

Customer :

No. M980031 (1/17)

Shintom Co.,Ltd.(TALK CORPORATION)

Date: Jun. 24. 1998

Attention:

Your ref. No.:

Your Part No.: 106013300

SPECIFICATIONS

ALPS :

MODEL : MDLM5A008A

Spec. No. :

Sample No.:

RECEIPT STATUS

RECEIVED

By. Date

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Name

Title

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RF SWITCH/MODULATOR PRODUCT SPECIFICATION

This specification covers VHF output RF modulator, ANT off through switch, which conform to the television standard transmission system (NTSC/M).

Model Applied: The specification conforms to the following model:

Cust Part No.	ALPS Model Name	Channel	Remarks
106013300	MDLM5A008A	US 3,4 CH	3 CH : 61.25 MHz 4 CH : 67.25 MHz

Customer name : TALK CORPORATION

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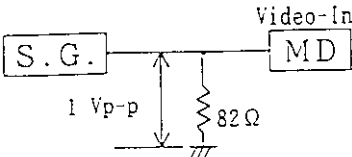
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RF SWITCH/MODULATOR PRODUCT
SPECIFICATION

SECTION	DESCRIPTION	MEASUREMENT METHOD										
1	General Specification											
1.1	Test Condition											
1.1.1	Standard Test Condition	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 15°C to 30°C and relative humidity range of 45% to 85%, provided test results within the Specification.										
1.1.2	Modulation Input signal Condition a) Video b) Audio	Unless otherwise specified, input signal condition as follows. Stair-Step signal : $1\text{Vp-p} \cdot \text{V/S} = 7/3 \cdot \text{APL} = 50\%$ Sine wave 1kHz, $-5\text{dBs}(1.23\text{Vp-p})$										
1.1.3	Temperature Stability	Within the relative humidity range 45% to 85%, 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 .										
1.1.4	Modulation Transmission System	NTSC/M system.										
1.1.5	ANT & Switch Pass Band	FULL BAND (54MHz to 806MHz)										
1.1.6	ANT & Switch Changing System	<table><tr><th>+B Terminal</th><th>Passing Mode</th></tr><tr><td>MD +B : DC +5 $\pm$ 0.2V</td><td>MODULATOR $\rightarrow$ ANT OUT</td></tr><tr><td>CONTROL : DC +5 $\pm$ 0.2V</td><td></td></tr><tr><td>MD +B : DC +5 $\pm$ 0.2V</td><td>ANT IN $\rightarrow$ ANT OUT</td></tr><tr><td>CONTROL : OPEN or GND</td><td></td></tr></table>	+B Terminal	Passing Mode	MD +B : DC +5 $\pm$ 0.2V	MODULATOR $\rightarrow$ ANT OUT	CONTROL : DC +5 $\pm$ 0.2V		MD +B : DC +5 $\pm$ 0.2V	ANT IN $\rightarrow$ ANT OUT	CONTROL : OPEN or GND	
+B Terminal	Passing Mode											
MD +B : DC +5 $\pm$ 0.2V	MODULATOR $\rightarrow$ ANT OUT											
CONTROL : DC +5 $\pm$ 0.2V												
MD +B : DC +5 $\pm$ 0.2V	ANT IN $\rightarrow$ ANT OUT											
CONTROL : OPEN or GND												
1.2	Remark	If there are any doubts regarding the Specifications or the Products, it will be settled between Alps and the Customer.										

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RF SWITCH/MODULATOR PRODUCT SPECIFICATION

SECTION	DESCRIPTION	STANDARD VALUE	MEASUREMENT METHOD
2.	Electrical Specifications		
2.1	Video Characteristics		
2.1.1	Input Impedance	1 k Ω $\pm$ 30 % (Unbalance)	Measured from 0MHz to 4.5MHz 
2.1.2	Input Signal Level	1Vp-p of Negative Sync.	
2.1.3	Video Modulation	80 $\pm$ 5 %	
2.1.4	White Clip	Less than 98 %	Input Voltage 1.5 Vp-p
2.1.5	V/S Ratio	7 $\pm$ 0.2 / 3 $\mp$ 0.2	Input signal : Stair-Step signal, 1Vp-p Negative Sync, (V/S=7/3)
2.1.6	Amplitude Frequency Characteristics	within + 2 dB - 3 (0.5MHz to 4.2MHz)	Based on fv+1MHz. Apply sweep signal into video input terminal, then measure at RF-OUTPUT.
2.1.7	Modulation varies by change of APL	within $\pm$ 3 %	Based on an initial measurement of 50% of APL, the variance is measured between 10% and 90% of APL and a final comparison is made.
2.1.8	Video S/N	45 dB Min.	Measure at the out of the standard De-modulator (Sony Tektronix 1450-1). S/N Meter (Shibasoku 925D-Equivalent) H.P.F : 100kHz, L.P.F : 4.2MHz SC TRAP : ON, WEIGHT : OFF Input signal Video : 100% White signal Audio : non-modulation
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SECTION	DESCRIPTION	STANDARD VALUE	MEASUREMENT METHOD
2.1.9	Differential Gain	5 % Max.	Input signal 10 Stair-Step case. (Chrominance level is 20IRE) Measure from APL 10% to 90% at preset modulator.
2.1.10	Differential Phase	8 deg. Max.	
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	-5dBs (1.23Vp-p)	
2.2.3	Amplitude Frequency Characteristics	within ± 3 dB	Measured between 0.1kHz and 10kHz. The value different from the theoretical curve of the pre-emphasis (75 μ Sec.) is measured, based on the level of 1kHz.
2.2.4	Modulation	80 $\pm$ 16 % (± 20 kHz $\pm$ 4kHz)	100% = ± 25 kHz Dev.
2.2.5	Distortion	2 % Max.	De-emphasis(75 μ Sec.) : ON (Standard Modulation)
2.2.6	Audio S/N	45 dB Min. (Standard Modulation)	Video input signal : Color bar 1Vp-p. Measured by HP 339A (Equivalent) at used demodulator Sony Tektronix 1450-1. (Inter carrier system)

