# HUMAX STB

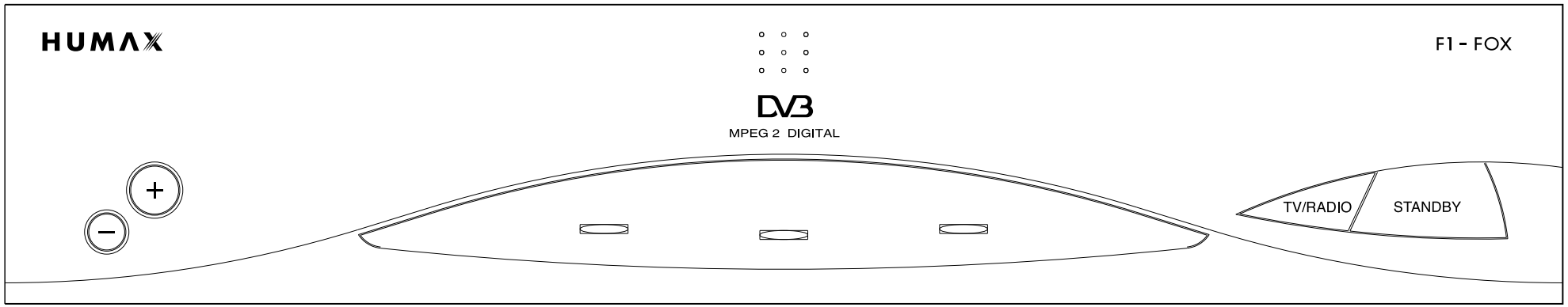
# Service Manual

**For OAK**

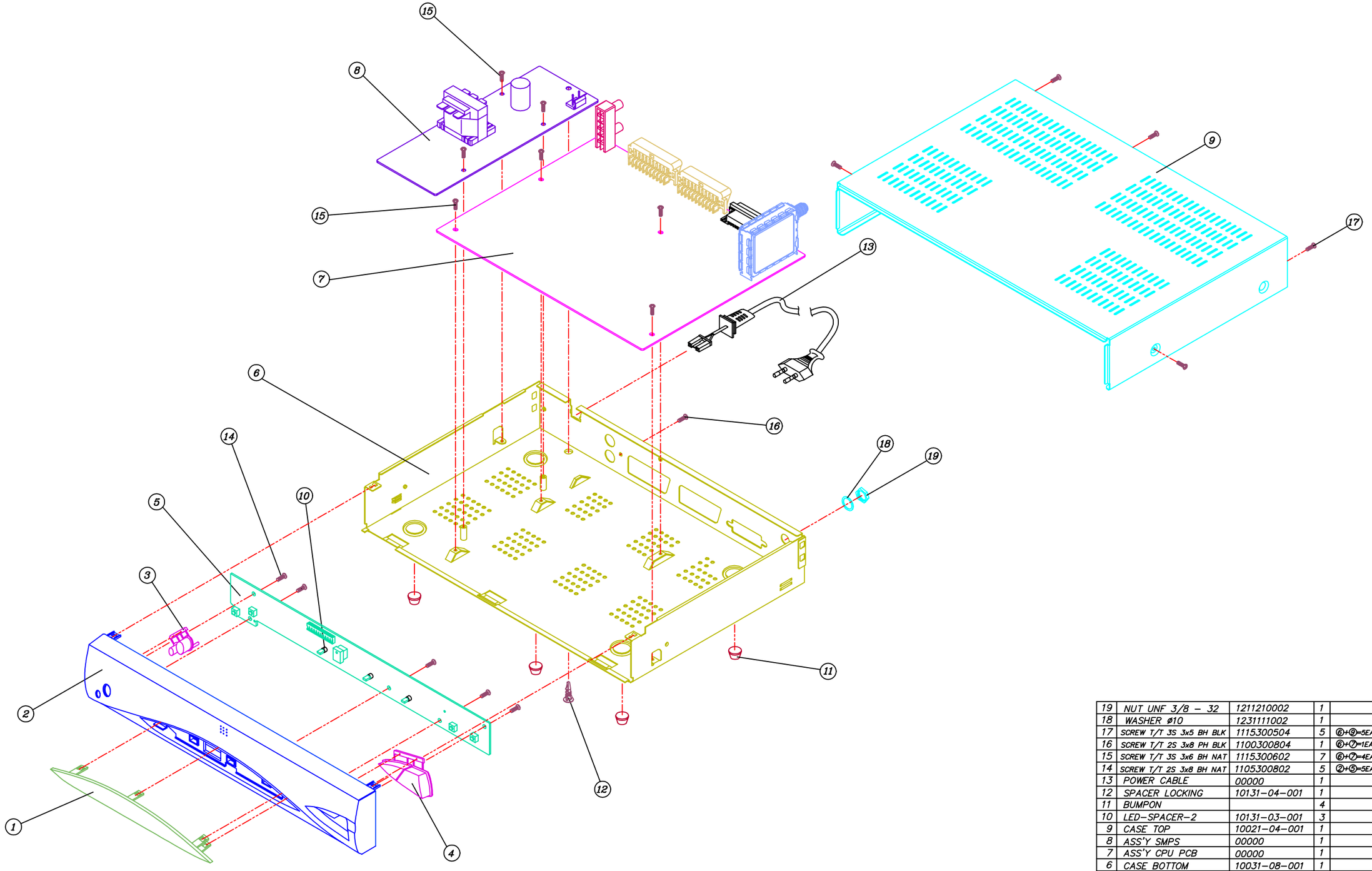
**Model**

**F1- FOX**

HUMAX


HUMAX
F1 - FOX
DVB
MPEG 2 DIGITAL
+
−
TV/RADIO
STANDBY

| NO. | DESCRIPTION OF CHANGE | REASON OF CHANGE | DATE | DESIGNED | APPROVED |
|---|---|---|---|---|---|
| 1 | | | | | |
| 2 | | | | | |




| | | | | |
|---|---|---|---|---|
| 19 | NUT UNF 3/8 – 32 | 1211210002 | 1 | |
| 18 | WASHER ø10 | 1231111002 | 1 | |
| 17 | SCREW T/T 3S 3x5 BH BLK | 1115300504 | 5 | ⑥+⑨=5EA |
| 16 | SCREW T/T 2S 3x8 PH BLK | 1100300804 | 1 | ⑥+⑦=1EA (RCA=1EA) |
| 15 | SCREW T/T 3S 3x6 BH NAT | 1115300602 | 7 | ⑥+⑦=4EA ⑥+⑧=3EA |
| 14 | SCREW T/T 2S 3x8 BH NAT | 1105300802 | 5 | ②+⑤=5EA |
| 13 | POWER CABLE | 00000 | 1 | |
| 12 | SPACER LOCKING | 10131–04–001 | 1 | |
| 11 | BUMPON | | 4 | |
| 10 | LED–SPACER–2 | 10131–03–001 | 3 | |
| 9 | CASE TOP | 10021–04–001 | 1 | |
