TV-processor with radio channel, keys and decoder functions for LCD TV applications

General description

The ILA8890/91 are front-end TV-processors, which are provide

- Audio & video IF signal processing
- Line and frame synchronization signals forming
- Audio/video input/output switching.
- Chroma & luminance signals forming
- Multi standard color decoding PAL, NTSC, SECAM (only for ILA8891).
- One line duration delay of chroma signal (only for ILA8891)
- YPRPB signals forming for PIP function processing. (only for ILA8891)

Main features:

- supply voltage 4,7 … 5,3 V (nominal value 5,0 V);
- audio part supply voltage 5; 8 V;
- consumption current 85 mA;
- total power dissipation 540 mW;
- output demodulated video signal swing

The ILA8890/91 are performed in 80-pin plastic package MO-112 CB-2

Table 1 Pin description

Pin No (ILA8891)	Pin No (ILA8890)	Description	Symbol
01	01	Differential clock input (negative)	CLKIN
02	02	Differential clock input (positive)	CLKIP
03	03	Sleepmode input	SLPNOT
04	04	Audio signal input (left signal) from DSP	DSPINL
05	05	Audio signal input (right signal) from DSP	DSPINR
06	06	Not connected	NC
07	07	Second sound intercarrier output for DSP	SSIFOUT
08	08	Not connected	NC
09	09	Differential audio output, left signal for DSP	MAINOUTL
10	10	Differential audio output, right signal for DSP	MAINOUTR
11	11	Horizontal synchronisation pulse output	HSYNCPIP
12	12	Vertical and/or horizontal synchronisation pulse output	V/HSYNCPIP
13	13	I^2C CLK	SCL
14	14	I^2C data	SDA
15	15	Not connected	NC
16	16	CVBS/YOUT for main picture processing	MAINVIDOUT
17	17	Chroma out for main picture processing	MAINCOUT
18	18	Audio-5 input (right channell)	IN5R
19	19	Audio-5 input (left channel)	IN5L
20	20	Audio-6 input (right channel)	IN6R
21	21	Audio-6 input (left channel)	IN6L
22	22	Analog/digital supply of TV processor (+3.3 V)	VDDA1(3,3V)
23	-	PIP P_R output	P_BOUTPIP
24	-	PIP Y output	YOUTPIP
25	-	PIP P_R output	P_ROUTPIP
26	26	4th supply for TV processor (+5V)	VP4
27	27	Ground 4 for TV-processor	GND4
28	-	3rd B input / P_B input	B3/P_B3
29	29	3rd G input / Y3 / CVBS3 input	G3/Y3/CVBS3
30	30	3rd R input / P_R /C3 input	R3/P_R3/C3
31	-	3rd RGB / YP_BP_R insertion input	INSSW3
32	32	Y-output	YOUT
33	33	Y-input for sync separator	YSYNC
34	34	Audio-7 input (right channel)	IN7R
35	35	Audio-7 input (left channel)	IN7L
36	36	3rd supply for TV processor (+5V)	VP3
37	37	Ground 3 for TV processor	GND3
38	38	Not connected	NC
39	39	PIP CVBS output	VIDOUTS2
40	40	Audio output for SCART/CINCH (right channe)	OUTS2R
41	41	Audio output for SCART/CINCH (left channel)	OUTS2L
42	42	Chroma-2/4/5 input	C2/C4/C5
43	43	Not connected	NC

Table1 continued

Pin No (ILA8891)	Pin No (ILA8890)	Description	Symbol
44	44	CVBS5/Y5 input	CVBS5/Y5
45	45	Audio 2 input (right channel)	IN2R
46	46	CVBS2/Y2 input	CVBS2/Y2
47	47	Not connected	NC
48	48	Audio 2 input (left channel)	IN2L
49	49	Not connected	NC
50	50	CVBS4/Y4 input	CVBS4/Y4
51	51	Audio-4 input (right channel)	IN4R
52	52	Audio-4 input (left channel)	IN4L
53	53	IF video output / MAIN CVBS output / PIP CVBS output	VIDOUTS1
54	54	2nd supply voltage TV processor (+5 V)	VP2
55	55	AGC capacitor second sound IF	AGC2SIF
56	56	Not connected	NC
57	57	5/8 Volt supply for audio switches	VCC5/8V
58	58	IF-PLL loop filter	PLLIF
59	59	Ground 2 for TV processor	GND2
60	60	AGC sound IF	SIFAGC
61	61	Audio output for SCART/CINCH (right channel)	OUTS1R
62	62	Audio output for SCART/CINCH (left channel)	OUTS1L
63	63	Audio-3 input (right channel)	IN3R
64	64	Audio-3 input (left channel)	IN3L
65	65	Not connected	NC
66	66	Tuner AGC output	AGCOUT
67	67	Sound IF input 2	SIFIN2
68	68	Sound IF input 1	SIFIN1
69	69	Ground connection for IF amplifier	GNDIF
70	70	Not connected	NC
71	71	Video IF input 2	VIFIN2
72	72	Video IF input 1	VIFIN1
73	73	Bandgap decoupling	DECBG
74	-	SECAM PLL decoupling	SECPLL
75	75	Ground 1 for TV-processor	GND1
76	76	Phase-1 filter	PH1LF
77	77	1st supply voltage TV-processor (+5 V)	VP1
78	78	Decoupling digital supply	DECDIG
79	79	Output switch	SWO
80	80	Digital part ground	DECDIGNEG2

Note – Abbreviation:

- AGC – Automatic Gain Control;
- IF – intermediate frequency;
- PLL – Phase-Locked Loop;
- CVBS – composite video blanking synchronizing signal;
- PIP – picture in picture

