

To all our customers

Regarding the change of names mentioned in the document, such as Mitsubishi Electric and Mitsubishi XX, to Renesas Technology Corp.

The semiconductor operations of Hitachi and Mitsubishi Electric were transferred to Renesas Technology Corporation on April 1st 2003. These operations include microcomputer, logic, analog and discrete devices, and memory chips other than DRAMs (flash memory, SRAMs etc.) Accordingly, although Mitsubishi Electric, Mitsubishi Electric Corporation, Mitsubishi Semiconductors, and other Mitsubishi brand names are mentioned in the document, these names have in fact all been changed to Renesas Technology Corp. Thank you for your understanding. Except for our corporate trademark, logo and corporate statement, no changes whatsoever have been made to the contents of the document, and these changes do not constitute any alteration to the contents of the document itself.

Note : Mitsubishi Electric will continue the business operations of high frequency & optical devices and power devices.

Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

M61202SP

PRELIMINARY

Notice ; This is not a final specification.
Some parametric limits are subject to change.

TV SIGNAL PROCESSOR FOR MULTI SYSTEM

DESCRIPTION

M61202SP is IIC-bus controlled single chip TV processor which is intend to be provided a solution to PAL/NTSC and PAL-M/N colour television receivers. It consists of various processing blocks such as video IF, sound IF, luminance, chrominance, baseband delay line, OSD display, interface, and H/V deflection, but no SECAM function is integrated.

FEATURES

- VIF VCO Coil-less
- Alignment-free Sound Demodulator
- 1 Crystal Chroma Demodulation for full multi system
- Built-in Base band 1H Delay Line
- Fsc output available
- Half Tone available
- Built-in Horizontal Oscillator resonator
- Built in Sync. Sep. (Auto Slicer type)
- Built-in Vertical Saw Tooth Generator
- Built-in Black Peak Hold ,AFC2,Killer Filter
- Inverted SCP OUT, Vertical Pulse Out available
- No SECAM function

APPLICATIONS

MULTI SYSTEM TELEVISION

RECOMMENDED OPERATING CONDITIONS

Supply voltage	4.75V to 5.25V (pins 8 and 26)
	7.6V to 8.4V (pins 22 and 42)
Rated supply voltage	5.0V (pins 8 and 26)
	8.0V (pins 22 and 42)

PIN CONFIGURATION (TOP VIEW)

IF GND	1	52	VIF VIDEO OUT
AFT OUT	2	51	VIF APC FILTER
SIF IN	3	50	VIF VCO FEEDBACK
RF AGC OUT	4	49	NC
IF AGC FILTER	5	48	FM DIRECT OUT
VIF IN	6	47	EXT AUDIO IN
VIF IN	7	46	AUDIO BYPASS
IF Vcc (5V)	8	45	AUDIO OUT
H.VCO FEEDBACK	9	44	SPOT KILLER
AFC FILTER	10	43	DDS FILTER
FBP IN / SCP OUT	11	42	Hi Vcc
H OUT	12	41	INTELLIGENT MONITOR
DEF Vss / GND	13	40	X-TAL 4.43
SDA	14	39	NC
SCL	15	38	AV SW OUT
INV. FBP OUT	16	37	VIDEO/CHROMA GND
V.PULSE OUT	17	36	TV/Y IN
R OUT	18	35	CHROMA APC FILTER
G OUT	19	34	EXT/C IN
B OUT	20	33	NC
V.RAMP OUT	21	32	DDS DECOUPLING
START UP Vcc (8V)	22	31	ACL ABCL / fsc OUT
B IN	23	30	R IN
V.RAMP FEEDBACK	24	29	PAL ID. FILTER
V.RAMP CAP	25	28	G IN
VIDEO/CHROMA Vcc	26	27	FAST BLK

Outline 52P4B

NC:NO CONNECTION

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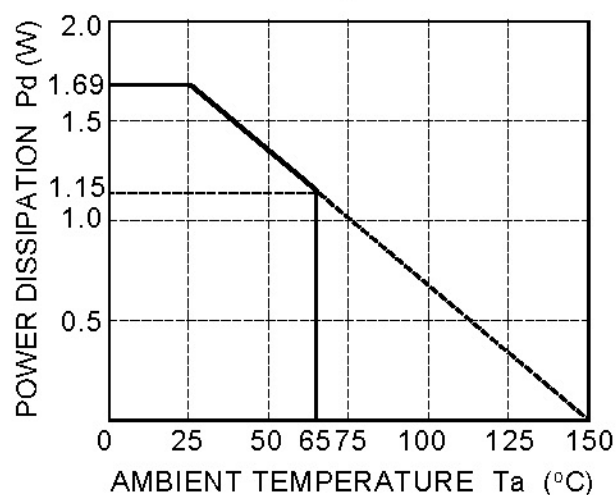
TV SIGNAL PROCESSOR FOR MULTI SYSTEM

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Ratings	Unit
Vcc	Supply voltage	6.0, 10.0	V
Pd	Power dissipation	1.69	W
Kt	Thermal derating	13.5	mW/°C
Topr	Operating temperature	-20 to 65	°C
Tstg	Storage temperature	-40 to 125	°C