| 8 | ASS'Y SMPS | 00000 | 1 | |
| 7 | ASS'Y CPU PCB | 00000 | 1 | |
| 6 | CASE BOTTOM | 10031–08–001 | 1 | |
| 5 | ASS'Y FRONT PCB | 00000 | 1 | |
| 4 | KNOB DIRECTION | 10051–22–000 | 1 | |
| 3 | KNOB POWER | 10051–21–000 | 1 | |
| 2 | PANEL FRONT | 10001–16–000 | 1 | |
| 1 | WINDOW | 10071–11–000 | 1 | |

| 부호 NO. | 품명 PART NAME | 품번 PART NUMBER | 수량 Q'ty | 재질 MATERIAL | FINISHED | REMARK |
|---|---|---|---|---|---|---|

| 일반 공차 표시 TOLERANCE LEVEL | 0 ~ 6 | 6 ~ 30 | 31~120 | 121~200 | 201~315 | 316 ~1100 |
|---|---|---|---|---|---|---|
| A | 0.05 | 0.1 | 0.15 | 0.15 | 0.2 | 0.3 |
| B | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.8 |
| C | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 1.0 |

| 3RD ANGLE PROJECTION | SCALE | UNIT | DATE | REVISION |
|---|---|---|---|---|
| | N/S | mm | '99 8/30 | A |

| 제도 DRAWING | 설계 DESIGNED | 검도 CHECKED | 승인 APPROVED |
|---|---|---|---|
| | 김봉모 1999.8.30 | | |

