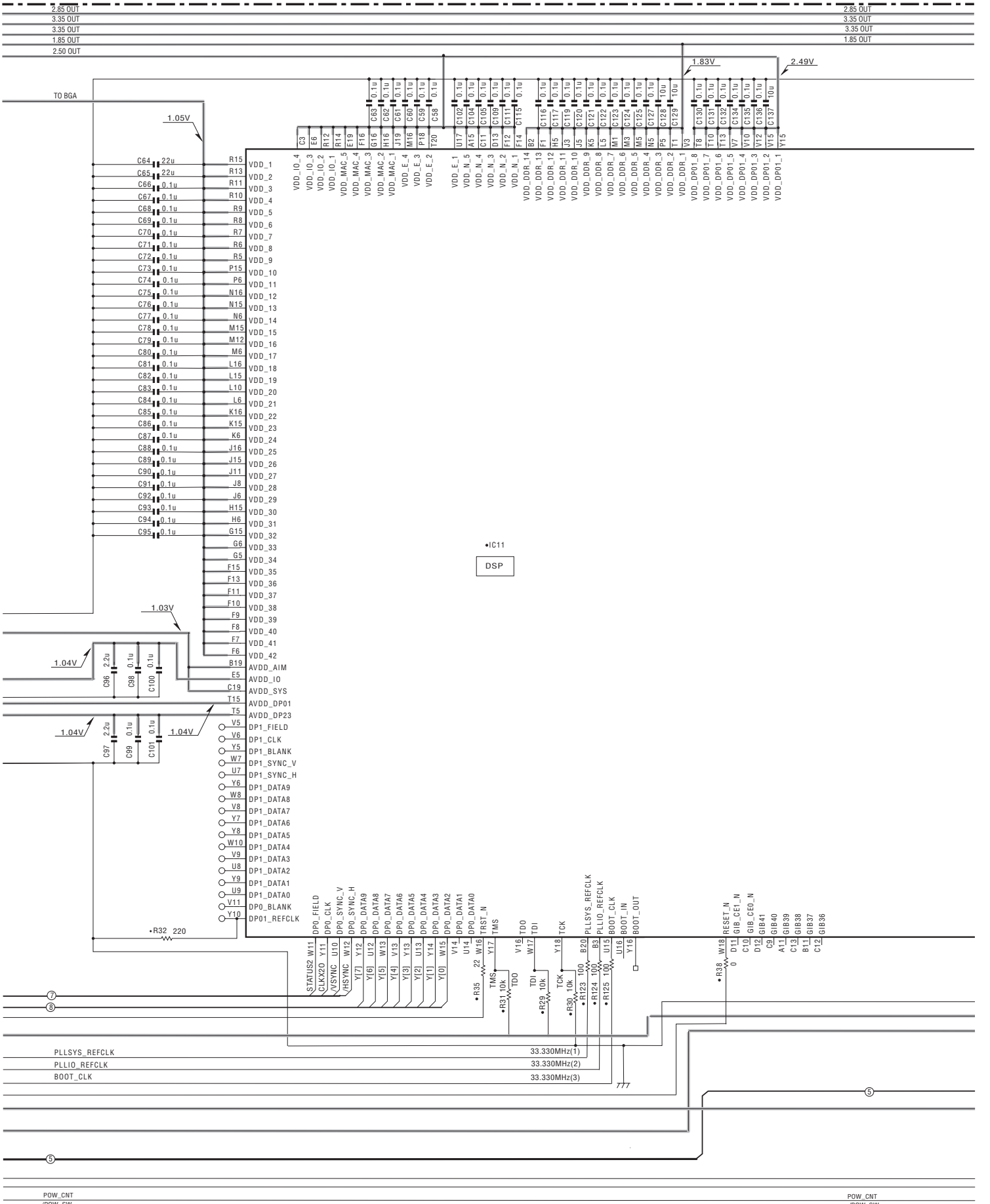
KVT-11 SCHEMATIC DIAGRAM

CONTROL UNIT (X53-4500-20)



SCHEMATIC DIAGRAM KVT-11

CONTROL UNIT (X53-4500-20)