TYPICAL CHARACTERISTICS

THERMAL DERATING (MAXIMUM RATING)



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TV SIGNAL PROCESSOR FOR MULTI SYSTEM

ELECTRICAL CHARACTERISTIC

VIF

Block	Parameter	Condition	Pin No.	Min	Typ	Max	Unit
VIF AMP	VIF Input Impedance		6,7		1.2		Kohm
	VIF Input Capacitance				5		pF
	Input Sensitivity	-3dB			47		dBμ
	Maximum Input Amplitude	+3dB			108		dBμ
PLL	Capture Range U		-		2		MHz
	Capture Range L				-2		MHz
	Inter Modulation	Red Raster			35		dB
IF AGC	AGC Control Range		5		61		dB
	Output Current(Charge)				10		μA
	Output Current(Discharge)				400		μA
	Maximum IF AGC voltage				4.6		V
	IF AGC voltage (80dBu)				2.3		V
	Minimum IF AGC voltage				1.8		V
RF AGC	Maximum RF AGC voltage		4		7.7		V
	Minimum RF AGC voltage				0.3		V
	Maximum Delay Point				105		dBμ
	Minmum Delay Point				65		dBμ
	RF AGC Adjustment Step	IIC 7bit			0.31		dB/bit
	Output Current(Charge & Discharge)				400		uA
Video Det	Video S/N		52		54		dB
Video Out	Frequency Response				8		MHz
	DG				3		%
	DP				3		deg
	Video Out DC voltage(Neg)	No input,IFAGC gainMin			2.7		V
	Maximum Output Amplitude	87.5% Video Mod			2.4		Vp-p
	Typical Output Amplitude				2.2		Vp-p
	Minimum Output Amplitude				2		Vp-p
	Sync Tip voltage (typ) (Neg)						V
	Gain Adjustment Step	IIC 3bit			57		mV/bit
	Video output impedance						Ohm
	Maximum output current						mA
	Ratio of Sync and Video amplitude				28.5		%
VIF VCO	Frequency Select	IIC 3bit	-				
	Free run Frequency Offset	38.0MHz(China)			0		MHz
		38.9MHz(Asia,EU)			0		MHz
		39.5MHz(UK)			0		MHz
		45.75MHz(US,Kor)			0		MHz
		58.75MHz(JP)			0		MHz
	Free run Frequency Adjustment Step	IIC 6bit			125		KHz/bit
AFT	Center Frequency Offset		2		+/- 30		KHz
	Sensitivity				-80		mV/KHz
	Sensitivity (Reverse type for L')	IIC 1bit			+80		mV/KHz
	Output Current(Charge & Discharge)				100		μA
	Maximum AFT voltage				7.7		V
	Minimum AFT voltage				0.3		V
	AFT Defeat voltage	IIC 1bit			4		V
	IIC Output byte(IIC 2bit AFT0,AFT1)	f<-100KHz	-		11		
		-100KHz < f < fo			01		
		fo < f < +100KHz			00		
		+100KHz < f			10		
Station Det	IIC Output byte(Lock Det +SPD AGC)	IIC 1bit	-		L		

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TV SIGNAL PROCESSOR FOR MULTI SYSTEM

SIF

	Parameter	Condition	Pin No.	Min	Typ	Max	Unit
Limiter	Limiting Sensitivity		-	-	43	50	dBμV
FM DET	Capture Range U		48		250		KHz
	Capture Range L				-250		KHz
AF AMP	Direct Out Impedance	De-emp C=2200F	48				Kohm
	Direct Out DC voltage				2.5		V
	Direct Out Level(4.5MHz mode)	25KHz dev			600		mVrms
	Direct Out Level(5.5MHz mode)	50KHz dev			600		mVrms
	Direct Out Level(6.0MHz mode)	50KHz dev			600		mVrms
	Direct Out Level(6.5MHz mode)	50KHz dev			600		mVrms
	AMR			52			dB
	THD (4.5MHz)	25KHz dev			1		%
	THD (5.5MHz)	50KHz dev			1		%
	S/N (4.5MHz)	input 100dBu			52		dB
	S/N (5.5MHz)	input 100dBu			58		dB
MUTE SW	Suppression of Direct out	IIC 1bit	48		-60		dB
Audio SW	Crosstalk between internal and external signal	IIC 1bit	45		-65		dB
	Maxumum Input Amplitude		47		1		Vrms
	EXT Audio Input Impedance		47				Kohm
Attenuator	Attenuation Gain (Max)		45		0		dB
	Attenuation Gain (typ)						dB
	Attenuation Gain (Min)				-65		dB
	Control Step	IIC 7bit					dB/bit