| | |
|---|---|
| 모델명 PROJECT NAME | F1 – FOX |
| 품명 PART NAME | EXPLODE |
| 품번 PART NUMBER | |
| 리퍼 도번 REF. NO. | |

| SHEETS |
|---|
| 1 |

HUMAX

# F1-FOX Specifications

## 1 Brief Specifications

| Items | Description |
|---|---|
| Transport Specification | ● MPEG-2 transport stream<br>● DVB compliant SI |
| Input Frequency | ● 950 – 2150MHz |
| MCPC and SCPC | ● Supported |
| Modulation Type | ● QPSK |
| FEC | ● Multi convolutional coding supported defined in DVB |
| LNB Power | ● Switchable 13.5 / 18V |
| DiSEqC Bus | ● DiSEqC 1.0/1.2 Compatible , 22KHz tone |
| Video Compression | ● MP@ML in MPEG-2 |
| Aspect Ratio | ● 4:3 and 16:9 with pan vector, Letter Box support. |
| Video Output | ● CVBS, RGB, SVHS |
| Audio Output | ● Baseband Left/Right |
| Audio Mode | ● Mono ,dual, stereo and joint stereo |
| Audio Sampling | ● 32, 44.1 and 48KHz |
| Data Service | ● RS-232 |
| Flash Memory | ● Base : 1MB + 1MB(Asynchronous FLASH) |
| RAM | ● Base : 2MB (SDRAM for OSD, system)<br>● 2MB(SDRAM for MPEG) |
| EEPROM | ● Not used |
| On-Screen Display | ● 256 colors |
| Teletext | ● Support in DVB ETS300 472 |
| Subtitling | ● Support in DVB A009 |
| IPPV, EPG | ● EPG Supported , IPPV not supported. |
| OTA | ● OTA Supported |

## 2 Electrical Characteristics

### 2.1 Power Supply

| Items | Description |
|---|---|
| Input Voltage | ● 190V – 250V AC |
| Frequency | ● 50/60Hz |
| Type | ● SMPS(Switching Mode Power Supply) |
| Power Consumption | ● 30W . |
| Standby power consumption | ● ≤ 8W |

### 2.2 Tuner

| Items | Specifications |
|---|---|
| Connector | ● IEC 169-2, female(F type)<br>● For signal input from the antenna and LNB<br>● Loop through not supported |
| Frequency range | ● 950 – 2150MHz |
| No. of inputs | ● 1 |
| Signal level | ● -25 ~ -65dBm |
| LNB input | ● 75 Ω unbalanced nominal impedance<br>● input return loss >7dB |
| LNB power & feedhorn polarisation | ● Vertical : +13.5V<br>● Horizontal : +18V<br>● Internal DC source resistance < 0.5<br>● Current : 500mA max. short circuit protection |
| LNB Control | ● DiSEqC 1.0/1.2<br>● 22KHz tone |
| Protection | ● 4.5KV surge protection, short circuit protection |
| Bypass(loop-through) | ● Not supported |

## 3 Channel Processing

This specifications is based on 'Digital broadcasting systems for television, sound and data services; Framing structure, channel coding and modulation for 11/12 GHz satellite services, prETS300 421

### 3.1 QPSK Demodulation

| Item | Description |
|---|---|
| Modulation | ● QPSK |
| Input symbol rate | ● 2 – 31 Mbps |

### 3.2 FEC

| Item | Specifications |
|---|---|
| Inner FEC | ● Convolutional code rate 1/2, 2/3, 3/4 5/6, and 7/8 with constraint length<br>● K = 7 |
| Convolutional deinterleaver | ● Convolutional deinterleaving with I = 12 |
| Outer FEC | ● Reed Solomon code, RS(204, 188, T=8).<br>● Quasi error free output is assumed (i.e. BER of about $10^{-11}$) in the presence of input error bursts at a BER of $2 \times 10^{-4}$ or better with interleaving depth I=12. In case of worse BER situation, the IRD shall stop the MPEG decoding. |
| Energy Dispersal Removal | ● The polynomial for the Pseudo Random Binary Sequence(PRBS) generator is: $1 + X^{14} + X^{15}$<br>● The initialization sequence shall be the 15 bit sequence: "100101010000000" |