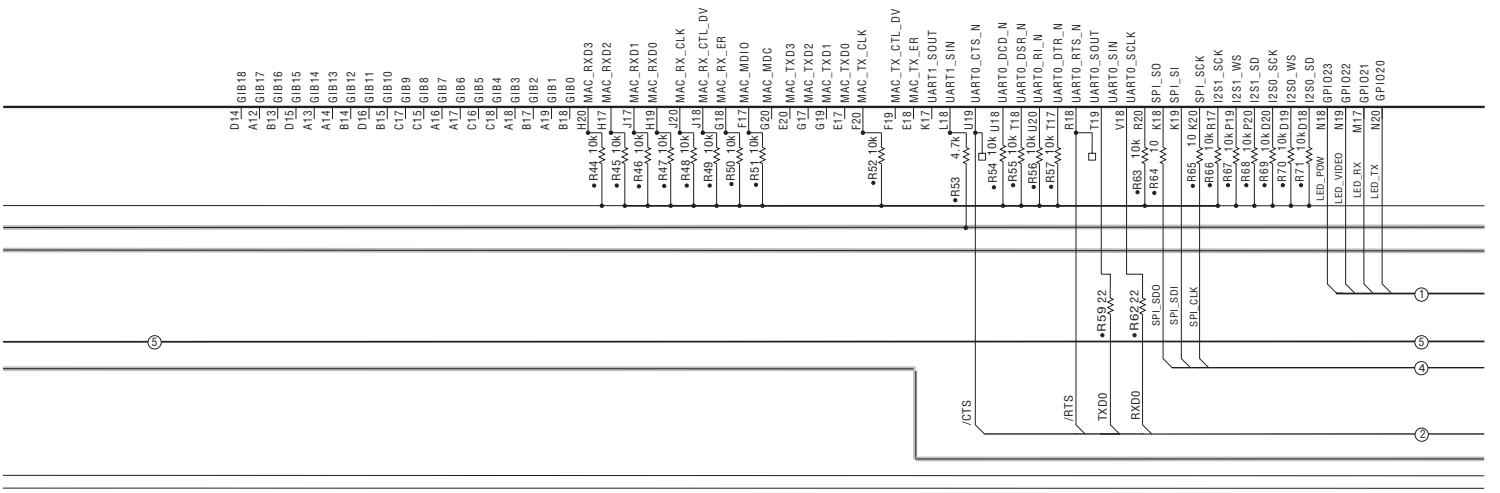
KVT-11 SCHEMATIC DIAGRAM

CONTROL UNIT (X53-4500-20)

2.85 OUT
3.35 OUT
3.35 OUT
1.85 OUT

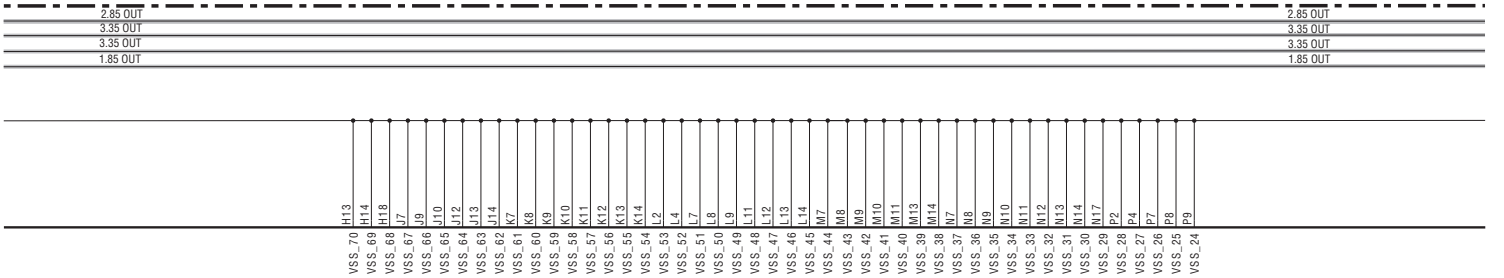
•IC11

DSP



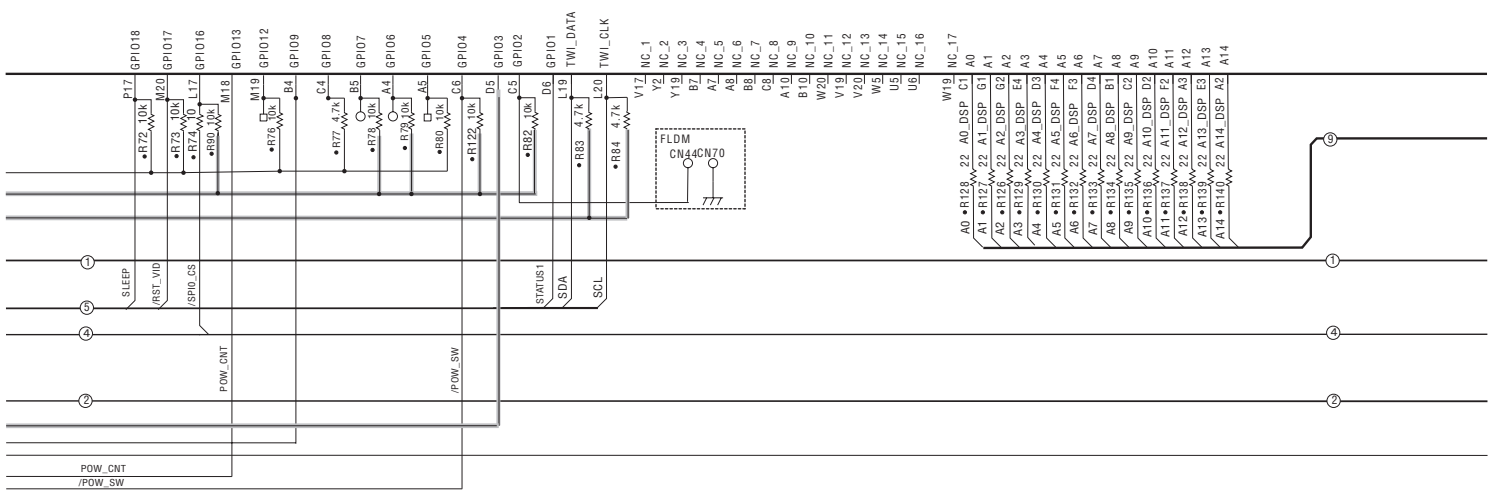
SCHEMATIC DIAGRAM KVT-11

CONTROL UNIT (X53-4500-20)



