

TF3000CIPpro

Service Manual

05 Dec, 2001

Topfield Co., Ltd

IMPORTANT

Note : The design of the satellite receiver is subject to continuous development and improvement. Consequently, this receiver may incorporate minor changes in detail from the information contained in this manual.

Warning : These servicing instructions are for use by qualified personnel only. To reduce the risk of electric shock, do not perform any servicing other than that specified in the operating instructions unless you are fully qualified to do so.

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1. Safety Instructions

Read this chapter carefully before servicing the IRD.

- 1.1 The IRD must be disconnected from the mains plug before it is opened.
- 1.2 The capacitor inside the SMPS (power supply) can hold charge even if the IRD has been disconnected from the mains plug. To handle SMPS, wait until the capacitor is discharged.
- 1.3 Only the same screw should be used to assemble the IRD.

2. List and Description of The Major Parts

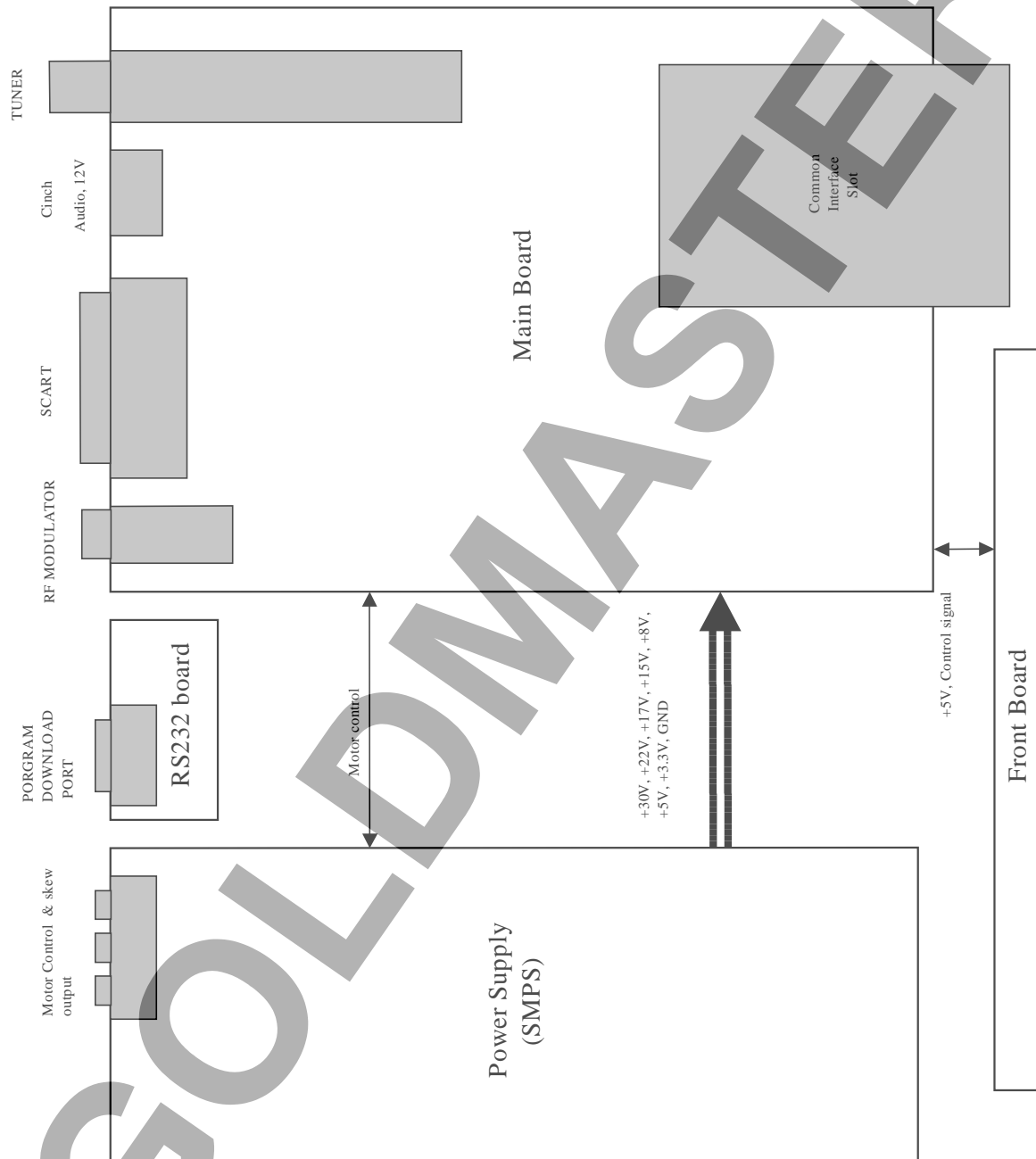
2.1. Main Board

Page	Part Name	Location Number	Part number	Function	Comment
1	Tuner Module	U1	TBMU30321IPB	Channel tuning. Analog to Digital Conversion. QPSK demodulation.	Or, equivalent part
	Regulator	U2	LM317	Regulates LNB power voltage.	Or, equivalent part
	Poly Switch	U3	RXE065	Over current protection of LNB power.	
3	CPU, Demux and Decoder	U5	IBM39STB02100	Main CPU of IRD(PowerPC401B3) MPEG Demux and Decoder	
4	Flash Memory	U7	SST39VF800	Saves program and constant	Or, equivalent part
	EEPROM	U8	24LC02B-SN	Saves some parameters	Or, equivalent part
5	SDRAM	U9	K4S641632D	Main system memory	Or, equivalent part
6	ASIC	U10	TF301SC10	CI interface, System control	
	Reset IC	U11	ELM9727NBA	Power level detection, Resets the system.	Only one IC is used
7	FET	U12, U13	IRF7303	Power On/Off	Or, equivalent part
	Regulator	U14	MIC39100-2.5BS	Regulates internal 2.5V.	
	Regulator	U15	78L12	Regulates external 12V output	
	Regulator	U16	78L12	Regulates internal 12V.	
	Connector	JP2	5267-12A	Power input connector	
	Connector	JP4	5267-6A	Front Board interface	
	Connector	JP3	5267-9A	Connector for Smart Card sub board.	Embedded CAS, optional
8	RS232 Driver	U17	MAX232	Rs232 level conversion	Or, equivalent part
	Connector	JP5	5267-3A	Connector for RS232 sub board	
	Connector	JP6	2mm pitch	Connector for RS232 sub board	SPDIF, optional
9, 10	TTL	U19, ...	74 series	Buffer and mux for CI	
	FET	U18	IRF7303	CI Power On/Off	Or, equivalent part
	Connector	U22	PIS2B1382	PCMCIA connector for CI	
11	Audio DAC	U34	UDA1334TS	Audio Digital to Analog Converter	
	OP Amp	U33	TL072	Audio Amplifier	
12	AV Switch	U35	STV6412	AV switch for SCART and Cinch	
	SCART	SCART1	2203-42STA	SCART connector	
	Cinch	J1	RCA – 4pin	Cinch connector for AV, 12V	
13	RF Modulator	U37	RMUP74055WT	Generate UHF signal	
	Regulator	U36	LM7805	Regulates 5V for RFmodulator	

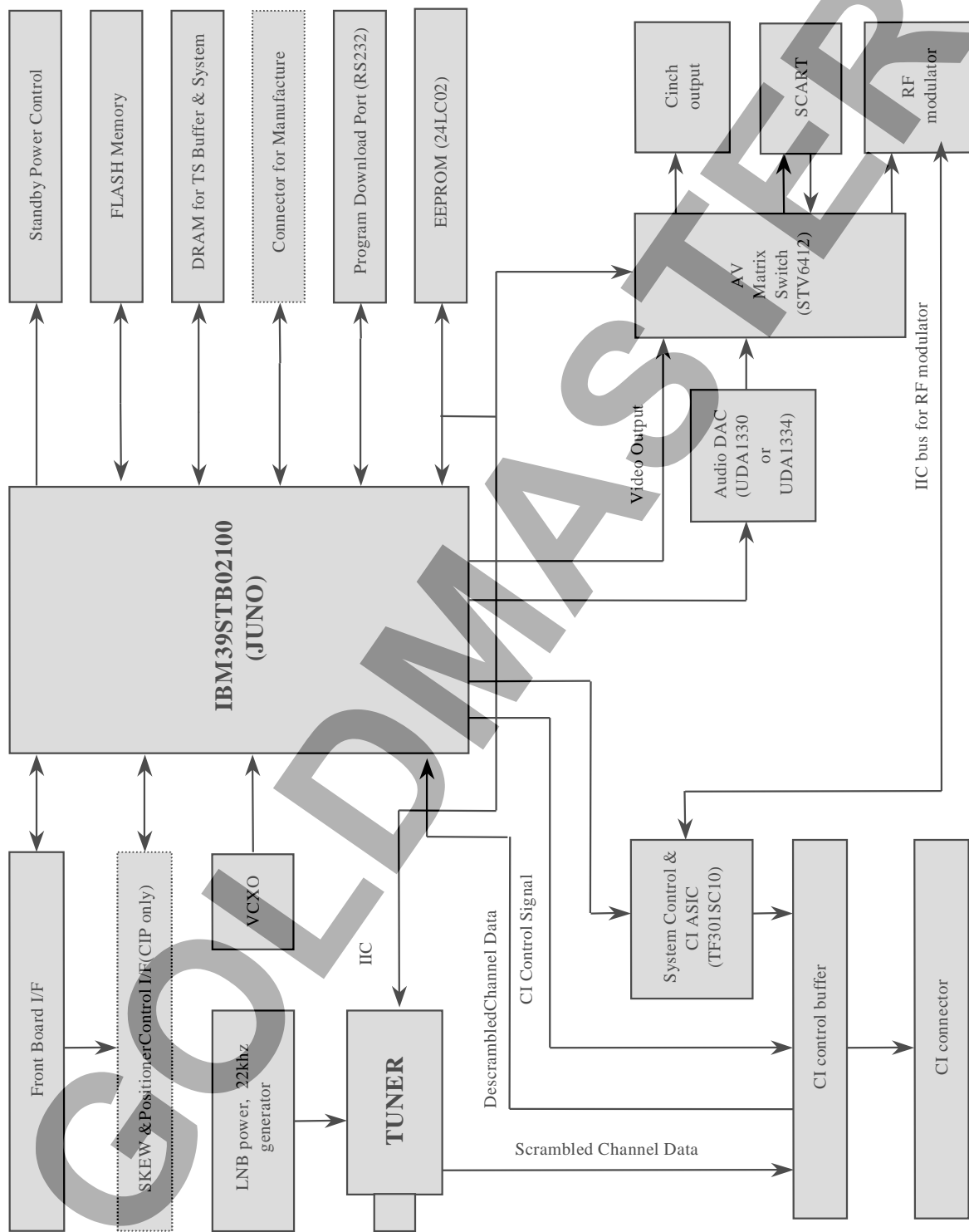
2.2. Front Board

page	Part Name	Location Number	Part number	Function	Comment
1	Microprocessor	U1	80C52	Receives KEY, RCU input Controls the LEDs. Controls the 7-segment display Serial Communication with Main Board. Main Board power control.	Or, equivalent part
	Reset IC	U2	KIA7442	Power level detection, Resets the system.	Only one IC is used
2	Remocon sensor	U5	TSOP4838	Receives RCU signal	Or, equivalent part
	7-segment	U4	A3C4G	Displays messages	

3. Block Diagram of The IRD



4. Block Diagram of The Main Board

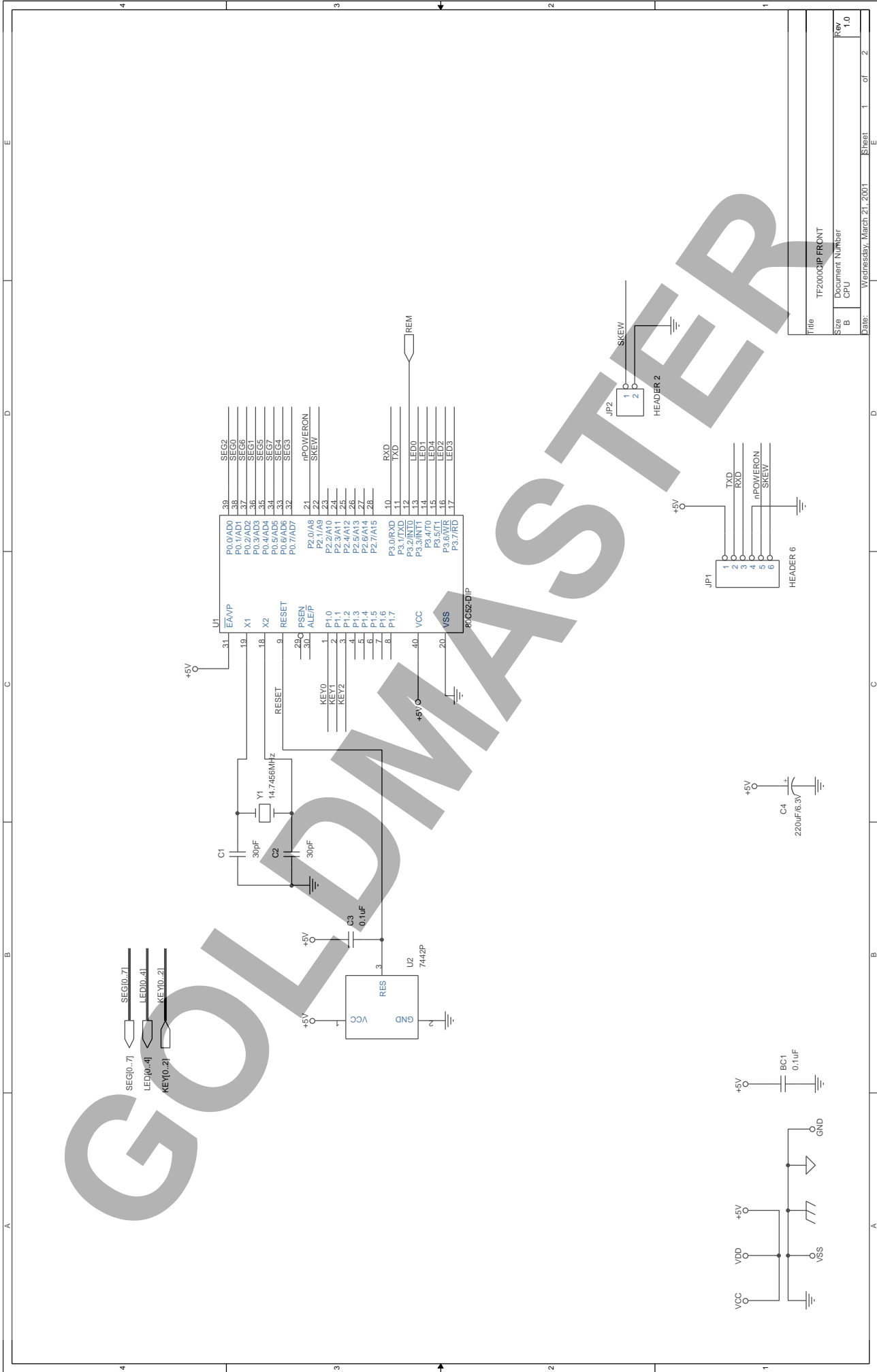


5. Schematic Diagrams

5.1. Schematic diagram of Front Board

- see next page.

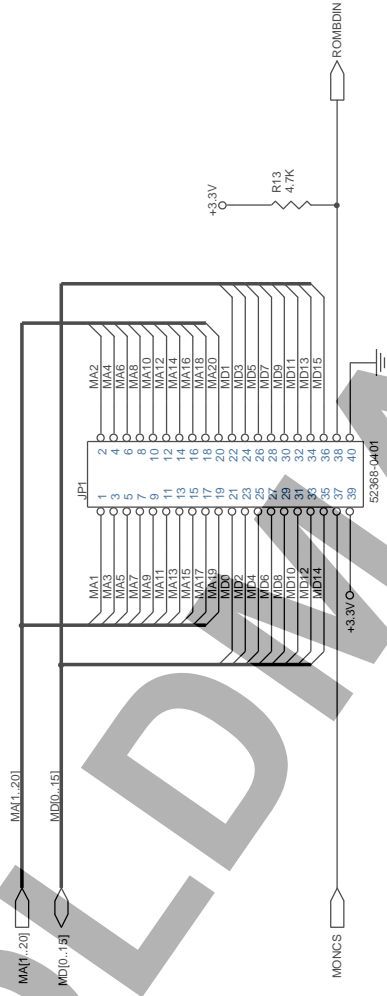
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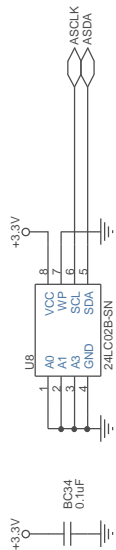
5.2. Schematic diagram of Main Board

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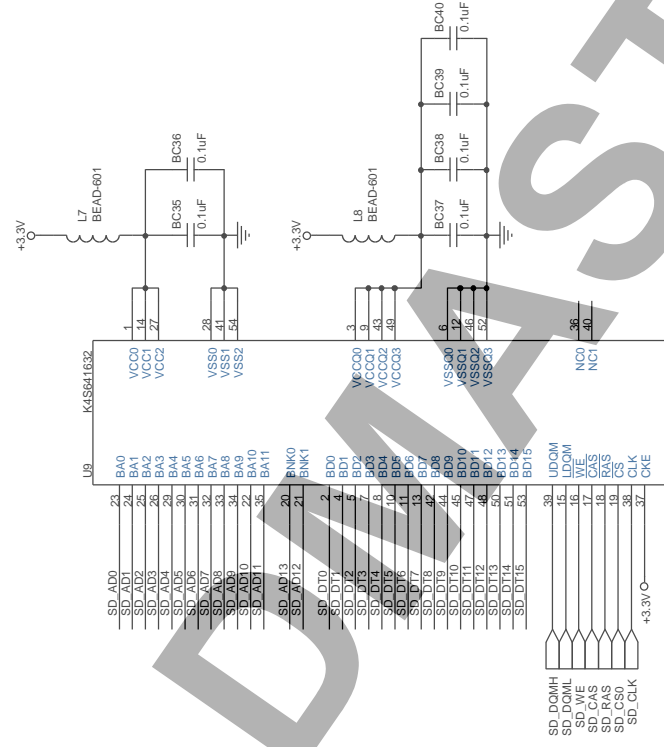
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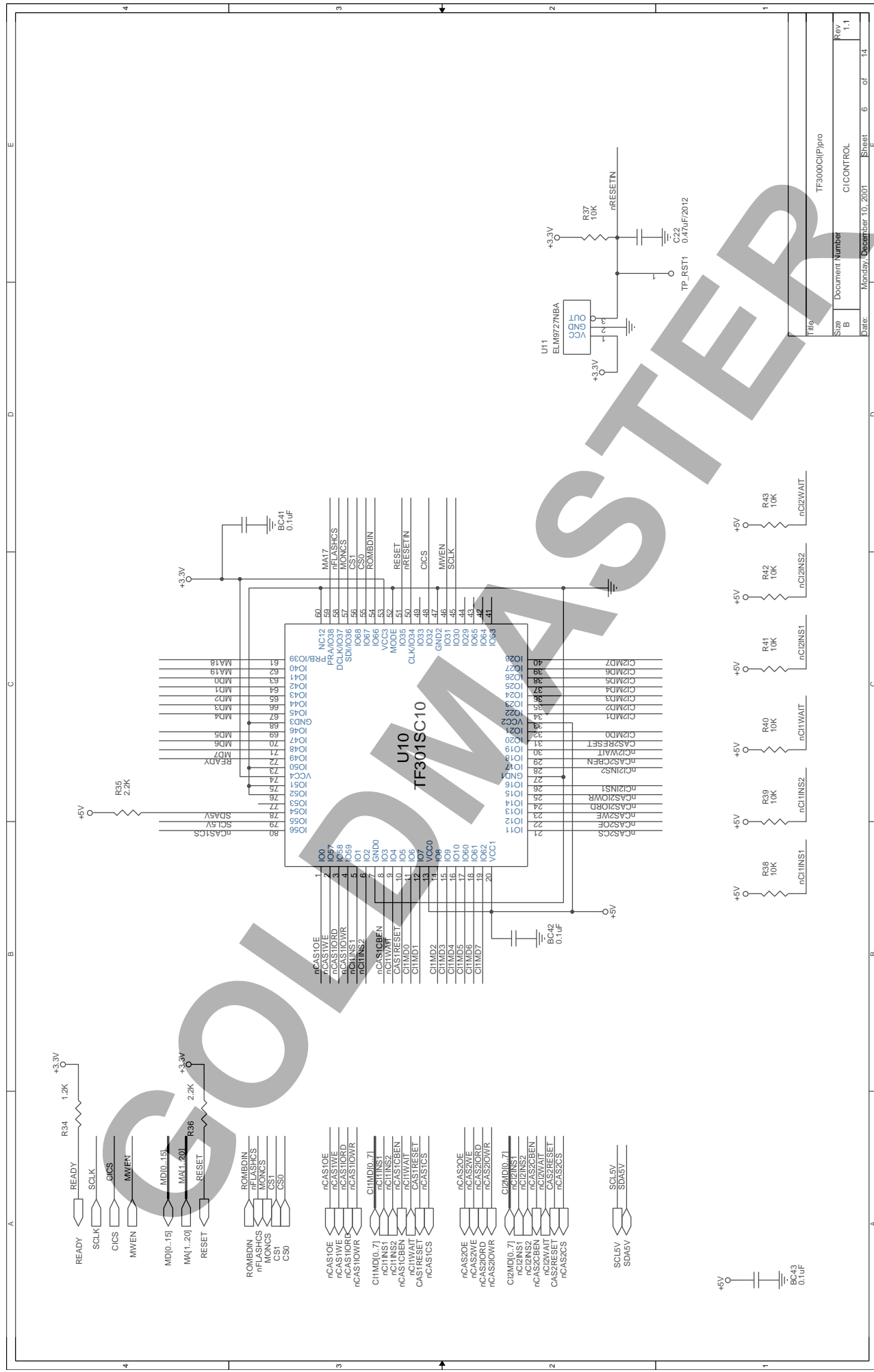