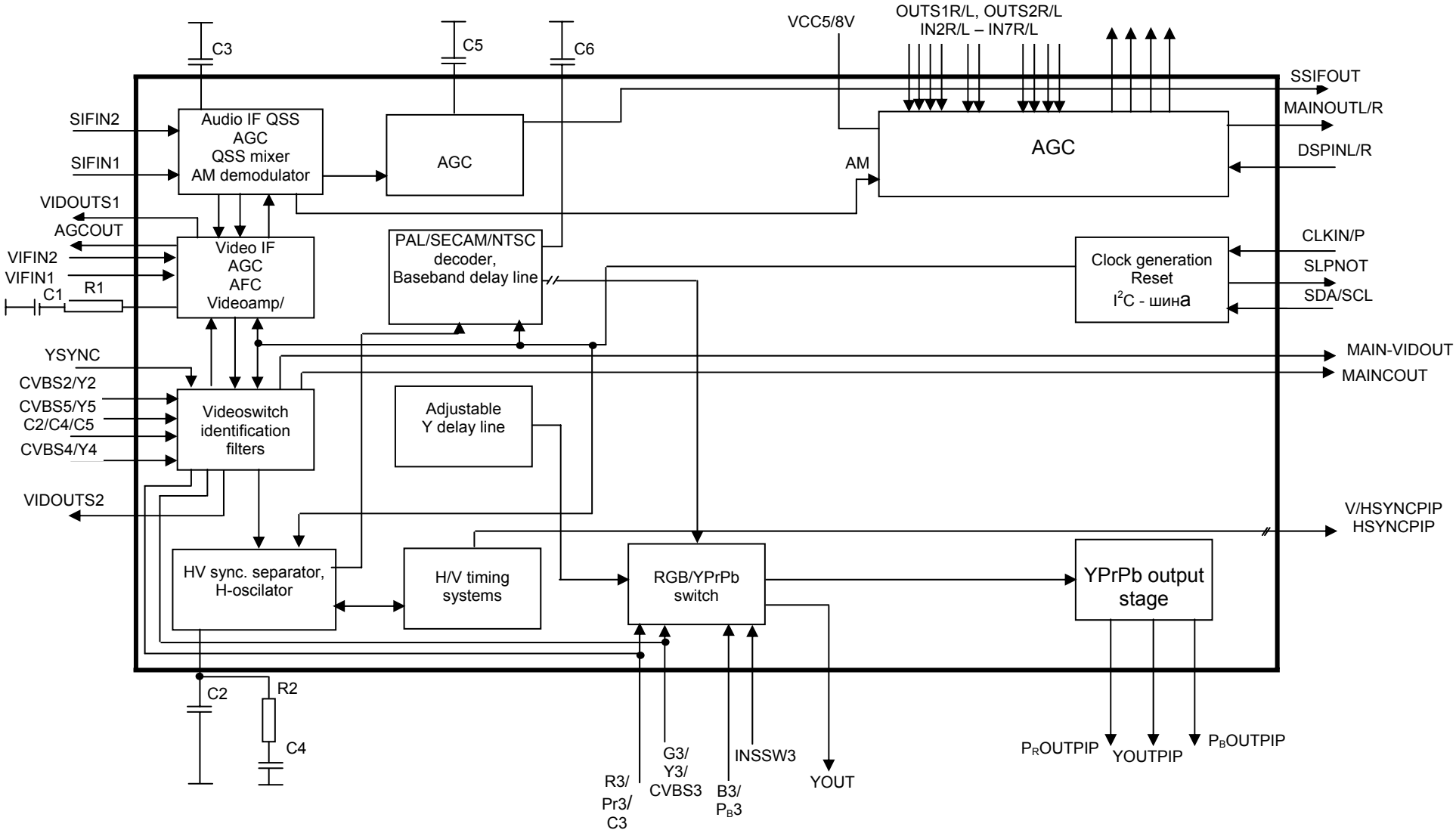


Fig.1 Block-diagramm

Table 2 Maximum ratings

Symbol	Parameter	Target		Unit
		Min	**Max**	
Main supply				
V.1.1	Supply voltage	-	5,5	V
Audio supply				
U_n	Supply voltage	-	8,6	V
Digital inputs/outputs				
U_I	Input voltage	-0,5	5,5	V
U_O	Output voltage	-0,5	5,5	°C
Temperature features				
T_{stg}	Storage temperature	-50	150	°C

Table 3 Recommended operating conditions

Symbol	Parameter	Target		Unit
		Min	**Max**	
Main supply				
V.1.1	Supply voltage	4,7	5,3	V
Audio supply				
V.1.3	Supply voltage	7,6	8,4	V
IF circuit				
M.1.7	Input signal, (RMS value)	-	150	mV
AGC tunning				
M.5.1	Minimum starting level for tuner take-over (RMS value)	-	0,8	mV
M.5.2	Maximum starting level for tuner take-over (RMS value)	50	-	mV
External AGC output				
M.6.1	Max. tuner AGC output voltage,(maximum tuner gain)	-	5,0	V

Table 4 Electric parameters (U_P = 5 V; T_A = 25 °C, unless otherwise specified)

Symbol	Parameter	Measuring mode	Target		Unit
			Min	Max	
Supply					
V.1.1	Main supply voltage	-	4,7	5,3	V
V.1.2	Digital part supply voltage	-	3,0	3,6	V
V.1.3	Audio part supply voltage	-	7,6	8,4	V
V.1.4	Analog part consumption current	V.1.1 = 5,0 V	70	130	mA
V.1.5	Digital part consumption current	V.1.2 = 3,3 V	5,60	10,40	mA
V.1.6	Audio part consumption current	V.1.3 = 8,0 V	0,70	1,30	mA
Vision IF amplifier inputs					
M.1.1	**Vision IF amplifier** input sensitivity (RMS value)	V.1.1 = 5,0 V, f = 38,90 MHz	75	150	µV
M.1.2		V.1.1 = 5,0 V, f = 45,75 MHz	75	150	
M.1.3		V.1.1 = 5,0 V, f = 58,75 MHz	75	150	
M.1.6	AGC range	V.1.1 = 5,0 V	64,0	-	dB
M.1.7	Maximum input signal (RMS value)	V.1.1 = 5,0 V	150	-	mV
PLL demodulator					
M.2.1	Free-running frequency deviation from nominal	V.1.1 = 5,0 V	-500	500	kHz
M.2.3	Time of catching PLL identification	V.1.1 = 5,0 V	-	20	ms
Video output IFVIDOUT (VIDOUTS1) controlled by SVO0/1 bits (at position 00);					
M.3.3	Top sync level (negative modulation)	V.1.1 = 5,0 V	0,40	0,60	V
M.3.5	Difference in amplitude between negative and positive modulation		-	15	%
M.3.7	Internal bias current of output emitter follower		1,0	-	mA
M.3.8	Maximum source current		-	5	mA