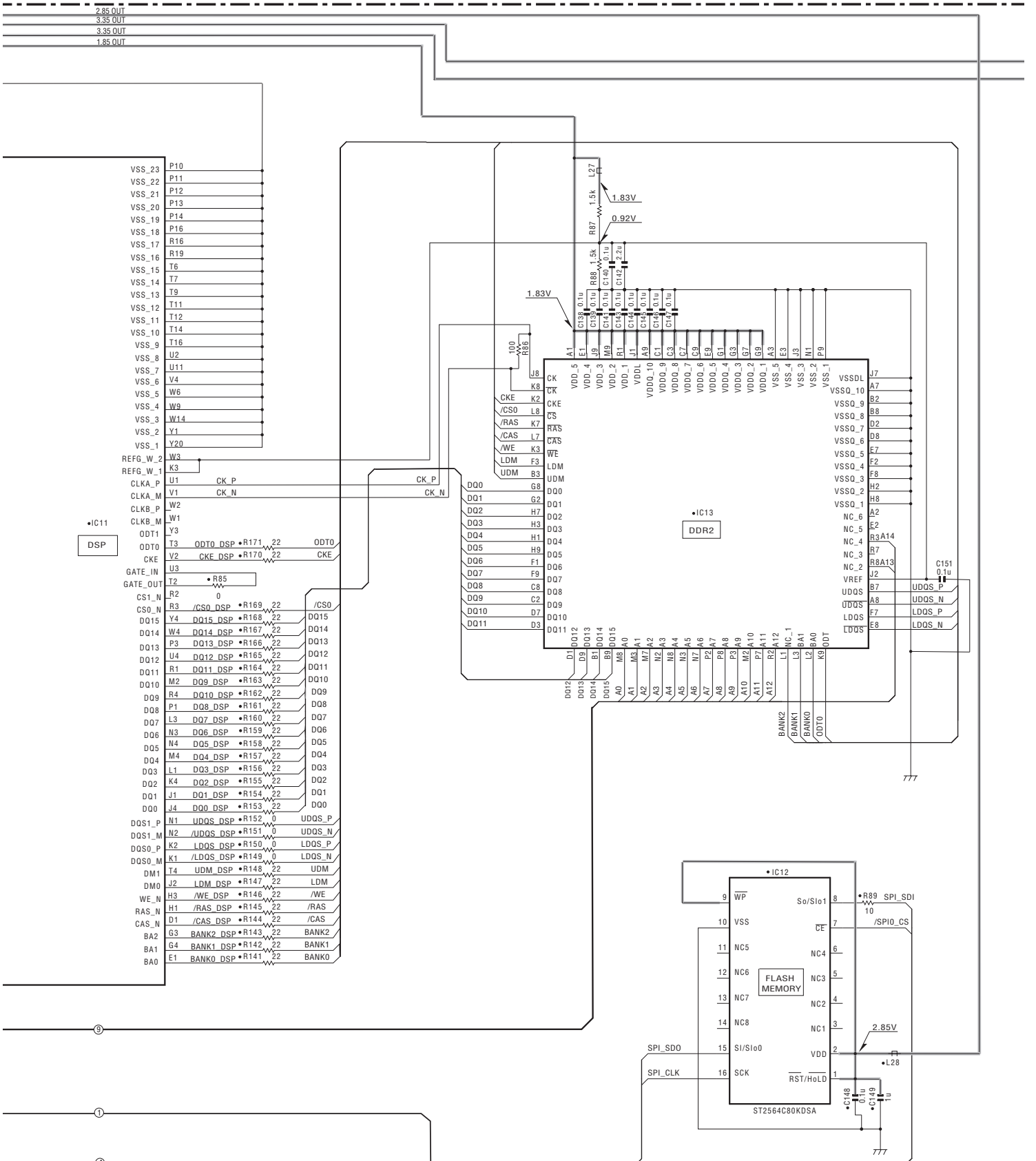
•IC11

DSP



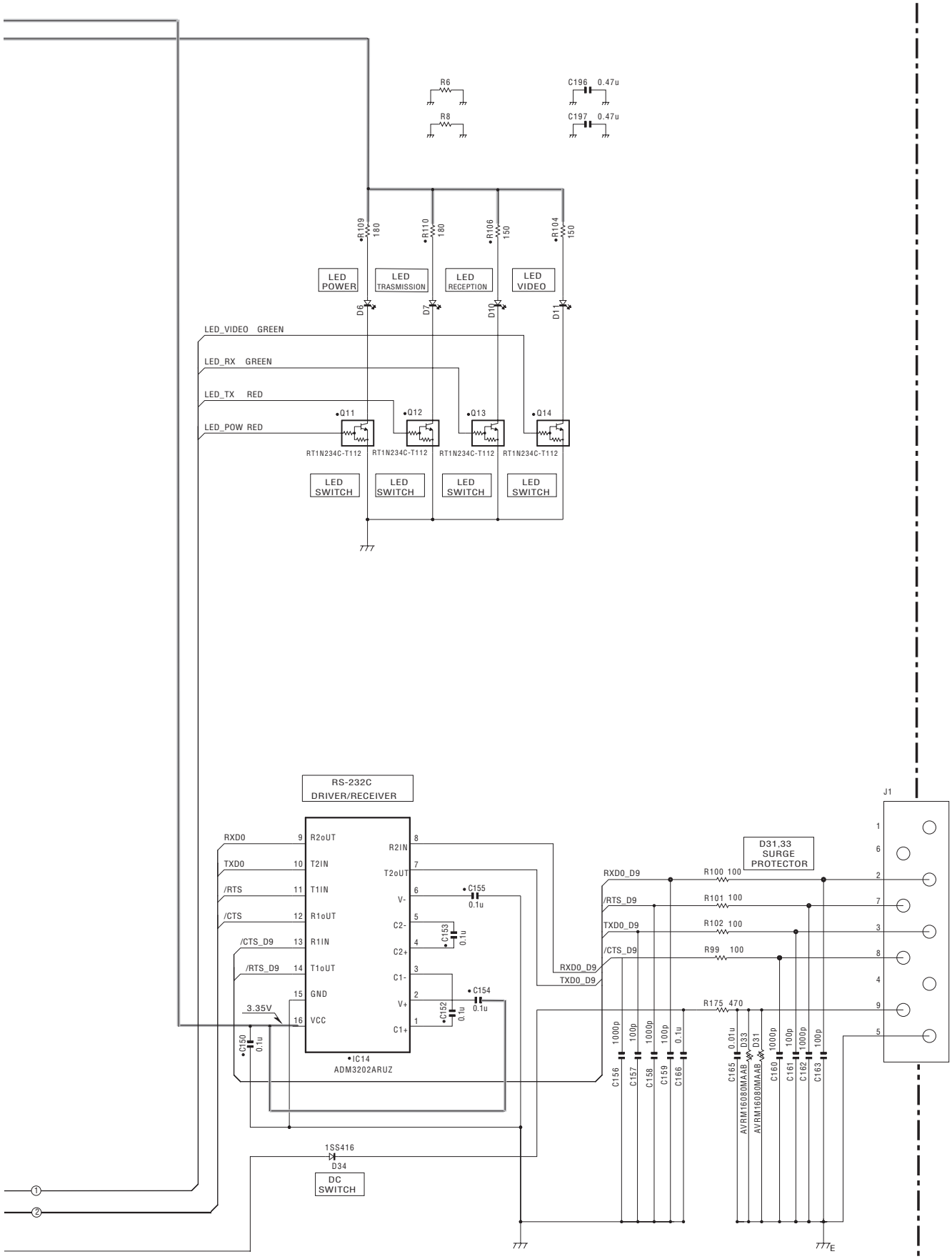
KVT-11 SCHEMATIC DIAGRAM

CONTROL UNIT (X53-4500-20)