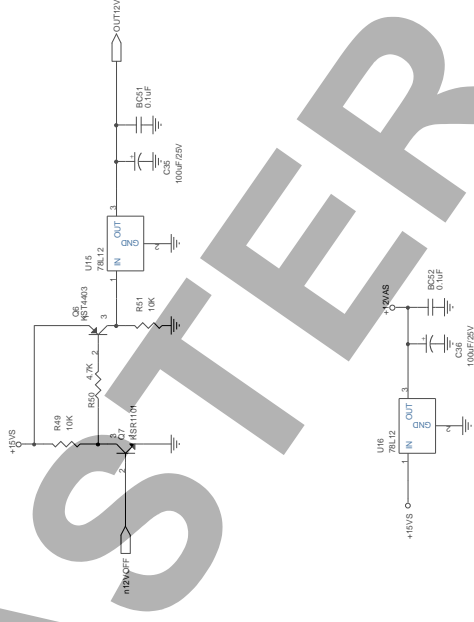
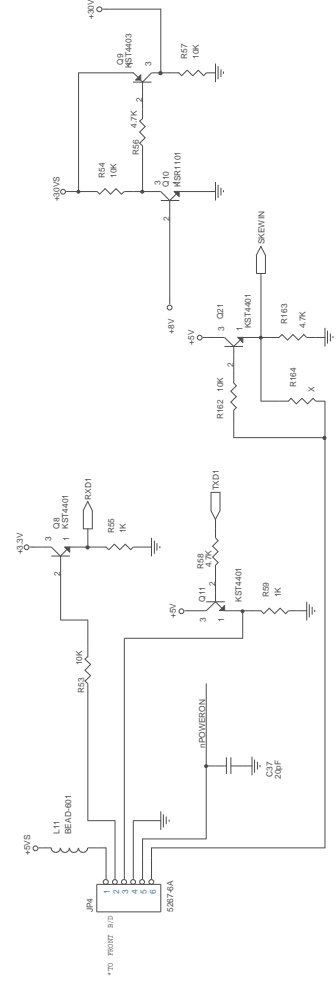
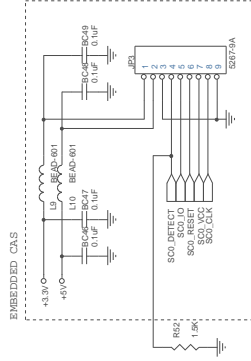
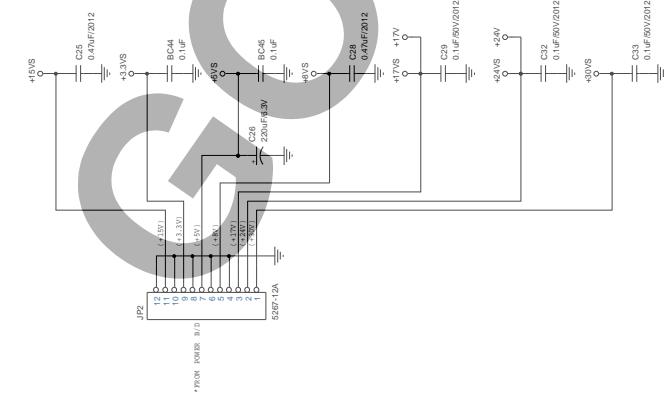
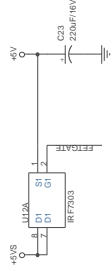
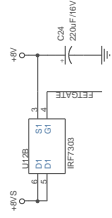
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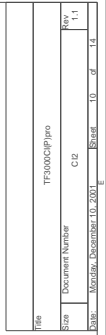
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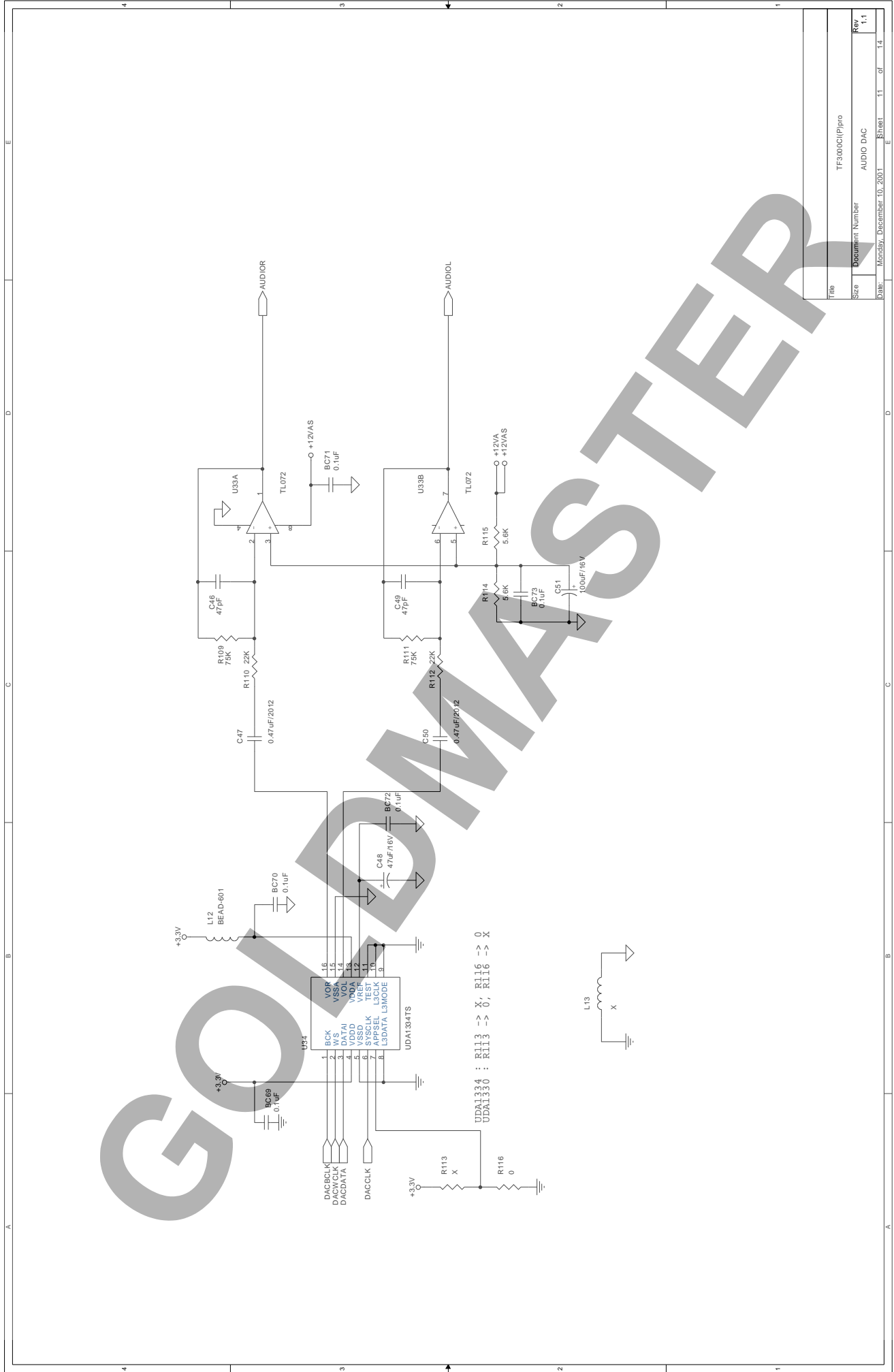




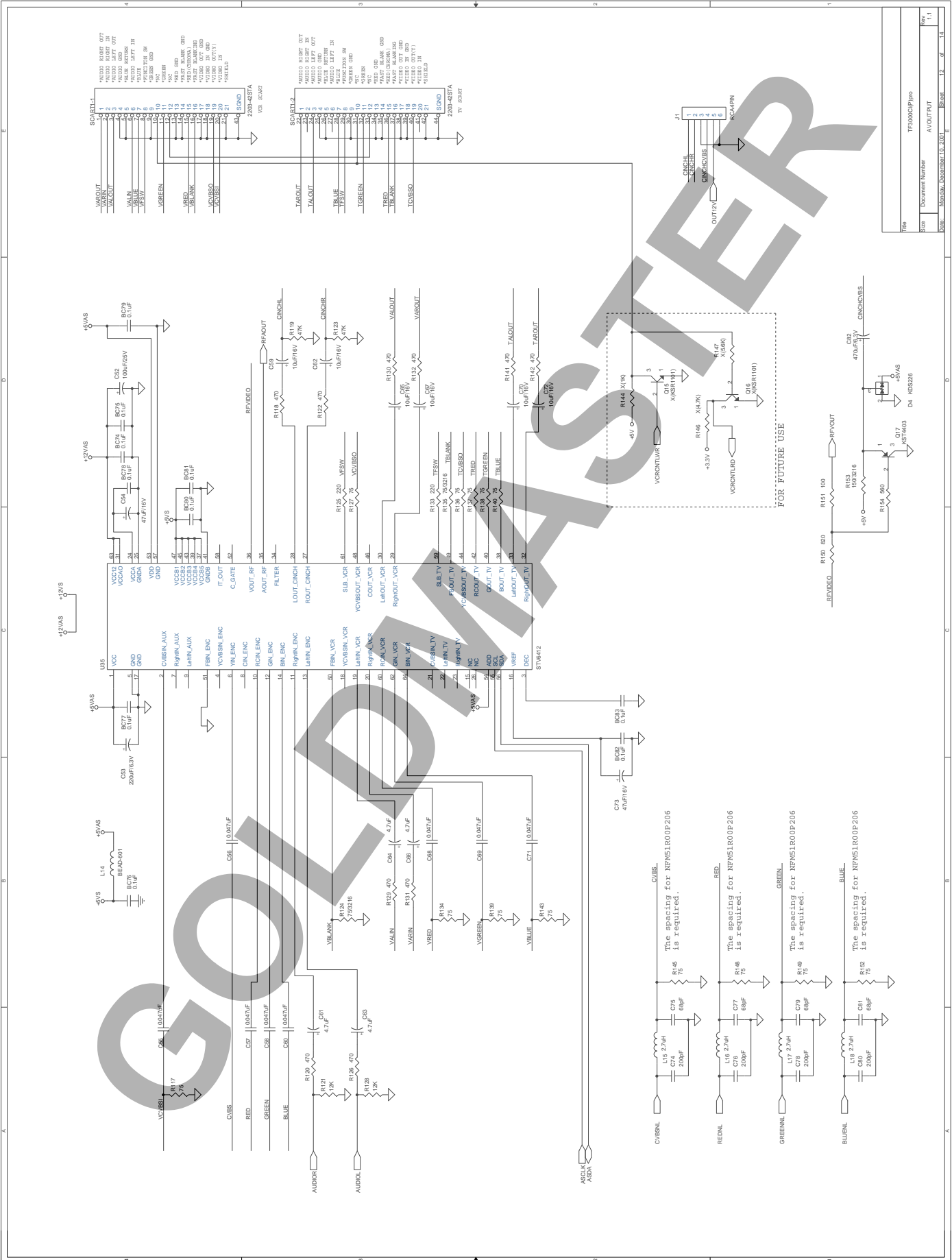
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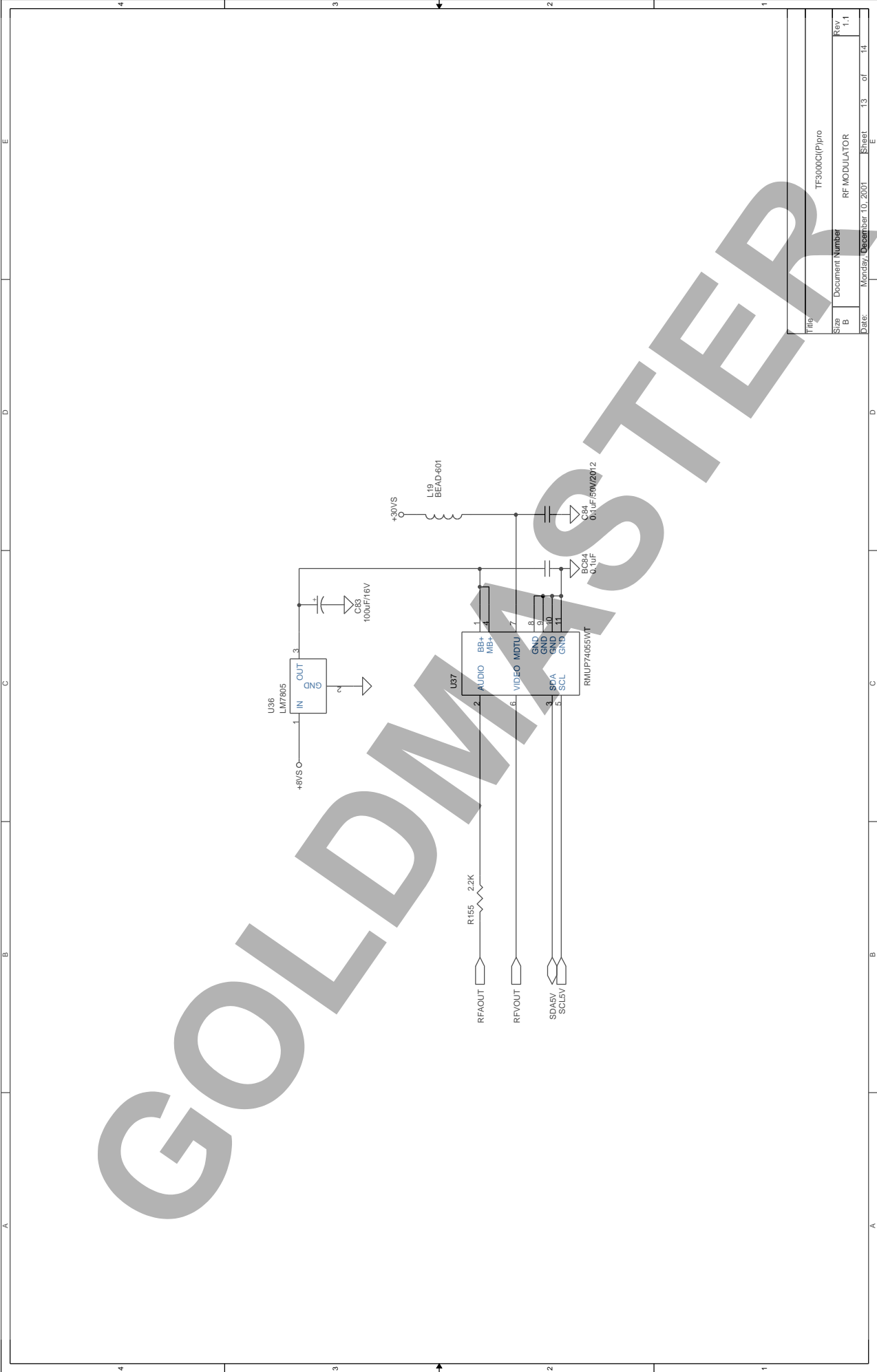


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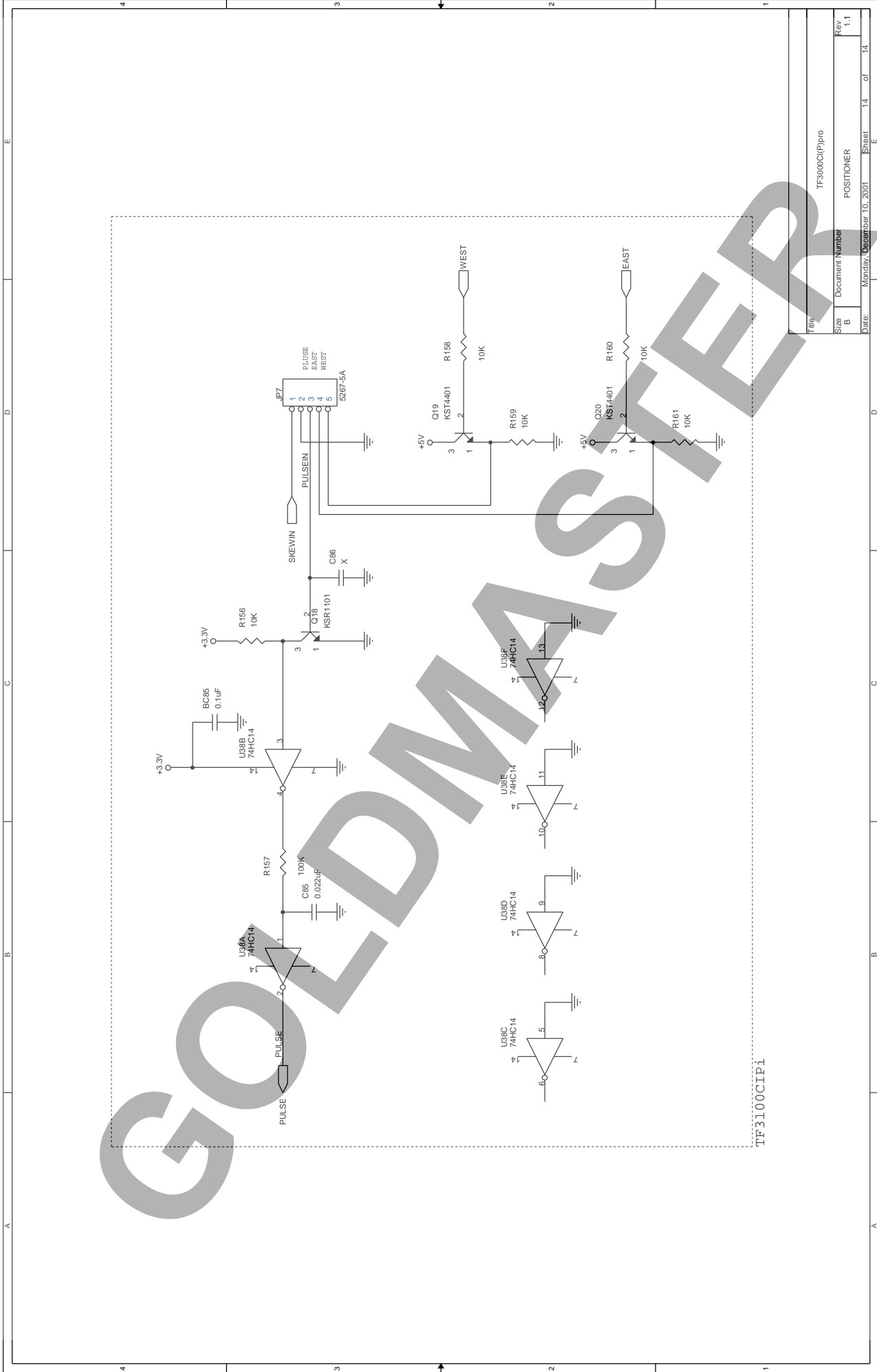
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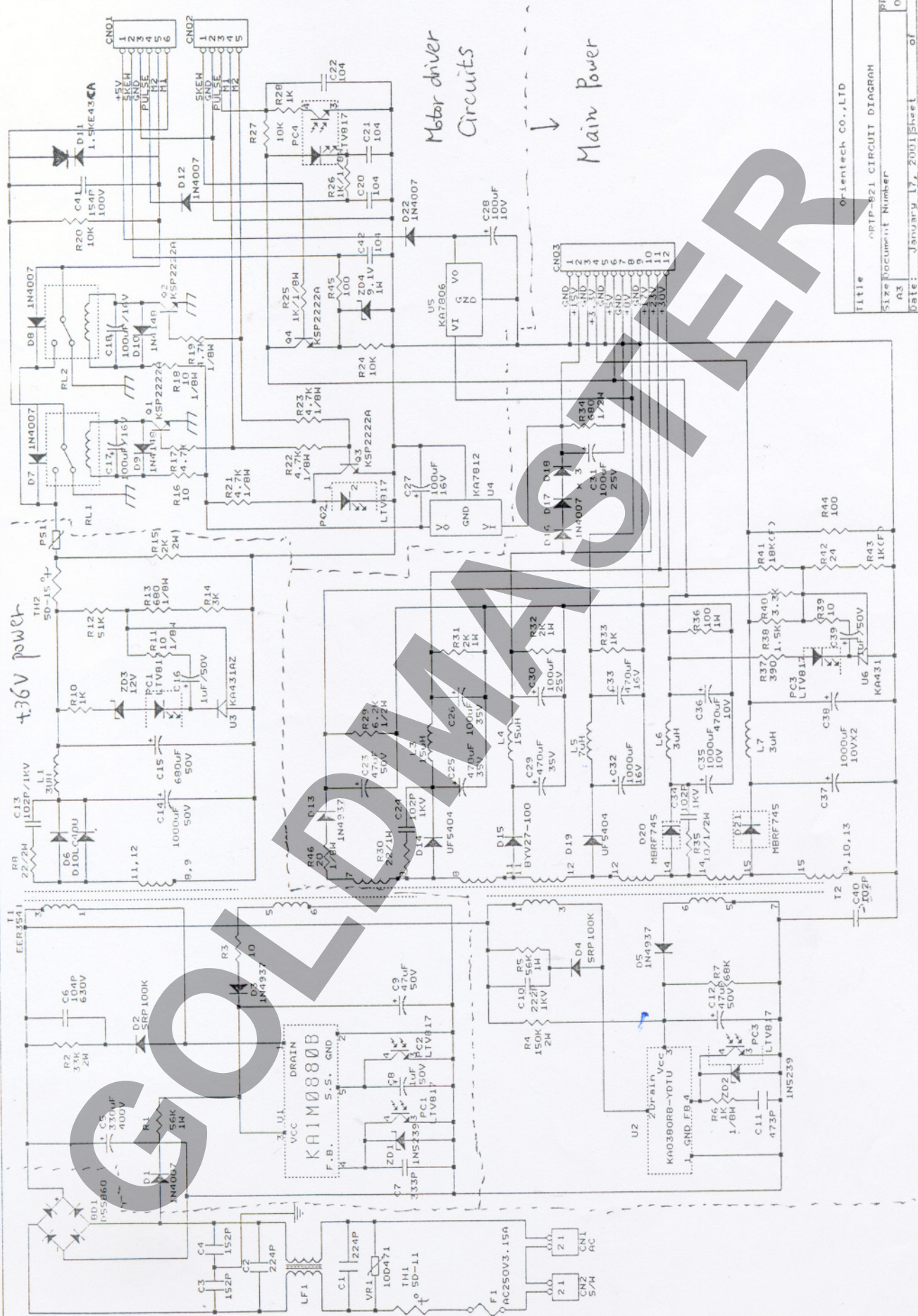
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5.3. Schematic diagram of SMPS (power supply)

- see next page. -

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Motor driver
Circuits

Main Power

6. Test and Repair

6.1. Visual Test

- Check whether all the connectors are plugged well.
 - 'JP2' of Main Board : Power connector.
 - 'JP3' of Main Board : Connector for SMART Card sub-Board interface (optional)
 - 'JP4' of Main Board : Connector for Front Board interface
 - 'JP5' of Main Board : Internal RS232 connector.
 - 'JP6' of Main Board : SPDIF connector(optional).
 - 'JP7' of Main Board : motor control and skew control (built-in positioner model only)
- Check whether the SMPS(power supply) has any damage.
- Check whether the Main Board has any damage.
- Check whether the Front Board has any damage.

6.2. Basic Function Test

6.2.1. No LED and 7-segment is turned on

	Possible Cause	How to Check	How to repair
1	Front Board Problem	Replace the Front Board with new one which works well in the other IRD	If it works, repair the Front Board. Otherwise, check the Main Board and SMPS.

6.2.2. Some LED and 7-segment have problems

	Possible Cause	How to Check	How to repair
1	Front Board Problem		Check the Front Board according to the advanced function test.

6.2.3. Remote Control Unit (RCU) does not work.

	Possible Cause	How to Check	How to repair
1	Remote Controller may have some problem.	If some keys of RCU do not work, it may be RCU problem.	Replace the RCU with new one.
2	Sensor of the Front Board may have problem	If key, LED and 7-segment work, And only the Remote control does not work, it is sensor problem.	Check the PCB pattern of Front Board. Check the power of U5(sensor). Replace the sensor.

6.2.4. Key of the front panel have problems

	Possible Cause	How to Check	How to repair
1	If the power key does not work, it may be caused from either the Main Board or the Front Board problem.	Replace the Front Board with new one which works well in the other IRD	If it works, repair the Front Board. If it does not work, repair the Main Board.
2	If some of the key does not work, it is the Front Board problem. Pattern or broken tact switch can be a problem	If one of the key(except the power key) or RCU work, it is the problem of the switch or PCB pattern of the Front Board.	Check the switch and the PCB pattern of Front Board.
3	If sometime RCU work, but the key of the front panel does not work, then one of the key may be pressed always.	Check the key input pins of Micom.(U1.1 to U1.8). None of them should be low at normal state. It should about 5V.	Replace the tact switch. Check the PCB and remove the short to the GND. Replace the Micom.

6.2.5. No loader version is displayed

	Possible Cause	How to Check	How to repair
1	Main Board problem Communication problem	Replace the Front Board with new one which works well in the	If it works, repair the Front Board. If it does not work, repair the Main

	between the Front Board and the Main Board.	other IRD	Board.
2	Main Board fails to boot.	The 7-segment on the Front Board displays only the time with brighter display when the power key is pressed.	Repair the Main Board. Check the powers of Main Board.

REF) loader version : When the power is turned on, 7-segment on the Front panel displays it.