Table 4 continued

Symbol	Parameter	Measuring mode	Target		Unit
			Min	Max	
M.3.9	Bandwidth of demodulated signal at level -3dB	V.1.1 = 5,0 V	6,0	-	MHz
M.3.10	Differential gain of videoamplifier		-	5	%
M.3.11	Differential phase of videoamplifier		-	5	degree
M.3.12	Video non-linearity		-	5	%
Videoamplifier crosstalk:					
M.3.16	-at 0.92 & 1.1 MHz, blue		60	-	dB
M.3.18	-at 0.92 & 1.1 MHz, yellow		56,0	-	dB
M.3.17	-at 2.66 & 3.3 MHz , blue		60	-	dB
M.3.19	-at 2.66 & 3.3 MHz, yellow		60	-	dB
Signal-to-noise ratio:					
M.3.20	- Weighted value		56,0	-	dB
M.3.21	- Unweighted value		49,0	-	
Video output CVBS-PIP (VIDOUTS1), the SVO1/SVO0 bits (at position 01)					
M.3.26	Output impedance	V.1.1 = 5,0 V	-	50	Ω
Video output CVBS-MAIN (VIDOUTS1), the SVO1/SVO0 (at position 10)					
M.3.31	Output impedance	V.1.1 = 5,0 V	-	50	Ω
Sound Trap					
M.3.35	Bandwidth	V.1.1 = 5,0 V, f_{SC1}=4.5 MHz	3,90	-	MHz
		V.1.1 = 5,0 V, f_{SC1}=5,5 MHz	4,80	-	
		V.1.1 = 5,0 V, f_{SC1}=6,0 MHz	5,25	-	
		V.1.1 = 5,0 V, f_{SC1}=6,5 MHz	5,70	-	
M.3.36	Attenuation at first sound carrier frequency f_{SC1}	V.1.1 = 5,0 V , f_{SC1} = 4,5; 5,5 MHz	30	-	dB
		V.1.1 = 5,0 V, f_{SC1} = 6,0 & 6,5 MHz	26,0	-	

Table 4 continued

Symbol	Parameter	Measuring mode	Target		Unit
			Min	Max	
M.3.37	Attenuation at second sound carrier frequency f_{SC2}	V.1.1 = 5,0 V, f_{SC2} = 4,726 MHz, f_{SC1}=4,5 MHz	21,0	-	dB
		V.1.1 = 5,0 V, f_{SC2} =5,742 MHz, f_{SC1}=5,5 MHz	21,0	-	
		V.1.1 = 5,0 V, f_{SC2} = 6,55 MHz, f_{SC1}=6,0 MHz	12,0	-	
		V.1.1 = 5,0 V, f_{SC2} =6,742 MHz, f_{SC1}=6,5 MHz	18,0	-	
M.3.38	Transfer ratio at the color subcarrier frequency	V.1.1 = 5,0 V, f = 58 MHz, f_{SC1}=4,5 MHz	-	2,0	dB
		V.1.1 = 5,0 V, f = 4,43 MHz, f_{SC1}=5,5 MHz	-	2,0	
		V.1.1 = 5,0 V, f = 4,43 MHz, f_{SC1}=6,0 MHz	-	2,0	
		V.1.1 = 5,0 V, f = 4,28 MHz, f_{SC1}=6,5 MHz	-	2,0	
Performance of internal AGC					
M.4.1	Modulated video interference	U_P = 5,0 V, 30% AM; U=(1 ÷ 100) mV; f = (0 ÷ 200) Hz	-	10	%
External **AGC adjustment**					
M.5.1	Minimum starting level for tuner take-over (RMS value)	V.1.1 = 5,0 V	-	0,80	mV
M.5.2	Maximum starting level for tuner take-over (RMS value)	V.1.1 = 5,0 V	50	-	mV
External AGC output					
M.6.1	Max. output voltage	V.1.1 = 5,0 V. Max. tuner gain	-	5,0	V
M.6.2	Saturation voltage	U_P = 5,0 V, I_0=1mA	-	300	mV
M.6.3	Output current maximum swing	V.1.1 = 5,0 V	1,0	-	mA
M.6.4	Leakage current	V.1.1 = 5,0 V	-	1,0	µA
M.6.5	Input signal variation for complete tuner AGC control	V.1.1 = 5,0 V	0,5	4,0	dB
Video identification					
M.8.1	Time of identification after the AGC has stabilized on a new transmitter	V.1.1 = 5,0 V	-	10	ms

Table 4 continued

Symbol	Parameter	Measuring mode	Target		Unit
			Min	Max	
SOUND PROCESSING CIRCUIT					
AM sound demodulator output					
Q.3.1	Output signal amplitude (RMS value)	V.1.1 = 5,0 V, 54% modulation	200	300	mV
Q.3.2	total harmonic distortion	V.1.1 = 5,0 V, 54% modulation	-	2,0	%
Q.3.21		V.1.1 = 5,0 V, 80% modulation	-	5,0	
Q.3.3	Bandwidth	V.1.1 = 5,0 V	100	-	kHz
IF SOUND AGC					
Q.5.2	Charge current	V.1.1 = 5,0 V, FM	-	12,5	µA
Q.5.3	Discharge current	V.1.1 = 5,0 V , FM	-	50	µA
Q.5.4	Charge current	V.1.1 = 5,0 V, AM	-	2,5	µA
Q.5.5	Discharge current	V.1.1 = 5,0 V, AM	-	2,5	µA
External Audio inputs					
A.1.1	Maximum input voltage (RMS value)	V.1.1 = 5,0 V	-	1,40	V_{RMS}
A.1.2	Input resistance	V.1.1 = 5,0 V	24,0	-	kΩ
Audio outputs OUTS1L/R, OUTS2L/R					
A.2.1	Maximum output signal amplitude (RMS value)	DSG=0	1,0	-	mV
A.2.2		V.1.3 = 8 V, DSG=1	2,0	-	
A.2.3	Output voltage	-	-	650	Ω
A.2.8	Frequency range	-	20	15000	Hz
CVBS, Y/C, RGB/YP_BP_R inputs					
CVBS-Y/C inputs					
S.1.1	CVBS or Y input voltage (peak-to-peak value)	V.1.1 = 5,0 V	-	1,4	V
S.1.3	Suppression of non-selected input signal,	V.1.1 = 5,0 V	50	-	dB
S.1.4	Chrominance input voltage (flash amplitude)	V.1.1 = 5,0 V	-	1,0	V
CVBS output (VIDOUTS2)					
S.1.12	Output voltage	V.1.1 = 5,0 B	-	50	Ω