# 4 MPEG Decoding

## 4.1 Demultiplexer

| Item | Description |
|---|---|
| Input transport stream | ● MPEG-2 ISO/IEC 13818-1 transport stream specification |
| Input rate | ● 60 Mbit/sec max. |
| Filter | ● One audio PID<br>● One video PID<br>● 30 general purpose PIDs |
| Transport buffer | ● A 512-byte buffer for each of the two output elementary streams (audio/video) |
| Section layer filtering criteria | ● Table ID<br>● Version number<br>● Section number<br>● Current/next indicator |
| Error detection | ● CRC32 on all 30 general purpose PIDs |
| Etc. | ● Detects and handles errors, lost packets, and discontinuity<br>● Spontaneously detects and handles splice points<br>● Provides PCR recovery<br>● Provides a high speed output data port for transport packets |

## 4.2 Video Decoding

| Items | Description |
|---|---|
| Profile, Level | ● ISO/IEC 13818-2 , MP@ML |
| Frame rate | ● 25 Hz |
| Aspect ratio | ● 4:3, 16:9 |
| Pan vectors | ● To allow a 4:3 monitor to give a full-screen display of a 16:9 coded picture |
| Resolution | ● 720 x 576, 25 frame per second |
| Up conversion to produce a full-screen display | ● 544 x 576, 25 frames per second<br>● 480 x 576, 25 frames per second<br>● 352 x 576, 25 frames per second,<br>● 352 x 288, 25 frames per second |
| OSD | ● 256 colors<br>● Western European character set |

## 4.3 Audio Decoding

| Item | Description |
|---|---|
| MPEG | ● MPEG-1 Layer I and Layer II |
| Mode | ● MPEG-1 single channel<br>● MPEG-1 dual channel<br>● MPEG-1 joint stereo<br>● MPEG-1 stereo |
| Sampling rate | ● 32, 44.1, and 48 kHz |

# 5 Mechanical Characteristics

## 5.1 Front Panel

### 5.1.1 Key Button

| Item | Description |
|---|---|
| Standby | ● Standby/Operation |
| Channel | ● 2 keys for channel up and down |
| A/V | ● A key for Audio/Video selection |

### 5.1.2 Display

| Item | Description |
|---|---|
| LED | ● Standby (Red)<br>● Audio (Yellow)<br>● Video (Green)<br>● Led 용도는 초기 Initial 시 Error code 표시로 변경 |

## 5.2 Rear Panel Input, Output

| Item | Description |
|---|---|
| Power code | ● Connector type: IEC83, C5 alternative II |
| Base Band A/V | ● Cinch (Audio L+R) |
| LNB in | ● From the LNB<br>● Connector type: F-type, female |
| SCART | ● EN50049 –1<br>● TV SCART (RGB, CVBS, AudioL+R output, CVBS, audio L+R input)<br>● VCR SCART(RGB, CVBS, Audio input, CVBS ,fixed level audio L+R output) |
| D-sub9(Serial) | ● 9-pin D type, 115200bps |

## 5.3 RCU

| Item | Description |
|---|---|
| Operating distance | ● 0.2 to 7 m |
| Angle | ● 90° in the horizontal plain, and a vertical offset of ±20° |
| Keys | ● Standby<br>● TV Service<br>● Numeric keys(0~9)<br>● Audio/Video<br>● Audio Mute<br>● EPG<br>● Arrow keys(up/down/left/Right)<br>● Select/Ok<br>● Recall<br>● Menu<br>● Query<br>● Time<br>● Help<br>● Subtitle selection<br>● UHF<br>● Audio soundtrack selection<br>● Exit<br>● 예비 : 4keys ( P+, P-, V+, V-) |

## 6 IRD Interface

### 6.1.1 Serial Interface

| Item | Description |
|---|---|
| Electrical interface | ● Complying with RS232C specifications |
| Speed | ● 4800,9600,19200(RS232 standards) |
| Moreover | ● 38400, 57600, 115200 bauds |

## 7 Environmental Requirements

| Item | Description |
|---|---|
| Storage | ● -10° - +50 °C |
| Ambient operating temperature range | ● 0° - +45 °C |
| Storage humidity range | ● 5 – 95% RH non condensing |
| Operating humidity range | ● 10 – 95% RH non dondensing |
| EMC requirements | ● Meet applicable EMC requirements |