SCHEMATIC DIAGRAM KVT-11

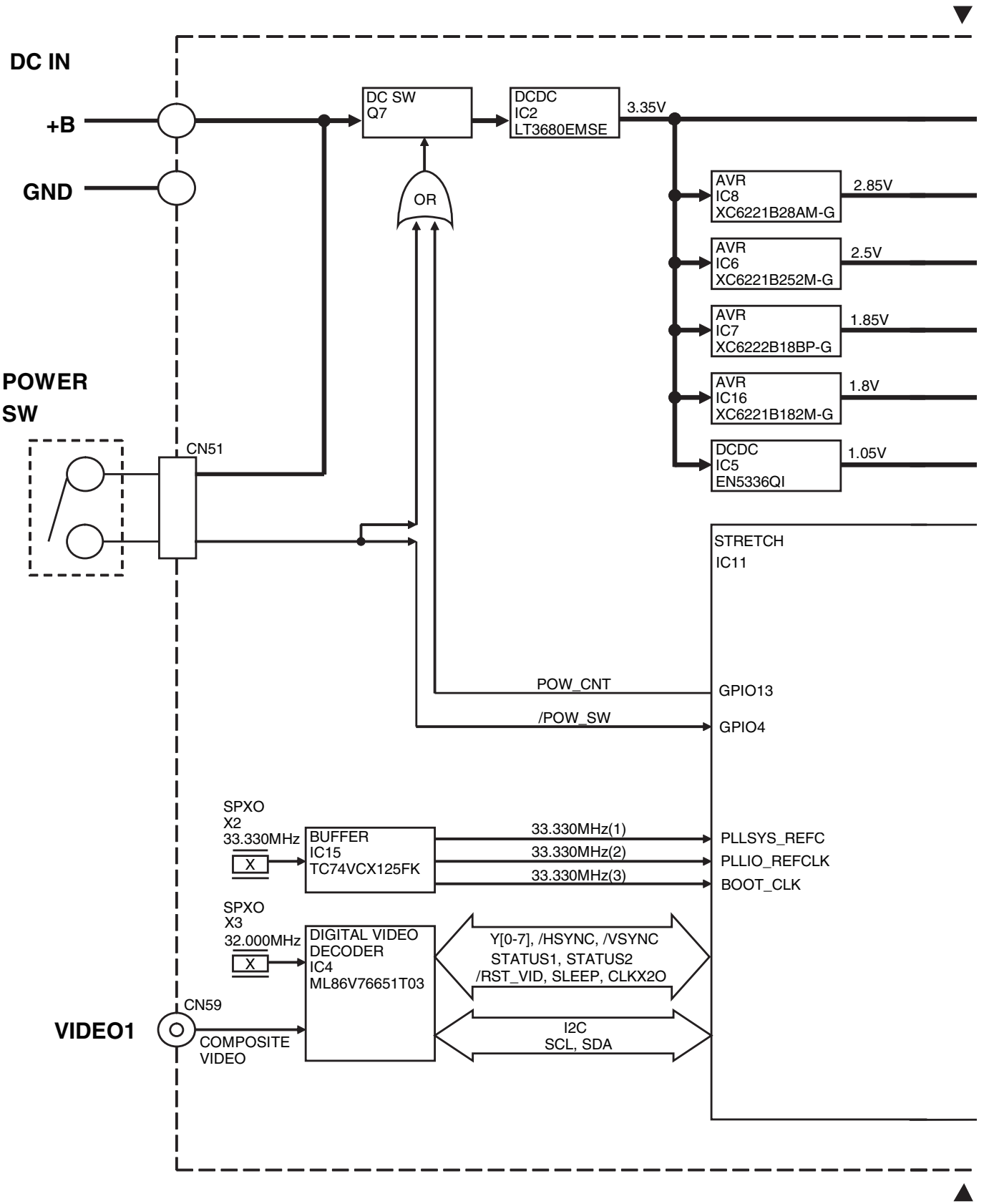
CONTROL UNIT (X53-4500-20)