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RF SWITCH/MODULATOR PRODUCT SPECIFICATION

SECTION	DESCRIPTION	STANDARD VALUE	MEASUREMENT METHOD
2.3	Output Characteristics		
2.3.1	CH. Switch Terminal	OPEN (Low CH.) GND (High CH.)	2.5V~4.0V 0.7V Max.
2.3.2	Video Output Channel	3, 4 CH	(US)
2.3.3	Video Carrier Frequency	$f_v' = f_v \pm 90\text{kHz}$	f_v : Video carrier frequency Test Condition : Temperature : 25°C Relative Humidity : 65%
2.3.4	Audio Carrier Frequency	$f_v + (4500 \pm 7) \text{ kHz}$	Test Condition : Temperature : 25°C Relative Humidity : 65% The measurement is taken after 0.5 Min. from the Power-ON.
2.3.5	Video Output Level	$66 \pm 3 \text{ dB}\mu\text{V}$	75 Ω term. Peak Value level at Standard Modulation.
2.3.6	Audio Output Level	$16 \pm 3 \text{ dB}$	Measure the level difference between the Video at standard modulation the Audio.
2.3.7	Out-Band Spurious	-30 dB Max. Against f_v' level.	Measure the level difference against the Video at standard modulation. Measure Range : 0 to 1GHz except the range of $f_v' - 4.5\text{MHz}$.
2.3.8	In-Band Spurious	-60 dB Max. Against f_v' level.	Measure between f_v' and f_a' . (f_v', f_a' : non-modulation)
2.3.9	Chromabeat	-60 dB Max. Against f_v' level.	Based on non-modulated f_v' VIDEO IN : 3.58MHz(SC)0.4Vp-p
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SECTION	DESCRIPTION	STANDARD VALUE	MEASUREMENT METHOD																				
2.4	Characteristics of ANT & Switch		Measured by 75Ω measurement system at item 2.4. Unused terminal shall be terminated at 75Ω.																				
2.4.1	Insertion Loss CONTROL : OFF	4.0 dB Max.	54MHz to 806MHz (ANT IN → ANT OUT)																				
2.4.2	(1) VSWR of each Terminal CONTROL : OFF	ANT IN : 3 Max. ANT OUT : 3 Max.	54MHz to 806MHz 54MHz to 806MHz																				
	(2) VSWR of each Terminal CONTROL : ON	ANT OUT : 3 Max.	60MHz to 72MHz																				
2.4.3	Voltage Leakage AERIAL IN Terminal CONTROL : ON	9.5 dBμV Max.	75Ω term. Measure maximum value from 54MHz to 806MHz.																				
2.4.4	Intermodulation ANT IN → ANT OUT	<table><tr><th>f1</th><th>f2</th><th>f(IM)</th><th>INPUT LEVEL(75Ω)</th><th>Inter Modulation Level</th></tr><tr><td>MHz</td><td>MHz</td><td>MHz</td><td>dBμV</td><td>dB</td></tr><tr><td>183</td><td>189</td><td>177</td><td>100</td><td>50 Min.</td></tr><tr><td>183</td><td>189</td><td>195</td><td>100</td><td>50 Min.</td></tr></table>		f1	f2	f(IM)	INPUT LEVEL(75Ω)	Inter Modulation Level	MHz	MHz	MHz	dBμV	dB	183	189	177	100	50 Min.	183	189	195	100	50 Min.
f1	f2	f(IM)	INPUT LEVEL(75Ω)	Inter Modulation Level																			
MHz	MHz	MHz	dBμV	dB																			
183	189	177	100	50 Min.																			
183	189	195	100	50 Min.																			