## 8 Man Machine Interface(MMI)

- Support for MPEG-2/DVB Compliant SI with guidelines on implementation and usage of service information (TM1324 of DVB Doc. )
- User friendly error messages
- TV, radio modes
- Sub-titling supported
- On-Screen Display for IRD configuration and set-up
- Signal strength and error rate on screen displays
- Context sensitive help messages
- Navigation between channels and programs
- Favorite channel selection
- Parental lock facility by channel and program event
- Support for auto tuning channels
- Support for skipping channels
- Support for different national languages(English, Dutch, German, French, Itlian,, Spanish etc.)
- Multiple Network

| Classification | Troubleshooting Guide |
|---|---|

- The following work flow is recommended when troubleshooting.

1. Appearance Check
   - Check the state of set assembly, connection of connectors, curved or broken PCB, soldered/shorted parts, and other noticeable parts failure.

2. Basic Check
   - After applying power to the set, check the voltage output from JP1 connector.
     The output voltages are as follows: +3.3V, +5V, +12V, +18V, +24V, +30V
   - Check for the clock and reset timing.

3. System Check
   - Check whether SAA7219 CPU operates normally. At this time, check the items such as Memory Access that are essential when the set operates.

4. MPEG & AV Check
   - Check from MPEG Decoding through A/V output. And then check for the functions of the output terminals of Back Panel (SCART, Phone Jack).

5. Channel Check
   - Check the Front End which receives, tunes, and locks the RF frequency output from LNB (antenna) and then supplies DC power of driving LNB and outputs 22KHz tone signal.
   -

- The figures shown in this guide depend on the state of system, received signal or etc.

- When a problem happens, the point is to find where it takes place by tracking the stream of the related signal. Therefore, the waveforms shown herein are recommended just as a reference.

## Parts & Functions (by each schematic diagram page)

| Page | Main Parts | Key Functions | Remark |
|---|---|---|---|
| 1. | Power Control | KTA1273<br>For Power Saving in STBY mode | |
| | Regulator | KIA7805<br>Convert +8V to +5V | |
| 2 | TUNER | SD1228S-MK2<br>Channel tuning, No loop through | Much heat generation |
| | LNB SUPPLY | LNBP15SP<br>LNB Power Supply | Be careful when troubleshooting because this is weak in static electricity |
| | REGULATOR | KIA7805<br>Convert +8V to +5V | |
| 3 | QPSK Demodulator | TDA8044AH<br>Channel Locking | The PLL part is particularly weak in static electricity |
| 4 | MPEG TS Demux | SAA7219<br>MPEG TS Processing<br>MIPS Processor | The PLL part is particularly weak in static electricity |
| | Reset circuit | KIA7027<br>2.7V Reset IC | |
| 5 | Fast Boot Block FLASH | 28F800B3B-90(8Mb)<br>Code Area | Main Code Area |
| 6 | FLASH | 28F8000B3B-90(8Mb)<br>Channel Data<br>Constant Area | |
| 7 | SDRAM | KM416S1020BT-G10(2MB) | OPTION |
| 8 | MPEG Decoder | SAA7215<br>Converts into A/V signal after decoding MPEG Data | |
| 9 | MPEG SDRAM | KM416S1020BT-G10<br>MPEG Decoding Memory | |
| 10 | OSD SDRAM | KM416S1020BT-G10<br>OSD Memory | |
| 11 | Connector | Front B/D Connector<br>Smart Card Connector ( Option ) | |
| 12 | Serial Communication | ADM232LJR<br>UART communication | |
| 13 | Audio DAC | UDA1320<br>Audio Digital to Analog Conversion | |
| 14 | A/V Switching | CXA2126<br>TV,VCR Scart output switching | |

| | | | |
|---|---|---|---|
| **15** | SCART Connector | 2203-21T<br>TV Connector<br>VCR Connector | |
| **16** | CINCH | DPAM-9949<br>Audio Left Output<br>Audio Right Output | |

| Classification | Basic Operation Check |
|---|---|

Item: Power Supply of SMPS, MAIN B/D

Symptom : System Doesn't Operate (partly or completely)

- Use the Schematic Diagram page 1/JP1 to check whether each power is supplied.