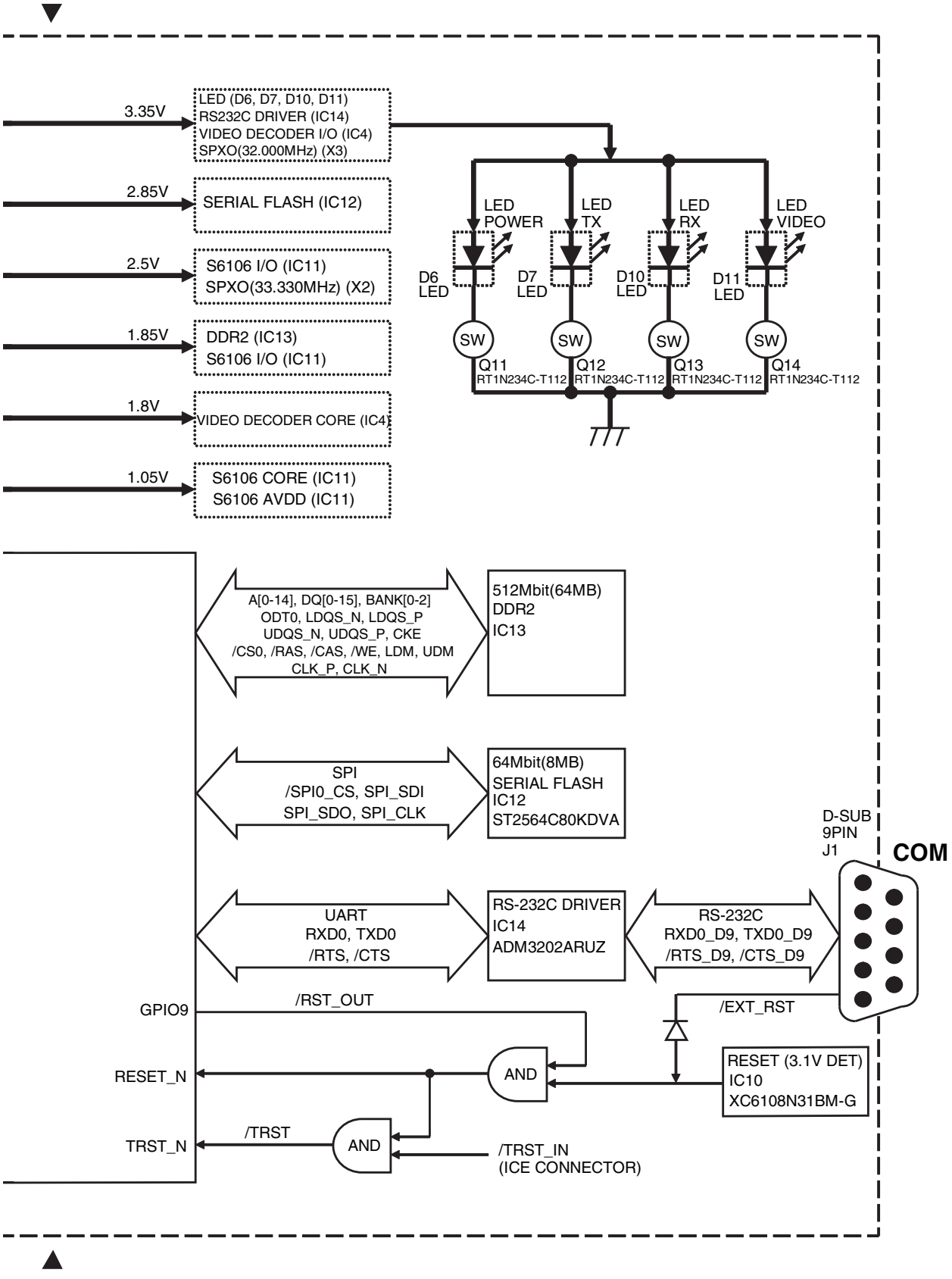
Note : The components marked with a dot (•) are parts of layer 1.