Ex) 'L2.0.5' is displayed : its loader version is 2.0.5

6.2.6. Receiver acts like the key of the Front Board or RCU is pressed.

	Possible Cause	How to Check	How to repair
1	The key of the Front Board is pressed always.	Replace the Front Board and check it.	Replace the broken key with new one. Check the Front PCB.
2	The pin of Micom on the Front Board can be damaged.	Check the pin 1 to 8 of U1 on the Front Board. It should high(about 5V) in normal state.	Pull up the pin with a resistor(the value is between 1k to 10k ohm) to 5V(U1.40).

6.2.7. No picture but the OSD works.

	Possible Cause	How to Check	How to repair
1	Tuner problem	If the signal level of the tuner is very low, it may be a problem of the tuner, antenna cable or antenna.	Check the antenna signal. Check the tuner part.
2	No or bad LNB power No or bad 22khz signal.	Check the LNB power and 22khz signal on LNB in of the tuner.	See LNB section of this manual.
3	The power of the tuner has some problem.	If the signal level of the tuner is very low, check the voltage of the U1.6 (tuner). It should be about 30V.	If not, check the SMPS and the power path.
4	CPU (IBM39STB02100) problem	If all the other things work except the picture and sound, it may be the problem MPEG decoding. In this case, the signal level and signal quality of the information bar will be good.	
5	Channel Data path problem. (include CI interface Circuit)	There is good RF signal level, and good signal quality, but no broadcasting is scanned. In this case, it may be a channel data path problem.	Check the channel data path of the Main Board.

6.2.8. No picture(and no OSD) and No sound

	Possible Cause	How to Check	How to repair
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1	CPU (IBM39STB02100) problem.	In this case, the OSD have some problems.	
2	AV switch problem	If the front works well and nothing is appear on TV, it can be an AV switch problem.	Repair the Main Board according to the advanced function test.
3	SMPS problem.	Check the all the power of power connector on Main Board.	Repair the power according to the advanced function test.

6.2.9. No sound and good picture

	Possible Cause	How to Check	How to repair
1	Audio DAC or OP Amp problem	Test the Main Board according to the advanced function test.	Repair the Main Board according to the advanced function test.
2	AV switch problem	Test the Main Board according to the advanced function test.	Repair the Main Board according to the advanced function test.

6.2.10. No picture(and no OSD) and good sound

	Possible Cause	How to Check	How to repair
1	CPU (IBM39STB02100) problem	Test the Main Board according to the advanced function test.	
2	AV switch problem	Test the Main Board according to the advanced function test.	Repair the Main Board according to the advanced function test.

6.2.11. No sound and/or no picture on the RF modulator (Cinch works well)

	Possible Cause	How to Check	How to repair
1	RF channel is selected incorrectly.	Check the RF channel selection.	Select the correct channel.
2	RF modulator has problem.	Replace the RF modulator with new one. If it works well, it is the problem of RF modulator.	Replace it with new one.
3.	Problem of Audio or Video line on the board.	Replace the RF modulator with new one. It will have the same problem.	Repair the Main Board.

6.2.12. No LNB power at all of the vertical and horizontal.

	Possible Cause	How to Check	How to repair
1	'LNB power OFF' is selected in the menu.	Check the LNB menu.	Set the LNB power to ON.
2	U2(LM317) or related circuit has problem.	Test the Main Board according to the advanced function test.	Repair the Main Board according to the advanced function test.
3	Relay or related circuit has a problem	Check the input and output of the Relay. All of them should have same LNB voltage.	If not, replace Relay or the relay driving circuit.

4	SMPS has problem.	Check the SMPS	Replace the SMPS.
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6.2.13. Incorrect LNB power

	Possible Cause	How to Check	How to repair
1	If only the 18V is very low, it can be a SMPS problem. Or, it can be a problem of power selection circuit.	Check the SMPS(or JP2.2). It should be higher than 20V. Check U13 and its driving circuit.	If not, replace SMPS. If D1(U13.6) and S1(U13.3) have voltage difference more than 0.5V, it have a problem. Check it and its driving circuit.
2	A problem of power selection circuit.	If the LNB power is not selected and sticks to vertical or horizontal with correct voltage, Check U2 and its voltage control circuit. Especially, check the base Q2. It should be changed.	Check Q2. If the base of Q2 (Q2.2) does not change, it can be a problem of U8.
3	Both the 18V and 13V are too low or too high.	Test the Main Board according to the advanced function test.	R3, R4, R5, R6, R8 have problem. Replace with new one. Or, change with slightly different valued resistor.

6.2.14. No 12V output

	Possible Cause	How to Check	How to repair
1	'12V OFF ' is selected in menu.	Check the LNB menu.	Set the 12V power to ON.
2	Control circuit problem	Check the control circuit of page 7. Q7, Q6, U15 should be checked.	Replace with new one if some part have problem.

6.2.15. Motor of the antenna does not move. (Positioner model only)

	Possible Cause	How to Check	How to repair
1	Relay problem. In this case, the motor does not move at all.	Check the relay for motor driver. The relay should work to move the motor.	Replace the broken part. It can be a relay or transistor to drive the relay.
2	Pulse sensing problem. In this case, the motor move a few seconds.	Connect the pulse input to the GND pin and disconnect it. The voltage level of JP7.3 should be changed.	If The voltage level of JP7.3 is not changed, the pulse sensing circuit of SMPS has problem.

6.3. The Advanced Test of Main Board.

6.3.1. Voltages on important point

- Voltage at JP2 in page 7 (of a schematic diagram)

Pin number	Minimum voltage	Nominal voltage	Maximum voltage	Comment
1	+28V	+30V	+32V	
2	+20V	+22V	+23V	
3	+16V	+17V	+18V	
5	+7.6V	+8V	+8.4V	
7	+4.75V	+5V	+5.25V	
9	+3.22V	+3.3V	+3.38V	In standby mode, it can be higher than maximum voltage
11	+14V	+15V	+17V	
2,4,6,8,10,12	GND	GND	GND	

- Voltage at check points in standby mode.

check points	page	Nominal voltage	Comment
U12.1	7	+0V	Power off in standby mode
U12.3	7	+0V	Power off in standby mode
U13.1	7	+0V	Power off in standby mode
JP4.1	7	+5V	Power is supplied to the Front Board even if standby mode
U16.3	7	+12V	Power is supplied to SCART Circuit even if standby mode
C53	15	+5V	Power is supplied to SCART Circuit even if standby mode

- Voltage at check points in normal mode.

check points	page	Nominal voltage	Comment
U12.1	8	+5V	Power off in standby mode
U12.3	8	+8V	Power off in standby mode
U13.1	8	+3.3V	Power off in standby mode
JP4.1	8	+5V	Power is supplied to the Front Board even if standby mode
U16.3	8	+12V	Power is supplied to SCART Circuit even if standby mode
C53	15	+5V	Power is supplied to SCART Circuit even if standby mode

* **important** : Be careful not to short the signals while checking the signals. It may damage the other part of Main Board.

- Check point 1 -

Replace the SMPS. And check it again.

- Check point 2-

Set the receiver to standby mode.

If the U12.1 has about 5V, check U12.2. If the voltage of U12.2 is about 0V, replace U12 with new one.

If the voltage of U12.2 is above 1V, check Q4.2. If the voltage of Q4.2 is above 0.8V, replace Q4 with new one .

If the voltage of Q4.2 is below 0.3V, replace Q4 with new one. Otherwise, check the Front Board and the connector from the Front Board.

- Check point 3-

Set the receiver to standby mode.

If the U12.3 has about 8V, check U12.4. If the voltage of U12.4 is about 0V, replace U12 with new one.

If the voltage of U12.4 is above 1V, check Q4.2. If the voltage of Q4.2 is above 0.8V, replace Q4 with new one .

If the voltage of Q4.2 is below 0.3V, replace Q4 with new one. Otherwise, check the Front Board and the connector from the Front Board.

- Check point 4-

Set the receiver to standby mode.

If the U13.1 has about 3.3V, check U13.2. If the voltage of U13.2 is about 0V, replace U13 with new one.

If the voltage of U13.2 is above 1V, check Q4.2. If the voltage of Q4.2 is above 0.8V, replace Q4 with new one .

If the voltage of Q4.2 is below 0.3V, replace Q4 with new one. Otherwise, check the Front Board and the connector from the Front Board.

- Check point 5 -

Set the receiver to normal mode.

If one or two of the output has problem among the U12.1, U12.3, U13.1, check the Front Board and the connector from the Front Board. It should be about 0V at normal state.

If it is above 0.8V replace the Front Board and test again.

6.3.2. Power on Test sequence

The power of the Main Board is controlled by the Front Board.

- Check point 1 -

JP4.1 is the power supply pin of the Front Board. It should be 5V.

If it is not 5V, remove the Front Board from the JP4. And, check JP4.1 again.

If it is 5V, the Front Board have problem. Otherwise, the Main Board or SMPS have problem.

- Check point 2 -

JP4.5 is the power control pin.

Standby mode : JP4.5 -> high (above 2V)

Normal operation : : JP4.5 -> low (below 0.8V)

If it does not work, the micom on the Front Board may have problem.

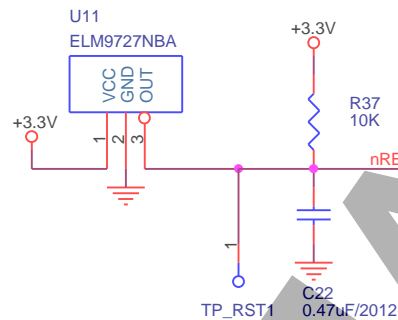
- Check point 3 -

Replace the Front Board with new one. If it does not work, it is the problem of Main Board. Check the voltages of some points according to 'Voltages on important point' section.

6.3.3. Reset

After power on by the Front Board, reset circuit works.

Schematic page 6.



U11 is a voltage detector. If the voltage of 3.3V is lower than 2.7V its output goes to low.

The 'nRESETIN' signal should go high after power up (when the IRD goes to Normal state from Standby state.)

The reset signal is delayed and reconstructed in U10(TF301SC10). The reset output of U10.51 is provided to all the system.

- Check point 1 -

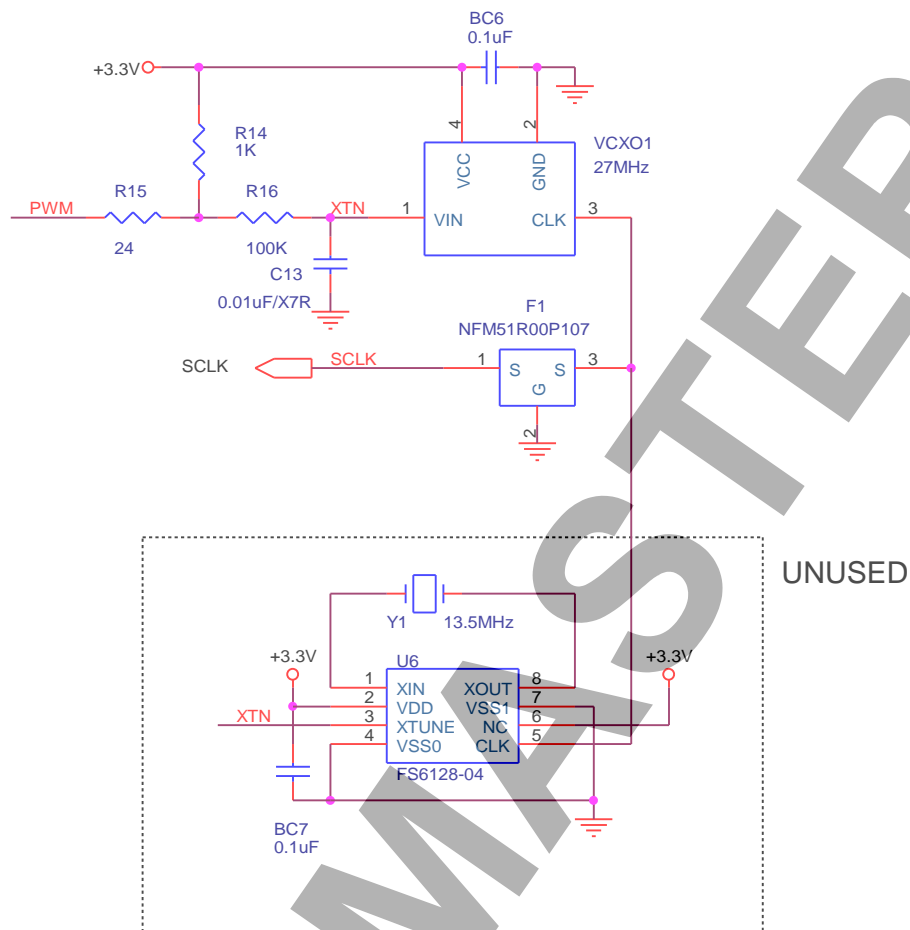
In normal state, the 'nRESETIN' signal is 3.3V. If it is about 0V, U11 has problem.

- Check point 2 -

U10.50 and U10.51 should be 3.3V. If only U10.50 is 3.3V, check the system clock.

6.3.4. System Clock

Schematic page 3



VCXO1 generates the system clock.

The 'SCLK' signal is 27.000MHz clock signal .

If the color of the picture disappear , the 'SCLK' signal may be different from 27.000MHz or the VCXO1 have bad quality. In this case, replace VCXO1 with new one.

- Check point 1 -

Check the input and output of 'F1'. All of them should have 27Mhz clock signal.

If F1.3 have not 27Mhz clock signal, it may the problem of VCXO1.

- Check point 2 -

If the video output of receiver has not color, It may the problem of VCXO1.

6.3.5. RS232 Data Port (Program download port) and Program download

Connect a PC with a download cable. If it fails program download and nothing happens in the receiver, check the download cable and the PC. The pin2 and pin3 of the download cable should be crossed.

- Check point 1 -

Check the download cable and the PC with a new receiver.

- Check point 2 -

Check the error code on the display of the Front Board. Some message is displayed on the Front panel when the new program is downloaded. The message and error code is as follows.

Display	Description
dn##	Data is being downloaded. ('##': the number of remained data block)
LP##	Loader program is being saved. ('##' : the number of remained flash block to write the loader program.)
AP##	Application program is being saved. ('##' : the number of remained flash block to write the application program.)
Fd##	Flash data program is being saved. ('##' : the number of remained flash block to write the flash data.)
Ed##	EEPROM data is being saved. ('##' : the number of remained EEPROM block to write the EEPROM data.)
E-01	The CRC error of Header/Data block.
E-02	The CRC error of Application program.
E-03	UART communication error.
E-04	Error while Flash writing.
E-05	Memory overflow
E-06	Different system ID. -> The model of the receiver and the program(or data) to be downloaded is not matched.
E-07	Not supported TFD version.
E-08	Not supported data type.
E-09	EEPROM read error.
E-10	EEPROM write error.
E-11	Not supported Flash memory.
E-12	Error while TFD writing.

6.3.6. LNB power

<Voltage selection Circuit for Regulator>

V/H signal : selects the vertical or horizontal

At Vertical(13V) output for LNB : LNBPIN is about 17V.

At Horizontal (18V) output for LNB : LNBPIN is about 23V.

- Check point 1 -

Check +17VS, +24VS line. It should +17VS, +24VS always. (include Standby mode.)

If not, it can be SMPS problem.

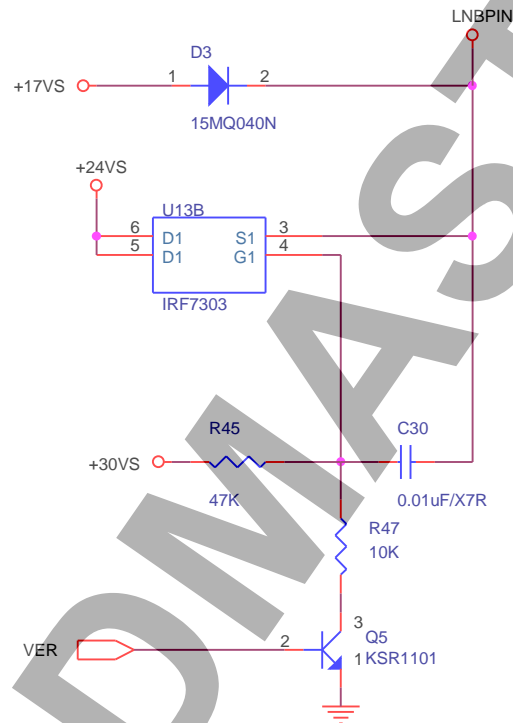
- Check point 2-

Set the LNB voltage to Vertical.

If the U13.1 has about 23V, check U13.2. If the voltage of U13.2 is under 15V, replace U13 with new one.

If the voltage of U13.2 is above 15V, check Q5.2. If the voltage of Q5.2 is below 1V, replace Q5 with new one. If the voltage of Q5.2 is above 1V, check the V/H signal.

Schematic Page 7



- Check point 3-

Set the LNB voltage to Vertical.

If the U13.1 has below 16V, check D3. If the voltage of D3.1 is about 17V replace D3 with new one. If the voltage of D3.1 is below 16V, check the voltage of SMPS according to 'Voltages on important point' section.

- Check point 4-

Set the LNB voltage to Horizontal.

If the U13.1 has about 17V, check U13.2. If the voltage of U13.2 is under 25V, check Q5.2. If the voltage of Q5.2 is below 0.8V replace Q5 with new one. If the voltage of Q5.2 is above 1V, check the V/H signal.

<LNB power Regulation Circuit.>

V/H signal : selects the vertical or horizontal.

Horizontal : about 0V

Vertical : about 1V

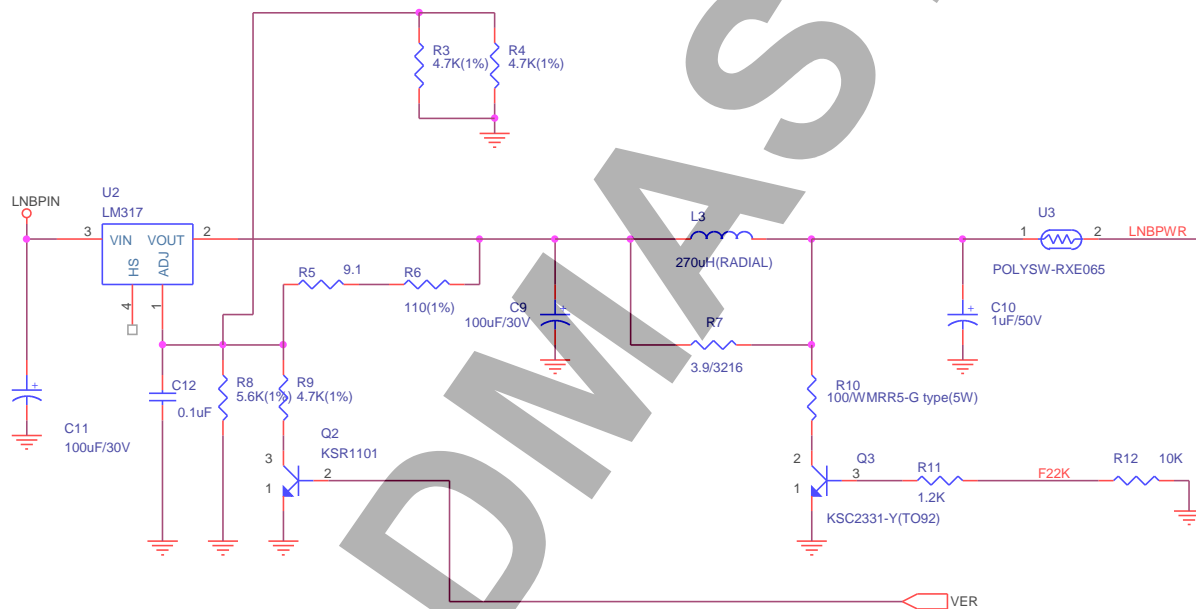
U3 is over-current protector. If the LNB output current is more than 500mA for a long time, It may block the LNB power. In this case remove the external device and cool the polyswitch(U3)

- Check point 1 -

If the voltage of U2.3 is not changed from 23V to 17V(or from 17V to 23V) by horizontal/vertical control in menu screen, **check the LNBPIN signal by 'Voltage selection Circuit for Regulator' section of this chapter.**

If the voltage on U2.3 is changed, check the voltage on U2.3. If it is not changed, check Q2 and replace it.

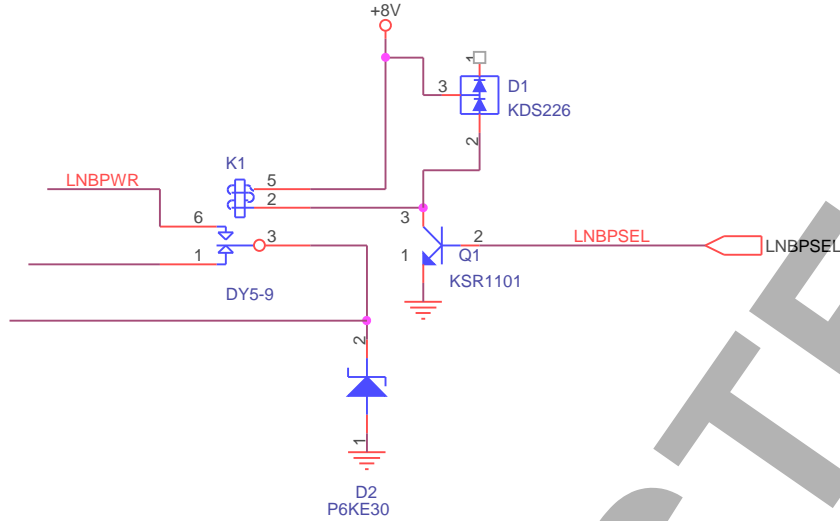
Schematic page 1



< internal/external LNB power switching circuit >

This circuit selects the LNB power source between the internal or external.

Schematic page 1



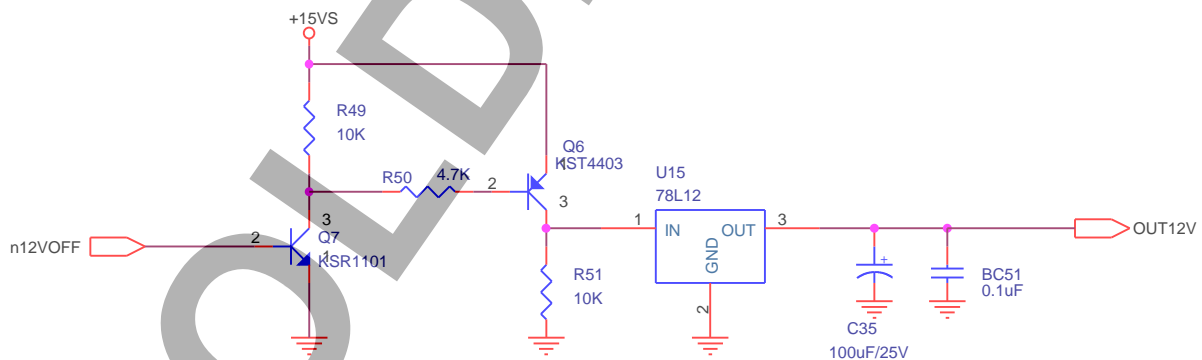
- Check point 1 -

Check the input(K1.6) and output(K1.3) of the relay. All of them should have same LNB voltage when the LNB power option is turned to 'ON'. It means the input(K1.6) and output(K1.3) of the relay is perfectly conducted.

If not, check the voltage between the K1.5 and K1.2. It should about 8 volts when the LNB power option is turned to 'ON'. If its voltage is too low, check D1 and Q1. The Q1.3 should about 0V. If Q1.3 is about 8V, Q1 or LNBSEL signal has problem. Q1.3 should about 0V when Q1.2(LNBSEL signal) is high(above 1V).

6.3.7. 0/12V

Schematic page 7



The transistor Q7 controls the 12V output. And U15 generates 12V.

- Check point 1 -

Check the input of U15(U15.1). It should about 15V to 17V when the 12V output is enabled.

