

Customer:

No. M970041 (1/17)

ALPS ELECTRIC EUROPA GMBH

Date: Mar. 31, 1997

Attention:

Your ref. No.:

Your Part No.: MDLP3W104A

SPECIFICATIONS

ALPS :

MODEL : MDLP3W104A

Spec. No. :

Sample No.:

RECEIPT STATUS

RECEIVED

By. Date

Signature

Name

Title

ALPS ELECTRIC CO., LTD.

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RF DEVICES DIVISION

COMPONENTS BUSINESS UNIT

Sales

RF BOOSTER/MODULATOR PRODUCT SPECIFICATION

This specification covers UHF output PLL modulator, booster and mixer, which conform to the television standard transmission system (NTSC-M, PAL-G/I/K, SECAM-L).

Model Applied: The specification conforms to the following model:

Cust Part No.	ALPS Model Name	Channel	Remarks
MDLP3W104A	MDLP3W104A	CH.21 to CH.69	

Customer name : ALPS ELECTRIC EUROPA GMBH

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					APPD.	CHKD.	DSGD.	TITLE		
					Mar. 31, '97		Mar. 31, '97	MDLP3W SPECIFICATION		
					S.		H.	DOCUMENT NO.		
					Akiawa		Nakamura	(1 / 13)		
					ALPS ELECTRIC CO., LTD.					
SYMB.	DATE OR NO.	APPD.	CHKD.	DSGD.						

SECTION		DESCRIPTION			MEASUREMENT METHOD			
1		General Specification			Standard test shall be conducted at a temperature of $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$ and a relative humidity of $65\% \pm 5\%$. However, test may be performed within a temperature range of 5°C to 30°C and relative humidity range of 45% to 85%, provided test results are not affected. The video carrier frequency shall conform to the specified value unless other specified by the customer. a) Video Stair-Step signal : $1\text{Vp-p} \cdot \text{V/S} = 7/3 \cdot \text{APL} = 50\%$ b) Audio Sine wave 1kHz, $-5\text{dBs}(1.23\text{Vp-p})$ Within the humidity range 45%RH to 85%RH, the test shall be performed under the following conditions, unless otherwise specified: $0^{\circ}\text{C}-2\text{Hr}$, $10^{\circ}\text{C}-1\text{Hr}$, $25^{\circ}\text{C}-1\text{Hr}$ $45^{\circ}\text{C}-1\text{Hr}$, $60^{\circ}\text{C}-2\text{Hr}$ Initial value measure at a temperature 25°C, gradually increase temperature to 60°C after cool down temperature 0°C. Should be certificate rule of CENELEC. This specification is the spec. at the state expressed in 1.4 PLL CONTROL BITS (2)STATE (page 5), the performance at the other state is not guaranteed.			
1.1		Test Condition						
1.1.1		Standard Test Condition						
1.1.2		Video Carrier Frequency						
1.1.3		Modulation Input signal Condition						
1.1.4		Temperature Stability						
1.1.5		Rule Safty and Radiation of Local Oscillation						
1.2		Specify Performance						
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SECTION	DESCRIPTION	MEASUREMENT METHOD
1.3	Remark	If there are any doubts regarding the Specification or the Products, it will be settled by consultation between ALPS and the Purchaser.
1.3.1	Booster & Mixer Pass Band	FULL BAND (47MHz to 862MHz)
1.3.2	Modulator Transmission System	NTSC-M, PAL-G/I/K, SECAM-L system

[illegible]