VIDEO

	Parameter	Condition	Pin No.	Min	Typ	Max	Unit
Video SW	TV/Y input voltage		36		1	1.4	Vp-p
	EXT/C input voltage (CVBS)		34		1	1.4	Vp-p
	EXT/C input voltage (Chrominance)	Y/C mode	34		0.6	1	Vp-p
	Video SW output Gain		38		6		dB
	Video SW output Dynamic Range		38		2.8		Vpp
	Video SW Frequency Response		38		10		MHz
	Video SW Crosstalk (Ext->TV)		38		55		dB
	Video SW Crosstalk (TV->EXT)		38		55		dB
Chroma Trap	Trap Frequency		18/19/20	-	fsc	-	MHz
	Suppression at fsc				-30	-20	dB
	Suppression at fsc+/-100KHz				-25		dB
	Suppression at fsc+/-500KHz				-10		dB
	Fine Adjust Frequency Range(4.43MHz)	IIC 2bit		-200		125	KHz
	Fine Adjust Frequency Range(3.58MHz)	IIC 2bit		-150		125	KHz
Y Delay Line	Double Trap Suppression at fsc	IIC 1bit				-25	dB
	Y Delay Time 1	IIC 2bit	18/19/20		125		nsec
	Y Delay Time 2				250		nsec
	Y Delay Time 3				400		nsec
	Y Delay Time 4				550		nsec
Video Tone	Y Delay Fine Adjust	IIC 1bit			80		nsec
	Emphasised Peaking Frequency		18/19/20		2.5		MHz
	Video Tone Control Range			-2.5		+10	dB
	Control Step	IIC 6bit					dB/bit
	Width of preshoot or overshoot				160		nsec
Black Stretch	Ratio of preshoot or overshoot				1		
	Maximum black level shift	+6dB	18/19/20		25		IRE
	Start Point				45		IRE
	Stop Point				8		IRE
Video Mute	Black Stretch Control (Charge)	IIC 2bit					
	Video Mute Function	IIC 1bit	18/19/20			-38	dB
Ganma Cont	Control Step	IIC 2bit	18/19/20				

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Chroma

Block	Parameter	Condition	Pin No.	Min	Typ	Max	Unit
PAL/NTSC							
ACC	Chroma Input voltage(burst amplitude)		-	-	0.3	-	Vp-p
	ACC Range Low				-22		dB
	ACC Range Hi				6		dB
	Over Load						
C-BPF	Center Frequency of TOF(4.43MHz)		-				MHz
	Band Width of TOF(4.43MHz)						MHz
	Center Frequency of BPF(4.43MHz)				4.43		MHz
	Band Width of BPF(4.43MHz)				1.5		MHz
	Center Frequency of TOF(3.58MHz)						MHz
	Band Width of TOF(3.58MHz)						MHz
	Center Frequency of BPF(3.58MHz)				3.58		MHz
	Band Width of BPF(3.58MHz)				1.5		MHz
VCXO	Free-run Frequency		40		4.433619		MHz
DDS	Free-run Frequency (NTSC)				3.579545		MHz
	Free-run Frequency (PAL-M)				3.575611		MHz
	Free-run Frequency (PAL-N)				3.582056		MHz
C-APC	APC Pull-In Range(4.43MHz +)		35		+600		Hz
	APC Pull-In Range(4.43MHz -)				-600		Hz
	APC Pull-In Range(3.58MHz +)				+500		Hz
	APC Pull-In Range(3.58MHz -)				-500		Hz
	APC Control Sensitivity(4.43MHz)						Hz/mV
	APC Control Sensitivity(3.58MHz)						Hz/mV
TINT	Tint Control Range		-	-45	-	+45	deg
Demodulator	-(R-Y) Output Amplitude (4.43MPAL)				560		mVp-p
	-(B-Y) Output Amplitude (4.43MPAL)				1000		mVp-p
	-(R-Y) Output Amplitude (3.58MNTSC)				560		mVp-p
	-(B-Y) Output Amplitude (3.58MNTSC)				1000		mVp-p
	Relative Amplitude : R/B				0.56		-
	Relative Phase Angle(PAL) : R-B				90		deg
	Relative Phase Angle(NTSC) : R-B				108		deg
	Relative Phase Angle(NTSC) : R-B	IIC(C Angle 95)			95		deg
	Total Chroma Delay Time						nsec
	Band Width of Demodulator				650		KHz
Killer	Residual Carrier leakage				-40		dB
	Threshold Killer On (Forced PAL)				-46		dB
	Threshold Killer On (Auto Mode PAL)				-46		dB
	Threshold Killer On (Forced NTSC)				-46		dB
	Threshold Killer On (Auto Mode NTSC)				-46		dB
Identification	Color Residual at Killer On				-40		-
	Identification Time			-	4	-	frames
	Detection Threshold Angle				23		deg