Table 4 continued

Symbol	Parameter	Measuring mode	Target		Unit
			Min	Max	
Input RGB/YP_BP_R					
S.2.1	Input signal amplitude for a 1.2V amplitude of output signal (black to white)	V.1.1 = 5,0 V	-	0,8	V
S.2.2	Input signal amplitude before clipping occurs (peak-to-peak value)	V.1.1 = 5,0 V	1,0	-	V
S.2.3	Y input signal amplitude (peak-to-peak value)	V.1.1 = 5,0 V. To obtain a amplitude of output signal 1.2V (black to white)	-	1,4	V
S.2.4	P_B input signal amplitude (peak-to-peak value)		-	1,0	V
S.2.5	P_R input signal amplitude (peak-to-peak value)		-	1,0	V
S.2.6	Difference between black level of internal and external signals	V.1.1 = 5,0 V	-	20	mV
S.2.7	Input currents	V.1.1 = 5,0 V	-	1,0	µA
S.2.8	delay difference for the three channels	V.1.1 = 5,0 V	-	20	ns
Fast commutation					
S.3.1	Input voltage for mode “no data input”	V.1.1 = 5,0 V	-	0,4	V
S.3.2	Input voltage for mode “data input”	V.1.1 = 5,0 V	0.9	5,0	V
S.3.4	Delay time from input to output	V.1.1 = 5,0 V . “Data input”	-	20	ns
CVBS (YOUT)output					
S.5.1	Output signal amplitude (peak-to-peak value)	V.1.1 = 5,0 V	0,9	1,1	V
CHROMINANCE AND LUMINANCE FILTERS					
First trap circuit					
F.3.4	Color subcarrier rejection	V.1.1 = 5,0 V	24,0	-	dB
Cloche filter					
F.5.1	Central frequency	V.1.1 = 5,0 B, CLO=0	4,26	4,31	MHz
F.5.2	Bandwidth	V.1.1 = 5,0 V	241	295	kHz
Drive output (SWO)					
I/O.1.1	Output voltage HIGH	V.1.1 = 5,0 V	3,5	5,5	V
I/O.1.2	Output voltage LOW	V.1.1 = 5,0 V	-	0,40	V
I/O.1.3	Output current LOW	V.1.1 = 5,0 V	2,0	-	mA

Table 4 continued

Symbol	Parameter	Measuring mode	Target		Unit
			Min	Max	
HORIZONTAL & FRAME SINCHRONISATION					
Sync video input					
H.1.1	Sync pulse amplitude	V.1.1 = 5,0 V	50	350	mV
Генератор строчной развёртки					
H.2.1	Free running frequency	V.1.1 = 5,0 V	15312	15938	Hz
H.2.3	Frequency variation with respect to the supply voltage	V.1.1 = 5,0 V ± 10%	-	0,5	%
H.2.4	Frequency variation with temperature	V.1.1 = 5,0 V T_A=0 ÷ 70 °C	-	80	Hz
First control loop					
H.3.1	Holding range PLL	V.1.1 = 5,0 V	-	±1,1	kHz
H.3.2	Catching range PLL	V.1.1 = 5,0 V	±0,5	-	kHz
COLOR DEMODULATION PART					
Chrominance amplifier					
D.1.1	AGC range	V.1.1 = 5,0 V	26,0	10000	dB
D.1.2	change in amplitude of the output signals over the AGC range	V.1.1 = 5,0 V	-	2,0	dB
D.1.3	Threshold color detector OFF	V.1.1 = 5,0 V	-30	-	dB
Phase-locked loop					
D.3.1	Catching range	V.1.1 = 5,0 V	- 500	500	Hz
D.3.2	Phase shift for a ±400 Hz deviation of the oscillator frequency	V.1.1 = 5,0 V	-	2,0	deg
Phase adjustment					
D.5.1	Phase adjustment range	V.1.1 = 5,0 V, 63 steps	-35	35	deg
Demodulator					
D.6.3	Spread of signal amplitude ratio for different standards	V.1.1 = 5,0 V	-1,0	1,0	dB
PAL/NTSC demodulator					
D.6.6	Gain between both demodulators G(B−Y) and G(R−Y)	V.1.1 = 5,0 V	1,260	1,580	-
D.6.13	change of output signal amplitude with supply voltage	V.1.1 = 5,0 V	-0,10	0,10	dB
D.6.14	Phase error in the demodulated signals	V.1.1 = 5,0 V	-5,0	5,0	deg

Table 4 continued

Symbol	Parameter	Measuring mode	Target		Unit
			Min	Max	
SECAM demodulator					
D.7.1	Black level off-set	V.1.1 = 5,0 V	-	7,0	kHz
D.7.2	Pole frequency of deem-phasis	V.1.1 = 5,0 V	77,0	93,0,6	kHz
D.7.4	Non linearity	V.1.1 = 5,0 V	-	3,0	%
D.7.5	Calibration voltage	V.1.1 = 5,0 V	1,80	2,80	V
Base-band delay line					
D.8.1	Variation of output signal for adjacent time samples at constant input signals	V.1.1 = 5,0 V	-0,10	0,10	dB
D.8.2	Residual clock signal (peak-to-peak value)	V.1.1 = 5,0 V	-	5	mV
D.8.3	Delay of delayed signal	V.1.1 = 5,0 V	63,940	64,060	µs
D.8.4	Delay of non-delayed signal	V.1.1 = 5,0 V	40	80	ns
D.8.5	Difference in output amplitude with delay on or off	V.1.1 = 5,0 V	-	5	%
YOUTPIP/P_ROUTPIP/P_BOUTPIP outputs					
C.4.14	Variation of black level with temperature	-	-	1,0	mV/K
C.4.21	Signal-to-noise ratio of the output signals	RGB input	55	-	dB
C.4.22		CVBS input	50	-	
C.4.23	Residual voltage at the YOUTPIP/PROUTPIP/PBOUTPIP outputs (peak-to-peak value)	At f_{sc}	-	15	mV
C.4.24		At $2f_{sc}$ + higher harmonics	-	15	
C.4.28	Bandwidth of output signals (at -3 dB)	S-VHS input	5	-	MHz
Control input of I^2C-bus (SCL/SDA)					
B.1.1	Input voltage		0,30	3,30	V
B.1.2	Low level input voltage	-	-	0,3Up	V
B.1.3	High level input voltage	-	0,7Up	-	V
B.1.4	Low level input current	B.1.1=0V	-	-10	µA
B.1.5	High level input current	B.1.1=3,3V	-	10	µA
B.1.6	Low level output voltage	-	-	0,2Up	V