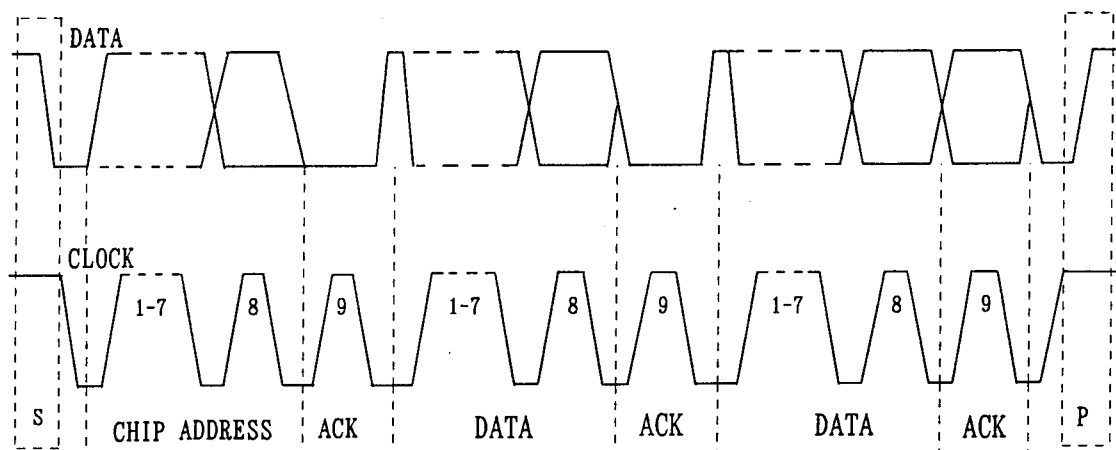
RF BOOSTER/MODULATOR PRODUCT SPECIFICATION

SECTION

METHOD

1.4

PLL Control Bits (1) BUS FORMAT(I2C)



	Bit7							Bit0	
CA (CHIP ADDRESS)	1	1	0	0	1	0	1	0	A
C1	1	AMD2	AMD1	AMD0	PS2	PS1	PS0	SYSL EN	A
CO	VMD2	VMD1	VMD0	FA1	FA0	1	0	0	A
FM	0	TPSGEN	N13	N12	N11	N10	N9	N8	A
FL	N7	N6	N5	N4	N3	N2	0	0	A

NOTES ;

ORDER OF BYTES : CA C1 CO or
CA FM FL or
CA C1 CO FM FL or
CA FM FL C1 CO

A =ACKNOWLEDGE BIT
AMDx =AUDIO MODULATION DEPTH
PSx =SOUND TO PICTURE CARRIER RATIO
SYSL EN =SYSTEM L ENABLE(+ve MOD.&A.M.SOUND ; 1=SYSTEM L,0=OTHER)
VMDx =VIDEO MODULATION DEPTH
FAx =SOUND CARRIER FREQUENCY
TPSGEN =TPSG ENABLE(1=TPSG EN.)
Nx =PROGRAMMABLE DIVIDER CONTROL

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RF BOOSTER/MODULATOR PRODUCT SPECIFICATION

SECTION

METHOD

(2) STATE

AMDx bits :

SYSTEM	AMD2	AMD1	AMD0
M	1	0	1
G/I/K	1	1	0
L	0	1	0

PSx bits :

SYSTEM	PS2	PS1	PS0
M	1	0	1
G/I/K	1	0	1
L	1	1	0

VMDx bits :

SYSTEM	VMD2	VMD1	VMD0
M	0	1	1
G/I/K	0	1	1
L	1	0	1

FAx bits :

SOUND CARRIER FREQUENCY (MHz)	FA1	FA0
4.5	0	0
5.5	0	1
6.0	1	0
6.5	1	1

Nx bits ; (N2...N13) UHF frequency programming bits, in step of 250kHz.

(3) BUS CHARACTERISTIC (CLOCK, DATA)

- HIGH-LEVEL INPUT VOLTAGE : 3.0 V MIN. 5.5 V MAX.
- LOW-LEVEL INPUT VOLTAGE : 0 V MIN. 1.0 V MAX.
- BUS CLOCK FREQUENCY : 500 kHz MAX.

(4) REMARK

If the RF Modulator is powerd off, the memory data in IC are put out.
Therefore, when the RF Modulator is powered on again, the bus data have
to be sent at the same time.