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RGB Interface

	Parameter	Condition	Pin No.	Min	Typ	Max	Unit
1H delay line	Dynamic Range (Direct)		-		1.5		Vp-p
	Dynamic Range (Delay)				1.5		Vp-p
	AC Gain (Direct)				-0.2		dB
	AC Gain (Delay)				-0.2		dB
	Direct-Delay AC Gain difference			-1	0	+1	dB
	Color Belt characteristics 1		18,19,20		100		mV
	Color Belt characteristics 2				100		mV
	1H delay time				64		μsec
	Residual clock noise	3MHz					mVp-p
Matrix	Mix ratio R/B(PAL)		18,19,20		0.56		
	Mix ratio G/B(PAL)				0.32		
	R Matrix Gain UP Function(PAL):R/B	IIC 1bit			0.95		
	Mix ratio R/B(NTSC)				0.95		
	Mix ratio G/B(NTSC)				0.93		
EXT RGB	Input level	(Pedestal Clamp)	23,28,30		0.7		Vp-p
	Fast Blanking SW (TV)		27			1	V
	Fast Blanking SW (Half Tone)	when 09HD4=L	27	2		3	V
	Fast Blanking SW (EXT RGB)	when 09HD4=L	27	4		5	V
	Fast Blanking SW (EXT RGB)	when 09HD4=H	27	2		5	V
	EXT RGB Contrast Clip Function	IIC 1bit	18,19,20				
	EXT RGB Speed (rising edge)		18,19,20		20		nsec
	EXT RGB Speed (falling edge)		18,19,20		20		nsec
	Offset voltage between TV and external RGB		18,19,20		0		mV
	Blue Back Function	IIC 1bit	18,19,20				
	White Back Function	IIC 1bit	18,19,20				
Color Cont	Color Control (Center)		18,19,20				V
	Color Control Range			-45		4	dB
	Color Control Step (around center bit)	IIC 7bit					dB/bit
Contrast	Contrast Control (center)		18,19,20				Vp-p
	Contrast Control Range			-40		3	dB
	Contrast Control Step (around center bit)	IIC 7bit					dB/bit
Bright	Brightness Control (center)		18,19,20		2.4		V
	Brightness Control Range			-0.85		+0.85	V
	Brightness Control Step	IIC 8bit					mV/bit
	ABCL Gain						dB
Drive	Drive Control (center)		18,19,20		0		dB
	Drive Control Range			-3		+3	dB
	Drive Control Step	IIC 7bit					dB/bit
Cut Off	Cut Off Control Range		18,19,20	-0.9		+0.9	V
	Cut Off Control Step	IIC 8bit					mV/bit
RGB OUT	Output Pedestal Voltage		18,19,20		2.4		V
	Output Blanking Voltage				0.3		V
	Clamp Ability				100		%
	Maximum output current				4		mA

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TV SIGNAL PROCESSOR FOR MULTI SYSTEM

DEFLECTION

Block	Parameter	Condition	Pin No.	Min	Typ	Max	Unit
Sync Sep.	Sync Slice Level	IIC 2bit	-		20/30/40/50		%
	Minimum Sync Detection Level		-		75		%
H VCO	Horizontal Free-running Frequency		12		15.725		KHz
	Free-running Frequency Adjustment	IIC 3bit		-500	-	+500	Hz
AFC1	Pull-in Range (U) (normal)	(switch by IIC and COINCIDENT)	12		+600		Hz
	Pull-in Range (L) (normal)				-600		Hz
	Pull-in Range (U) (fast)				+800		Hz
	Pull-in Range (L) (fast)				-800		Hz
H Phase	Control Range		12	-1.6	-	+1.6	usec
	Control Step	IIC 5bit			0.1		usec/bit
HOUT	H Pulse Timing from rising edge of FBP		12		-8.5		usec
	H Pulse Width				25		usec
	H Pulse Amplitude				6		V
	H STOP Function	IIC 1bit			0		V
	H Free Function	IIC 1bit					
SCPOUT/ FBPIN	BGP Timing from rising edge of sync		11		0.5		usec
	BGP Width		11		3		usec
	Inverted FBP OUT	Open Collector	16				
Vertical Countdown	Vertical Free-running Frequency	IIC 1bit	21		50 / 60		Hz
	V Free Function	IIC 1bit					
	Pull-in Range 50Hz (U)				55		Hz
	Pull-in Range 50Hz (L)				45		Hz
	Pull-in Range 60Hz (U)				67		Hz
	Pull-in Range 60Hz (L)				55		Hz
	V Blanking Width		18		1.5		msec
V RAMP OUT	V Ramp out Amplitude (typ)		21		2		Vp-p
	V Ramp out DC voltage (typ)		21		2.5		Vdc
	V Size Control Range	IIC 6bit	21	-40		40	%
	V Shift Step	IIC 3bit	21		2 H		

Other

Block	Parameter	Condition	Pin No.	Min	Typ	Max	Unit
IIC	Acknowledge Current		14/15		5		mA
	SCL/SDA Threshold voltage(H)				0.75		V
	SCL/SDA Threshold voltage(L)				4.25		V
	Clock Frequency				100		KHz
Intelligent Monitor	TBD	IIC 4bit	41				

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TV SIGNAL PROCESSOR FOR MULTI SYSTEM

I²C BUS CONTROL

1)SLAVE ADDRESS= BAH(WRITE), BBH(READ)

A6	A5	A4	A3	A2	A1	A0	R/W
1	0	1	1	1	0	1	1/0

2)WRITE TABLE(input bytes)