BLOCK DIAGRAM

Control unit (X53-4500-20)

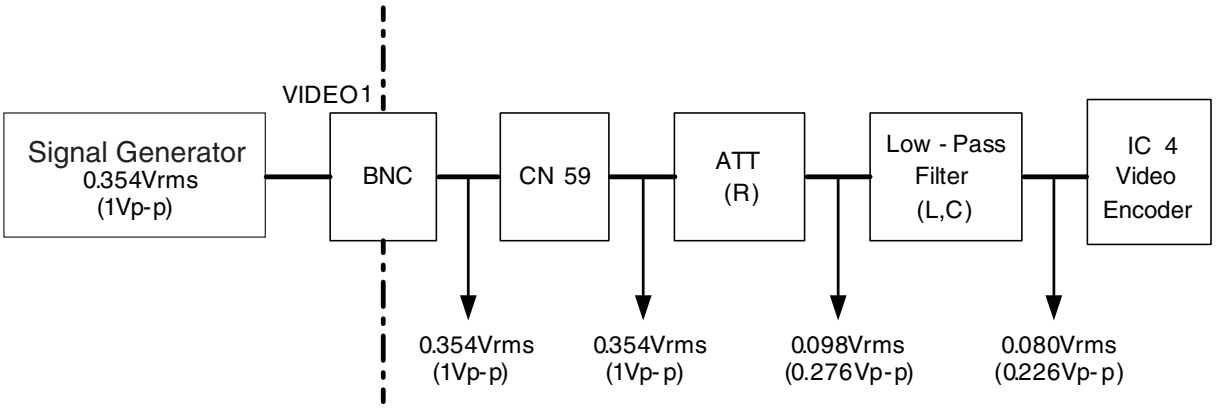


BLOCK DIAGRAM



KVT-11

LEVEL DIAGRAM



All voltage values are measured by using an oscilloscope when 0.354Vrms(1.0Vp-p) is applied to the BNC terminal.
The output impedance of the signal generator is 75Ω, and the output frequency of the signal generator is 1MHz.

SPECIFICATIONS

Input voltage
STD ..... 13.6V DC / 13.2V DC
Range ..... 6.5V~ 16.0V DC
Current Rating
..... 0.22A(typ) at 13.2V~13.6V
0.45A(typ) at 6.5V
Operating temperature range ..... –30°C ~ +60°C (–22°F ~ +140°F)
Signal system ..... NTSC/ PAL
Video input ..... Composite video signal: 1.0V(p-p), 75Ω (BNC)
Dimensions (W x H x D) (projections not included) .... 136.4 x 38 x 92.2 mm (5.37 x 1.50 x 3.63 inches)
Weight ..... Approx. 520 g (18.3 oz)

Kenwood Corporation
2967-3, Ishikawa-machi, Hachioji-shi, Tokyo, 192-8525 Japan

Kenwood U.S.A. Corporation
P.O. BOX 22745, 2201 East Dominguez Street, Long Beach, CA 90801-5745, U.S.A.

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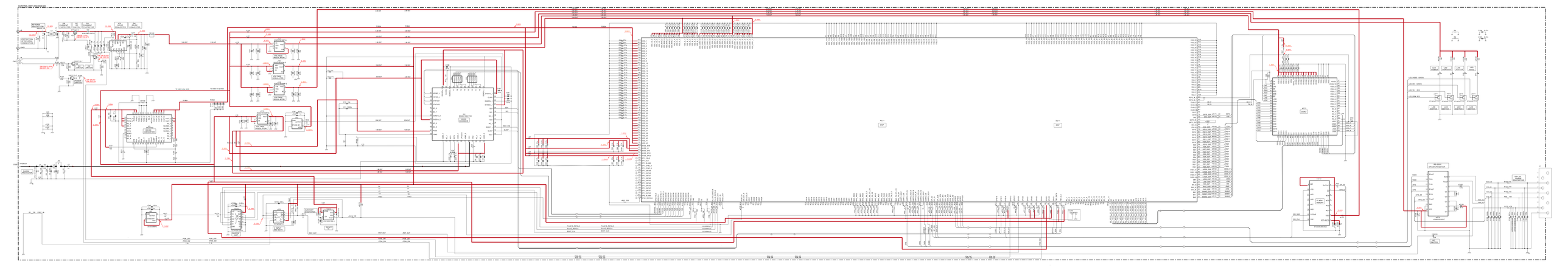
Bolivia, 239-08020 Barcelona, Spain