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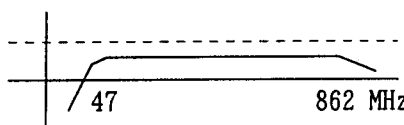
[illegible]

SECTION	DESCRIPTION	STANDARD VALUE	MEASUREMENT METHOD
2.2	Audio Characteristics		
2.2.1	Input Impedance	10 k Ω Min.	Measured between 0.1kHz and 10kHz.
2.2.2	Input Signal Level	-5 dBs (1.23Vp-p)	
2.2.3	Amplitude Frequency Characteristics	± 3 dB (Except NTSC-M)	Based on 1kHz within the range from 0.1kHz to 10kHz, and measured theoretical value of pre-emphasis (The following notes) characteristics, the level difference is measured. 50 μ Sec.
2.2.4	Modulation	M : 80 $\pm$ 15 % G/I/K : 90 $\pm$ 15 % L : 60 $\pm$ 15 %	M : 100% = $\pm$ 25kHz Dev. G/I/K : 100% = $\pm$ 50kHz Dev.
2.2.5	Distortion	M/G/I/K : 3 % Max. L : 4 % Max.	Standard Modulation
2.2.6	Audio S/N	M/G/I/K : 40 dB Min. L : 38 dB Min.	Video input signal : Color bar 1Vp-p. Measured by HP 339A (Equivalent) & LPF (15kHz) at used demodulator (M/G/I/K : Sony Tektronix 1450-, L : NIHON TSUSHINKI 5210)
2.2.7	TPSG	Through external Audio signal input and Audio signal at TPSG output.	

[illegible]

[illegible]

RF BOOSTER/MODULATOR PRODUCT SPECIFICATION

No.	ITEM	STANDARD VALUE			MEASUREMENT METHOD																																			
2.4	Characteristics of Booster & Mixer																																							
2.4.1	Power Gain	3 + 4 dB - 3			ANT IN → ANT OUT (47MHz to 862MHz) 																																			
2.4.2	Noise Figure	9 dB Max.			ANT IN → ANT OUT (47MHz to 862MHz)																																			
2.4.3	VSWR of each Terminal	ANT IN : 3.5 Max. ANT OUT : 3 Max.			(47MHz to 862MHz)																																			
2.4.4	Voltage Leakage AERIAL IN Terminal	40 dBμV Max.			75Ω terminate. Unused terminal shall be terminated at 75Ω. This applies to all the variable frequency ranges.																																			
2.4.5	Intermodulation ANT IN → ANT OUT	<table><tr><td>f1</td><td>f2</td><td>f(IM)</td><td>INPUT LEVEL (75Ω) dBμV</td><td>Inter Modulation Level dB</td></tr><tr><td>MHz</td><td>MHz</td><td>MHz</td><td></td><td></td></tr><tr><td>500</td><td>700</td><td>200</td><td>85</td><td>50 Min.</td></tr><tr><td>200</td><td>210</td><td>220</td><td>85</td><td>55 Min.</td></tr><tr><td>175</td><td>230</td><td>55</td><td>85</td><td>50 Min.</td></tr><tr><td>60</td><td>55</td><td>50</td><td>85</td><td>50 Min.</td></tr><tr><td>600</td><td>650</td><td>700</td><td>85</td><td>55 Min.</td></tr></table>				f1	f2	f(IM)	INPUT LEVEL (75Ω) dBμV	Inter Modulation Level dB	MHz	MHz	MHz			500	700	200	85	50 Min.	200	210	220	85	55 Min.	175	230	55	85	50 Min.	60	55	50	85	50 Min.	600	650	700	85	55 Min.
f1	f2	f(IM)	INPUT LEVEL (75Ω) dBμV	Inter Modulation Level dB																																				
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60	55	50	85	50 Min.																																				
600	650	700	85	55 Min.																																				