Table 4 continued

Symbol	Parameter	Measuring mode	Target		Unit
			Min	Max	
Detector of «sleep mode»					
B.2.2	Detection level sleep mode	V.1.1 = 5,0 V	-	1,0	V
Horizontal display sync output (HSYNCPIP)					
B.6.1	High level output voltage	V.1.1 = 5,0 V	0,8Up	-	V
B.6.2	Low level output voltage	V.1.1 = 5,0 V	-	0,2Up	V
B.6.3	Output current	V.1.1 = 5,0 V	0,25	-	mA
Vertical and (or) horizontal display sync output (V/HSYNCPIP)					
B.7.1	High level output voltage	V.1.1 = 5,0 V	0,8Up	-	V
B.7.2	Low level output voltage	V.1.1 = 5,0 V	-	0,2Up	V
B.7.3	Output current	V.1.1 = 5,0 V	0,25	-	mA
Clock input (CLKIP/CLKIN)					
B.11.2	Input frequency accuracy	V.1.1 = 5,0 V	-45	45	meander
B.11.3	Duty cycle	V.1.1 = 5,0 V	45	55	%
B.11.4	Jitter	V.1.1 = 5,0 V	-	520	ps
Main CVBS/Y output for digital color decoder (MAINVIDOUT)					
B.13.5	Bandwidth	V.1.1 = 5,0 V C_{LOAD}=15 pF	6,0	-	MHz
Main CVBS/Y output for digital color decoder (MAINVIDOUT)					
B.14.1	Output voltage amplitude (peak-to-peak value)	V.1.1 = 5,0 V	-	1,0	V
B.14.3	Bandwidth	V.1.1 = 5,0 V C_{LOAD}=15 pF	6,0	-	MHz
Second sound IF output to DSP (SSIFOUT)					
B.15.1	Output voltage amplitude (peak-to-peak value)	V.1.1 = 5,0 V	-	1,2	V
DSP audio outputs (MAINOUTL/R)					
B.16.3	Bandwidth	V.1.1 = 5,0 V C_{LOAD}=15pF	250	-	kHz

Note – Abbreviation:

- AGC – Automatic Gain Control;
- IF – Intermediate Frequency;
- PLL – Phase-Locked Loop;
- CVBS – Composite Video Blanking Synchronizing Signal;
- PIP – Picture in Picture
- AM – Automatic Modulation

Table 5 – Typical electric parameters

Symbol	Parameter	Measuring condition	Typical value	Unit
IF PROCESSING CIRCUIT				
Vision IF amplifier inputs				
M.1.4	Input resistance	-	2	kΩ
M.1.5	Input capacity	-	3	pF
PLL demodulator				
M.2.2	Catching range PLL	-	±1	MHz
Video output (VIDOUTS1) SVO0/1 bits (at position 00);				
M.3.1	**Zero signal output level of demodulator:** -for negative modulation	-	2,7	V
M.3.2	-for positive modulation	-	0,5	V
M.3.4	White level (positive modulation)	-	2,5	V
M.3.6	Output resistance	-	50	Ω
M.3.13	White spot clamp level,	-	2,9	V
M.3.14	Noise inverter clamping level	-	0,3	V
M.3.15	Noise inverter insertion level,	-	1,4	V
M.3.22	Residual carrier signal	-	5,5	mV
M.3.23	Residual 2nd harmonic of carrier signal	-	2,5	mV
Video output CVBS-PIP (VIDOUTS1), SVO1/SVO0 bits (at position 01)				
M.3.24	Output signal amplitude (peak-to-peak value)	-	2,0	V
M.3.25	Top sync level	-	0,5	V
Video output CVBS-MAIN (VIDOUTS1), SVO1/SVO0 (at position 10)				
M.3.29	Output signal amplitude (peak-to-peak value)	-	2,0	V
M.3.30	Top sync level	-	0,5	V
Video output CVBS-MAIN (VIDOUTS1), SVO1/SVO0 (at position 11)				
M.3.32	DC output level at mute mode	-	0,5	V

Table 5 continued

Symbol	Parameter	Measuring condition	Typical value	Unit
Group Delay Correction				
M.3.33	Group delay sound trap only	-	180	ns
M.3.34	Group delay sound trap plus group delay correction filter	-	170	ns
Internal AGC performance				
M.4.2	Response time to IF input signal amplitude increase of 52 dB	Positive & negative modulation	2	
	Response to an IF input signal amplitude decrease of 52 dB			
M.4.3	-negative modulation	-	50	ms
M.4.4	-positive modulation	-	100	ms
AFC output (via I^2C-bus)				
M.7.1	Resolution (1 bit)	-	25	kHz
M.7.2	AFC range	-	±1,6	MHz
AUDIO PROCESSING CIRCUIT				
Sound IF amplifier (SIFA)				
Q.1.1	Input sensitivity of SIFA (RMS value)	–3dB	45	dBμV
Q.1.3	Maximum input signal	-	100	dBμV
Q.1.5	Input differetial resistance	-	2	kΩ
Q.1.6	Input differetial capacitance	-	3	pF
Q.1.7	AGC range	-	55	dB
Q.1.8	Crosstalk attenuation between SIF and VIF input	-	50	dB
AM sound demodulator output				
Q.3.4	Weighted signal-to-noise ratio	54% modulation	45	dB
Q.3.5	DC output voltage	-	2,5	V
Q.3.6	Power supply ripple rejection	-	20	dB

Table 5 continued

Symbol	Parameter	Measuring condition	Typical value	Unit
Sound IF AGC circuit				
Q.5.1	AGC range	-	24	dB
Q.5.6	Discharge current	Overload	1	mA
External audio inputs;				
A.1.3	Gain	DSG = 0	0	dB
A.1.31		DSG = 1	6	
A.1.5	Crosstalk between channels	-	80	dB
A.1.6	Crosstalk between left and right	-	80	dB
Audio outputs OUTS1L/R and OUTS2L/R				
A.3.4	DC output voltage	DSG = 0	2,5	V
A.3.5		V.1.3 = 8 B, DSG = 1	3,6	
A.2.6	Non-linear distortions	-	-80	%
CVBS, Y/C AND RGB/YP_BP_R INPUTS				
CVBS-Y/C inputs				
S.1.2	Input current	-	2	μA
S.1.5	Chrominance input impedance	-	50	kΩ
CVBS output				
S.1.9	Output signal amplitude (peak-to-peak value)	-	2,0	V
S.1.10	Top sync level	-	0,5	V
S.1.11	DC output voltage at mute mode	-	0,5	V
Fast switching				
S.3.6	Input impedance	-	500	kΩ
S.3.7	Suppression of internal RGB signals	“Data insertion”	55	dB
S.3.8	Suppression of external RGB signals	“No data insertion”	55	dB
Luminance output signal Y_{OUT}				
S.5.2	Top sync level	-	1,5	V