SUB ADDRESS			DATA								INITIAL			
HEX	DEC	BIN	D7	D6	D5	D4	D3	D2	D1	D0	HEX	DEC		
00H	0	00000000	R MTX UP		RF Delay Adj						40H	64		
			0	1	0	0	0	0	0	0				
01H	1	00000001	VIF VCO ADJ.								20H	32		
			0	0	1	0	0	0	0	0				
02H	2	00000010	Video Mute	Audio EXT	CTRAP Off		Video T Sharp	ABCL	Black Stre. Off	Take Off	00H	0		
			0	0	0	0	0	0	0	0				
03H	3	00000011	Audio Mute	Audio ATT								00H	0	
			0	0	0	0	0	0	0	0				
04H	4	00000100	ABCL G UP	AFT Defeat	Video Tone							20H	32	
			0	0	V1	V0	V0	V0	V0	V0				
05H	5	00000101	EXTRGB C. Clip	Contrast Control								40H	64	
			V0	V1	V0	V0	V0	V0	V0	V0				
06H	6	00000110	VIF Video Out Gain			Y/C	EXT	Y DL Fine Adj	Y DL Time Adj			80H	128	
			1	0	0	V0	V0	0	0	0				
07H	7	00000111	VIF Defeat	Tint Control							40H	64		
			0	V1	V0	V0	V0	V0	V0	V0				
08H	8	00001000	Blue Back	Color Control								40H	64	
			V0	V1	V0	V0	V0	V0	V0	V0				
09H	9	00001001				HTONE-SW	Color System					F8H	248	
			1	1	1	1	1	0	0	0				
0AH	10	00001010	Brightness Control								80H	128		
			V1	V0	V0	V0	V0	V0	V0	V0				
0BH	11	00001011	fsc out1	Drive(R)								40H	64	
			0	1	0	0	0	0	0	0				
0CH	12	00001100	fscout2	Drive(B)								40H	64	
			0	1	0	0	0	0	0	0				
0DH	13	00001101	Cut Off(R)								80H	128		
			1	0	0	0	0	0	0	0				
0EH	14	00001110	Cut Off(G)								80H	128		
			1	0	0	0	0	0	0	0				
0FH	15	00001111	Cut Off(B)								80H	128		
			1	0	0	0	0	0	0	0				
10H	16	00010000	White Back	V-free	H VCO Adj			VIF FREQ				20H	32	
			0	0	1	0	0	0	0	0				
11H	17	00010001	DON'T USE	Read Page	V-Size								20H	32
			0	0	1	0	0	0	0	0				
12H	18	00010010	Monitoring				Gamma Control		C-TRAP Fine Adj			00H	0	
			0	0	0	0	0	0	0	0				
13H	19	00010011	H-free	1 Window	AFC1 GainUP	H Stop	Service SW	V Shift					00H	0
			0	0	0	0	0	0	0	0				
14H	20	00010100	Black StretchDischarge	Black Strech Charge			S. SliceDown2	S.SliceDown1	SIF Freq 65		03H	3		
			0	0	0	0	0	0	1	1				
15H	21	00010101					Force MONO	Force COLOR	C.Angle 95	Killer Level	40H	64		
			0	1	0	0	0	0	0	0				
16H	22	00010110				AFC2 H PHASE						90H	144	
			1	0	0	1	0	0	0	0				
17H	23	00010111		AFC2 GainDown									A0H	160
			1	0	1	0	0	0	0	0				
18H	24	00011000	DON'T USE										20H	32
			0	0	1	0	0	0	0	0				
19H	25	00011001											A0H	160
			1	0	1	0	0	0	0	0				
1AH	26	00011010											20H	32
			0	0	1	0	0	0	0	0				
1BH	27	00011011											20H	32
			0	0	1	0	0	0	0	0				
1CH	28	00011100	V60Hz	Y SW LPF									20H	32
			0	0	1	0	0	0	0	0				
1DH	29	00011101			0		0	1	0	0	88H	136		
			1	0	DON'T USE		STPON	STPREV	STPSEL1	STPSEL0				
1EH	30	00011110			0		0	0	0	0	80H	128		
			1	0	0		0	0	0	0				
1FH	31	00011111	DON'T USE										00H	0
			0	0	0	0	0	0	0	0				

NOTE: V0 / V1 ==> V- LATCH BIT

2)READ TABLE(input bytes)

SUB ADDRESS		D7	D6	D5	D4	D3	D2	D1	D0
00H	00000000	CONDITION/ KILLERB	0	NTSC	3.58M	AFT0	AFT1	HCOINB	V60Hz
01H	00000001	2WIN WIDEB	VFREEB	0	0	VCOINB	STDETB	M	N

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TV SIGNAL PROCESSOR FOR MULTI SYSTEM

