To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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To all our customers

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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

M61201SP

PRELIMINARY

Some parametric limits are subject to change.

TV SIGNAL PROCESSOR FOR MULTI SYSTEM

DESCRIPTION

M61201SP 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, H/V deflection, and EAST/WEST geometry, 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
- East-West Geometry Control
- No SECAM function

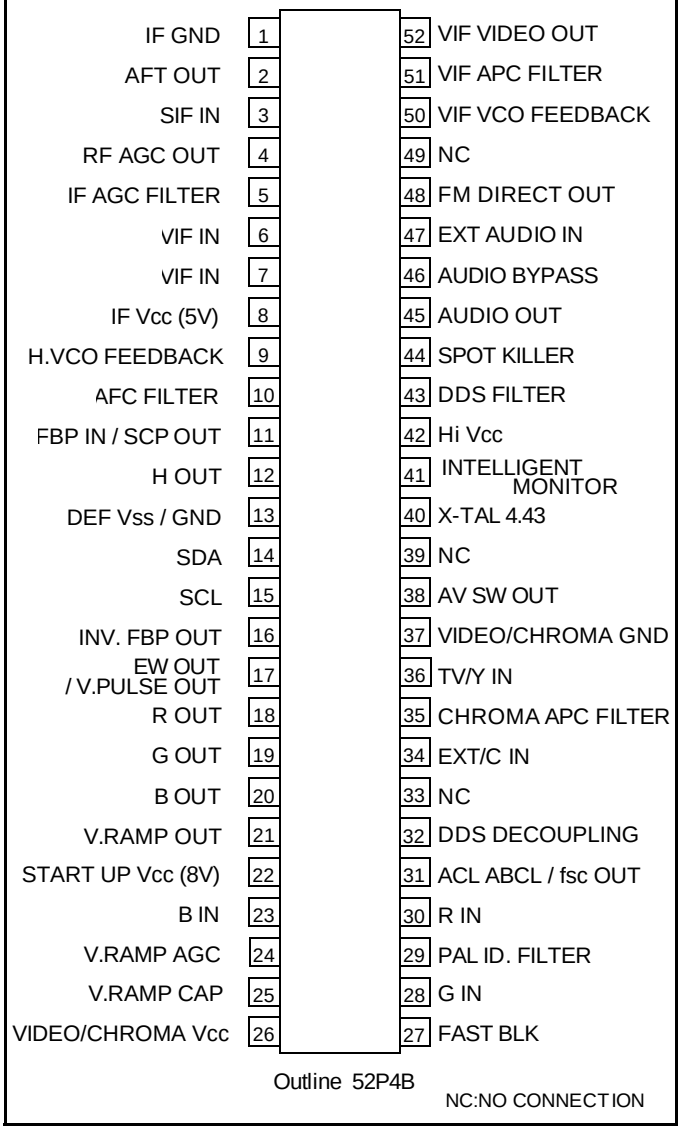
APPLICATIONS

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)