Table 5 continued

Symbol	Parameter	Measuring condition	Typical value	Unit
CHROMINANCE AND LUMINANCE FILTERS				
1st trap				
F.3.1	Trap frequency	-	f_{sc}	MHz
F.3.2	Bandwidth	fsc=3.58MHz	2,7	MHz
F.3.3		fsc=4.43MHz	3,3	
F.3.5	Trap frequency during SECAM reception	-	4,3	MHz
2nd trap				
F.3.6	Bandwidth during SECAM reception	–3dB	2,6	**MHz**
F.3.7	Color subcarrier rejection during SECAM reception	29	-	**dB**
Bandpass filter				
F.4.1	Central frequency	CB=0	fsc	MHz
F.4.2		CB=1	1.1×fsc	
F.4.3	Bandpass quality factor	-	3	-
VERTICAL & HORIZONTAL SYNC VIDEO CIRCUIT				
Sync video input				
H.1.2	Slicing level for horizontal sync	-	45	%
H.1.3	Slicing level for vertical sync	-	35	%
First control loop				
H.3.3	Signal/noise ratio	-	24	**dB**
H.3.4	Hysteresis at the switching point	-	3	**dB**
COLOR DEMODULATION CIRCUIT				
Chrominance amplifier				
D.1.4	Hysteresis color detector ON	S/N ≥ 40 dB	+3	dB
D.1.5		S/N < 40 dB	+1	
D.1.6	AGC time constant	Charge	8	**ms**
D.1.7		Discharge	24	
Chrominance limiting circuit				
D.2.1	Chrominance burst ratio at which the Chrominance limiting circuit starts to operate	-	3,0	-
Phase control				
D.5.2	Phase variation with ±10% supply voltage	-	0	deg
D.5.3	Phase variation with temperature	T_A = 0 ÷70 °C	0	deg

Table 5 continued

Symbol	Parameter	Measuring condition	Typical value	Unit
Demodulators				
D.6.5	Bandwidth of demodulators	-3 dB	650	kHz
PAL/NTSC demodulator				
D.6.12	Change of output signal amplitude with temperature %/°C	-	0,1	%/oC
SECAM demodulator				
D.7.3	Ratio pole and zero frequency	-	3	-
YOUTPIP/P_ROUTPIP/P_BOUTPIP outputs				
C.4.1	Output signal amplitude at nominal luminance input signal(peak-to-peak value)	-	1,2	V
C.4.41	Output resistance	-	100	Ω
C.4.5	Nominal black voltage level	-	1,65	V
C.4.91	black voltage level	RBL = 1	1,65	V
C.4.14	Variation of the black level voltage with temperature		1,0	mV/ K
C.4.25	Bandwidth of output signal (at -3 db)	RGB input	7	MHz
C.4.26		CVBS input f_{sc}= 3,58 MHz	2,8	
C.4.27		CVBS input f_{sc}= 4,43 MHz	3,4	
C.4.29		YPRPB input	6,6	
«Sleep mode» detector				
B.2.1	Imput impedance	-	24	kΩ
Switch on/off time of the videoprocessor				
B.3.1	Switch on time	STB from 0 to 1	44	ms
B.3.2	Switch off time	STB from 1 to 0	50	ms
Horizontal display sync output (HSYNCPIP)				
B.6.4	Pulse width	-	9.6	µs
B.6.5	Timing of start of separated timing pulse to start of sync signal	-	1	µs
Vertical and horizontal (xor) display sync output (V/HSYNCPIP)				
B.7.4	Pulse width	VXORH=1	9,6	µs
B.7.5	Timing of start of separated timing pulse to start of sync signal	VXORH=1	1	µs
B.7.6	Pulse width vertical timing pulse	50 Hz	1,47	ms
B.7.7		60 Hz	1,27	

Table 5 continued

Symbol	Parameter	Measuring condition	Typical value	Unit
B.7.8	Time from start of vertical sync pulse to positive edge of vertical display sync output	-	37,7	μs
Clock input (CLKIP/CLKIN)				
B.11.1	Input clock frequency	-	24,576	MHz
B.11.5	AC input current (peak-peak)	-	150	μA
B.11.6	DC input current	-	100	μA
B.11.7	DC input clamp level	-	0,7	V
Main CVBS/Y output for digital color decoder (MAINVIDOUT);				
B.13.1	output signal amplitude (peak-to-peak value)	-	1,0	V
B.13.2	Black level	-	1,3	V
B.13.3	Top sync level	-	1,0	V
B.13.4	DC component of output voltage level at mute mode	-	1,1	V
B.13.6	Output impedance	-	100	Ω
Main chroma output for digital color decoder (MAINCOUT)				
B.14.2	DC output voltage level	-	1,7	V
B.14.2	Output impedance	-	100	Ω
Second sound IF output to DSP (SSIFOUT)				
B.15.2	DC output voltage level	-	1,65	V
B.15.4	Output impedance	-	100	Ω
Audio outputs to DSP (MAINOUTL/R)				
B.16.1	Maximum output signal amplitude (peak-to-peak value)	-	2.0	V
B.16.2	DC component of output voltage level	-	1.65	V
B.16.4	Output impedance	-	125	Ω
B.16.5	Transfer gain audio scart input to main base band audio output	-	-5.5	dB
Audioinputs (DSPINL/R)				
B.18.1	Maximum input signal amplitude (peak-to-peak value)	-	2.0	V
B.18.2	DC component of input voltage level	-	1.65	V
B.18.3	Input impedance	-	32	Ω