BUS FUNCTION

WRITE

FUNCTION	BIT	SUB ADD	DATA	DESCRIPTION	INITIAL	NOTE
VIF						
RF Delay Adj	7	00H	D0-D6	RF AGC Delay Point Adjustment by 7bit DAC	1000000	
VIF VCO Adj	6	01H	D0-D5	VIF VCO Free-running Frequency Adjustment by 6bit DAC	1000000	
VIF Freq	3	10H	D0-D2	VIF Frequency Selector. see table1.	000	
VIF Video Out Gain	3	06H	D5-D7	VIF Video det output Amplitude Adjustment by 3bit DAC	100	
AFT Defeat	1	04H	D6	AFT OUT ON/OFF(Defeat) switch 0: AFT ON (Non Defeat), 1: Defeat	0	
VIF Defeat	1	07H	D7	VIF AGC Gain 0: AGC Function 1: Defeat(Minimum Gain) This bit is for VCO Adjustment.	0	
SIF						
Audio ATT	7	03H	D0-D6	Audio Out Level Attenuation by 7bit DAC MAX gain=0dB	0	
Audio EXT	1	02H	D6	AF Direct out/External Audio input signal switch 0:AF amp out , 1: External	0	
Audio Mute	1	03H	D7	AF Direct out ON/OFF(Mute) switch 0: Sound ON (Non Mute), 1: Mute	0	
SIF Freq. 65	1	14H	D0	SIF Frequency Selector. 0: 5.5 - 6.5MHz 1: 4.5MHz	0	

VIDEO

Video Tone	6	04H	D0-D5	Delay line type Aperture Control by 6bit DAC	1000000	V Latch
Contrast Control	7	05H	D0-D6	Contrast Control by 7bit DAC	1000000	V Latch
EXT RGB Contrast Clip	1	05H	D7	Contrast Control Clip Switch when OSD mode 0: Clip ON, 1: Clip OFF	0	V Latch
Y DL Time Adj	2	06H	D0-D1	Luminance Signal Delay time Adjustment	0	
Y DL Fine Adj	1	06H	D2	Luminance Signal Delay time Fine pitch Adjustment	0	
EXT	1	06H	D3	AV Switch Selector 0:TV mode , 1:EXT mode	0	V Latch
Y/C	1	06H	D4	AV Switch Selector 0:Composit video input , 1:Y/C input mode	0	V Latch
Y SW LPF	1	1CH	D6	Y SW OUT frequency switch 0: FLAT , 1: LPF(fc=700KHz)	0	
Video Tone Sharp	1	02H	D3	Video Tone Gain (Sharp/Soft) switch 0:Soft 1:Sharp	0	
Video Mute	1	02H	D7	Luminance signal Mute ON/OFF switch 0: OUT, 1:Mute	0	
CTRAP Off	1	02H	D4	Chroma Trap ON/OFF switch 0:Chroma Trap ON, 1: Chroma Trap Off	0	
TRAP Fine Adj	2	12H	D0-D1	Chroma Trap fo Adjustment	00	
Black Stretch Off	1	02H	D1	Black Stretch function ON/OFF switch 0: ON 1: OFF	0	
Black Stretch Charge	2	14H	D4-D5	Charge Time Constant Adjustment for Black Stretch.	00	
Black Stretch Discharge	2	14H	D6-D7	Discharge Time Constant Adjustment for Black Stretch.	0	
Gamma Control	2	12H	D2-D3	Luminance Gamma Threshold Control 0:Gamma OFF	00	

CHROMA

Tint Control	7	07H	D0-D6	Tint Control by 7bit DAC.	1000000	V Latch
Color Control	7	08H	D0-D6	Color Saturation Control by 7bit DAC.	1000000	V Latch
Take Off	1	02H	D0	Chroma BPF/Take Off Switch. 0: BPF, 1: Take Off	0	
C Angle 95	1	15H	D1	Chroma Demodulation Angle Switch. 0: 108deg, 1: 95deg	0	
Killer Level	1	15H	D0	Color Killer Sensitivity Threshold Switch for PAL/NTSC system. 0: 43dB 1: 45dB	0	
Force Color	1	15H	D2	Forced Color mode switch for PAL/NTSC system. 0: OFF 1: Forced Color (Killer function not available)	0	
Force Mono	1	15H	D3	Forced B/W mode 0: OFF , 1: Forced Black&White	0	
Color System	4	09H	D0-D3	Color System Selector. See table3.	1000	

RGB INTERFACE

Brightness Control	8	0AH	D0-D7	Brightness Control by 8bit DAC	10000000	V Latch
Drive(R)	7	0BH	D0-D6	R OUT Amplitude Adjustment by 7bit DAC	1000000	
Drive(B)	7	0CH	D0-D6	B OUT amplitude Adjustment by 7bit DAC	1000000	
Cut Off(R)	8	0DH	D0-D7	R OUT Pedestal Level Adjustment by 8bit DAC	10000000	
Cut Off(G)	8	0EH	D0-D7	G OUT Pedestal Level Adjustment by 8bit DAC	10000000	
Cut Off(B)	8	0FH	D0-D7	B OUT Pedestal Level Adjustment by 8bit DAC	10000000	
R MTX UP	1	00H	D7	R Matrix Gain UP (PAL mode only) 0: OFF 1: GAIN UP	0	
Blue Back	1	08H	D7	Blue Back mode ON/OFF switch 0: OFF , 1: Blue Back	0	
White Back	1	10H	D7	White Raster mode ON/OFF switch 0: OFF, 1: White Back	0	
ABCL	1	02H	D2	ABCL ON/OFF switch 0: OFF(ACL) 1: ABCL ON	0	
ABCL Gain	1	04H	D7	ABCL Gain Low/High switch 0: Low, 1: Hi	0	
fsc out1	2	0BH	D7	fsc output selector. Fsc signal outputs from ACL/ABCL pin when these bits are active.	0	
fsc out2		0CH	D7	see table 5	0	
HTONE-SW	1	09H	D5	H-TONE MODE 1: OFF 0: HALF TONE function. enable(1.0V < FAST BLK < 3.5V)	0	