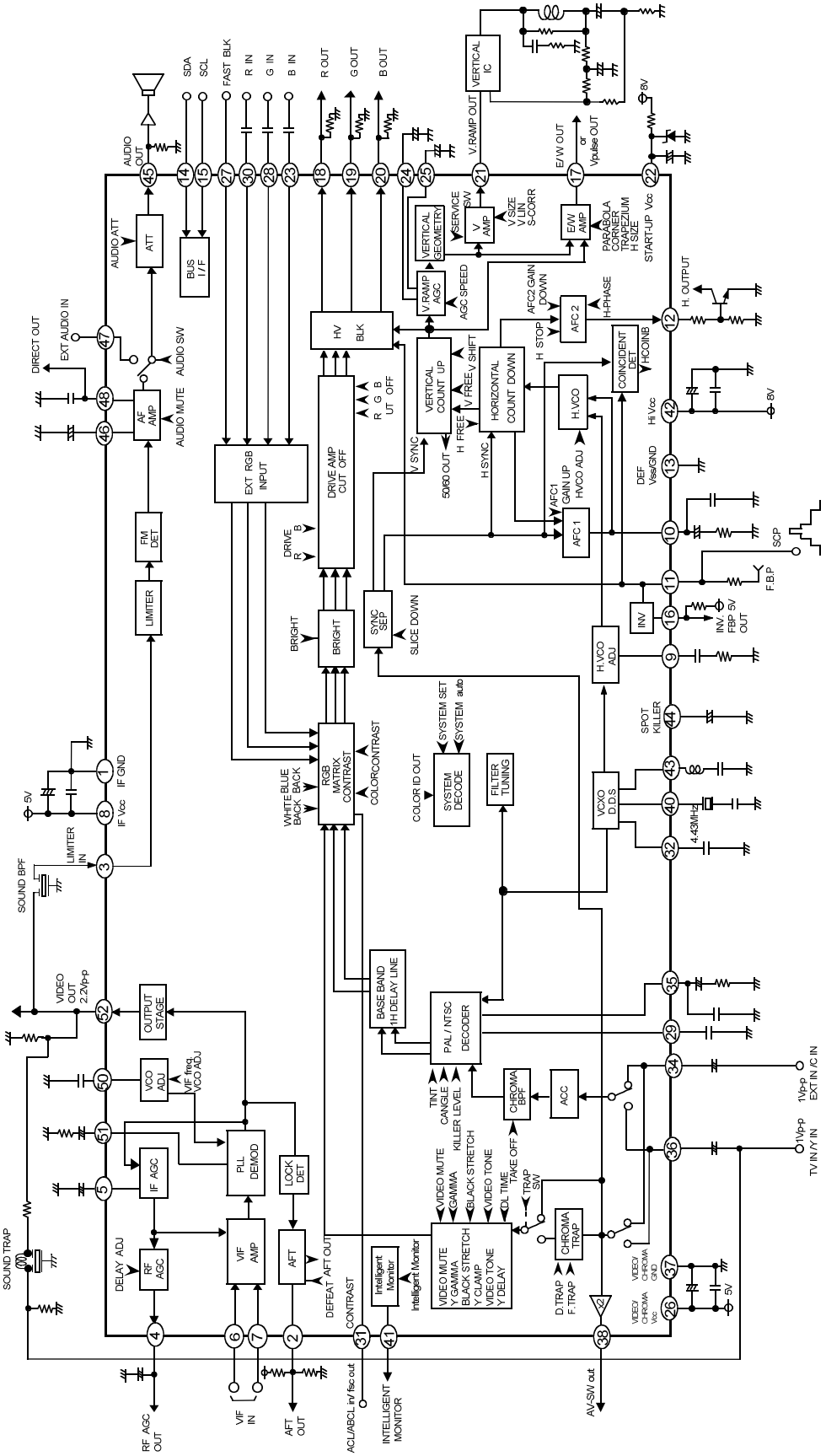
PIN CONFIGURATION (TOP VIEW)



Outline 52P4B

NC:NO CONNECTION

BLOCK DIAGRAM

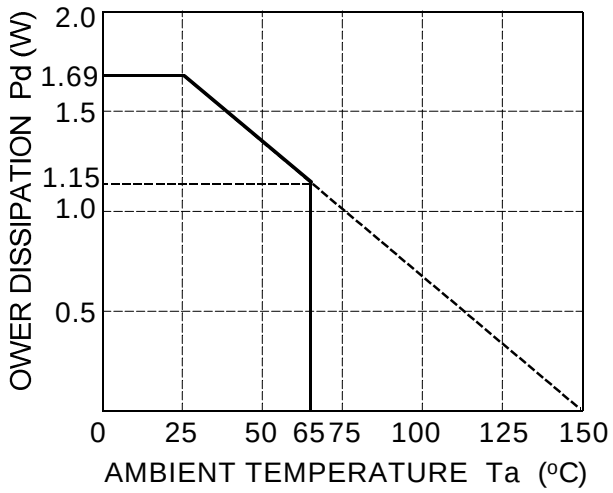


ABSOLUTE MAXIMUM RATINGS

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)



ELECTRICAL CHARACTERISTIC

VIF

Block	Parameter	Condition	Pin No.	Min	Typ	Max	Unit
VIF AMP	VIF Imput Impedance		6,7		1.2		Kohm
	VIF Imput 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		

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
	Double Trap Suppression at fsc	IIC 1bit				-25	dB
Y Delay Line	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
	Y Delay Fine Adjust	IIC 1bit			80		nsec
Video Tone	Emphasised Peaking Frequncy		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
	Ratio of preshoot or overshoot				1		
Black Stretch	Maximum black level shift	+6dB	18/19/20		25		IRE
	Start Point				45		IRE
	Stop Point				8		IRE
	Black Stretch Control (Charge)	IIC 2bit					
Video Mute	Video Mute Function	IIC 1bit	18/19/20			-38	dB
Ganma Cont	Control Step	IIC 2bit	18/19/20				