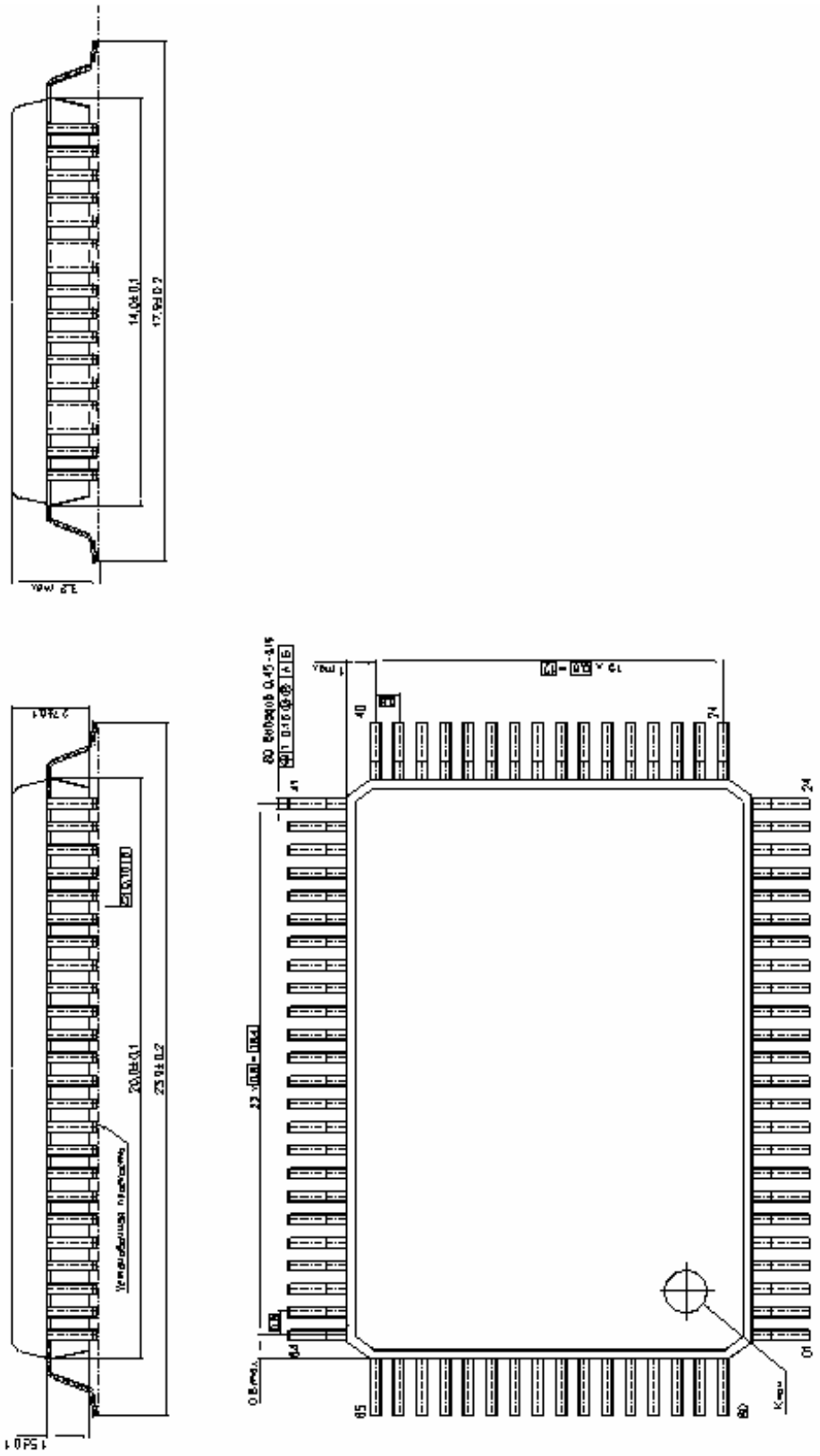
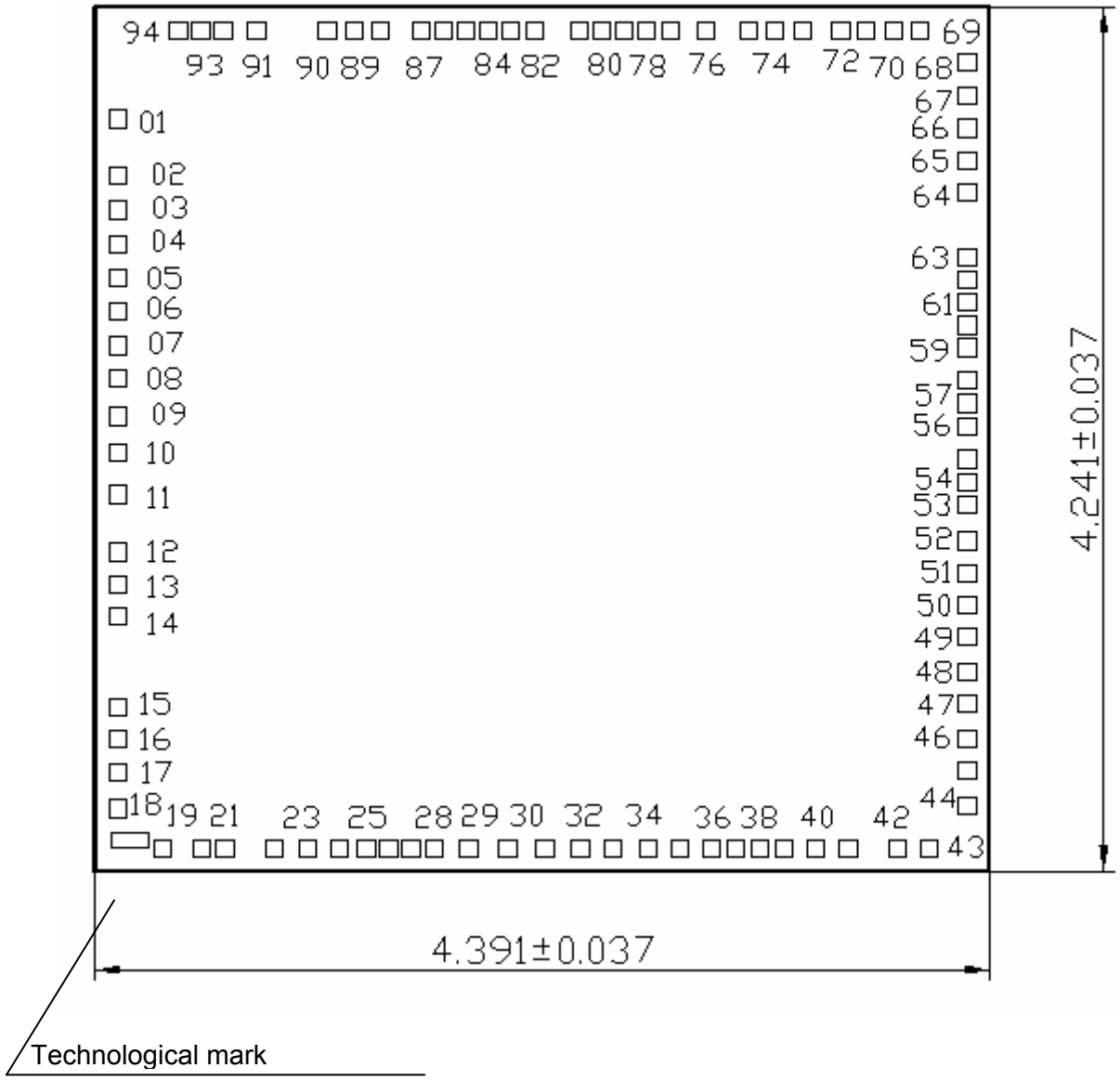