Kenwood Electronics Australia Pty. Ltd.
Talavera Business Park Building A, 4 Talavera Road, North Ryde NSW 2113 Australia

Kenwood Electronics (Hong Kong) Ltd.
Suite 2504, 25/F, Tower 2, Nina Tower, No. 8 Yeung Uk Road, Tsuen Wan, New Territories, Hong Kong

Kenwood Electronics Singapore Pte Ltd
1 Ang Mo Kio Street 63, Singapore 569110



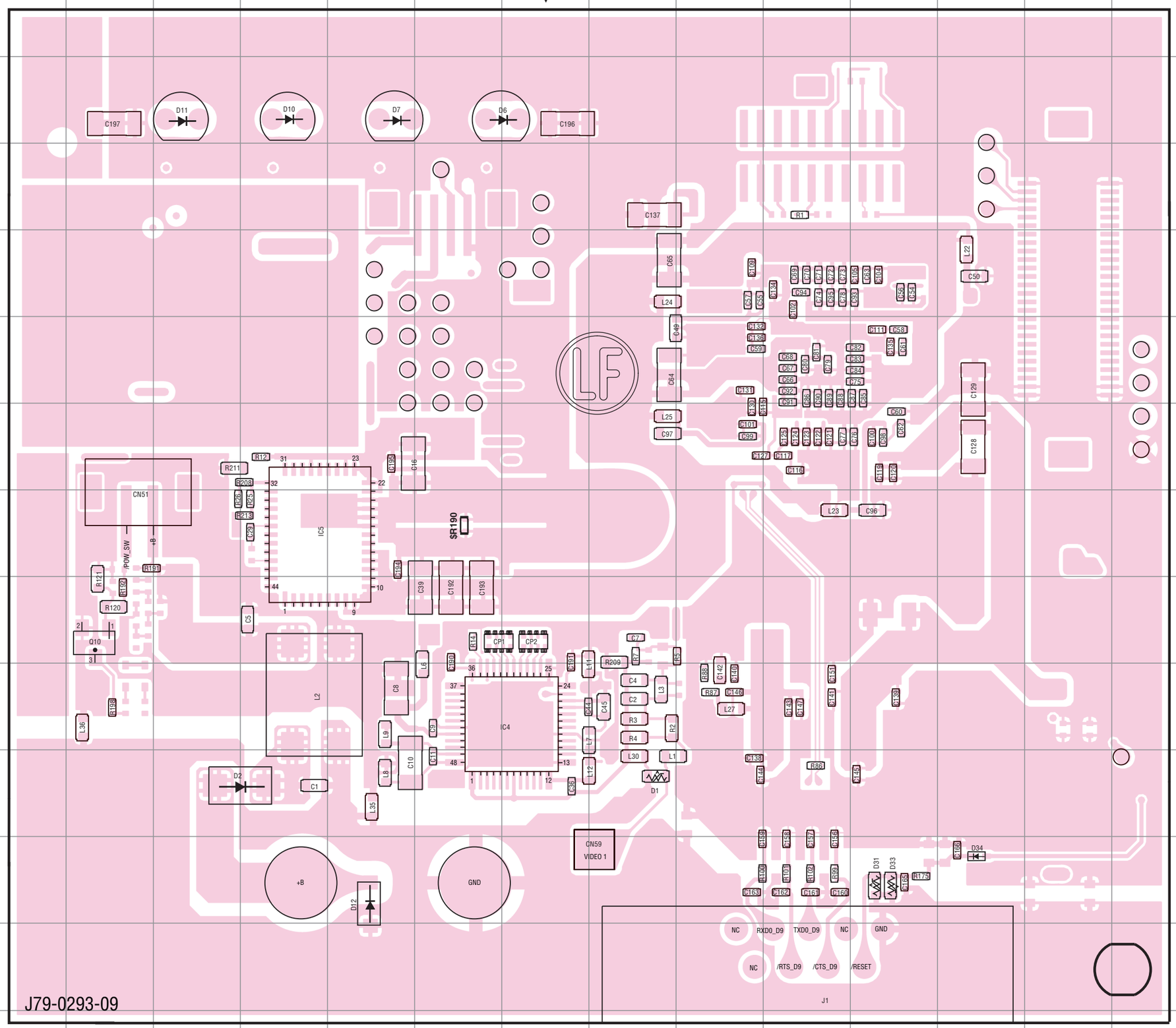
KVT-11 PC BOARD

PC BOARD KVT-11

CONTROL UNIT (X53-4500-20)
Component side view (J79-0293-09)

CONTROL UNIT (X53-4500-20)
Component side view (J79-0293-09)