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
	Residual Carrier leakage				-40		dB
Killer	Threshold Killer On (Forced PAL)				-46		dB
	Threshold Killer On (Auto Mode PAL)				-46		dB
	ThresholdKiller On (Forced NTSC)				-46		dB
	ThresholdKiller On (Auto Mode NTSC)				-46		dB
	Color Residual at Killer On				-40		-
Identification	Identification Time			-	4	-	frames
	Detection Threshold Angle				23		deg

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 differnce			-1	0	+1	dB
	Color Belt chracteristics 1		18,19,20		100		mV
	Color Belt chracteristics 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)				0.33		
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

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)		12		+600		Hz
	Pull-in Range (L) (normal)				-600		Hz
	Pull-in Range (U) (fast)	(switch by IIC and			+800		Hz
	Pull-in Range (L) (fast)	COINCIDENT)			-800		Hz
H Phase	Control Range		12	-1.6	-	+1.6	µsec
	Control Step	IIC 5bit			0.1		µsec/bit
HOUT	H Pulse Timing from rising edge of FBP		12		-8.5		µsec
	H Pulse Width				25		µsec
	H Pulse Amplitude				6		V
	H STOP Function	IIC 1bit			0		V
	H Free Function	IIC 1bit					
SCPOUT/	BGP Timing from rising edge of sync		11		0.5		µsec
FBPIN	BGP Width		11		3		µsec
	Inverted FBP OUT	Open Collector	16				
Vertical	Vertical Free-running Frequency	IIC 1bit	21		50 / 60		Hz
Countdown	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		2.0		Vp-p
	V Size Control Range	IIC 6bit		-40		+40	%
	V Shift Step	IIC 3bit			2 H/step		
	V Linearity Control Range	IIC 6bit		-15		+15	%
	S-Correction Control Range	IIC 6bit			25		%
East-West	H Size (TOP DC voltage)typ		17		4.0		Vdc
	H Size Control Range	IIC 6bit		3.2		4.8	V
	Parabola Amplitude typ				1.0		Vp-p
	Parabola Control Range	IIC 6bit		-80		+80	%
	Trapezium Control Range	IIC 6bit		-6		+6	%
	Parabola Corner Control Range	IIC 6bit		-30		+30	%

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				

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 0	RF Delay Adj 1	0	0	0	0	0	0	40H	64
01H	1	00000001	0	0	VIF VCO ADJ. 1	0	0	0	0	0	20H	32
02H	2	00000010	Video Mute 0	Audio EXT 0	0	CTRAP Off 0	Video T Sharp 0	ABCL 0	Black Stre. Off 0	Take Off 0	00H	0
03H	3	00000011	Audio Mute 0	Audio ATT 0	0	0	0	0	0	0	00H	0
04H	4	00000100	ABCL G UP 0	AFT Defeat 0	Video Tone V1	V0	V0	V0	V0	V0	20H	32
05H	5	00000101	EXTRGB C. Clip V0	Contrast Control V1	V0	V0	V0	V0	V0	V0	40H	64
06H	6	00000110	VIF Video Out Gain 1	0	0	Y/C V0	EXT V0	Y DL Fine Adj 0	Y DL Time Adj 0	0	80H	128
07H	7	00000111	VIF Defeat 0	Tint Control V1	V0	V0	V0	V0	V0	V0	40H	64
08H	8	00001000	Blue Back V0	Color Control V1	V0	V0	V0	V0	V0	V0	40H	64
09H	9	00001001	1	1	1	HTONE-SW 1	1	Color System 0	0	0	F8H	248
0AH	10	00001010	Brightness Control V1	V0	V0	V0	V0	V0	V0	V0	80H	128
0BH	11	00001011	fsc out1 0	Drive(R) 1	0	0	0	0	0	0	40H	64
0CH	12	00001100	fscout2 0	Drive(B) 1	0	0	0	0	0	0	40H	64
0DH	13	00001101	Cut Off(R) 1	0	0	0	0	0	0	0	80H	128
0EH	14	00001110	Cut Off(G) 1	0	0	0	0	0	0	0	80H	128
0FH	15	00001111	Cut Off(B) 1	0	0	0	0	0	0	0	80H	128
10H	16	00010000	White Back 0	V-free 0	H VCO Adj 1	0	0	VIF FREQ 0	0	0	20H	32
11H	17	00010001	DON'T USE 0	Read Page 0	V-Size 1	0	0	0	0	0	20H	32
12H	18	00010010	Monitoring 0	0	0	0	Gamma Control 0	0	C-TRAP Fine Adj 0	0	00H	0
13H	19	00010011	H-free 0	1 Window 0	AFC1 GainUP 0	H Stop 0	Service SW 0	V Shift 0	0	0	00H	0
14H	20	00010100	Black StretchDischarge 0	0	Black Strech Charge 0	0	S. SliceDown2 0	S.SliceDown1 0	1	SIF Freq 65 1	03H	3
15H	21	00010101	0	1	0	0	Force MONO 0	Force COLOR 0	C.Angle 95 0	Killer Level 0	40H	64
16H	22	00010110	1	0	V PULSE 0	AFC2 H PHASE 1	0	0	0	0	90H	144
17H	23	00010111	V-AGC GAIN 1	AFC2GainDown 0	E/W PARABOLA 1	0	0	0	0	0	A0H	160
18H	24	00011000	DON'T USE 0	0	E/W CORNER 1	0	0	0	0	0	20H	32
19H	25	00011001	BGPFBPoff 1	Test On 0	E/W TRAPEZIUM 1	0	0	0	0	0	A0H	160
1AH	26	00011010	DL Test 0	Monitor MSB 0	E/W H SIZE 1	0	0	0	0	0	20H	32
1BH	27	00011011	HBLK Stop 0	VBLK Stop 0	V S-CORRECTION 1	0	0	0	0	0	20H	32
1CH	28	00011100	V60Hz 0	Y SW LPF 0	V LINEARITY 1	0	0	0	0	0	20H	32
1DH	29	00011101	1	0	0	0	1	0	0	0	88H	136
1EH	30	00011110	1	0	DON'T USE 0	0	STPON 0	STPREV 0	STPSEL1 0	STPSEL0 0	80H	128
1FH	31	00011111	0	0	**DON'T USE** 0	0	0	0	0	0	00H	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