Fig. 2 – Package MO-112 CB-2 dimensions



Technological mark “8890” coordinates, mm: x = 0.0162 , y = 0.1302.
Die thichness 0,46±0,02 mm.

Fig. 3 – Chip and contact pad layout diagram

Table 6 Contact pad coordinates

Contact pad #	Coordinates (left bottom corner), mm	
	X	Y
01	0	3,58115
02	0	3,30175
03	0	3,13340
04	0	2,96620
05	0	2,79795
06	0	2,63315
07	0	2,46800
08	0	2,30655
09	0	2,12145
10	0	1,94030
11	0	1,73830
12	0	1,45530
13	0	1,29645
14	0	1,13965
15	0	0,69410
16	0	0,53350
17	0	0,37310
18	0	0,19580
19	0,21875	0
20	0,41115	0
21	0,52315	0
22	0,76255	0
23	0,92715	0
24	1,08745	0
25	1,21605	0
26	1,32605	0
27	1,43625	0
28	1,54655	0
29	1,71825	0
30	1,9102	0
31	2,0922	0
32	2,2666	0
33	2,42315	0
34	2,59655	0
35	2,7531	0
36	2,91115	0
37	3,0299	0
38	3,1471	0
39	3,26365	0
40	3,42385	0
41	3,58035	0
42	3,82115	0
43	3,9801	0
44	4,1664	0,20775
45	4,1664	0,38035
46	4,1664	0,53690
47	4,1664	0,71050
48	4,1664	0,86645
49	4,1664	1,03870

Table 6 continued

Contact pad #	Coordinates (left bottom corner), mm	
	X	Y
50	4,1664	1,19460
51	4,1664	1,35060
52	4,1664	1,50740
53	4,1664	1,68725
54	4,1664	1,79810
55	4,1664	1,90915
56	4,1664	2,07155
57	4,1664	2,18320
58	4,1664	2,34545
59	4,1664	2,45700
60	4,1664	2,56865
61	4,1664	2,67910
62	4,1664	2,79060
63	4,1664	2,90120
64	4,1664	3,22070
65	4,1664	3,37675
66	4,1664	3,53605
67	4,1664	3,69230
68	4,1664	3,84850
69	3,9334	4,01640
70	3,8023	4,01640
71	3,6712	4,01640
72	3,54395	4,01640
73	3,355	4,01640
74	3,2239	4,01640
75	3,0928	4,01640
76	2,8798	4,01640
77	2,7067	4,01640
78	2,591	4,01640
79	2,4794	4,01640
80	2,3694	4,01640
81	2,2594	4,01640
82	2,04205	4,01640
83	1,9268	4,01640
84	1,8168	4,01640
85	1,7068	4,01640
86	1,5968	4,01640
87	1,4868	4,01640
88	1,28635	4,01640
89	1,15525	4,01640
80	1,02415	4,01640
91	0,67785	4,01640
92	0,5145	4,01640
93	0,4945	4,01640
94	0,29445	4,01640

Note - Contact pad coordinates and dimensions 0,085x0,085mm are indicated under “Passivation” layer

Table7 ILA8890 Pin-pad correspondence table

Contact pad #	Pin #
01	01
02	02
03	03
04	04
05	05
-	06
06	07
-	08
07	09
08	10
09	11
10	12
11	13
12	14
13	15
14	16
15	17
16	18
17	19
18	20
19	21
20	22
21	22
22	-
23	-
24	-
25	26
26	26
27	27
28	27
29	-
30	29
31	30
32	-
33	32
34	33
35	34
36	35
37	36
38	36
39	37
40	38
41	39
42	40
43	41
44	42
-	43
45	44
46	45

Table 7 continued

Contact pad #	Pin #
47	46
-	47
48	48
-	49
49	50
50	51
51	52
52	53
53	54
54	54
55	54
56	55
-	56
57	57
58	58
59	59
60	59
61	59
62	59
63	59
64	60
65	61
66	62
67	63
68	64
-	65
69	66
70	67
71	68
72	69
73	70
74	71
75	72
76	73
77	-
78	75
79	75
80	75
81	75
82	76
83	77
84	77
85	77
86	77
87	77
88	78
89	78
90	78
91	79
92	80
93	80
94	80

Table8 ILA8891 Pin-pad correspondence table

Contact pad #	Pin #
01	01
02	02
03	03
04	04
05	05
-	06
06	07
-	08
07	09
08	10
09	11
10	12
11	13
12	14
13	15
14	16
15	17
16	18
17	19
18	20
19	21
20	22
21	22
22	23
23	24
24	25
25	26
26	26
27	27
28	27
29	28
30	29
31	30
32	31
33	32
34	33
35	34
36	35
37	36
38	36
39	37
40	38
41	39
42	40
43	41
44	42
-	43
45	44
46	45

Table 8

Contact pad #	Pin #
47	46
-	47
48	48
-	49
49	50
50	51
51	52
52	53
53	54
54	54
55	54
56	55
-	56
57	57
58	58
59	59
60	59
61	59
62	59
63	59
64	60
65	61
66	62
67	63
68	64
-	65
69	66
70	67
71	68
72	69
73	70
74	71
75	72
76	73
77	74
78	75
79	75
80	75
81	75
82	76
83	77
84	77
85	77
86	77
87	77
88	78
89	78
90	78
91	79
92	80
93	80
94	80