If the voltage of the U15.1 is lower than 12V, check Q7 and Q6.

- Check point 2 -

The pin Q7.3 should about 0V when 12V output is enabled. And it is about 15V when disabled. If it has problem, replace it with new one.

- Check point 3 -

The pin Q6.3 should about 15V when Q7.3 is about 0V. And it is about 0V when Q7.3 is about 15V. If it has problem, replace it with new one.

6.3.8. RF modulator

- Check point 1 -

Check the power input of RF modulator(U37, schematic page 13)

- Check point 2 -

Check the IIC line.(the signal name is SDA5V, SCL5V).

6.3.9. Video

- Check point 1 -

Check L15 and its related circuit (CVBS), L16 and its related circuit (RED), L17 and its related circuit (GREEN) and L18 and its related circuit (BLUE). At this point all the signal should be work. If it works well, U35 or its related circuit has problem. If it does not work well, the IBM39STB02100 (U5) may have problem.

6.3.10. Audio

- Check point 1 -

Check U33.1 and U33.7. If it has audio signal, U35 or its related circuit has problem. If it does not have audio signal, the Audio DAC(U34) or OP AMP(U33) may have problem. To check audio DAC, check C47 and C50. If it has audio signal, the OP AMP is the problem.

6.3.11. SCART bypass

- Check point 1 -

If SCART bypass has problem, check U35 and its related circuit.

6.4. The Advanced Test of Front Board.

*** Applicable Front Board : TF2000CIP REV 1.0, TSFRONT REV1.1**

6.4.1. Key

The key input pin (U1.1 – U1.8) goes low(0V) when key is pressed.

According to the number of key, the key input pin is used from U1.1 to U1.8.

All the pin is pulled up in the micom(U1).

- Check point 1 –

If any pin is low without key pressed, the pin has some problem

Pull up the pin with a 1k ohm to 10k ohm resistor to 5V (U1.40)

If the pull up fix the problem, check the PCB pattern or replace the micom(U40).

- Check point 2 –

If one of the key does not work, check the key and the PCB pattern.

If they have no problem, replace the micom(U40).

6.4.2. Remote control

U5 is the sensor for remote control.

- Check point 1 –

Check the Remote control unit with other receiver. If it does not work, the Remote control unit may have problem.

If the key and display work and only the remote control does not work, U5(sensor) may have problem.

Check the power of the sensor(U5.3). It should 5V.. If not, check the R13 and the PCB.

- Check point 2 –

If you can not find any problem with the U5.3, replace it with new one.

6.4.3. Display

- Check point 1 –

If one of the digit is brighter than the other, and the digit display wrong character, the micom(U1) should be replace with new one.

- Check point 2 –

If one of the digit is not displayed, replace the transistor Q1 to Q5 as follows.

First Digit -> Q1

2nd Digit -> Q2

3rd Digit -> Q3

4th Digit -> Q4

dots and LED on the display -> Q5

- Check point 2 –

If one of the segments in one digit is not displayed, replace the display module.

- Check point 3 –

If one of the segments of all digit is not displayed, check the resistors(R3, R4, R5, R6, R7, R8, R10, R11) and the PCB pattern. If there is no problem, the micom(U1) should be replaced with new one.

6.4.4. Nothing works on Front Board.

- Check point 1 –
The power of micom(U1.40) should about 5V. Check it.
- Check point 2 –
The reset pin of micom(U1.9) should about 0V. Check it.
- Check point 3 –
Check the X-tal(Y1). It should oscillate well.

GOLDMASTER

6.5. The Advanced Test of SMPS.

Caution

- I. The SMPS must be disconnected from the mains plug to test.
- II. The capacitor inside the SMPS (power supply) can hold charge even if the IRD has been disconnected from the mains plug. To handle SMPS, wait until the capacitor is discharged.
- III. Very high voltage is generated in SMPS.

6.5.1. The structure of Positioner power.

The positioner power is composed of two separated power and motor driving circuits.

One of the separated power is main power. And the other is +36V power to drive motor.

The two powers operate independently even though built in one board.

The main power operates always. But, the +36V power operates only when the motor is activated.

6.5.2. Check the damaged parts.

- Check point 1 –
Check whether there is broken part by visual test.

6.5.3. Test the diodes.

- Check point 1 –
Check whether the diodes has crack. If there is a crack, replace it with new one.
Same part should be replaced.
- Check point 2 –
Check the resistance of all the diodes. If the resistance is too low (lower than 10ohm), it is the problem.
Replace it with new one. Same part should be replaced. Diodes is named as Dxx or ZDxx.(ex: D14, ZD1)
To measure the resistance, you must remove the mains plug.
- Check point 3 –
If only the positioner part has problem, check the diode of +36V power part(D6,ZD3) and Motor driver Circuits.

6.5.4. Check the Shunt regulator

- Check point 1 –
If the main power has problem, check the parts of main power.
The voltage at U6.1(ref) should 2.5V. If not, replace U6 with new one.
- Check point 2 –
If only the positioner power part has problem, check the part of +36V power. The +36V power is turned on only when the motor is activated.
The voltage at U3.1(ref) should 2.5V when the motor is activated. If not, replace U3 with new one.

6.5.5. Check SPS(Power switch IC)

- Check point 1 –

If the main power has problem, check SPS of main power(U2).

Check if it has damages. And replace it with new one.

- Check point 2 –

If only the positioner power(+36V) part has problem, check SPS of +36V power(U1).

Check if it has damage. And replace it with new one.

6.5.6. Check the Relays

- Check point 1 –

To check the relays, try to move the motor east and west repeatedly. If it moves only one direction, one of the relays or its related circuit has problem. If the motor does not move at all and the relay makes sound(which is made when the relay change contact.), it is the +36V power problem.

- Check point 2 –

If the relay has no problem even though the relay does not work(it means that it does not fixed even though the relay is replaced with new one), its driving circuit may have problem.

Check the driving voltage of the relay at R16 and R18. It should be higher than 10V.

Q1 drives RL1, Q2 drives RL2. Check it and replace it with new one if it has problem.

To activate the relay independent of motor driving, disconnect the CNO2 from main board, and connect the signal M1(or M2) on CNO2 to +5V. Now, the relay should work. If the relay does not work , it is the problem.

6.5.7. Check the +36V.

- Check point 1 –

If the relay has no problem, it is the +36V power problem.

It will be easy for you to check the voltage at TH2. If it makes +36V power, check the relay and its driving circuits again. The important thing that should be remembered is that the output of the +36V is activated only for about few second if the motor does not move.

- Check point 2 –

To activate the +36V power independent of motor driving, disconnect the CNO2 from main board, and connect the signal M1(or M2) on CNO2 to +5V. Now, the +36V power should be activated. If the +36V does not work , it's the problem.

6.5.8. Check the sensor(REED) input.

- Check point 1 –

If the motor moves only a few seconds, it is the sensor input circuit problem.

To check the sensor input circuit, connect the pulse input of the CNO1 to GND. The pulse signal of CNO2 should about 0V. And disconnect the pulse input from GND. The pulse signal of CNO2 should be about 5V.

6.5.9. Check the Photocoupler IC

- Check point 1 –

If the main power has problem, check PC3. Check the resistance of diode part and photo Tr part.

If its resistance is about 0 or very low, replace it with new one.

Check if it has damages. And replace it with new one.

- Check point 2 –

If only the positioner power(+36V) part has problem, check PC1 and PC2. Check the resistance of diode part and potho Tr part. If its resistance is about 0 or very low, replace it with new one.

6.5.10. Check the Fuse.

- Check point 1 –

Check the fuse. Before replacing the fuse, check the other problems that can exist yet.

The same kind and rated fuse should be replaced.

7. PIN description of The Major Parts

7.1. Main Board

Part Name	Location Number	Part number
Tuner module	U1	TBMU30321IPB
Regulator	U2	LM317
Reset IC	U11	ELM9727NBA
CPU & Demux and Decoder	U5	IBM39STB02100
FET	U12, U13, U18	IRF7303
Regulator	U15	78L12
Regulator	U16	78L12
Rs232 Driver	U17	MAX232
Flash memory	U7	SST39VF800
SDRAM	U9	K4S641632D
EEPROM	U8	24LC02B-SN
AV switch	U35	STV6412
Audio DAC	U34	UDA1334TS
OP Amp	U33	TL072
RF modulator	U37	RMUP74055WT
Transistor		KSR1101

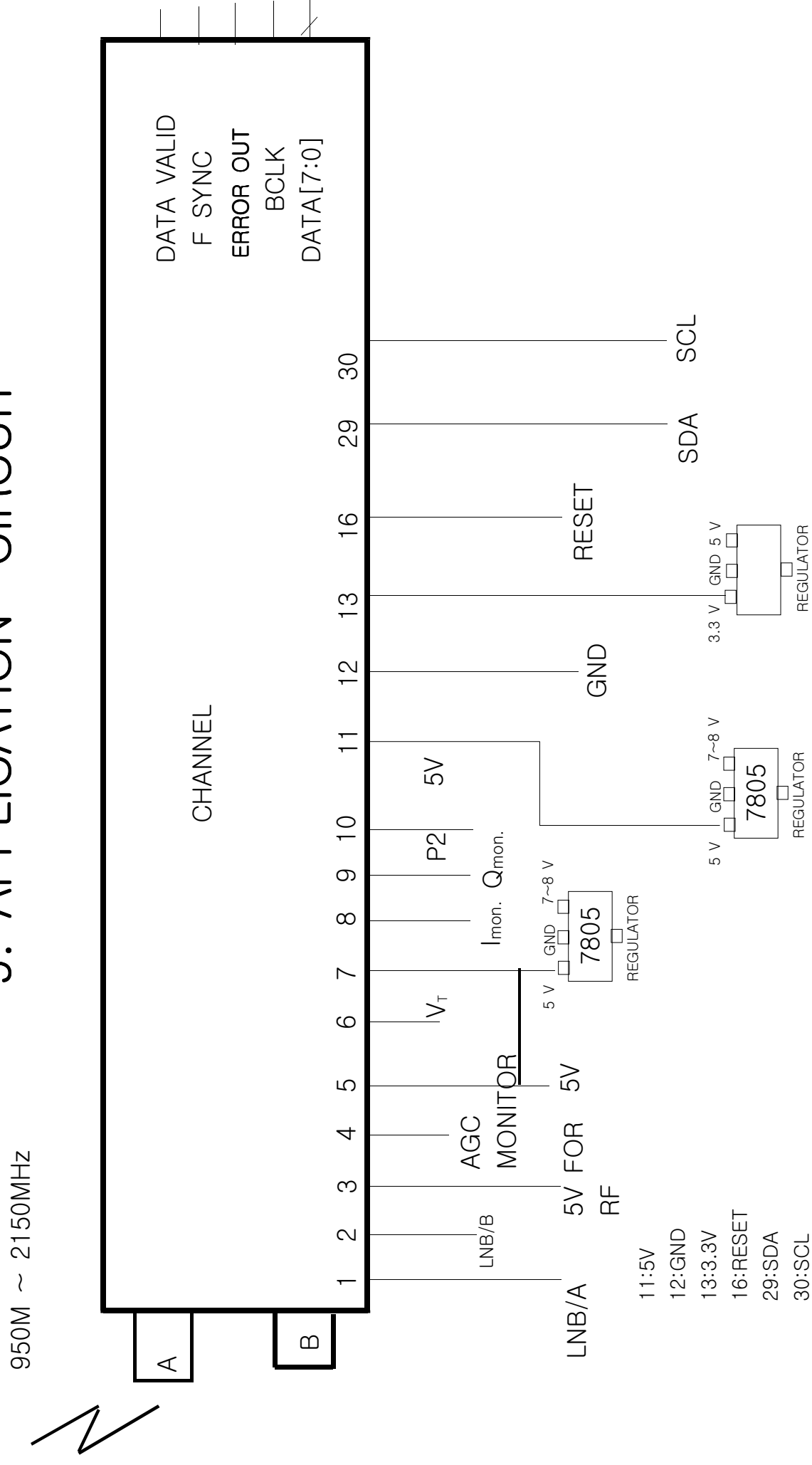
7.2. Front Board

Part Name	Location Number	Part number
Microprocessor	U1	80C52
Reset IC	U2	KIA7442
Remocon sensor	U5	TSOP4838
Transistor		KRA116S

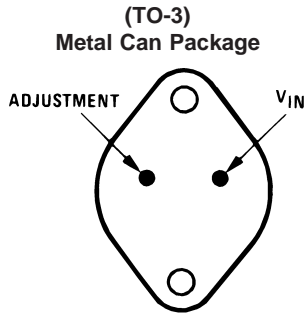
7.3. SMPS

Part Name	Location Number	Part number
Shunt regulator	U3,U6	KA431A
SPS	U2	KA1M0380R
SPS	U1	KA1M0880R

9. APPLICATION CIRCUIT



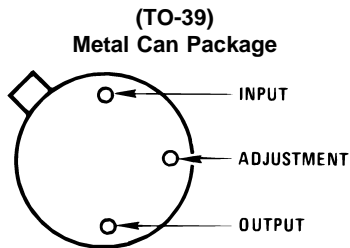
Connection Diagrams



00906330

Bottom View
Steel Package
Order Number LM117K STEEL
or LM317K STEEL
See NS Package Number K02A
Order Number LM117K/883
See NS Package Number K02C

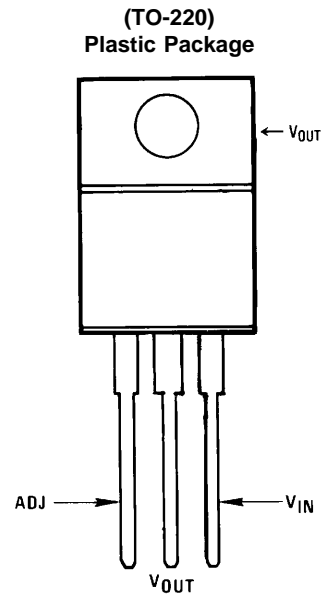
CASE IS OUTPUT



00906331

Bottom View
Order Number LM117H, LM117H/883,
LM317AH or LM317H
See NS Package Number H03A

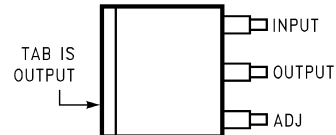
CASE IS OUTPUT



00906332

Front View
Order Number LM317AT or LM317T
See NS Package Number T03B

(TO-263) Surface-Mount Package



00906335

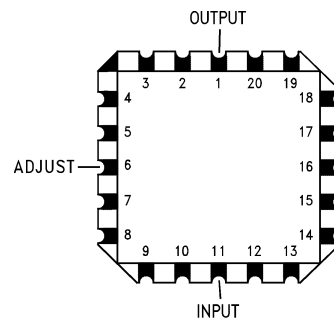
Top View



00906336

Side View
Order Number LM317S
See NS Package Number TS3B

**Ceramic Leadless
Chip Carrier**



00906334

Top View
Order Number LM117E/883
See NS Package Number E20A

ELM97xxxxA VOLTAGE DETECTOR

■ GENERAL DESCRIPTION

ELM 97xxxxA Series is a CMOS Voltage Detector IC for battery-operated portable devices. It consists of a very low-power-consumption reference voltage source, a comparator, an output driver, a hysteresis circuit, and detection voltage setting resistors. Output logic is positive, therefore output level is low when VDD is lower than detection voltage.

It can be used as a reset controller in microcomputer-based systems. And it can be widely applied to the devices, such as battery checkers, switching circuit of back-up power source, power failure detectors, etc. Two output styles are available, N-ch opendrain and CMOS output.

It is available in SOT-89 and SOT-23.

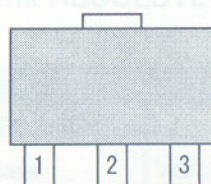
■ FEATURES

- Low power operation : TYP. $1.0 \mu A$ ($V_{DD} = 1.5V$)
- Low voltage operation : Reset operation assured at $0.8V$
- High accuracy of detection voltage : $\pm 2.5\%$
- Low temperature coefficient : TYP. $-300ppm/^{\circ}C$ (Detection voltage $< 2.0V$)
: TYP. $-100ppm/^{\circ}C$ (Detection voltage $\geq 2.0V$)
- Very small package : SOT-89, SOT-23

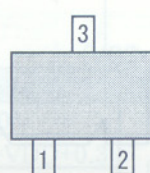
■ APPLICATION

- Reset for microcomputer
- Battery checker
- Power failure detector
- Switching of back-up power source

■ PIN CONFIGURATION (TOP VIEW)