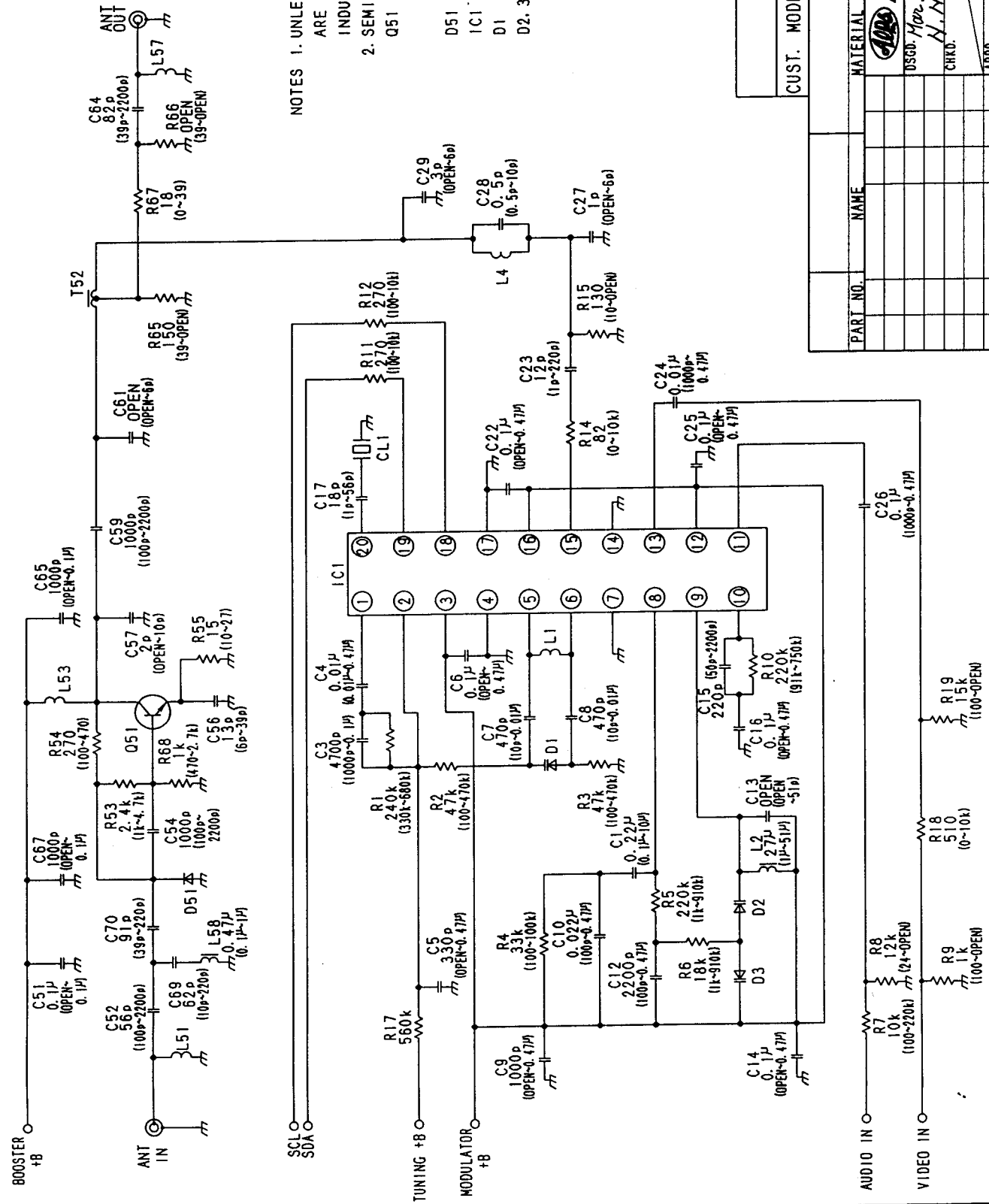
RF BOOSTER/MODULATOR PRODUCT SPECIFICATION