BUS FUNCTION

WRITE

FUNCTION	BIT	SUB ADD	DATA	DISCRIPTION	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	100000	
VIF Freq	3	10H	D0-D2	VIF Frequency Selecter. 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 Attenation 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. 4.5	2	14H	D0	SIF Frequency Selecter. 0: 5.5 - 6.5MHz 1: 4.5MHz	0	
VIDEO						
Video Tone	6	04H	D0-D5	Delay line type Aperture Control by 6bit DAC	100000	V Latch
Contrast Control	7	05H	D0-D6	Contrast Control by 7bit DAC	1000000	V Latch
EXTRGB 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	Luminunce Signal Delay time Adjustment	0	
Y DL Fine Adj	1	06H	D2	Luminunce Signal Delay time Fine pitch Adjustment	0	
EXT	1	06H	D3	AV Switch Selecter 0:TV mode , 1:EXT mode	0	V Latch
Y/C	1	06H	D4	AV Switch Selecter 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	Luminunce 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	Luminaunce 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 Angle95	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 availble)	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 Selecter. 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 selecter. 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 Minmum	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 Sart timing Adjustment 2Line/Step	0	
V-Size	6	11H	D0-D5	V RAMP Amplitude Adjustment by 6bit DAC.	100000	
V S-CORRECTION	6	1BH	D0-D5	Vertical S-correction control by 6bit DAC.	100000	
V LINEARITY	6	1CH	D0-D5	Vertical lineality control by 6bit DAC.	100000	
E/W PARABOLA	6	17H	D0-D5	Parabora amplitude control by 6bit DAC.	100000	
E/W CORNER	6	18H	D0-D5	Corner pin correction control by 6bit DAC.	100000	
E/W TRAPEZIUM	6	19H	D0-D5	Trapesium correction control by 6bit DAC.	100000	
E/W H SIZE	6	1AH	D0-D5	Parabora DC voltage control by 6bit DAC.	100000	
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% 1:30% 2:25% 3:15%)	00	
1 Window	1	13H	D6	Vertical Sync. Det mode (1 Window/2 Window) 0: 2 Window/Vsyncdet=9us , 1: 1Window/Vsyncdet=11us	0	
V PULSE	1	16H	D5	pin17 output switch 0: E/W output (Low Impedance output) 1: V Pulse output (Open Collector, Vpulse=L)	0	
V-AGC GAIN	1	17H	D7	V Ramp AGC Speed 0: SLOW 1:FAST(Increase AGC speed by five.)	1	
STPON	1	1EH	D3	0:Test pattern mode OFF 1:Test pattern mode ON	0	
STPREV	1	1EH	D2	Test pattern Neg/Pos select	0	
STPSEL	2	1EH	D0-D1	H/V Half Stripe, Cross Hatch available	0	
OTHER						
Monitoring	5	12H	D4-D7	Intelligent Monitor output selecter	0000	
Read Page	1	11H	D6	Read Page mode selecter 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 output
AFT1	1	00H	D2	AFT 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.