SOT-89



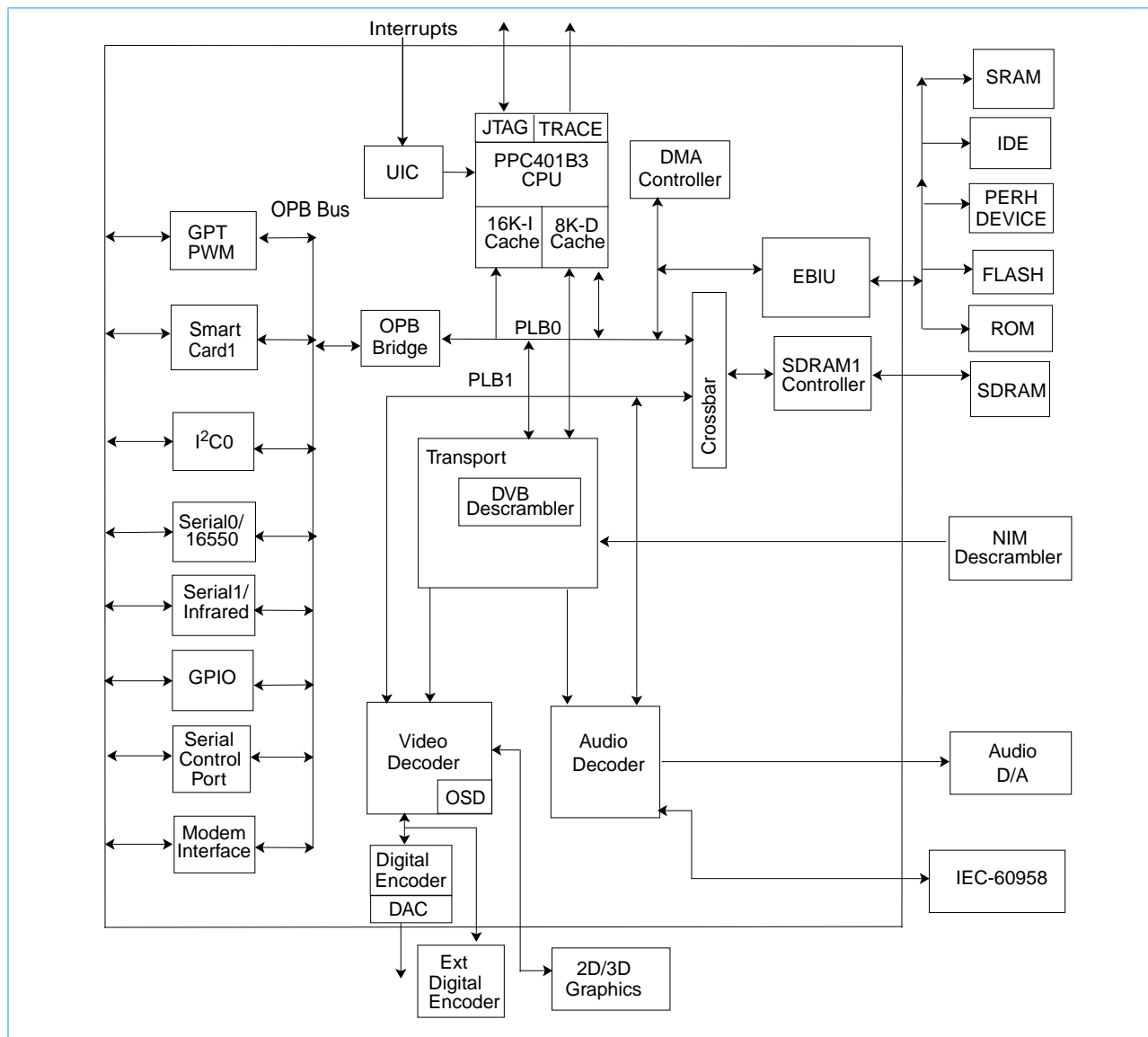
SOT-23

Pin No.	Pin Name
1	OUT
2	VDD
3	VSS

Pin No.	Pin Name
1	OUT
2	VSS
3	VDD

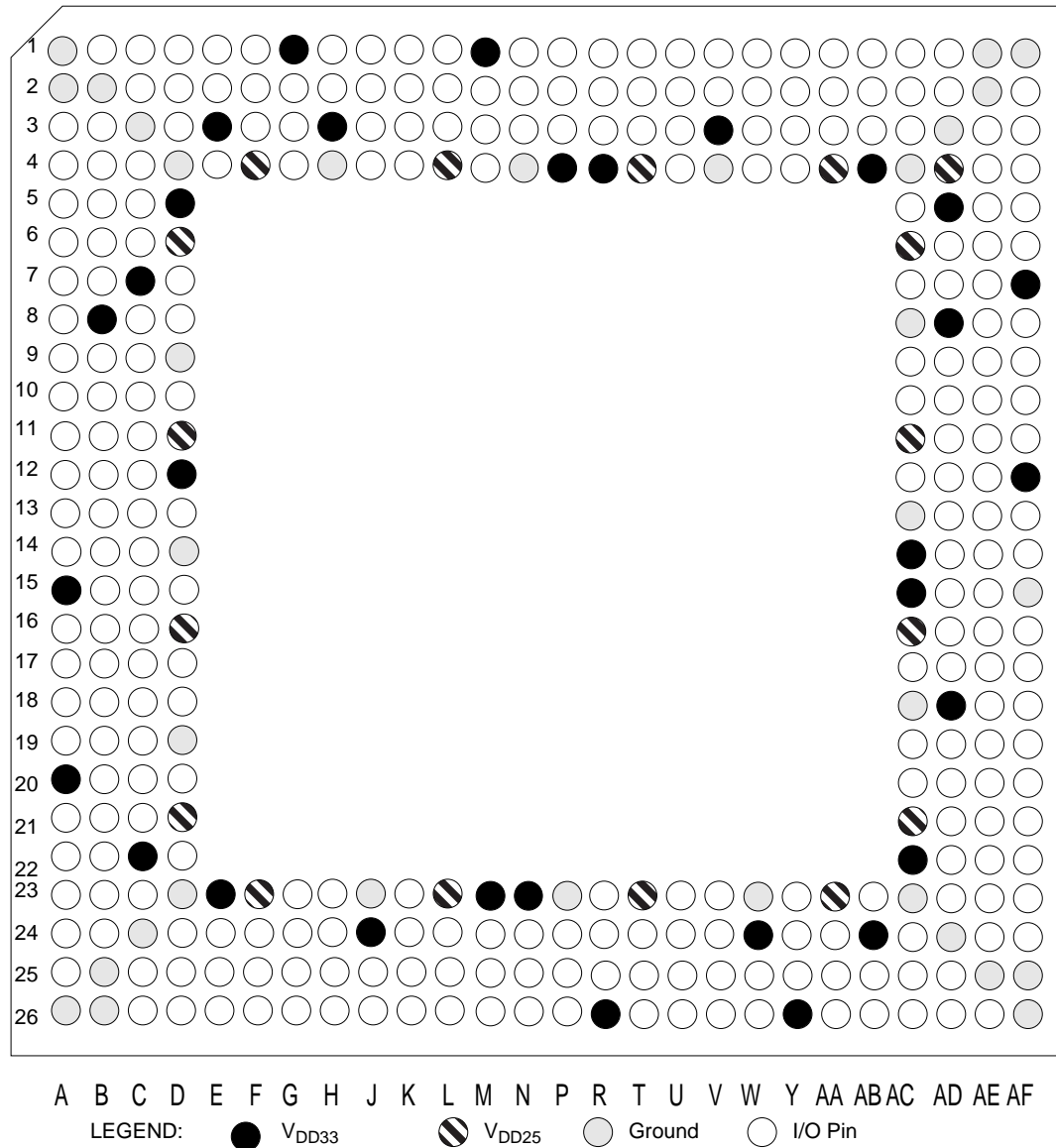
Architecture and Subsystem Information

Block Diagram



Pin and I/O Information

Pinout Diagram



Signal Pins Sorted by Signal Name

Signal	Grid (Pin) Position	Group	Signal	Grid (Pin) Position	Group
AUD_VDDA0	AF15	PLL Analog PWR + GND	BI_DATA2	AD16	Bus Interface
AUD_VDDA1	AE12	PLL Analog PWR + GND	BI_DATA3	AD15	Bus Interface
BI_ADDRESS8 (MSB)	AF11	Bus Interface	BI_DATA4	AE15	Bus Interface
BI_ADDRESS9	AD10	Bus Interface	BI_DATA5	AE16	Bus Interface
BI_ADDRESS10	AE10	Bus Interface	BI_DATA6	AE17	Bus Interface
BI_ADDRESS11	AE9	Bus Interface	BI_DATA7	AF19	Bus Interface
BI_ADDRESS12	AC9	Bus Interface	BI_DATA8	AE18	Bus Interface
BI_ADDRESS13	AE11	Bus Interface	BI_DATA9	AC17	Bus Interface
BI_ADDRESS14	AD4	Bus Interface	BI_DATA10	AF16	Bus Interface
BI_ADDRESS15	AF4	Bus Interface	BI_DATA11	AD14	Bus Interface
BI_ADDRESS16	AE5	Bus Interface	BI_DATA12	AF14	Bus Interface
BI_ADDRESS17	AC5	Bus Interface	BI_DATA13	AD13	Bus Interface
BI_ADDRESS18	AC7	Bus Interface	BI_DATA14	AF18	Bus Interface
BI_ADDRESS19	AD6	Bus Interface	BI_DATA15	AE20	Bus Interface
BI_ADDRESS20	AD7	Bus Interface	BI_DATA16	AD25	Bus Interface
BI_ADDRESS21	AE8	Bus Interface	BI_DATA17	AD23	Bus Interface
BI_ADDRESS22	AD9	Bus Interface	BI_DATA18	AE23	Bus Interface
BI_ADDRESS23	AC10	Bus Interface	BI_DATA19	AE22	Bus Interface
BI_ADDRESS24	AF9	Bus Interface	BI_DATA20	AD19	Bus Interface
BI_ADDRESS25	AF8	Bus Interface	BI_DATA21	AF21	Bus Interface
BI_ADDRESS26	AE7	Bus Interface	BI_DATA22	AD21	Bus Interface
BI_ADDRESS27	AF6	Bus Interface	BI_DATA23	AE26	Bus Interface
BI_ADDRESS28	AF5	Bus Interface	BI_DATA24	AE24	Bus Interface
BI_ADDRESS29	AE3	Bus Interface	BI_DATA25	AD22	Bus Interface
BI_ADDRESS30	AF3	Bus Interface	BI_DATA26	AF22	Bus Interface
BI_ADDRESS31 (LSB)/BI_WBE1	AF2	Bus Interface	BI_DATA27	AC20	Bus Interface
BI_CS0	AD11	Bus Interface	BI_DATA28	AC19	Bus Interface
BI_CS1	AF13	Bus Interface	BI_DATA29	AF20	Bus Interface
BI_CS2	AB3	Bus Interface	BI_DATA30	AF24	Bus Interface
BI_CS3	AC1	Bus Interface	BI_DATA31	AD26	Bus Interface
BI_DATA0 (MSB)	AE19	Bus Interface	BI_OE	AE13	Bus Interface
BI_DATA1	AD17	Bus Interface	BI_READY	AC12	Bus Interface



Signal Pins Sorted by Signal Name (Continued)

Signal	Grid (Pin) Position	Group	Signal	Grid (Pin) Position	Group
BI_RW	AE14	Bus Interface	DAC1_ROUT	C14	Video and Graphics
BI_WBE0	AD12	Bus Interface	DAC1_RREF_OUT	A9	Video and Graphics
CI_CLOCK	F26	Channel Interface	DAC1_VREF_IN	C10	Video and Graphics
CI_DATA0 (MSB)	C25	Channel Interface	DAC2_AGND0	B13	DAC Analog PWR + GND
CI_DATA1	D24	Channel Interface	DAC2_AGND1	B16	DAC Analog PWR + GND
CI_DATA2	G23	Channel Interface	DAC2_AGND2	D18	DAC Analog PWR + GND
CI_DATA3	A24	Channel Interface	DAC2_AVDD0	A14	DAC Analog PWR + GND
CI_DATA4	E26	Channel Interface	DAC2_AVDD1	C16	DAC Analog PWR + GND
CI_DATA5	B24	Channel Interface	DAC2_AVDD2	D17	DAC Analog PWR + GND
CI_DATA6	G26	Channel Interface	DAC2_AVDD3	C19	DAC Analog PWR + GND
CI_DATA7 (LSB)	E24	Channel Interface	DAC2_BOUT	A19	Video and Graphics
CI_DATA_ENABLE	H24	Channel Interface	DAC2_BREF_OUT	B19	Video and Graphics
CLK_VDDA	AC2	PLL Analog PWR + GND	DAC2_GOUT	B15	Video and Graphics
DA_BIT_CLOCK	P1	Audio	DAC2_GREF_IN	D15	Video and Graphics
DA_IEC_958	M3	Audio	DAC2_ROUT	C15	Video and Graphics
DA_LR_CHANNEL_CLOCK	M4	Audio	DAC2_RREF_OUT	B18	Video and Graphics
DA_OVERSAMPLING_CLOCK	P2	Audio	DAC2_VREF_IN	B17	Video and Graphics
DA_SERIAL_DATA0	R2	Audio	DV1_DATA0 (MSB)	C5	Video and Graphics
DAC1_AGND0	D13	DAC Analog PWR + GND	DV1_DATA1	B5	Video and Graphics
DAC1_AGND1	B10	DAC Analog PWR + GND	DV1_DATA2	C8	Video and Graphics
DAC1_AGND2	D8	DAC Analog PWR + GND	DV1_DATA3	B4	Video and Graphics
DAC1_AVDD0	B12	DAC Analog PWR + GND	DV1_DATA4	C6	Video and Graphics
DAC1_AVDD1	B11	DAC Analog PWR + GND	DV1_DATA5	C4	Video and Graphics
DAC1_AVDD2	D10	DAC Analog PWR + GND	DV1_DATA6	B3	Video and Graphics
DAC1_AVDD3	C9	DAC Analog PWR + GND	DV1_DATA7 (LSB)	A4	Video and Graphics
DAC1_BOUT	B7	Video and Graphics	DV1_HSYNC	A8	Video and Graphics
DAC1_BREF_OUT	A7	Video and Graphics	DV1_PIXEL_CLOCK	A6	Video and Graphics
DAC1_GOUT	A11	Video and Graphics	DV1_VSYNC	A3	Video and Graphics
DAC1_GREF_OUT	C13	Video and Graphics	G_SYSTEM_CLOCK	AC3	Global

Signal Pins Sorted by Signal Name (Continued)

Signal	Grid (Pin) Position	Group	Signal	Grid (Pin) Position	Group
G_SYSTEM_RST	G3	Global	GPIO_5	C23	General Purpose I/O
GND	P23	Ground	GPIO_6	Y4	General Purpose I/O
GND	V4	Ground	GPIO_7	AA1	General Purpose I/O
GND	A1	Ground	GPIO_8	W3	General Purpose I/O
GND	A2	Ground	GPIO_9	L2	General Purpose I/O
GND	A26	Ground	GPIO_10	K3	General Purpose I/O
GND	AC4	Ground	GPIO_11	G2	General Purpose I/O
GND	AC8	Ground	GPIO_12	M2	General Purpose I/O
GND	AC13	Ground	GPIO_13	L3	General Purpose I/O
GND	AC18	Ground	GPIO_14	H1	General Purpose I/O
GND	AC23	Ground	GPIO_15	N2	General Purpose I/O
GND	AD3	Ground	GPIO_16	AA25	General Purpose I/O
GND	AD24	Ground	GPIO_17	Y23	General Purpose I/O
GND	AE1	Ground	GPIO_18	A22	General Purpose I/O
GND	AE2	Ground	GPIO_19	D20	General Purpose I/O
GND	AE25	Ground	GPIO_20	C21	General Purpose I/O
GND	AF1	Ground	GPIO_21	B21	General Purpose I/O
GND	AF25	Ground	GPIO_22	B20	General Purpose I/O
GND	AF26	Ground	GPIO_23	A21	General Purpose I/O
GND	B2	Ground	GPIO_24	A16	General Purpose I/O
GND	B25	Ground	GPIO_25	B14	General Purpose I/O
GND	B26	Ground	GPIO_26	A12	General Purpose I/O
GND	C3	Ground	GPIO_27	C12	General Purpose I/O
GND	C24	Ground	GPIO_28	C11	General Purpose I/O
GND	D4	Ground	GPIO_29	J2	General Purpose I/O
GND	D9	Ground	GPIO_30	AB1	General Purpose I/O
GND	D19	Ground	GPIO_31	AB2	General Purpose I/O
GND	D23	Ground	I2C0_SCL	N1	Inter-Integrated Circuit)
GND	H4	Ground	I2C0_SDA	N3	Inter-Integrated Circuit
GND	J23	Ground	INT0	AC24	Interrupt
GND	N4	Ground	INT1	C26	Interrupt
GND	D14	Ground	INT2	AD2	Interrupt
GND	W23	Ground	INT3	AD1	Interrupt
GPIO_2	B9	General Purpose I/O	MUX1_0	AB25	Multiplexed I/O
GPIO_3	AB26	General Purpose I/O	MUX1_1	AB23	Multiplexed I/O
GPIO_4	P26	General Purpose I/O	MUX1_2	AC26	Multiplexed I/O



Advance

STB0210x Digital Set-Top Box Integrated Controllers

Signal Pins Sorted by Signal Name (Continued)

Signal	Grid (Pin) Position	Group	Signal	Grid (Pin) Position	Group
MUX2_0	C2	Multiplexed I/O	SD1_CLK	R23	SDRAM1 Controller
MUX2_1	D1	Multiplexed I/O	SD1_CS0	N26	SDRAM1 Controller
MUX2_2	E4	Multiplexed I/O	SD1_DATA0 (MSB)	AA26	SDRAM1 Controller
MUX2_3	E1	Multiplexed I/O	SD1_DATA1	Y24	SDRAM1 Controller
MUX3_0	V2	Multiplexed I/O	SD1_DATA2	W26	SDRAM1 Controller
MUX3_1	V1	Multiplexed I/O	SD1_DATA3	V25	SDRAM1 Controller
MUX3_2	P3	Multiplexed I/O	SD1_DATA4	V24	SDRAM1 Controller
MUX3_3	U3	Multiplexed I/O	SD1_DATA5	U25	SDRAM1 Controller
MUX3_4	U2	Multiplexed I/O	SD1_DATA6	U24	SDRAM1 Controller
MUX3_5	U4	Multiplexed I/O	SD1_DATA7	T26	SDRAM1 Controller
MUX3_6	T3	Multiplexed I/O	SD1_DATA8	U23	SDRAM1 Controller
MUX3_7	T2	Multiplexed I/O	SD1_DATA9	T25	SDRAM1 Controller
MUX3_8	T1	Multiplexed I/O	SD1_DATA10	U26	SDRAM1 Controller
MUX3_9	R3	Multiplexed I/O	SD1_DATA11	V26	SDRAM1 Controller
MUX3_10	R1	Multiplexed I/O	SD1_DATA12	V23	SDRAM1 Controller
Reserved (Tie to 3.3V)	F3	Global	SD1_DATA13	W25	SDRAM1 Controller
SC0_CLK	Y2	Smart Card Interface 0	SD1_DATA14	Y25	SDRAM1 Controller
SC0_DETECT	Y1	Smart Card Interface 0	SD1_DATA15 (LSB)	AA24	SDRAM1 Controller
SC0_IO	W4	Smart Card Interface 0	SD1_DQMH	P25	SDRAM1 Controller
SC0_RESET	W1	Smart Card Interface 0	SD1_DQML	T24	SDRAM1 Controller
SC0_VCC_COMMAND	W2	Smart Card Interface 0	SD1_RAS	N25	SDRAM1 Controller
SD1_ADDRESS0 (MSB)	M25	SDRAM1 Controller	SD1_WE	R25	SDRAM1 Controller
SD1_ADDRESS1	N24	SDRAM1 Controller	SERIAL1/INFRARED_CTS	F2	Serial1 / Infrared
SD1_ADDRESS2	P24	SDRAM1 Controller	SERIAL1/INFRARED_RTS	D36	Serial1 / Infrared
SD1_ADDRESS3	M26	SDRAM1 Controller	SERIAL1/INFRARED_RXD	G4	Serial1 / Infrared
SD1_ADDRESS4	L25	SDRAM1 Controller	SERIAL1/INFRARED_TXD	C1	Serial1 / Infrared
SD1_ADDRESS5	M24	SDRAM1 Controller	VDD25	AA4	2.5 V Power
SD1_ADDRESS6	K23	SDRAM1 Controller	VDD25	AA23	2.5 V Power
SD1_ADDRESS7	K24	SDRAM1 Controller	VDD25	AC6	2.5 V Power
SD1_ADDRESS8	J26	SDRAM1 Controller	VDD25	AC11	2.5 V Power
SD1_ADDRESS9	H26	SDRAM1 Controller	VDD25	AC16	2.5 V Power
SD1_ADDRESS10	J25	SDRAM1 Controller	VDD25	AC21	2.5 V Power
SD1_ADDRESS11	L24	SDRAM1 Controller	VDD25	D6	2.5 V Power
SD1_ADDRESS12	K25	SDRAM1 Controller	VDD25	D11	2.5 V Power
SD1_ADDRESS13 (LSB)	L26	SDRAM1 Controller	VDD25	D16	2.5 V Power
SD1_CAS	R24	SDRAM1 Controller	VDD25	D21	2.5 V Power

Signal Pins Sorted by Signal Name (Continued)

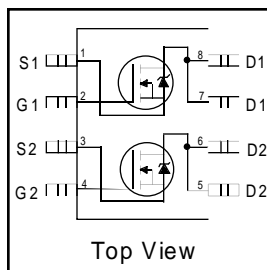
Signal	Grid (Pin) Position	Group	Signal	Grid (Pin) Position	Group
VDD25	F4	2.5 V Power	VDD33	AC14	3.3 V Power
VDD25	F23	2.5 V Power	VDD33	AC15	3.3 V Power
VDD25	L4	2.5 V Power	VDD33	AD18	3.3 V Power
VDD25	L23	2.5 V Power	VDD33	AC22	3.3 V Power
VDD25	T4	2.5 V Power	VDD33	AB24	3.3 V Power
VDD25	T23	2.5 V Power	VDD33	Y26	3.3 V Power
VDD33	E3	3.3 V Power	VDD33	W24	3.3 V Power
VDD33	G1	3.3 V Power	VDD33	R26	3.3 V Power
VDD33	H3	3.3 V Power	VDD33	N23	3.3 V Power
VDD33	M1	3.3 V Power	VDD33	M23	3.3 V Power
VDD33	P4	3.3 V Power	VDD33	J24	3.3 V Power
VDD33	R4	3.3 V Power	VDD33	E23	3.3 V Power
VDD33	V3	3.3 V Power	VDD33	C22	3.3 V Power
VDD33	AB4	3.3 V Power	VDD33	A20	3.3 V Power
VDD33	AD5	3.3 V Power	VDD33	A15	3.3 V Power
VDD33	AF7	3.3 V Power	VDD33	D12	3.3 V Power
VDD33	AD8	3.3 V Power	VDD33	D5	3.3 V Power
VDD33	AF12	3.3 V Power	VDD33	B8	3.3 V Power
			VDD33	C7	3.3 V Power

- Generation V Technology
- Ultra Low On-Resistance
- Dual N-Channel Mosfet
- Surface Mount
- Available in Tape & Reel
- Dynamic dv/dt Rating
- Fast Switching

Description

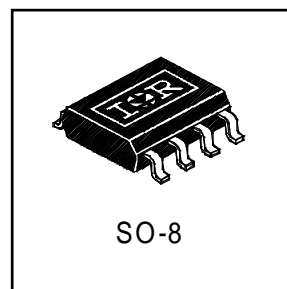
Fifth Generation HEXFETs from International Rectifier utilize advanced processing techniques to achieve the lowest possible on-resistance per silicon area. This benefit, combined with the fast switching speed and ruggedized device design that HEXFET Power MOSFETs are well known for, provides the designer with an extremely efficient device for use in a wide variety of applications.

The SO-8 has been modified through a customized leadframe for enhanced thermal characteristics and multiple-die capability making it ideal in a variety of power applications. With these improvements, multiple devices can be used in an application with dramatically reduced board space. The package is designed for vapor phase, infra red, or wave soldering techniques. Power dissipation of greater than 0.8W is possible in a typical PCB mount application.



$$V_{DSS} = 30V$$

$$R_{DS(on)} = 0.050\Omega$$



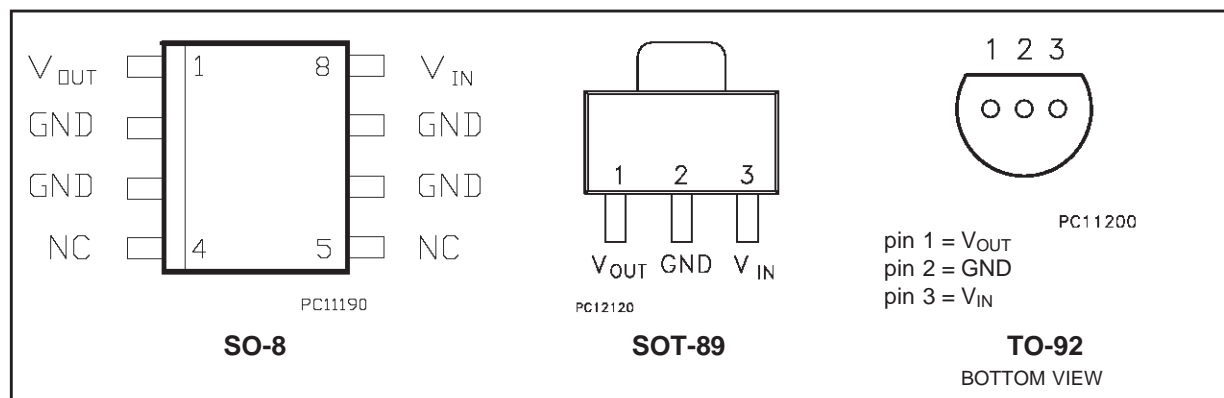
Absolute Maximum Ratings

	Parameter	Max.	Units
I_D @ $T_A = 25^\circ\text{C}$	10 Sec. Pulsed Drain Current, V_{GS} @ 10V	5.3	A
I_D @ $T_A = 25^\circ\text{C}$	Continuous Drain Current, V_{GS} @ 10V	4.9	
I_D @ $T_A = 70^\circ\text{C}$	Continuous Drain Current, V_{GS} @ 10V	3.9	
I_{DM}	Pulsed Drain Current ①	20	
P_D @ $T_A = 25^\circ\text{C}$	Power Dissipation	2.0	W
	Linear Derating Factor	0.016	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
dv/dt	Peak Diode Recovery dv/dt ②	5.0	V/ns
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to +150	°C

Thermal Resistance Ratings

	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient④	—	62.5	°C/W

CONNECTION DIAGRAM AND ORDERING NUMBERS (top view)

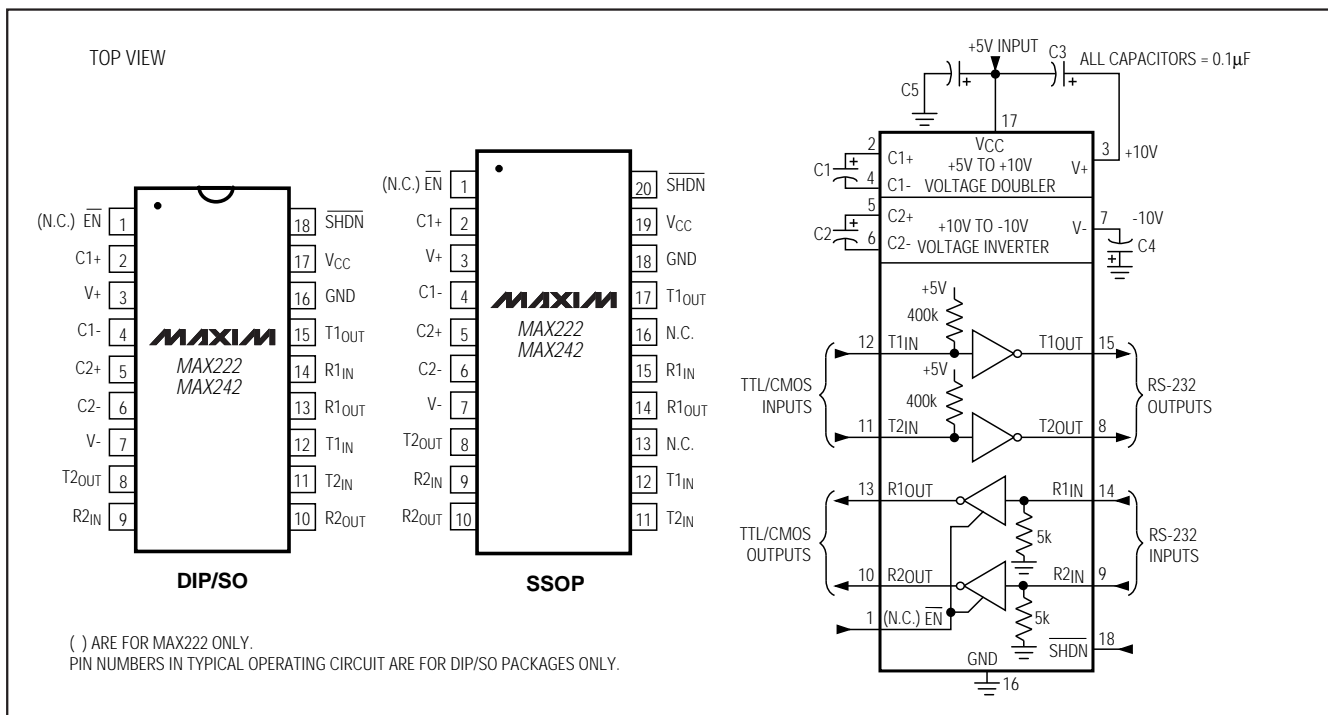
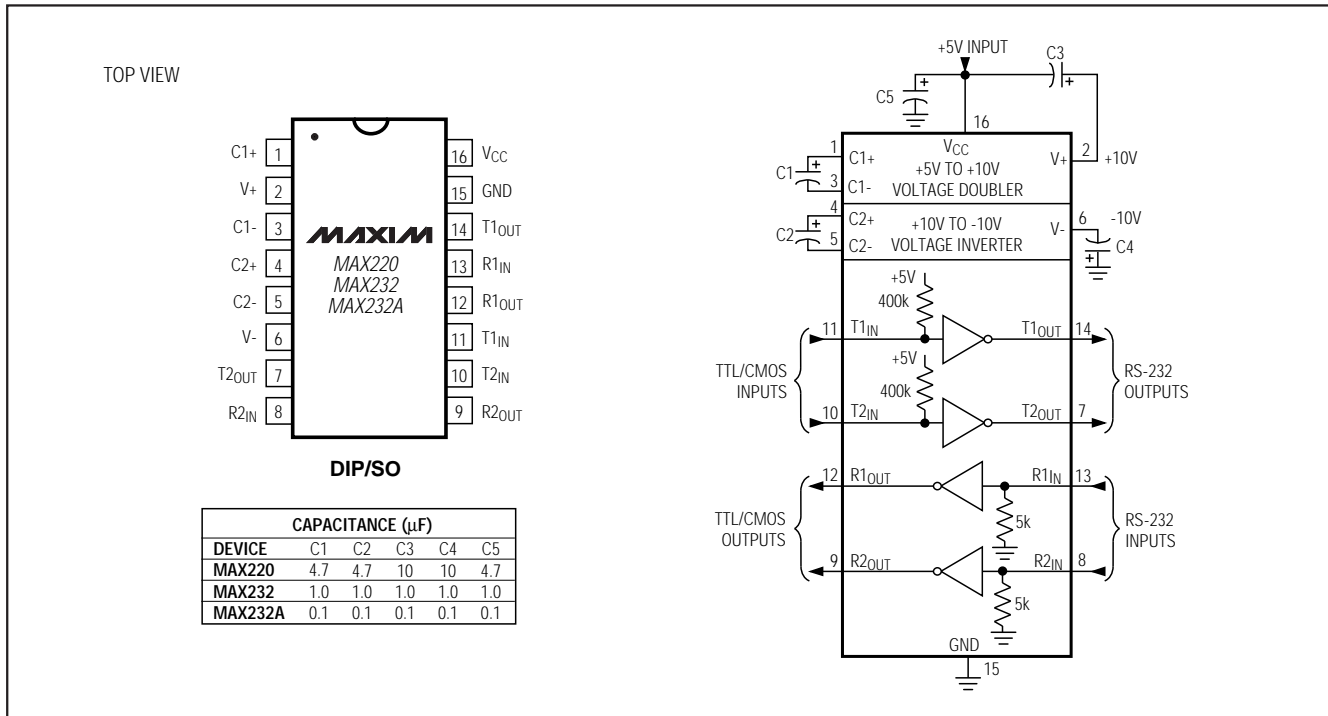