No.	ITEM	STANDARD VALUE	MEASUREMENT METHOD
2.5	Power Supply		
2.5.1	Input Voltage	MD +B= 5.0±0.3 V TUN +B= 30 ± 3 V BST +B= 5.0±0.3 V	Allowable Ripple Voltage : 10 mVp-p Max.
2.5.2	Current Consumption	MD section: 90 mA Max. TUN section: 3 mA Max. BST section: 45 mA Max.	Typical : 75 mA Typical : 0.1mA Typical : 35 mA
2.6	Temperature Characteristics		
2.6.1	Thermal Stability of Video Modulation	M/G/I/K : 80 ± 20 % L : 90 + 10 % - 20	Temperature ranging from 0°C to 60°C.
2.6.2	Thermal Stability of Video Carrier Frequency	within ± 100 kHz	Measure the deviated value according to the temperature measurement order from 0°C to 60°C.
2.6.3	Thermal Stability of Audio Carrier Frequency	within ± 3 kHz	Measure the deviated value according to the temperature measurement order from 0°C to 60°C.
2.6.4	Thermal Stability of Video Output Level	M/G/I/K : 71 + 5 dBμV - 6 L : 70 ± 6 dBμV	Temperature ranging from 0°C to 60°C.
2.6.5	Thermal Stability of Synchronous Level	M/G/I/K : 7 ± 0.4 / 3 ± 0.4 L : 7 ± 0.6 / 3 ± 0.6	Measure the deviated Video Sync. level according to the temperature measurement order from 0°C to 60°C. (V/S=7/3)
2.6.6	Thermal Stability of Audio Output Level	16 ± 6 dB	Temperature ranging from 0°C to 60°C.
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		DSGD.	TITLE
			MDLP3W SPECIFICATION
			DOCUMENT NO.
			(10 /)
SYMB.	DATE OR NO.	APPD.	CHKD.
		DSGD.	
ALPS ELECTRIC CO., LTD.			

RF BOOSTER/MODULATOR PRODUCT SPECIFICATION									
SECTION		DESCRIPTION			STANDARD VALUE			MEASUREMENT METHOD	
3.2		Structure & Dimensions			According to the assembly drawing.				
3.3		Operation Performance							
3.3.1		Total Pulout force for Coaxial Connector			(1) Initial : between 9.8N and 49N (1kg to 5kg). (2) After 100 times, 7.84N(0.8kg) Min.				
3.3.2		Connector			Neither bend nor play shall be permitted.				
4.		Other Test							
4.1		Vibration Test			The rated performance shall be satisfied.			The Unit is set to the fixture and then vibrated with total amplitude of 2mm. frequency range 7Hz to 30Hz, once per minute consecutively for 10 minutes, in each of three directions (X,Y,Z).	
4.2		Tapping Test			The rated performance shall be satisfied.			Tapped the Modulator except input/output terminal and covers. by Teflon rod.(Length:200mm, Diameter:8mm)	
4.3		Impact Test			The appearance and performance shall not have deteriorated.			Before measurement, the unpacked modulator is dropped from a height of 0.5m on each of 3 Modulator surfaces. Acceptable surfaces are : connectors, terminals and covers.	
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								MDLP3W SPECIFICATION	
								DOCUMENT NO. (12 /)	
ALPS ELECTRIC CO., LTD.									
SYMB.	DATE OR NO.	APPD.	CHKD.	DSGD.					

SECTION	DESCRIPTION	STANDARD VALUE	MEASUREMENT METHOD
4.4	Static Proof Test	$\pm 15 \text{ kV} / 200 \text{ pF}$ After impressing voltage 5 times in each connector, no abnormality should occur.	ANT IN, ANT OUT Terminal Electrical discharge resistance : 150Ω
4.5	Life Test		
4.5.1	Heat Test	(Against initial value.)	a).Environmental conditions Temperature : $70^{\circ}\text{C} \pm 3^{\circ}\text{C}$ Humidity : 40%RH to 45%RH b).Power Supply : OFF c).Measuring Time 0Hrs,100Hrs,250Hrs,500Hrs d).After using the above conditions, the tested modulator is left for one and a half hours at normal room temp.
	1.Video Modulation	$\pm 10 \%$	
	2.Audio Modulation	$\pm 25 \%$	
	3.Video Carrier Frequency	$\pm 200\text{kHz}$	
	4.Audio Carrier Frequency	$\pm 10 \text{ kHz}$	
	5.Video Output Level	$\pm 4 \text{ dB}$	
	6.Audio Output Level (fv-fa)	$\pm 4 \text{ dB}$	
4.5.2	Humidity Test	Same as in item 4.5.1	a).Environmental conditions Temperature : $60^{\circ}\text{C} \pm 3^{\circ}\text{C}$ Humidity : 90%RH to 95%RH Same as b),c),d)in item 4.5.1
4.5.3	Cold Test	Same as in item 4.5.1	a).Environmental conditions Temperature : $-20^{\circ}\text{C} \pm 3^{\circ}\text{C}$ Same as b),c),d)in item 4.5.1
4.5.4	Heat Shock Test	Same as in item 4.5.1	a).Environmental conditions $80^{\circ}\text{C} \pm 3^{\circ}\text{C} \dots 1 \text{ H}$ $-20^{\circ}\text{C} \pm 3^{\circ}\text{C} \dots 1 \text{ H}$ b).Power Supply : OFF c).Measurement : After 100 cycles. Same as d) in item 4.5.1