DEFLECTION

AFC2 H Phase	5	16H	D0-D4	Horizontal Phase Adjustment by 5bit DAC	10000	
Service SW	1	13H	D3	0: Vertical output ON/Contrast Control Normal 1: Vertical output OFF/Contrast Control Minimum	0	
H Stop	1	13H	D4	Horizontal output switch 0: H OUT , 1: H STOP	0	
AFC1 Gain UP	1	13H	D5	Horizontal AFC1 Gain switch 0: Low , 1: High	0	
AFC2 GAIN DOWN	1	17H	D6	Horizontal AFC2 Gain switch 0: Normal , 1: DOWN	0	
H VCO Adj	3	10H	D3-D5	H VCO free-running frequency Adjustment	100	
V Shift	3	13H	D0-D2	V RAMP Start timing Adjustment 2Line/Step	0	
V-Size	6	11H	D0-D5	V RAMP Amplitude Adjustment by 6bit DAC.	1000000	
H-free	1	13H	D7	Horizontal Forced free-running mode switch 0: OFF, 1: Forced Free-running	0	
V-free	1	10H	D6	Vertical Forced free-running mode switch 0: OFF, 1: Forced Free-running	0	
V60Hz	1	1CH	D7	Vertical free-running frequency 60Hz mode 0: 50Hz 1: 60Hz	0	
S Slice Down1 / 2	2	14H	D2-D3	Sync Det Slice Level Down. 0: 50% 1: 40% 2: 30% 3: 25%	00	
1 Window	1	13H	D6	Vertical Sync. Det mode (1 Window/2 Window) 0: 2 Window/syncdet=9us , 1: 1 Window/syncdet=11us	0	
STP ON	1	1EH	D3	0: Test pattern mode OFF 1: Test pattern mode ON	0	
STP PREV	1	1EH	D2	Test pattern Neg/Pos select	0	
STP SEL	2	1EH	D0-D1	H/V Half Stripe, Cross Hatch available	0	

OTHER

Monitoring	4	12H	D4-D7	Intelligent Monitor output selector	0000	
Read Page	1	11H	D6	Read Page mode selector 00: 00H , 01: 01H	0	

Condition / KILLERB	1	00H	D7	Condition bit for auto mode, Killer off for manual mode.		
NTSC	1	00H	D5	Color System ID output. System is NTSC.		
3.58M	1	00H	D4	Color System ID output. Fsc frequency is 3.58MHz		
AFT0	1	00H	D3	AFT o output		
AFT1	1	00H	D2	AFT o output		
HCOINB	1	00H	D1	Horizontal mute det output. 0: H coincident		
60	1	00H	D0	Vertical frequency ID output. 0: 50Hz 1: 60Hz		
VCOINB	1	01H	D3	Vertical Sync det output. 0: V coincident		
STDETB	1	01H	D2	Station det for TV mode. 0: Station det.		
M	1	01H	D1	Color System ID output for South America mode. System is M.		
N	1	01H	D0	Color System ID output for South America mode. System is N.		

PRELIMINARY

Notice ; This is not a final specification.
Some parametric limits are subject to change.

TV SIGNAL PROCESSOR FOR MULTI SYSTEM

VIF Frequency 3bit (10HD0-D2) table1

	VIF Frequency	Country
000	38.0MHz	China
001	38.9MHz	Asia,EU
010	39.5MHz	UK
011	45.75MHz	US,KOR
100	58.75MHz	JPN
101	-	-
110	-	-
111	-	-

Color System 4bit (09H: D0-D3) table 3

		D1,D0			
		00	01	10	11
D3,D2	00	PAL	-	4.43 NTSC	PAL-M
	01	3.58 PAL	-	NTSC	PAL-N
	10	AUTO1	AUTO1	AUTO1	AUTO1
	11	AUTO2	AUTO2	AUTO2	AUTO2

AUTO1 : PAL / NTSC / 4.43 NTSC

AUTO2 (SOUTH AMERICA MODE) : PAL-M / PAL-N / NTSC

PAL-M : fh=15.73426KHz, fsc=(909/4)*fh=3.575611MHz

PAL-N : fh=15.625KHz, fsc=(917/4)*fh=3.582056MHz

60Hz/V-Free 2bit(60Hz:1CHD7, V Free: 10HD6) table 4

60Hz 1CHD7	V-Free 10HD6	Vertical System
0	0	AUTO(50Hz at Free-run)
0	1	Forced freerun mode 50Hz
1	0	AUTO(60Hz at Free-run)
1	1	Forced freerun mode 60Hz