ORDERING NUMBERS

Type	SO-8	TO-92	SOT-89 (T&R)	Output Voltage
L78L33AC	L78L33ACD	L78L33ACZ	L78L33ACUTR	3.3 V
L78L33AB	L78L33ABD	L78L33ABZ	L78L33ABUTR	3.3 V
L78L05C	L78L05CD	L78L05CZ		5 V
L78L05AC	L78L05ACD	L78L05ACZ	L78L05ACUTR	5 V
L78L05AB	L78L05ABD	L78L05ABZ	L78L05ABUTR	5 V
L78L06C	L78L06CD	L78L06CZ		6 V
L78L06AC	L78L06ACD	L78L06ACZ	L78L06ACUTR	6 V
L78L06AB	L78L06ABD	L78L06ABZ	L78L06ABUTR	6 V
L78L08C	L78L08CD	L78L08CZ		8 V
L78L08AC	L78L08ACD	L78L08ACZ	L78L08ACUTR	8 V
L78L08AB	L78L08ABD	L78L08ABZ	L78L08ABUTR	8 V
L78L09C	L78L09CD	L78L09CZ		9 V
L78L09AC	L78L09ACD	L78L09ACZ	L78L09ACUTR	9 V
L78L09AB	L78L09ABD	L78L09ABZ	L78L09ABUTR	9 V
L78L12C	L78L12CD	L78L12CZ		12 V
L78L12AC	L78L12ACD	L78L12ACZ	L78L12ACUTR	12 V
L78L12AB	L78L12ABD	L78L12ABZ	L78L12ABUTR	12 V
L78L15C	L78L15CD	L78L15CZ		15 V
L78L15AC	L78L15ACD	L78L15ACZ	L78L15ACUTR	15 V
L78L15AB	L78L15ABD	L78L15ABZ	L78L15ABUTR	15 V
L78L18C	L78L18CD	L78L18CZ		18 V
L78L18AC	L78L18ACD	L78L18ACZ	L78L18ACUTR	18 V
L78L18AB	L78L18ABD	L78L18ABZ	L78L18ABUTR	18 V
L78L24C	L78L24CD	L78L24CZ		24 V
L78L24AC	L78L24ACD	L78L24ACZ	L78L24ACUTR	24 V
L78L24AB	L78L24ABD	L78L24ABZ	L78L24ABUTR	24 V

+5V-Powered, Multichannel RS-232 Drivers/Receivers

MAX220-MAX249

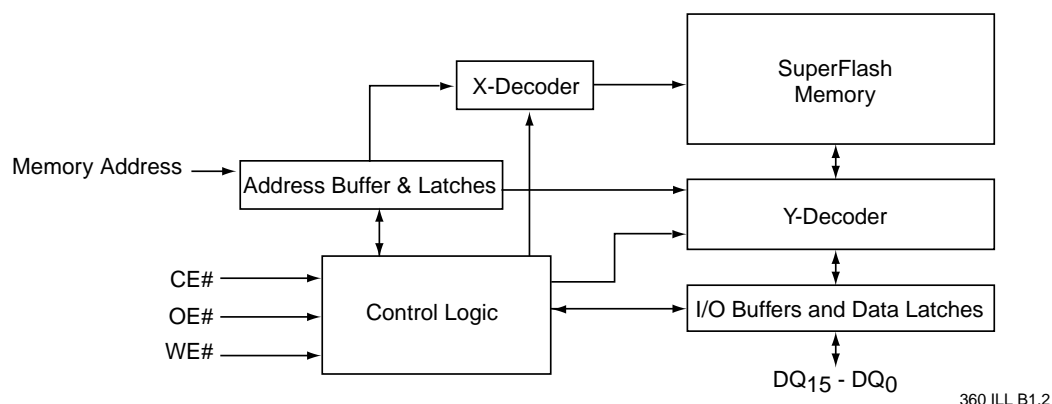


2 Mbit / 4 Mbit / 8 Mbit Multi-Purpose Flash SST39LF200A / SST39LF400A / SST39LF800A SST39VF200A / SST39VF400A / SST39VF800A



Data Sheet

FUNCTIONAL BLOCK DIAGRAM



SST39LF/VF800A SST39LF/VF400A SST39LF/VF200A

SST39LF/VF200A SST39LF/VF400A SST39LF/VF800A

A15	A15	A15
A14	A14	A14
A13	A13	A13
A12	A12	A12
A11	A11	A11
A10	A10	A10
A9	A9	A9
A8	A8	A8
NC	NC	NC
NC	NC	NC
WE#	WE#	WE#
NC	NC	NC
NC	NC	NC
NC	NC	NC
NC	NC	NC
A18	NC	NC
A17	A17	NC
A7	A7	A7
A6	A6	A6
A5	A5	A5
A4	A4	A4
A3	A3	A3
A2	A2	A2
A1	A1	A1

Standard Pinout
Top View
Die Up

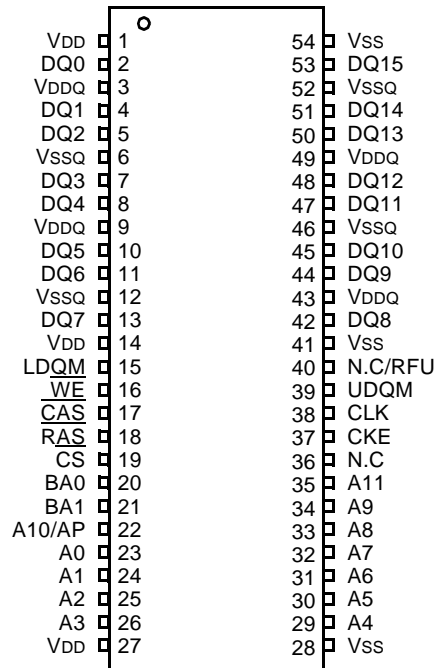
48	A16	A16
47	NC	NC
46	VSS	VSS
45	DQ15	DQ15
44	DQ7	DQ7
43	DQ14	DQ14
42	DQ6	DQ6
41	DQ13	DQ13
40	DQ5	DQ5
39	DQ12	DQ12
38	DQ4	DQ4
37	VDD	VDD
36	DQ11	DQ11
35	DQ3	DQ3
34	DQ10	DQ10
33	DQ2	DQ2
32	DQ9	DQ9
31	DQ1	DQ1
30	DQ8	DQ8
29	DQ0	DQ0
28	OE#	OE#
27	VSS	VSS
26	CE#	CE#
25	A0	A0

SST39LF200A/400A/800A
SST39VF200A/400A/800A

360 ILL F01.2

FIGURE 1: PIN ASSIGNMENTS FOR 48-LEAD TSOP

PIN CONFIGURATION (Top view)



54Pin TSOP (II)
(400mil x 875mil)
(0.8 mm Pin pitch)

PIN FUNCTION DESCRIPTION

Pin	Name	Input Function
CLK	System clock	Active on the positive going edge to sample all inputs.
\overline{CS}	Chip select	Disables or enables device operation by masking or enabling all inputs except CLK, CKE and L(U)DQM
CKE	Clock enable	Masks system clock to freeze operation from the next clock cycle. CKE should be enabled at least one cycle prior to new command. Disable input buffers for power down in standby.
A0 ~ A11	Address	Row/column addresses are multiplexed on the same pins. Row address : RA0 ~ RA11, Column address : CA0 ~ CA7
BA0 ~ BA1	Bank select address	Selects bank to be activated during row address latch time. Selects bank for read/write during column address latch time.
\overline{RAS}	Row address strobe	Latches row addresses on the positive going edge of the CLK with \overline{RAS} low. Enables row access & precharge.
\overline{CAS}	Column address strobe	Latches column addresses on the positive going edge of the CLK with \overline{CAS} low. Enables column access.
\overline{WE}	Write enable	Enables write operation and row precharge. Latches data in starting from CAS, \overline{WE} active.
L(U)DQM	Data input/output mask	Makes data output Hi-Z, tSHZ after the clock and masks the output. Blocks data input when L(U)DQM active.
DQ0 ~ 15	Data input/output	Data inputs/outputs are multiplexed on the same pins.
VDD/VSS	Power supply/ground	Power and ground for the input buffers and the core logic.
VDDQ/VSSQ	Data output power/ground	Isolated power supply and ground for the output buffers to provide improved noise immunity.
N.C/RFU	No connection /reserved for future use	This pin is recommended to be left No Connection on the device.

Features

- Low-Voltage and Standard-Voltage Operation
 - 5.0 ($V_{CC} = 4.5V$ to $5.5V$)
 - 2.7 ($V_{CC} = 2.7V$ to $5.5V$)
 - 2.5 ($V_{CC} = 2.5V$ to $5.5V$)
 - 1.8 ($V_{CC} = 1.8V$ to $5.5V$)
- Internally Organized 128 x 8 (1K), 256 x 8 (2K), 512 x 8 (4K), 1024 x 8 (8K) or 2048 x 8 (16K)
- 2-Wire Serial Interface
- Schmitt Trigger, Filtered Inputs for Noise Suppression
- Bidirectional Data Transfer Protocol
- 100 kHz (1.8V, 2.5V, 2.7V) and 400 kHz (5V) Compatibility
- Write Protect Pin for Hardware Data Protection
- 8-Byte Page (1K, 2K), 16-Byte Page (4K, 8K, 16K) Write Modes
- Partial Page Writes Are Allowed
- Self-Timed Write Cycle (10 ms max)
- High Reliability
 - Endurance: 1 Million Write Cycles
 - Data Retention: 100 Years
 - ESD Protection: >3000V
- Automotive Grade and Extended Temperature Devices Available
- 8-Pin and 14-Pin JEDEC SOIC, 8-Pin PDIP, 8-Pin MSOP, and 8-Pin TSSOP Packages

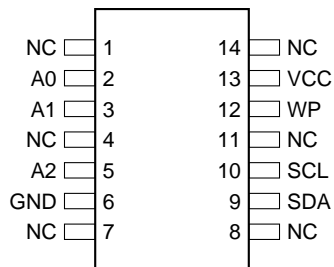
Description

The AT24C01A/02/04/08/16 provides 1024/2048/4096/8192/16384 bits of serial electrically erasable and programmable read only memory (EEPROM) organized as 128/256/512/1024/2048 words of 8 bits each. The device is optimized for use in many industrial and commercial applications where low power and low voltage operation are essential. The AT24C01A/02/04/08/16 is available in space saving 8-pin PDIP, (AT24C01A/02/04/08/16), 8-Pin MSOP (AT24C01A/02), 8-Pin TSSOP (AT24C01A/02/04/08/16), and 8-Pin and 14-Pin JEDEC SOIC (AT24C01A/02/04/08/16) packages and is accessed via a 2-wire serial interface. In addition, the entire family is available in 5.0V (4.5V to 5.5V), 2.7V (2.7V to 5.5V), 2.5V (2.5V to 5.5V) and 1.8V (1.8V to 5.5V) versions.

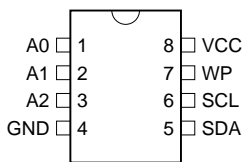
Pin Configurations

Pin Name	Function
A0 - A2	Address Inputs
SDA	Serial Data
SCL	Serial Clock Input
WP	Write Protect
NC	No Connect

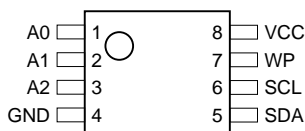
14-Pin SOIC



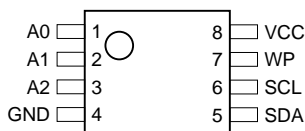
8-Pin PDIP



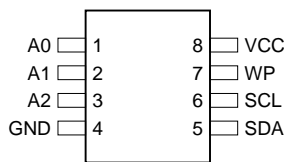
8-Pin TSSOP



8-Pin MSOP



8-Pin SOIC



2-Wire Serial EEPROM

1K (128 x 8)

2K (256 x 8)

4K (512 x 8)

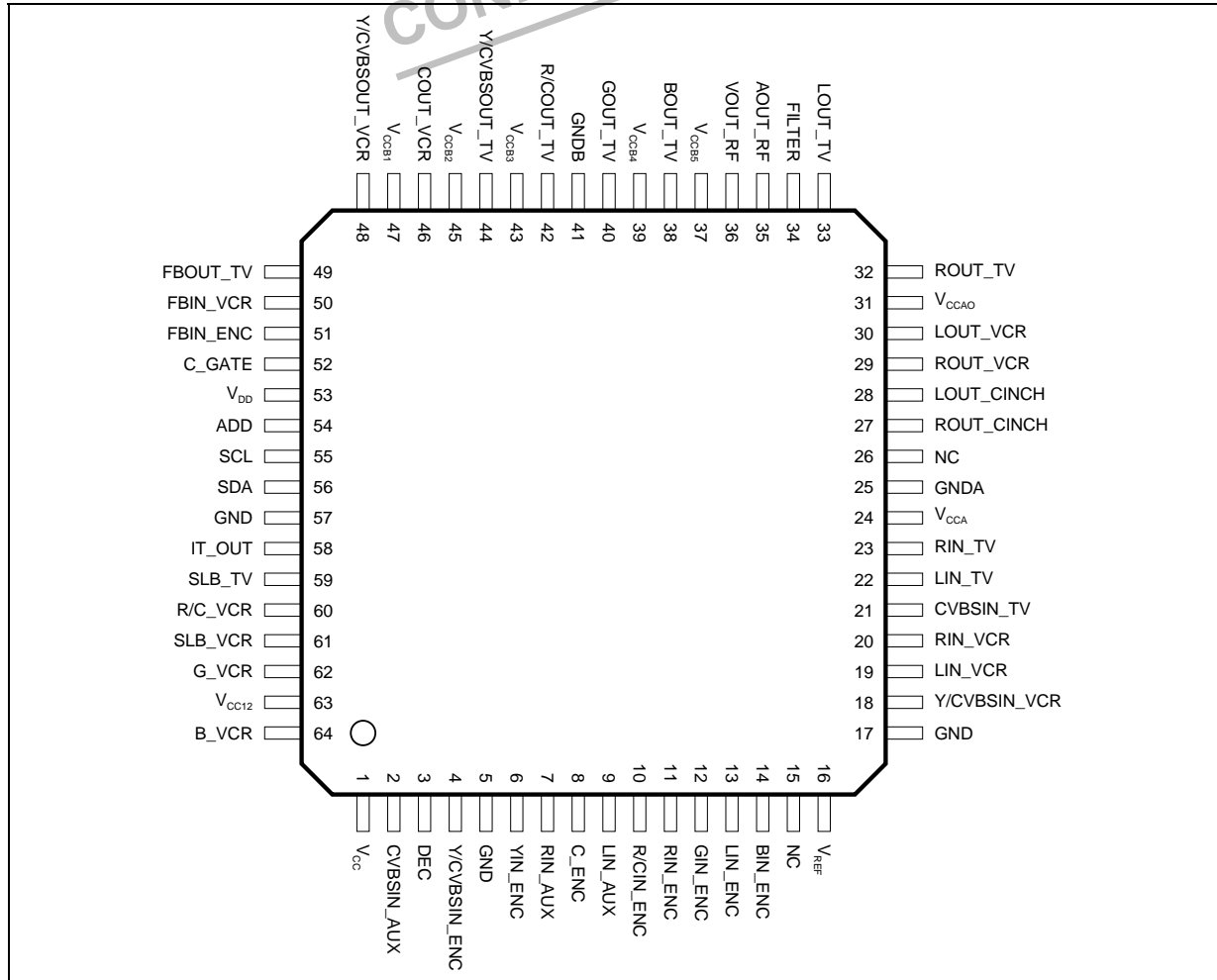
8K (1024 x 8)

16K (2048 x 8)

AT24C01A
AT24C02
AT24C04
AT24C08
AT24C16



PIN CONNECTIONS



6412-01.EPS

PIN LIST

Pin Number	Symbol	Description
1	V _{CC}	+5V Supply
2	CVBSIN_AUX	CVBS Input, from Aux
3	DEC	Decoupling Capacitor
4	Y/CVBSIN_ENC	Y/CVBS Input, from Encoder
5	GND	Ground
6	YIN_ENC	Y Input, from Encoder
7	RIN_AUX	Audio Right Input, from Aux
8	CIN_ENC	Chroma Input, from Encoder
9	LIN_AUX	Audio Left, Input from Aux
10	R/CIN_ENC	Red/Chroma Input, from Encoder
11	RIN_ENC	Audio Right, Input from Encoder
12	GIN_ENC	Green Input, from Encoder
13	LIN_ENC	Audio Left, Input from Encoder
14	BIN_ENC	Blue Input, from Encoder
15	NC	Not Connected
16	V _{REF}	Reference Voltage Decoupling

6412-01.TBL

PIN LIST (continued)

Pin Number	Symbol	Description
17	GND	Ground
18	Y/CVBSIN_VCR	Y/CVBS Input, from VCR scart
19	LIN_VCR	Audio Left, Input from VCR scart
20	RIN_VCR	Audio Right, Input from VCR scart
21	CVBSIN_TV	CVBS Input, from TV scart
22	LIN_TV	Audio Left, Input from TV scart
23	RIN_TV	Audio Right, Input from TV scart
24	V _{CCA}	Audio Supply Voltage - or - Audio Supply Decoupling
25	GNDA	Audio Ground
26	NC	Not Connected
27	ROUT_CINCH	Audio Right Output, to Cinch
28	LOUT_CINCH	Audio Left Output, to Cinch
29	ROUT_VCR	Audio Right Output, to VCR scart
30	LOUT_VCR	Audio Left Output, to VCR scart
31	V _{CCAO}	Audio Outputs Supply Voltage - or - Main Audio Supply Voltage
32	ROUT_TV	Audio Right Output, to TV scart
33	LOUT_TV	Audio Left Output, to TV scart
34	FILTER	Chroma Trap Filter
35	AOUT_RF	Audio(L+R) Output to RF Modulator
36	VOUT_RF	CVBS Video Output to RF Modulator
37	V _{CCB5}	Video Output Buffers Supply Pin
38	BOUT_TV	Blue Output, to TV scart
39	V _{CCB4}	Video Output Buffers Supply Pin
40	GOUT_TV	Green Output, to TV scart
41	GNDB	Video Buffers Ground
42	R/COUT_TV	Red/Chroma Output, to TV scart
43	V _{CCB3}	Video Output Buffers Supply Pin
44	Y/CVBSOUT_TV	Y/CVBS Output, to TV scart
45	V _{CCB2}	Video Output Buffers Supply Pin
46	COUT_VCR	Chroma Output, to VCR scart
47	V _{CCB1}	Video Output Buffers Supply Pin
48	Y/CVBSOUT_VCR	Y/CVBS Output, to VCR scart
49	FBOUT_TV	Fast Blanking Output, to TV scart
50	FBIN_VCR	Fast Blanking Input, from VCR scart
51	FBIN_ENC	Fast Blanking Input, from Encoder
52	C_GATE	External Mos Command for C_VCR bidirectional mode
53	V _{DD}	+5V I ² C Supply
54	ADD	I ² C Address Selection
55	SCL	I ² C Bus Clock
56	SDA	I ² C Bus Data
57	GND	Ground Digital
58	IT_OUT	Interrupt Output
59	SLB_TV	Slow Blanking Input/Output, from TV scart
60	R/CIN_VCR	Red Input (or C Input), from VCR scart
61	SLB_VCR	Slow Blanking Input/Output, from VCR scart
62	GIN_VCR	Green Input, from VCR scart
63	V _{CC12}	+12V Supply
64	BIN_VCR	Blue Input, from VCR scart

6412-01.TBL

Low power audio DAC

UDA1334TS

7 PINNING

SYMBOL	PIN	PAD TYPE	DESCRIPTION
BCK	1	5 V tolerant digital input pad; note 1	bit clock input
WS	2	5 V tolerant digital input pad; note 1	word select input
DATAI	3	5 V tolerant digital input pad; note 1	serial data input
V _{DDD}	4	digital supply pad	digital supply voltage
V _{SSD}	5	digital ground pad	digital ground
SYSCLK	6	5 V tolerant digital input pad; note 1	system clock input
SFOR1	7	5 V tolerant digital input pad; note 1	serial format select 1
MUTE	8	5 V tolerant digital input pad; note 1	mute control
DEEM	9	5 V tolerant digital input pad; note 1	de-emphasis control
PCS	10	3-level input pad; note 2	power control and sampling frequency select
SFOR0	11	digital input pad; note 2	serial format select 0
V _{ref} (DAC)	12	analog pad	DAC reference voltage
V _{DDA}	13	analog supply pad	DAC analog supply voltage
VOUTL	14	analog output pad	DAC output left
V _{SSA}	15	analog ground pad	DAC analog ground
VOUTR	16	analog output pad	DAC output right

Notes

- 1. 5 V tolerant is only supported if the power supply voltage is between 2.7 and 3.6 V. For lower power supply voltages this is maximum 3.3 V tolerant.
- 2. Because of test issues these pads are not 5 V tolerant and they should be at power supply voltage level or at a maximum of 0.5 V above that level.