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

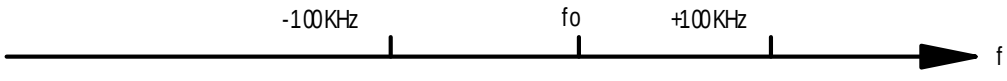
60Hz 1CHD7	V-Free 10HD6	Vertical System
0	0	AUTO(50Hz at Free-run)
0	1	Forced freerun mode 50Hz
1	0	AUTO(60Hz at Free-run)
1	1	Forced freerun mode 60Hz

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**



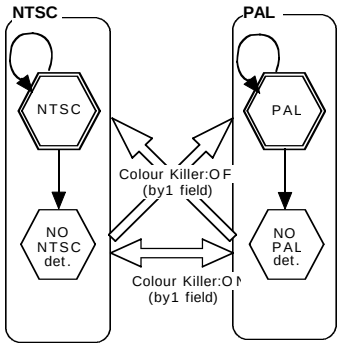
AFT0	1	0	0	1
AFT1	1	1	0	0

SPECIFICATION OF INTELLIGENT MONITOR

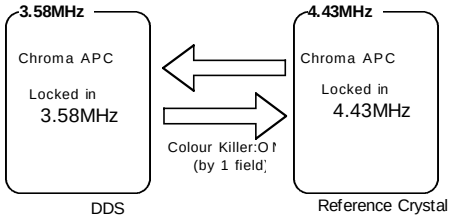
1) SUB ADDRESS : 12H D4 - D7 (4BIT)
2) OUTPUT PIN : PIN41
3) SPECIFICATION

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	

State Diagram of Auto Colour System

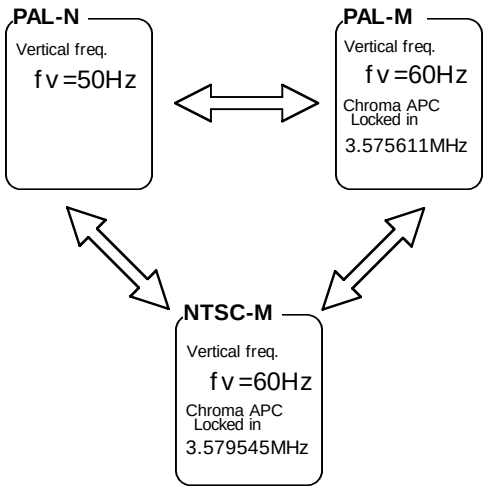


State Diagram of 4.43MHz/3.58MHz Selection

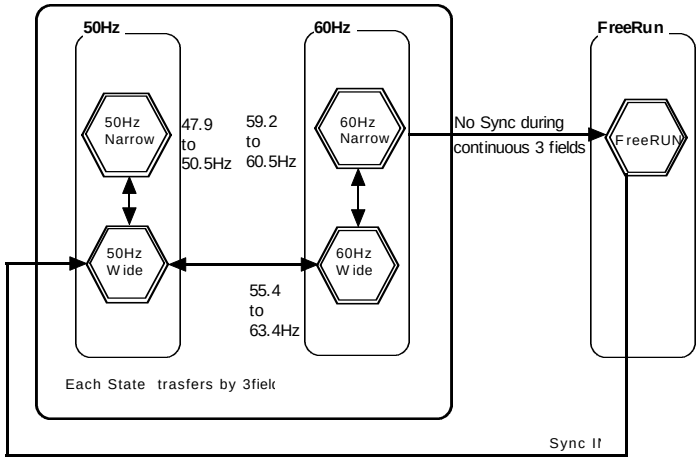


(DDS function quits when chroma APC is locked in 4.43MHz.)

State Diagram of South American Colour System



State Diagram of Vertical Frequency Identification



PRELIMINARY

Some parametric limits are subject to change.

TV SIGNAL PROCESSOR FOR MULTI SYSTEM

APPLICATION CIRCUIT (EVALUATION BOARD)