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SECTION	DESCRIPTION	STANDARD VALUE	MEASUREMENT METHOD
2.5	Power Supply		
2.5.1	Input Voltage MD +B terminal CONTROL terminal	DC +5 ± 0.2 V DC +5 ± 0.2 V	Allowable Ripple Voltage : 10 mVp-p Max.
2.5.2	Current Consumption MD +B terminal MD +B terminal CONTROL terminal	30 mA Max. (TYP.: 20mA) 20 mA Max. (TYP.: 13mA) 1 mA Max. (TYP.: 0.1mA)	CONTROL : ON CONTROL : OFF
2.6	Temperature Characteristics		
2.6.1	Thermal Stability of Video Modulation	within ± 6 %	Measure the deviated value according to the temperature measurement order 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 ± 15 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	within ± 3 dB μ V (However, 69.5 dB μ V Max.)	Measure the deviated value according to the temperature measurement order from 0°C to 60°C.
2.6.5	Thermal Stability of Synchronous Level	7 ± 0.5 / 3 ± 0.5	Measure the deviated Video Sync. level according to the temperature measurement order from 0°C to 60°C. (V/S=7/3)

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SPECIFICATION					STANDARD VALUE		MEASUREMENT METHOD	
SECTION	DESCRIPTION				STANDARD VALUE		MEASUREMENT METHOD	
2.6.6	Thermal Stability of Audio Output Level				within ± 3 dB (However, 56.5 dB μ V Max.)		Measure the deviated value according to the temperature measurement order from 0°C to 60°C.	
2.6.7	Thermal Stability of Audio Modulation				within ± 10 %		Measure the deviated value according to the temperature measurement order from 0°C to 60°C.	
2.6.8	Thermal Stability of Differential Gain				12 % Max.		Measured at a temperature ranging from 0°C to 60°C.	
2.6.9	Thermal Stability of Differential Phase				12 deg. Max.		Measured at a temperature ranging from 0°C to 60°C.	
2.7	Total Video & Audio Quality				Assured for practical use.		The limit sample should be prepared because this item is relative test.	
2.8	Environmental Test Condition							
2.8.1	Temperature and Humidity Test Condition				1. Temperature Range 0°C to 60°C 2. Humidity Range 10%RH to 80%RH			
2.8.2	Storage Condition				1. Temperature Range -10°C to 70°C 2. Humidity Range 85%RH or less.			

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SECTION	DESCRIPTION	STANDARD VALUE	MEASUREMENT METHOD
3.	Mechanical Specification		
3.1	Appearance		
3.1.1	Process	Normal condition applies.	
3.1.2	Stain or Damage	Neither stain nor damage shall be permitted.	
3.1.3	Electrical Contact	Neither stain nor damage shall be permitted.	
3.1.4	Weight	60 g Max.	Typical : 45 g
3.2	Structure & Dimensions	According to the assembly drawing.	
3.3	Operation Performance		
3.3.1	Channel Selector 1. Operation	Assured for practical use.	
3.3.2	Input and Output Terminal	Neither band nor play shall be permitted.	