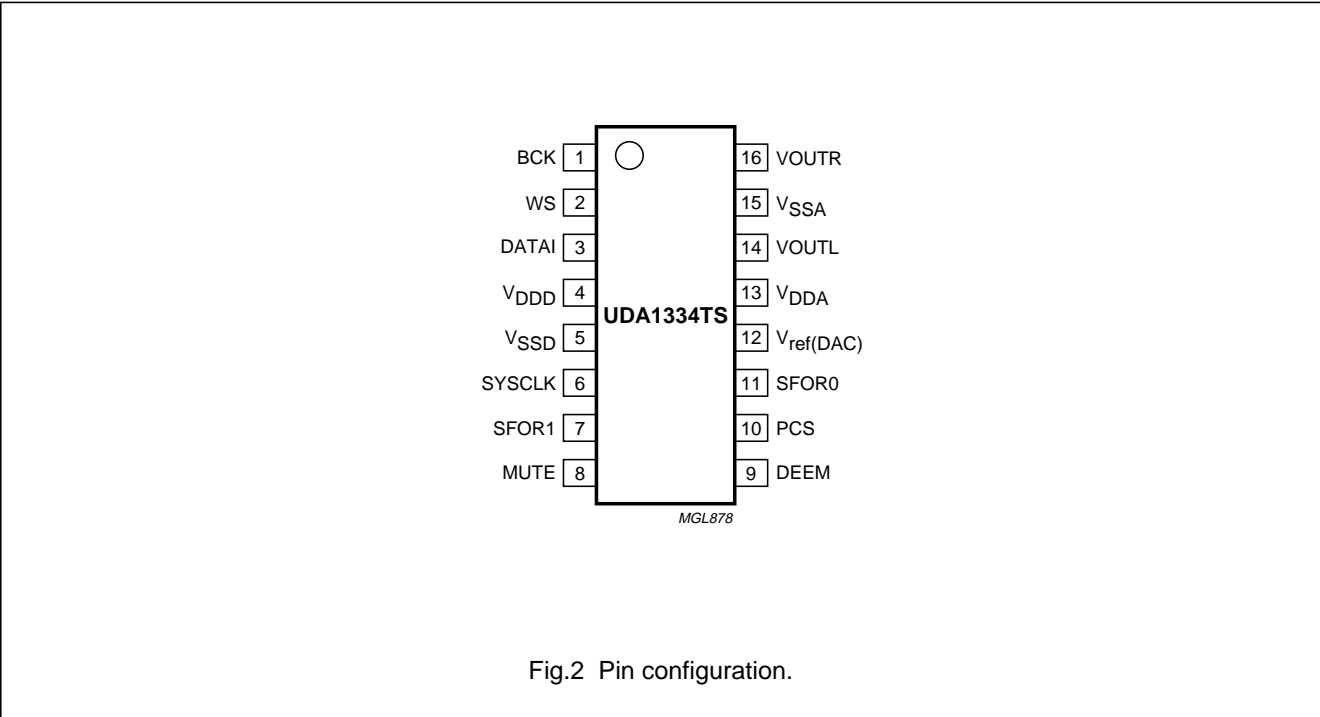


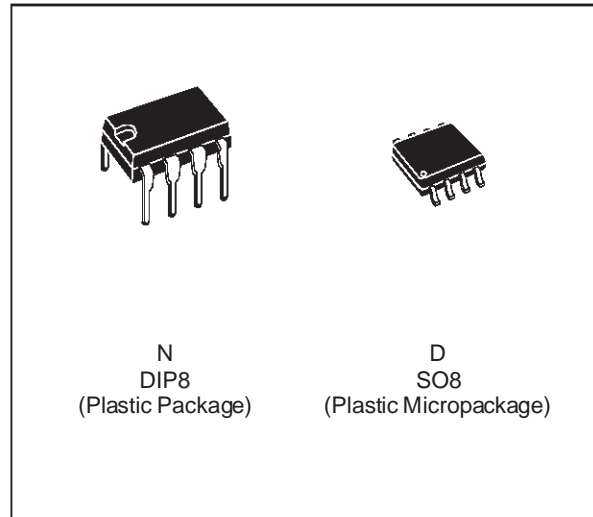
Fig.2 Pin configuration.



TL072 TL072A - TL072B

LOW NOISE J-FET DUAL OPERATIONAL AMPLIFIERS

- WIDE COMMON-MODE (UP TO V_{CC}^+) AND DIFFERENTIAL VOLTAGE RANGE
- LOW INPUT BIAS AND OFFSET CURRENT
- LOW NOISE $e_n = 15\text{nV}/\sqrt{\text{Hz}}$ (typ)
- OUTPUT SHORT-CIRCUIT PROTECTION
- HIGH INPUT IMPEDANCE J-FET INPUT STAGE
- LOW HARMONIC DISTORTION : 0.01% (typ)
- INTERNAL FREQUENCY COMPENSATION
- LATCH UP FREE OPERATION
- HIGH SLEW RATE : $16\text{V}/\mu\text{s}$ (typ)



DESCRIPTION

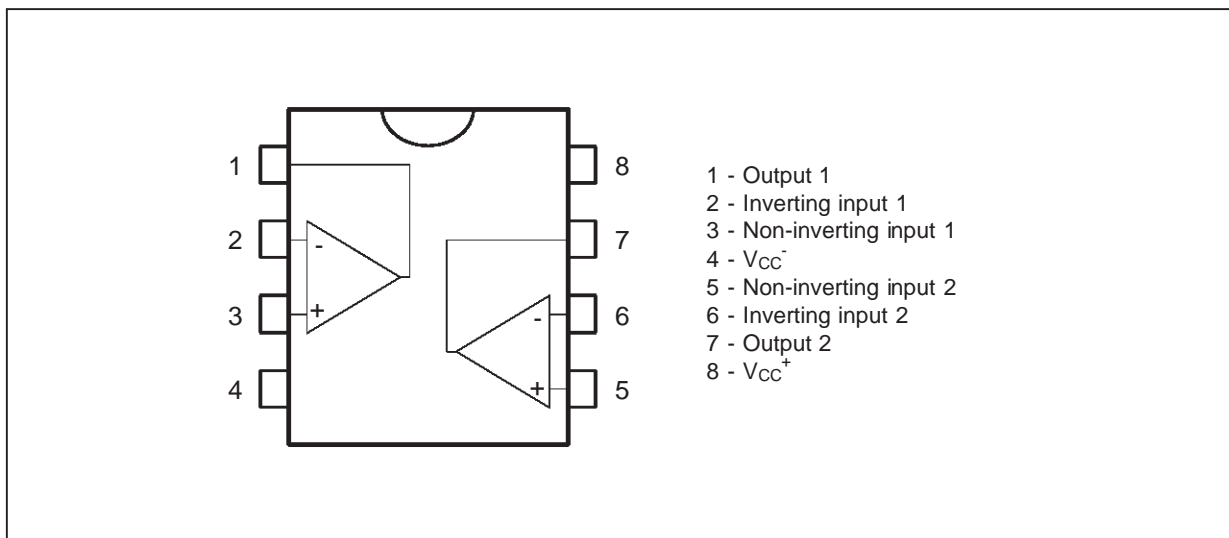
The TL072, TL072A and TL072B are high speed J-FET input dual operational amplifiers incorporating well matched, high voltage J-FET and bipolar transistors in a monolithic integrated circuit.

The devices feature high slew rates, low input bias and offset current, and low offset voltage temperature coefficient.

ORDER CODES

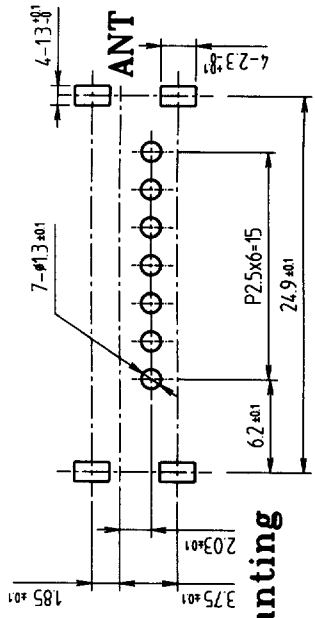
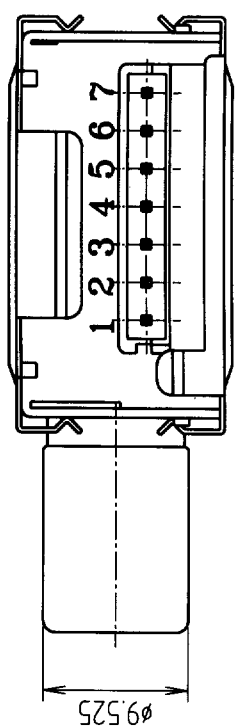
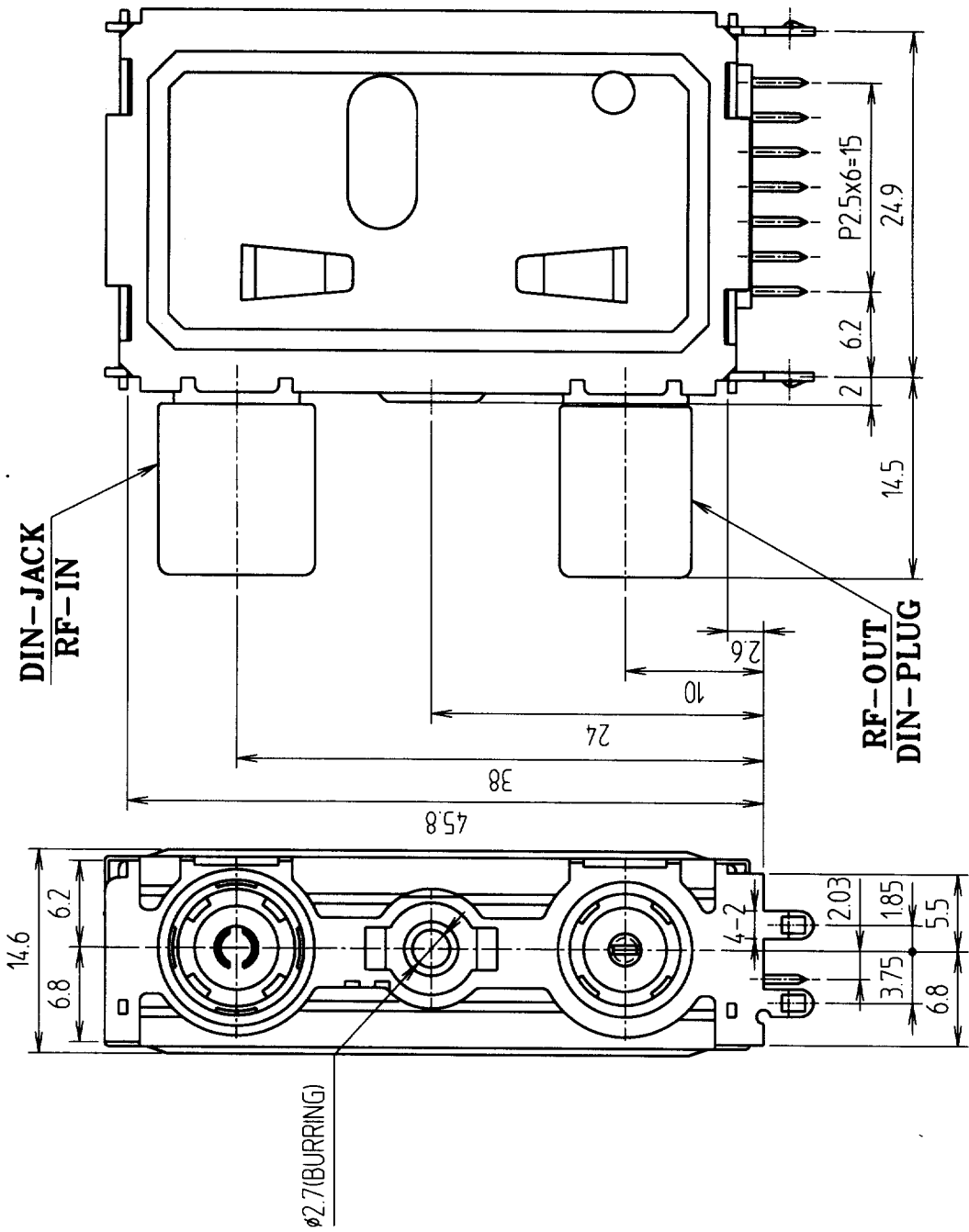
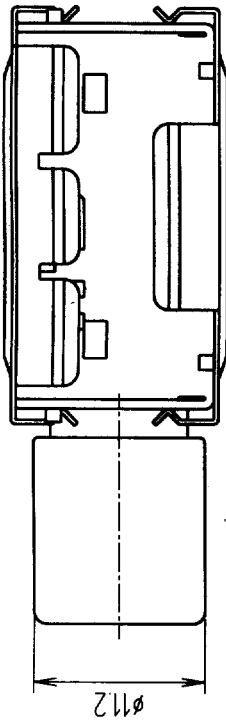
Part Number	Temperature Range	Package	
		N	D
TL072M/AM/BM	-55°C, +125°C	•	•
TL072I/AI/BI	-40°C, +105°C	•	•
TL072C/AC/BC	0°C, +70°C	•	•
Example : TL072CN			

PIN CONNECTIONS (top view)

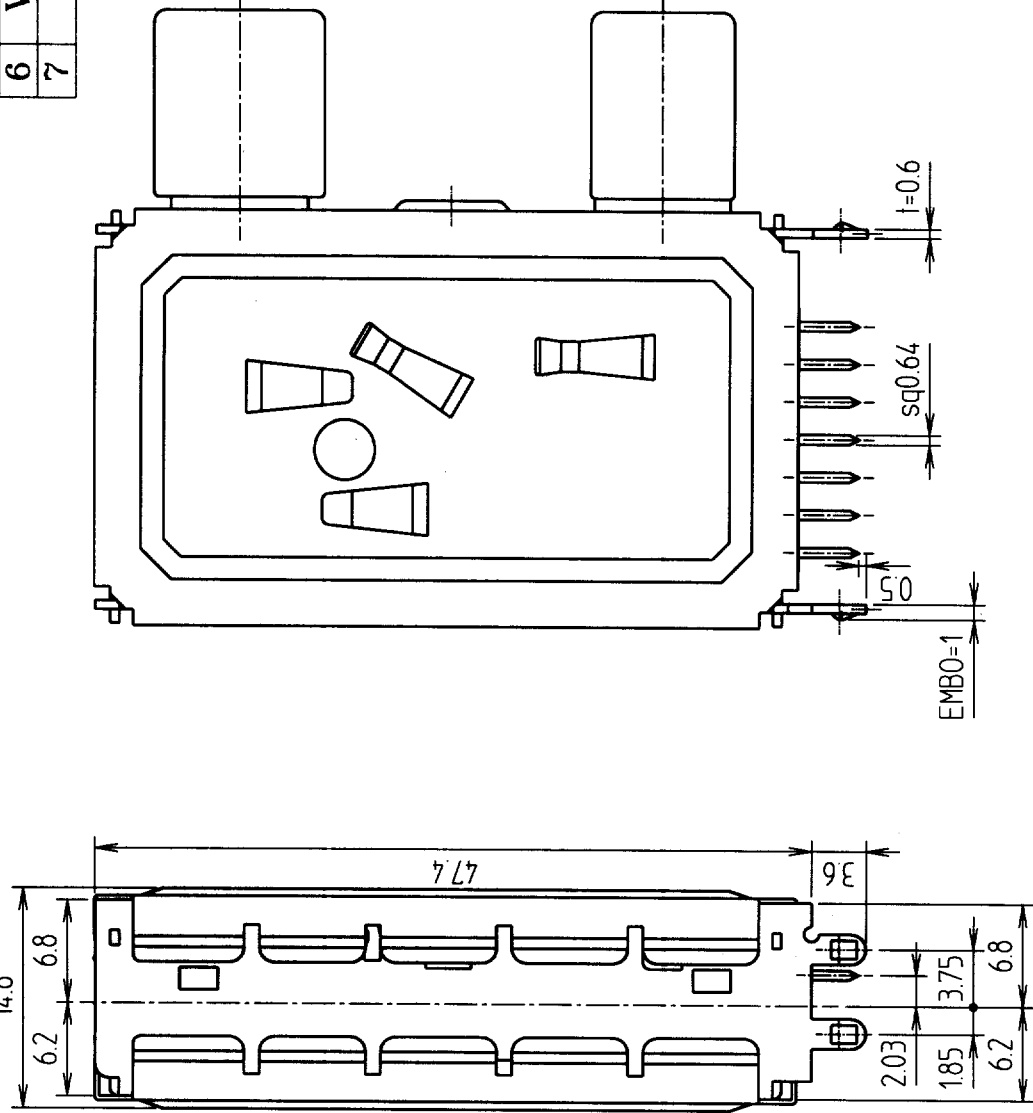


NO	PART NAME	Q'TY	MATERIAL	FINISH	REMARK

NO	NAME
1	BB+
2	AUDIO IN
3	SDA
4	MB+
5	SCL
6	VIDEO IN
7	MD TU



Dimension of P.C.B for RF Modulator Mounting
(Viewed from Copper Pattern)



Rev	DATE	WRITTEN BY	CHECKED BY	DESIGNED	CHECKED	APPROVED	REVISION RECORD	REMARK
1								
2								
3								

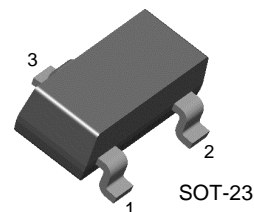
UNIT	m	SCALE	2	1	CAD	S.C.M	OUTDRAWING
TOLERANCE	±0.5	2000.04.18	4/18	4/18	4/18	4/18	RF MOD 12SERIES
FILE NAME	RMUP74055WT	RMUP74055WT	RMUP74055WT	RMUP74055WT	RMUP74055WT	RMUP74055WT	RMUP74055WT
ELECTRO-MECHANICS	3RD ANGLE PROJECTION	NO	NO	NO	NO	NO	B-10300-1200ZZ-0

KSR1101

KSR1101

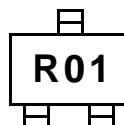
Switching Application (Bias Resistor Built In)

- Switching circuit, Inverter, Interface circuit, Driver Circuit
- Built in bias Resistor ($R_1 = 4.7K\Omega$, $R_2 = 4.7K\Omega$)
- Complement to KSR2101

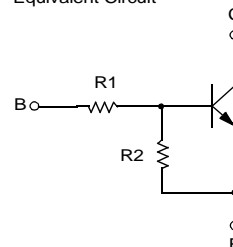


1. Base 2. Emitter 3. Collector

Marking



Equivalent Circuit



NPN Epitaxial Silicon Transistor

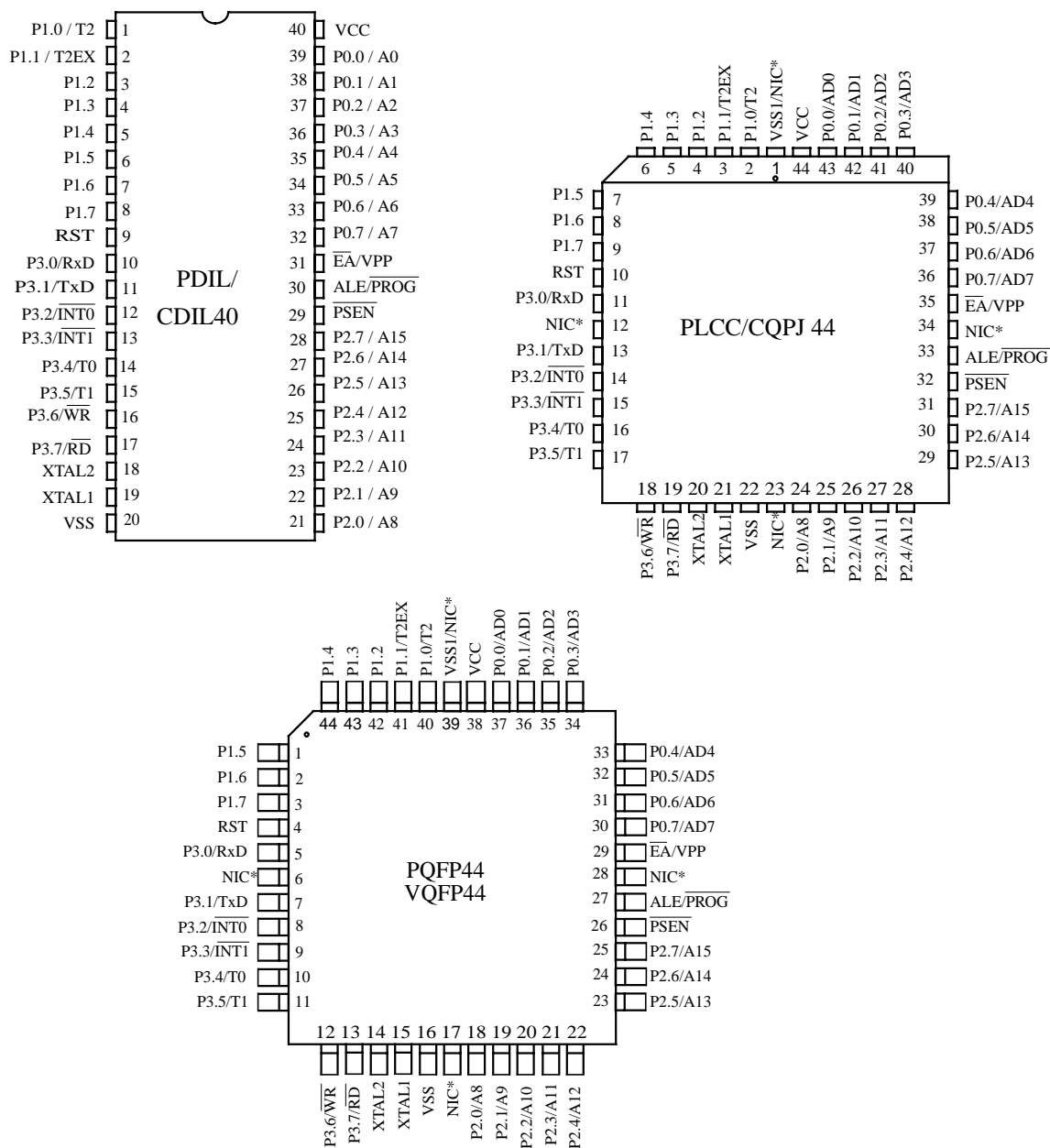
Absolute Maximum Ratings $T_a = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Value	Units
V_{CBO}	Collector-Base Voltage	50	V
V_{CEO}	Collector-Emitter Voltage	50	V
V_{EBO}	Emitter-Base Voltage	10	V
I_C	Collector Current	100	mA
P_C	Collector Power Dissipation	200	mW
T_J	Junction Temperature	150	$^\circ\text{C}$
T_{STG}	Storage Temperature	-55 ~ 150	$^\circ\text{C}$

Electrical Characteristics $T_a = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
BV_{CBO}	Collector-Base Breakdown Voltage	$I_C = 10\mu\text{A}$, $I_E = 0$	50			V
BV_{CEO}	Collector-Emitter Breakdown Voltage	$I_C = 100\mu\text{A}$, $I_B = 0$	50			V
I_{CBO}	Collector Cutoff Current	$V_{CB} = 40\text{V}$, $I_E = 0$			0.1	μA
h_{FE}	DC Current Gain	$V_{CE} = 5\text{V}$, $I_C = 10\text{mA}$	20			
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 10\text{mA}$, $I_B = 0.5\text{mA}$			0.3	V
f_T	Current Gain Bandwidth Product	$V_{CE} = 10\text{V}$, $I_C = 5\text{mA}$		250		MHz
C_{ob}	Output Capacitance	$V_{CB} = 10\text{V}$, $I_E = 0$ $f = 1.0\text{MHz}$		3.7		pF
$V_I(\text{off})$	Input Off Voltage	$V_{CE} = 5\text{V}$, $I_C = 100\mu\text{A}$	0.5			V
$V_I(\text{on})$	Input On Voltage	$V_{CE} = 0.3\text{V}$, $I_C = 20\text{mA}$			3	V
R_1	Input Resistor		3.2	4.7	6.2	$K\Omega$
R_1/R_2	Resistor Ratio		0.9	1	1.1	

5. Pin Configuration



*NIC: No Internal Connection

VOLTAGE DETECTOR

This IC series is usable for the CPU system of all types and wired logic system as it has the function of detecting the power supply voltage at the time of initial resetting after switching the power supply on and after instantaneous break in power supply voltage there-by accurately resetting the system this particular series has especially been designed as the high resetting output type.