V Free= Forced Freerun mode

60Hz=Forced 60Hz mode

fsc output 2bit (0BHD7,0CHD7) table 5

fscout2 (0CHD7)	fscout1 (0BHD7)	fscout(ACL/ABCL)
0	0	-
0	1	DDS OUT
1	0	4.43MHz OUT
1	1	fsc SW OUT

READ BYTE: AFT OUTPUT

	-100kHz	fo	+100kHz	f
AFT0	1	0	0	1
AFT1	1	1	0	0

PRELIMINARY

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TV SIGNAL PROCESSOR FOR MULTI SYSTEM

SPECIFICATION OF INTELLIGENT MONITOTR

1) SUB ADDRESS : 12H D4 - D7 (4BIT)

2) OUTPUT PIN : PIN41

3) SPECIFICATION

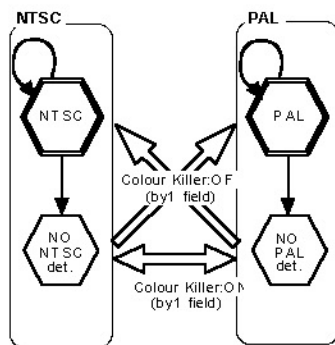
DEC	12H HEX	OUTPUT SIGNAL	VCC VOLTAGE	SPEC.	
0	0	Composit Sync	8V	0/4.75V	POSITIVE SYNC
1	1	AFT	8V	-6dB	
2	2	RF AGC	8V	-6dB	
3	3	TV/EXT SW OUT	5V	0dB	
4	4	Audio Direct out	5V	0dB	
5	5	EXT Audio	5V	-6dB	
6	6	G OUT	8V	-6dB	
7	7	R OUT	8V	-6dB	
8	8	B OUT	8V	-6dB	
9	9	ACL	5V	0dB	
10	A	AUDIO BYPASS	5V		
11	B	SCP OUT(pin6)	8V	-6dB	
12	C	VIF Vcc	5V	0dB	
13	D	START UP VCC(pin19)	8V	-9.5dB	
14	E	VIDEO/CROMA VCC (pin23,24,25)	5V	-6dB	
15	F	HI VCC(pin44,45,46)	8V	-9.5dB	

PRELIMINARY

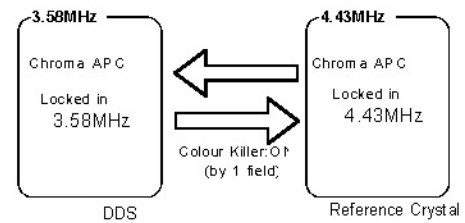
Notice ; This is not a final specification.
Some parametric limits are subject to change.

TV SIGNAL PROCESSOR FOR MULTI SYSTEM

State Diagram of Auto Colour System

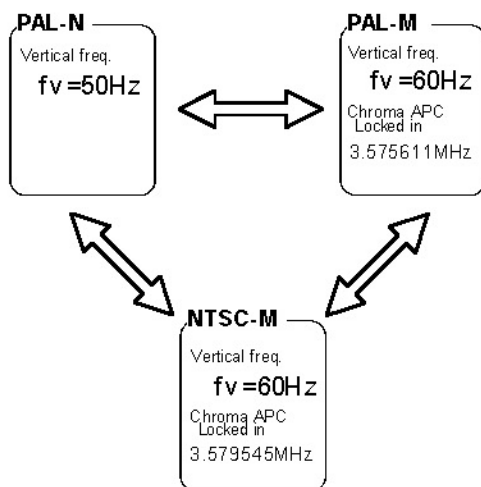


State Diagram of 4.43MHz/3.58MHz Selection

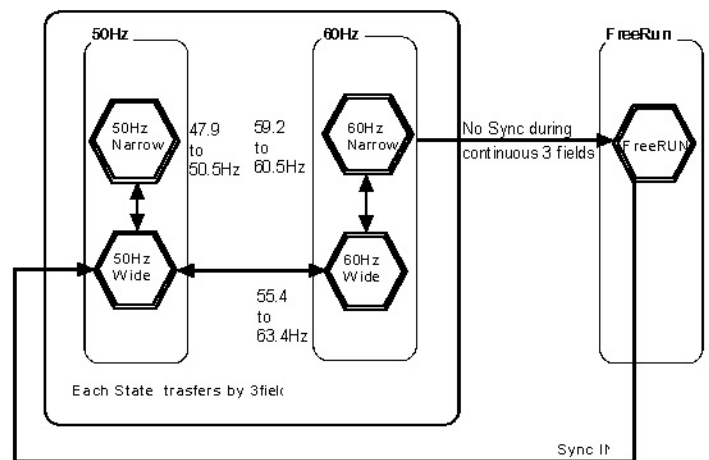


(DDS function quits when chroma APC is locked in 4.43MHz.)

State Diagram of South American Colour System



State Diagram of Vertical Frequency Identification



TV SIGNAL PROCESSOR FOR MULTI SYSTEM

NPN tr:2SC2603