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RF SWITCH/MODULATOR PRODUCT
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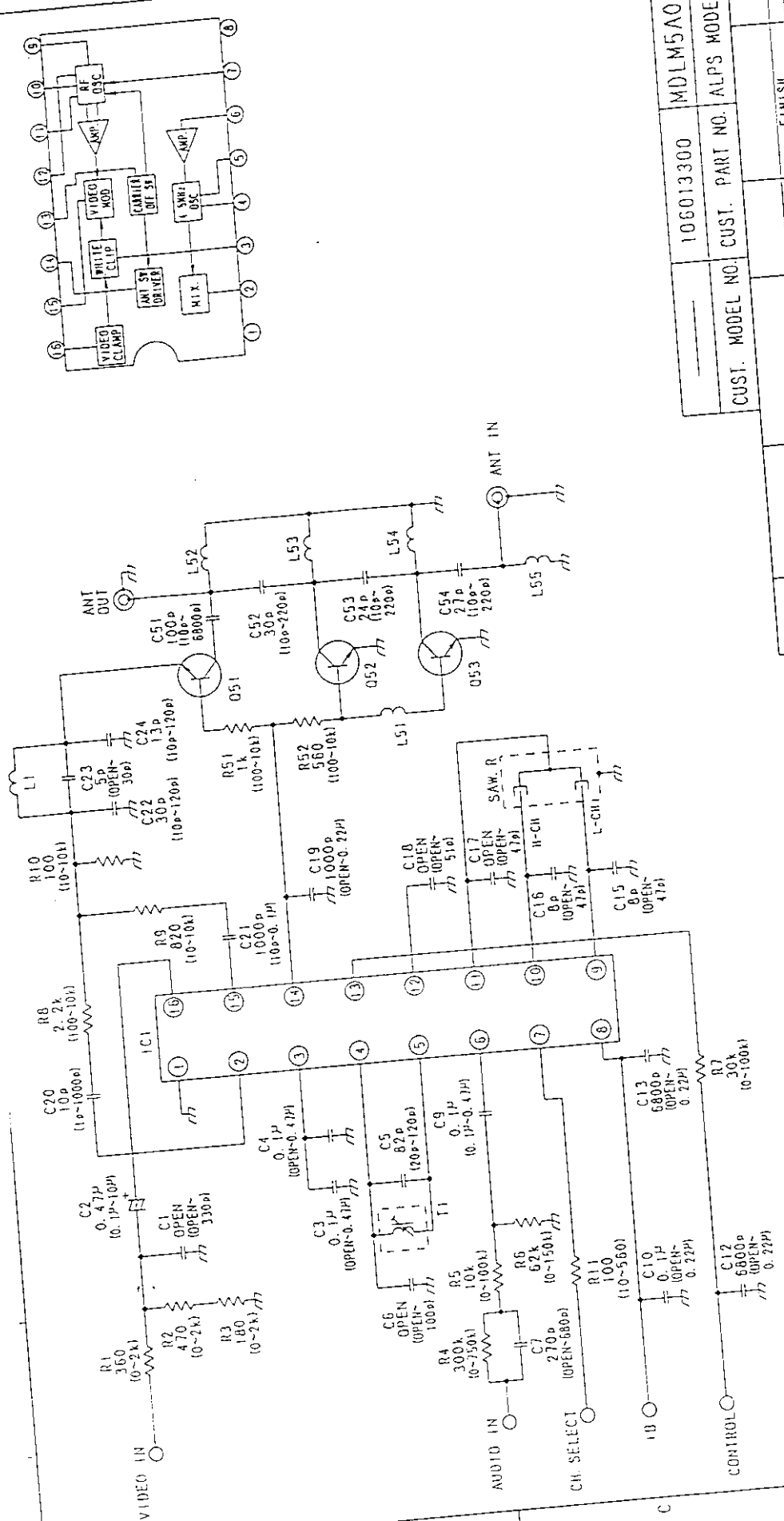
SECTION	DESCRIPTION	STANDARD VALUE	MEASUREMENT METHOD
4.	Other Test		
4.1	Vibration Test	The rated performance shall be satisfied.	The Unit is set to the fixture and then vibrated with total amplitude of 2mm. frequency range 7Hz to 30Hz, once per minute consecutively for 10 minutes, in each of three 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.
4.4	Static Proof Test	10 kV / 1000 pF 10 kV / 500 pF After impressing voltage 5 times in each connector, no abnormality should occur.	ANT IN Terminal ANT OUT Terminal

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SECTION	DESCRIPTION	STANDARD VALUE	MEASUREMENT METHOD
4.5	Life Test		
4.5.1	Heat Test 1.Video Modulation 2.Audio Modulation 3.Video Carrier Frequency 4.Audio Carrier Frequency 5.Video Output Level 6.Audio Output Level (fv-fa)	(Against initial value.) $\pm 10 \%$ $\pm 25 \%$ $\pm 80 \text{ kHz}$ $\pm 20 \text{ kHz}$ $\pm 4 \text{ dB}$ $\pm 4 \text{ dB}$	a).Environmental conditions Temperature : $70^{\circ}\text{C} \pm 3^{\circ}\text{C}$ Humidity : 40%RH to 45%RH b).Power Supply : ON 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.
4.5.2	Humidity Test	Same as in item 4.5.1	a).Environmental conditions Temperature : $40^{\circ}\text{C} \pm 3^{\circ}\text{C}$ 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

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- NOTES
1. UNLESS OTHERWISE SPECIFIED, ALL RESISTORS ARE IN OHM, CAPACITORS ARE IN FARAD, INDUCTORS ARE IN HENRY.
 2. SEMICONDUCTORS ARE AS FOLLOWS:
 Q51-Q53 : 2SC4713K, 2SC4680. (EQUIVALENT)
 IC1 : HA11560FP. (EQUIVALENT)

CUST. MODEL NO.		106013300		MDLM5A008A	
CUST. PART NO.		ALPS MODEL NO.			
MATERIAL		SPEC.		FINISH	
NAME		SCALE		TITLE	
PART NO.		DATE OR NO. APPD.		CIRCUIT DIAGRAM	
ZONE SYMB.		DATE		DOCUMENT NO.	
APPRO. <i>7/20/78</i>		CIRCUIT		UNIT	
APPRO. <i>7/20/78</i>		CIRCUIT		UNIT	

RECORD OF REVISIONS

MDLM5A008A

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		JAPAN	ALPS ELECTRIC CO.,LTD.	
		MANUFACTURER		