[illegible]



NOTES 1. UNLESS OTHERWISE SPECIFIED, ALL RESISTORS ARE IN OHM. CAPACITORS ARE IN FARAD. INDUCTORS ARE IN HENRY.

2. SEMICONDUCTORS ARE AS FOLLOWS.

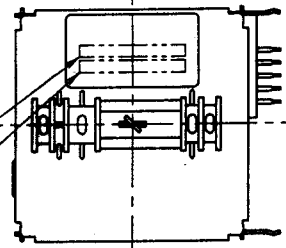
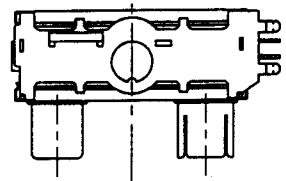
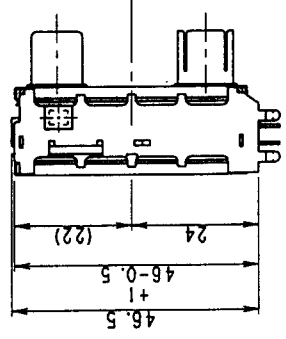
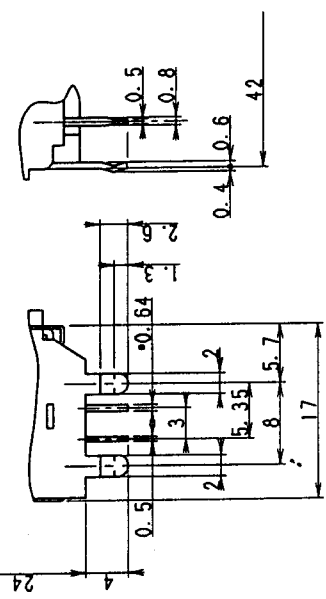
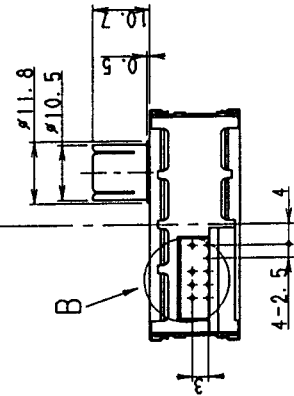
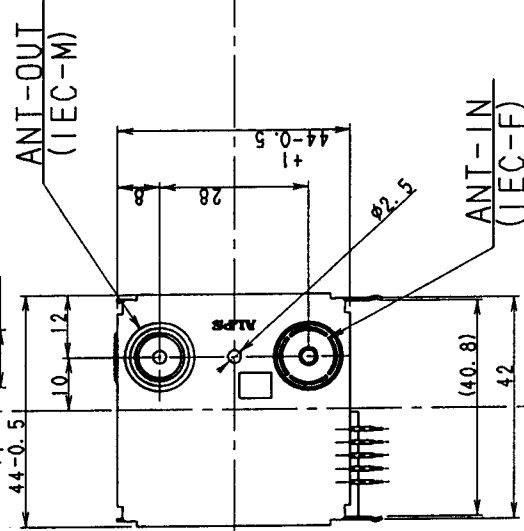
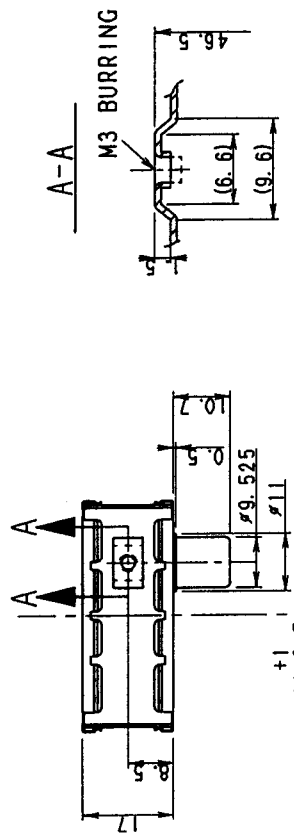
- Q51 : 2SC2570, 2SC3355, MPS571, MPS911, 2SC3512, 2SC3779, 2SC4874, 2SC4875, (EQUIVALENT)
- D51 : 1SS133, 1SS83, (EQUIVALENT)
- IC1 : MC44353, MC44354, MC44355, (EQUIVALENT)
- D1 : HVU202, (EQUIVALENT)
- D2, 3 : HVU300, HVU306, (EQUIVALENT)