FEATURES

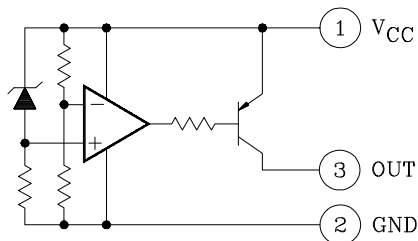
- Current Consumption is Low. $I_{CCL}=30\mu A$ Typ.
 $I_{CCH}=300\mu A$ Typ.
- Resetting Output Minimum Guarantee Voltage is Low 0.8V Typ.
- Hysteresis Voltage is Provided 50mV Typ.
- Reset Signal Generation Starting Voltages:

KIA7419P/F 1.9V Typ.	KIA7433P/F 3.3V Typ.
KIA7421P/F 2.1V Typ.	KIA7434P/F 3.4V Typ.
KIA7423P/F 2.3V Typ.	KIA7435P/F 3.5V Typ.
KIA7425P/F 2.5V Typ.	KIA7436P/F 3.6V Typ.
KIA7427P/F 2.7V Typ.	KIA7439P/F 3.9V Typ.
KIA7429P/F 2.9V Typ.	KIA7442P/F 4.2V Typ.
KIA7431P/F 3.1V Typ.	KIA7445P/F 4.5V Typ.
KIA7432P/F 3.2V Typ.	
- Taping Type is also Available.

APPLICATIONS

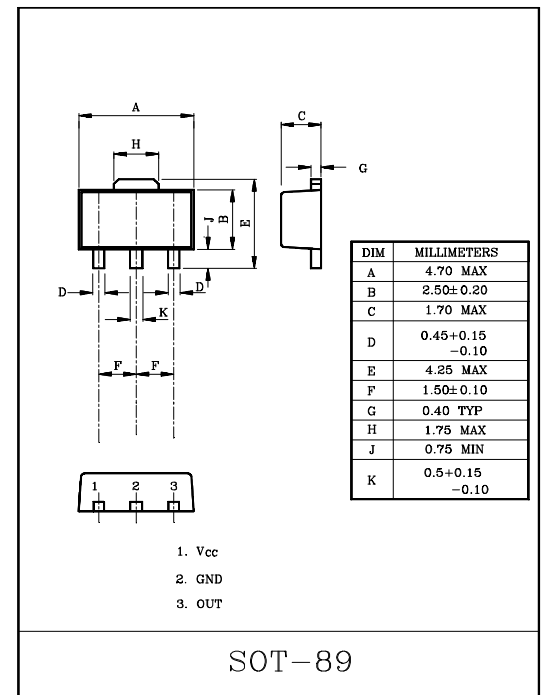
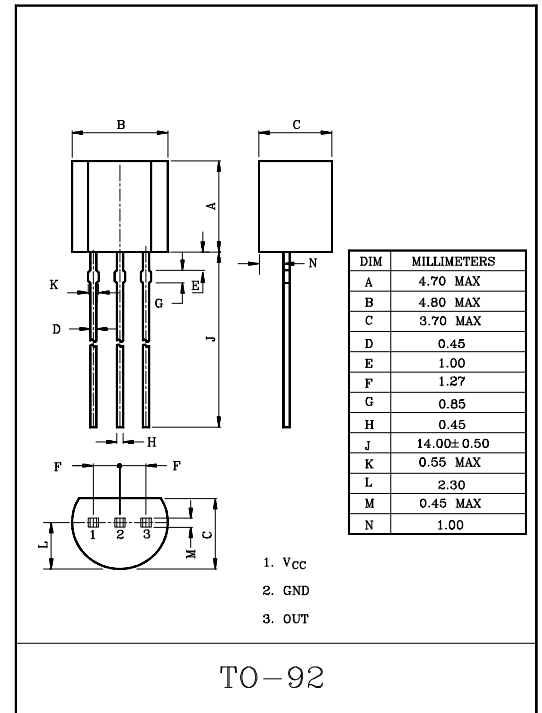
- As Control Circuit of Battery-Backed Memory Units.
- As Measure Against Erroneous Operations at Power Supply ON-OFF Time.
- As Measure Against System Runaway at Instantaneous Break of Power Supply etc.
- As Resetting Function for the CPU-Mounted Equipment, such as Personal Computers, Printers, VTRs and so forth.

EQUIVALENT CIRCUIT



MAXIMUM RATINGS (Ta=25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Supply Voltage		V_{CC}	-0.3 ~ +7.5	V
Power Dissipation (Package Limitation)	KIA7419P~45P	P_D	400	mW
	KIA7419P~45F		500	
Operating Temperature		T_{opr}	-30 ~ +75	°C
Storage Temperature		T_{stg}	-55 ~ 150	°C



MARKING

Type No.	Marking	Type No.	Marking
KIA7419F	4A	KIA7433F	4J
KIA7421F	4B	KIA7434F	4K
KIA7423F	4C	KIA7435F	4L
KIA7425F	4D	KIA7436F	4M
KIA7427F	4E	KIA7439F	4N
KIA7429F	4F	KIA7442F	4P
KIA7431F	4G	KIA7445F	4R
KIA7432F	4H		

Photo Modules for PCM Remote Control Systems

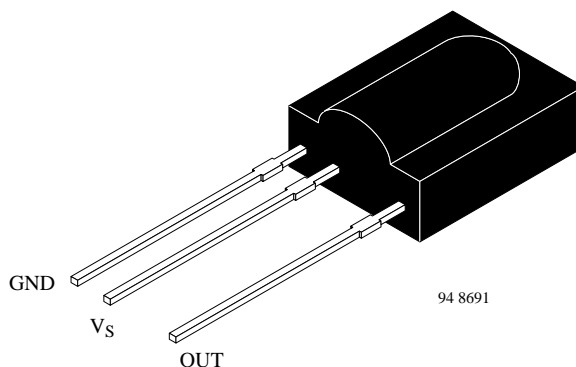
Available types for different carrier frequencies

Type	fo	Type	fo
TSOP1230	30 kHz	TSOP1233	33 kHz
TSOP1236	36 kHz	TSOP1237	36.7 kHz
TSOP1238	38 kHz	TSOP1240	40 kHz
TSOP1256	56 kHz		

Description

The TSOP12.. – series are miniaturized receivers for infrared remote control systems. PIN diode and preamplifier are assembled on lead frame, the epoxy package is designed as IR filter.

The demodulated output signal can directly be decoded by a microprocessor. The main benefit is the reliable function even in disturbed ambient and the protection against uncontrolled output pulses.



Features

- Photo detector and preamplifier in one package
- Internal filter for PCM frequency
- Improved shielding against electrical field disturbance
- TTL and CMOS compatibility
- Output active low
- Low power consumption
- Suitable burst length ≥ 10 cycles/burst

Special Features

- Enhanced immunity against all kinds of disturbance light
- No occurrence of disturbance pulses at the output

Block Diagram

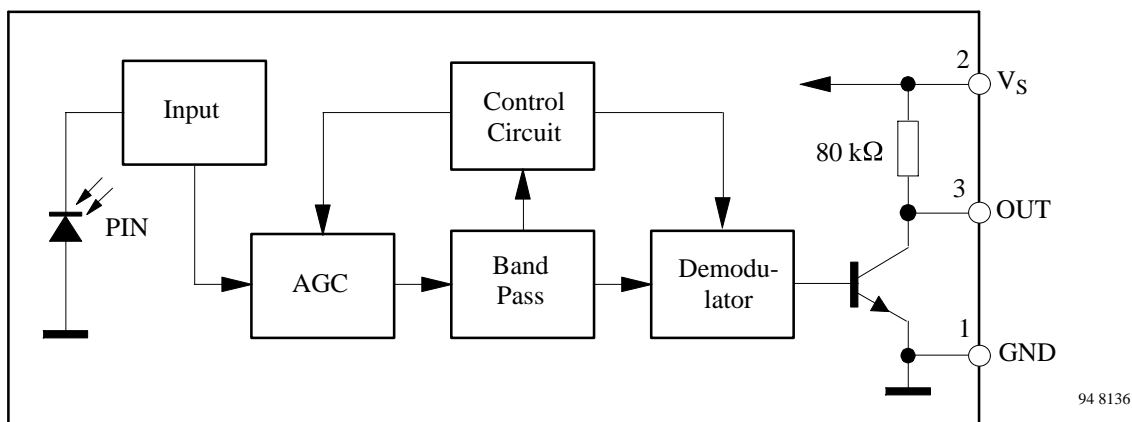


Photo Modules for PCM Remote Control Systems

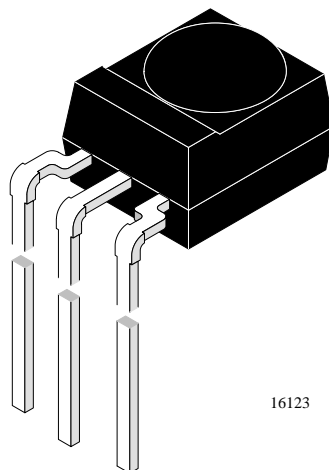
Available types for different carrier frequencies

Type	fo	Type	fo
TSOP4830SB1	30 kHz	TSOP4833SB1	33 kHz
TSOP4836SB1	36 kHz	TSOP4837SB1	36.7 kHz
TSOP4838SB1	38 kHz	TSOP4840SB1	40 kHz
TSOP4856SB1	56 kHz		

Description

The TSOP48..SB1 – series are miniaturized receivers for infrared remote control systems. PIN diode and preamplifier are assembled on lead frame, the epoxy package is designed as IR filter.

The demodulated output signal can directly be decoded by a microprocessor. TSOP48..SB1 is the standard IR remote control receiver series, supporting all major transmission codes.

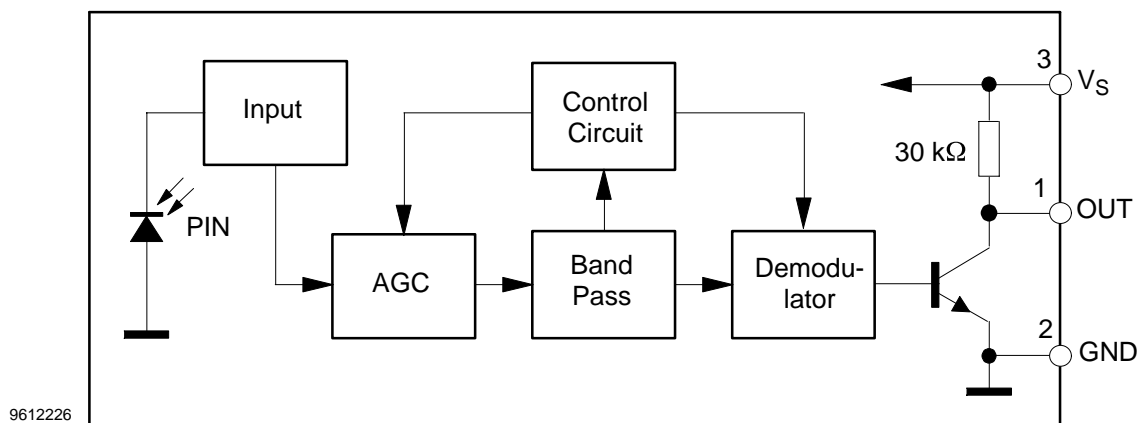


16123

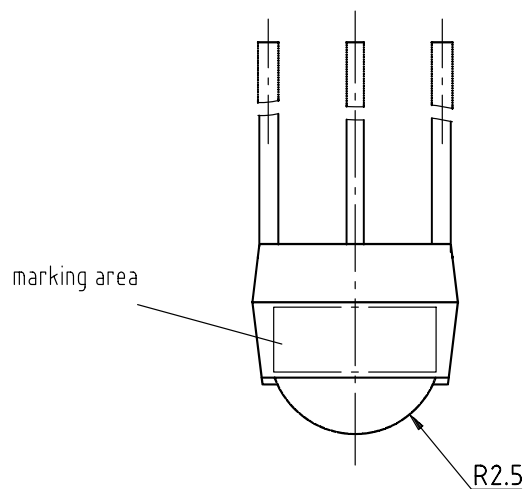
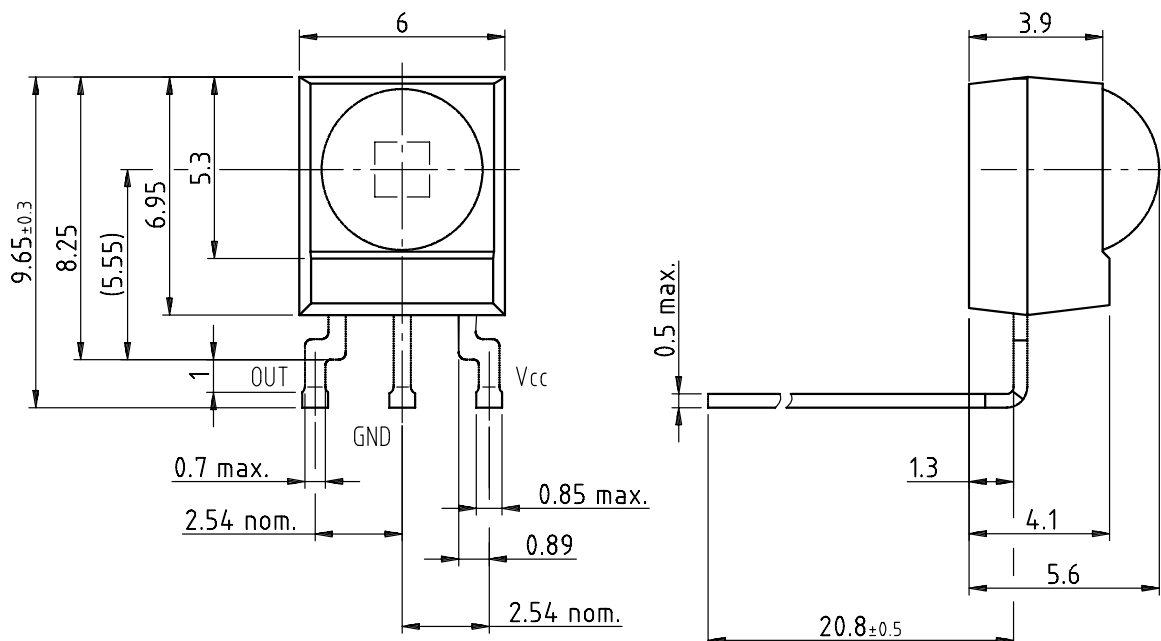
Features

- Photo detector and preamplifier in one package
- Internal filter for PCM frequency
- Improved shielding against electrical field disturbance
- TTL and CMOS compatibility
- Output active low
- Low power consumption
- High immunity against ambient light
- Continuous data transmission possible (800 bit/s)
- Suitable burst length ≥ 10 cycles/burst

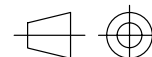
Block Diagram



Dimensions in mm



Not indicated tolerances ± 0.2



technical drawings
according to DIN
specifications

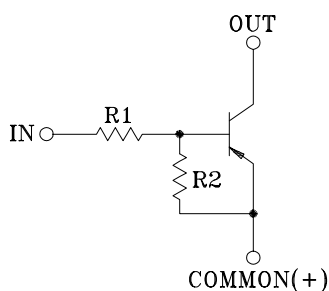
16777

SWITCHING APPLICATION.
INTERFACE CIRCUIT AND DRIVER CIRCUIT APPLICATION

FEATURES

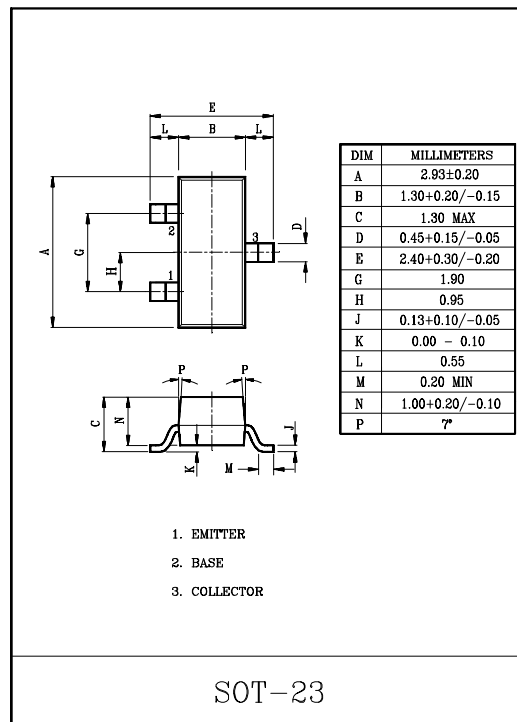
- With Built-in Bias Resistors.
- Simplify Circuit Design.
- Reduce a Quantity of Parts and Manufacturing Process.

EQUIVALENT CIRCUIT



BIAS RESISTOR VALUES

TYPE NO.	R1(k Ω)	R2(k Ω)
KRA116S	1	10
KRA117S	2.2	2.2
KRA118S	2.2	10
KRA119S	4.7	10
KRA120S	10	4.7
KRA121S	47	10
KRA122S	100	100



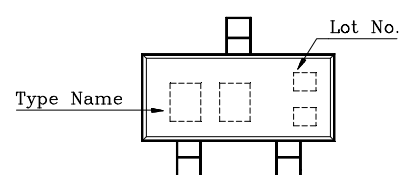
MAXIMUM RATING (Ta=25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Output Voltage	KRA116S~122S	V _O	-50	V
Input Voltage	KRA116S	V _I	-10, 5	V
	KRA117S		-12, 10	
	KRA118S		-12, 5	
	KRA119S		-20, 7	
	KRA120S		-30, 10	
	KRA121S		-40, 15	
	KRA122S		-40, 10	
Output Current	KRA116S~122S	I _O	-100	mA
Power Dissipation		P _D	200	mW
Junction Temperature		T _j	150	°C
Storage Temperature Range		T _{stg}	-55~150	°C

MARK SPEC

TYPE	KRA116S	KRA117S	KRA118S	KRA119S	KRA120S	KRA121S	KRA122S
MARK	P2	P4	P5	P6	P7	P8	P9

Marking



KA431/KA431A/KA431L

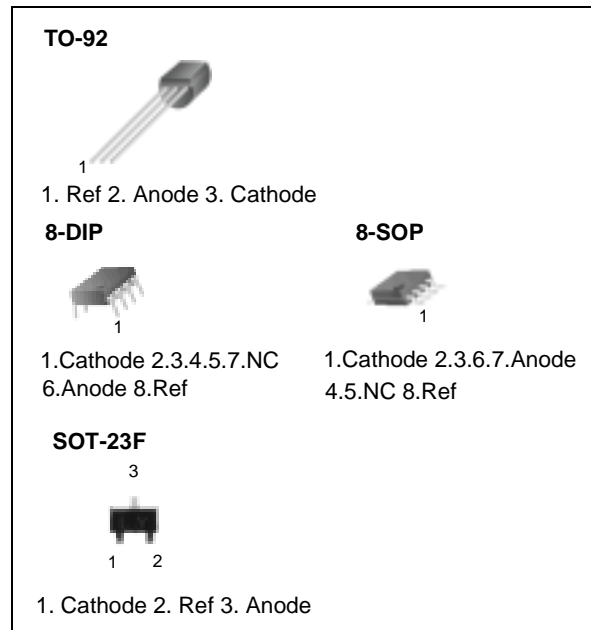
Programmable Shunt Regulator

Features

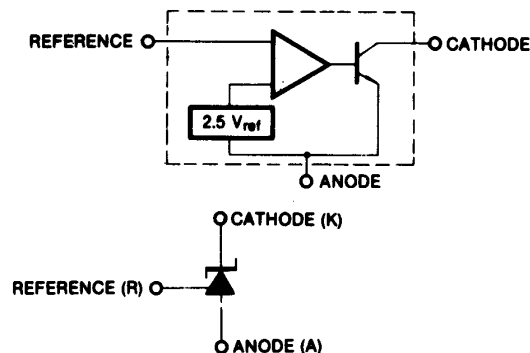
- Programmable output voltage to 36 volts
- Low dynamic output impedance 0.20 typical
- Sink current capability of 1.0 to 100mA
- Equivalent full-range temperature coefficient of 50ppm/°C typical
- Temperature compensated for operation over full rated operating temperature range
- Low output noise voltage
- Fast turn-on response

Description

The KA431/KA431A/KA431L are three-terminal adjustable regulator series with a guaranteed thermal stability over applicable temperature ranges. The output voltage may be set to any value between VREF (approximately 2.5 volts) and 36 volts with two external resistors. These devices have a typical dynamic output impedance of 0.2W. Active output circuitry provides a very sharp turn on characteristic, making these devices excellent replacement for zener diodes in many applications.



Internal Block Diagram



KA1L0380B/KA1L0380RB/ KA1M0380RB/KA1H0380RB

Fairchild Power Switch(FPS)

Features

- Precision fixed operating frequency
- KA1L0380B/KA1L0380RB (50KHz)
- KA1M0380RB (67KHz)
- KA1H0380RB (100KHz)
- Pulse by pulse over current limiting
- Over load protection
- Over voltage protection (Min. 23V)
- Internal thermal shutdown function
- Under voltage lockout
- Internal high voltage sense FET
- Auto restart (KA1L0380RB/KA1M0380RB/KA1H0380RB)

Description

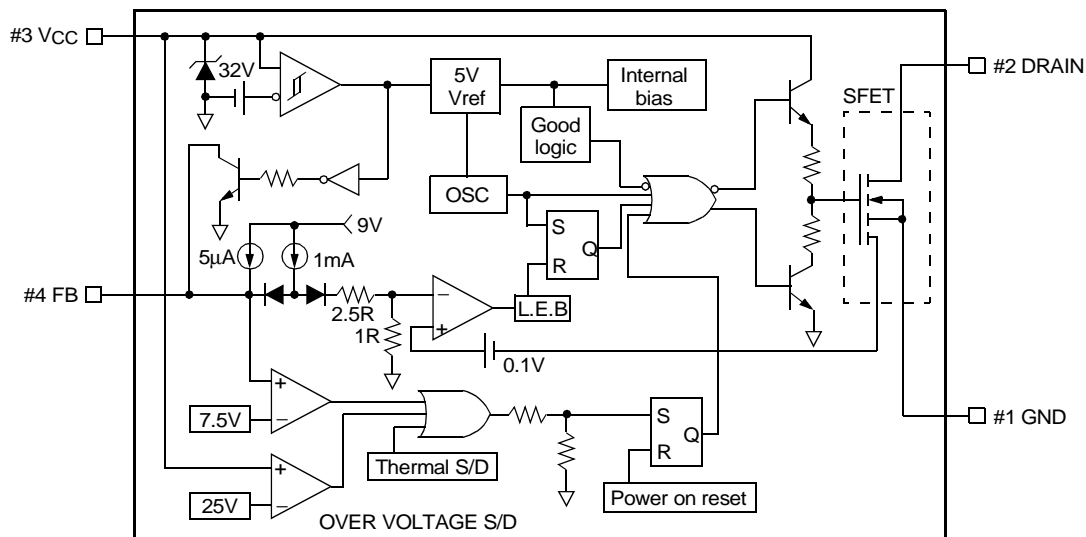
The Fairchild Power Switch(FPS) product family is specially designed for an off line SMPS with minimal external components. The Fairchild Power Switch(FPS) consist of high voltage power SenseFET and current mode PWM controller IC. PWM controller features integrated fixed oscillator, under voltage lock out, leading edge blanking, optimized gate turn-on/turn-off driver, thermal shut down protection, over voltage protection, temperature compensated precision current sources for loop compensation and fault protection circuit. compared to discrete MOSFET and controller or RCC switching converter solution, a Fairchild Power Switch(FPS) can reduce total component count, design size, weight and at the same time increase & efficiency, productivity, and system reliability. It has a basic platform well suited for cost effective design in either a flyback converter or a forward converter.

TO-220F-4L



1. GND 2. DRAIN 3. VCC 4. FB

Internal Block Diagram



Rev.1.0.2