Ref. No.	Address
IC4	10J
IC5	8G
Q10	9E
D1	11K
D2	11G
D6	3J
D7	3H
D10	3G
D11	3F
D12	11G
D31	12N
D33	12N
D34	12O



Component side
Layer 1
Layer 2
Layer 3
Layer 4
Layer 5
Layer 6
Layer 7
Layer 8
Foil side

KVT-11 PC BOARD

PC BOARD KVT-11

CONTROL UNIT (X53-4500-20)

Foil side view (J79-0293-09)

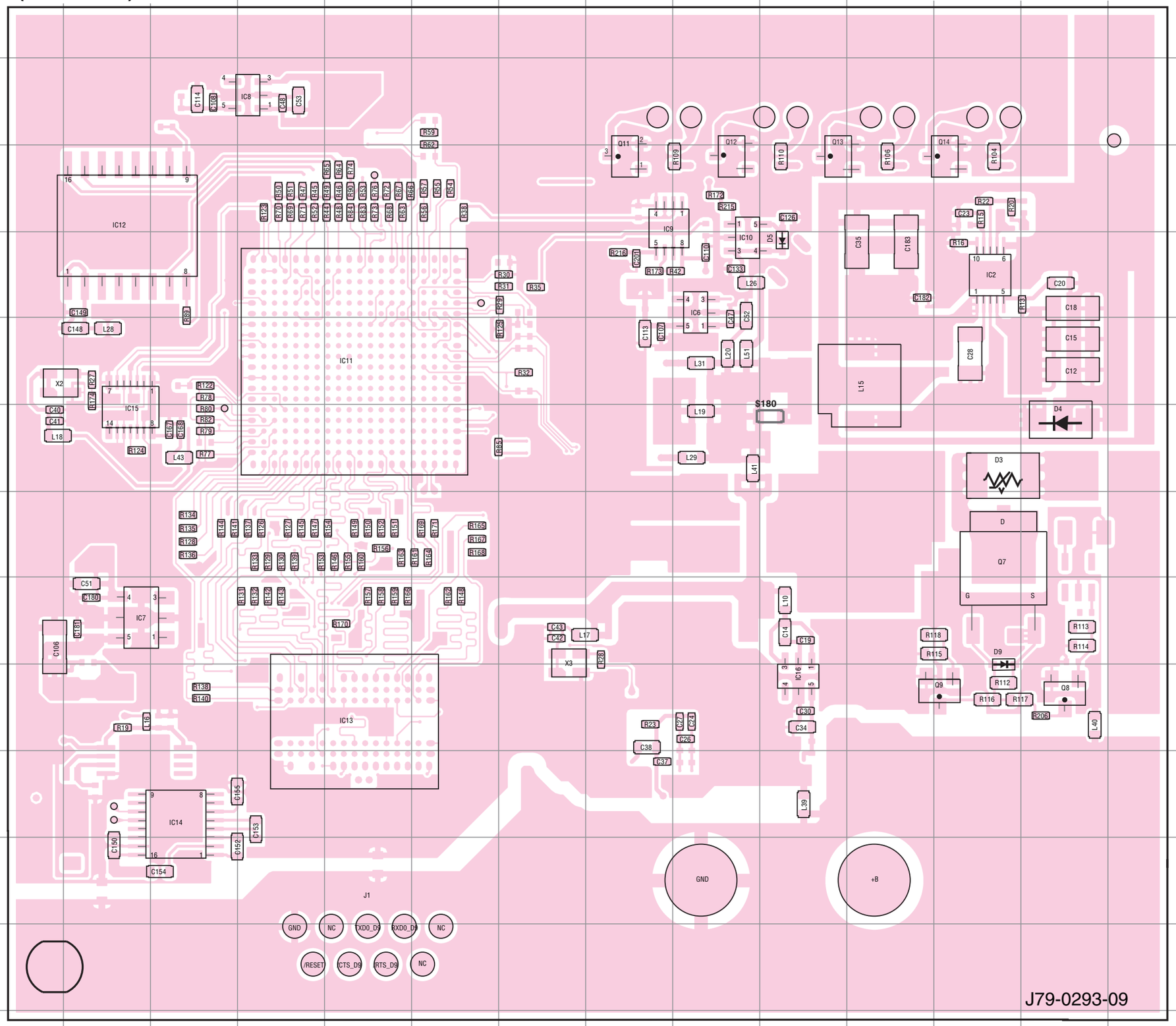
CONTROL UNIT (X53-4500-20)
Foil side view (J79-0293-09)

Ref. No.	Address
IC2	5O
IC6	5L
IC7	9E
IC8	3G
IC9	4K
IC10	5L
IC11	6H
IC12	4E
IC13	10H
IC14	11F
IC15	7E
IC16	10M
Q7	8O
Q8	10P
Q9	10O
Q11	4K
Q12	4L
Q13	4M
Q14	4O
D3	7O
D4	7P
D5	5M
D9	10O

Component side

Layer 1	
Layer 2	
Layer 3	
Layer 4	
Layer 5	
Layer 6	
Layer 7	
Layer 8	

Foil side



Control unit (X53-4500-20)