CUST. MODEL NO.		CUST. PART NO.		ALPS MODEL NO.	
MDLP3W104A		MDLP3W104A		MDLP3W104A	
MATERIAL		SPEC.		FINISH	
NAME		SCALE		TITLE	
DSGD: Mar. 31, '97		H. Nakamura		MDLP3 CIRCUIT DIAGRAM	
CHKD.		UNIT		DOCUMENT NO.	
APPD.		ZONE/SYMB.		DATE OR NO.	
T52		C29		C28	
C27		R15		C25	
C24		C23		C22	
C21		C20		C19	
C18		C17		C16	
C15		C14		C13	
C12		C11		C10	
C9		C8		C7	
C6		C5		C4	
C3		C2		C1	
R19		R18		R17	
R16		R15		R14	
R13		R12		R11	
R10		R9		R8	
R7		R6		R5	
R4		R3		R2	
R1		L5		L4	
L3		L2		L1	
L57		L56		L55	
L54		L53		L52	
L51		L50		L49	
L48		L47		L46	
L45		L44		L43	
L42		L41		L40	
L39		L38		L37	
L36		L35		L34	
L33		L32		L31	
L30		L29		L28	
L27		L26		L25	
L24		L23		L22	
L21		L20		L19	
L18		L17		L16	
L15		L14		L13	
L12		L11		L10	
L9		L8		L7	
L6		L5		L4	
L3		L2		L1	

ALPS ELECTRIC CO., LTD.

CONNECTOR LAYOUT

- | |
|--------------|
| 1. VIDEO IN |
| 2. AUDIO IN |
| 3. MD +B |
| 4. NC |
| 5. BST. +B |
| 6. SDA |
| 7. CLK |
| 8. NC |
| 9. TUNING +B |



-CUST. PART NO.
ALPS LOT NO.

NOTE 1: TOLERANCES ARE $\pm 0.5\text{mm}$.

UNLESS OTHERWISE SPECIFIED.

2. SCREW LENGTH FROM MOUNTING FACE

IS 2.5 mm MAX.

3. ALPS CAN ALTER COVER HOLE DESIGN

WITHOUT NOTICE IF NO ELECTRICAL DEGRADATION.

MDLP3W104A	—	MDLP3W104A	MDLP3W104A
PRESENTATION OF LABEL	CUST. MODEL NO.	CUST. PART NO.	ALPS MODEL NO.

[illegible]

RECORD OF REVISIONS

MDLP3W104□

DATE	PRESENT CONTENTS	NEW CONTENTS / REASON		DSGN BY
Mar.31,' 97 (M970041)	N E W			N.NAKAMURA
		JAPAN	ALPS ELECTRIC CO.,LTD.	
		M A N U F A C T U R E R		