- Item : SMPS Connector
  Location of Measurement (JP1) : See Schematic Diagram page 01

  Pin 1: +30V Pin 2 : +24V Pin 3 : +17V Pin 4 : +12V
  Pin 5 : +8V Pin 7: +3.3V Pin 8 : +3.3V
  GND: pins 6, 9

- Item : Rear part of POWER CONTROL
  Location of Measurement (Q1) Emitter : See Schematic Diagram page 01

  Q1 : +8VT

  The above +8V power supply is input to the tuner. It is not output during standby to reduce power consumption and it is output in normal operation. This power supply is controlled by the SAA7219 GPIO port .

- Item: FRONT Connector
  Location of Measurement (JP4): See Schematic Diagram page11

  Pin 2 : KEY_STBY Pin 3 : KEY_AV Pin 4: LED_VIDEO Pin 5: LED_STBY
  Pin 6: REMOCON Pin 7: +5V Pin 9: LED_AUDIO Pin 10: KEY_DOWN
  Pin 11: KEY_UP
  GND : Pins 1, 8

  KEY Entered : +5V(HIGH) -> 0V(LOW)
  LED ON: +5V(HIGH) for the relevant signal
  LED OFF: 0V(LOW) for the relevant signal

- Countermeasure

  Check the power supply connector is correctly connected.
  If trouble keeps happening, replace SMPS.

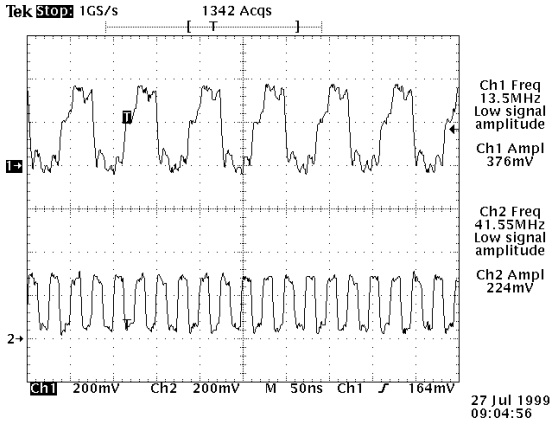
| Classification | Basic Operation Check |
|---|---|

Item : SAA7219 CLOCK(13.5MHz) & SAA7215 CLOCK(40.5MHz)

Symptom : System Doesn't Operate
Or it stops operating intermittently

- SAA7219 CLOCK is a system clock and it uses VCXO.
- SAA7219 internal clock oscillates the external system clock (13.5MHz) and generates various clocks. Check here whether the 40.5MHz clock is generated.
- SAA7215 generates 27MHz, 81MHz after 40.5MHz is fed. Check here the 27MHz clock is generated.

13.5MHz →

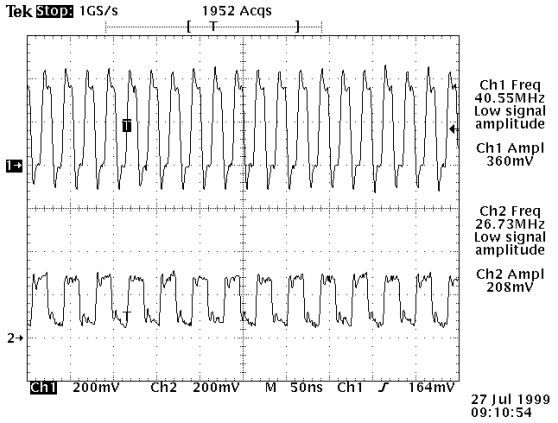



Location of Measurement:
See Schematic Diagram
Page04/ F1,Pin3

40.5MHz →

Location of Measurement:
See Schematic Diagram
Page 04/U2,Pin 91

40.5MHz →




Location of Measurement:
See Schematic Diagram
Page08/ U12,Pin168

27MHz →

Location of Measurement:
See Schematic Diagram
Page08/ U12,Pin126

- Cause & Countermeasure

Unstable 13.5MHz is usually caused by a defective VCXO or SAA7219. Replace the chip or VCXO. As the 40.5 MHz, 27MHz clocks, however, are not oscillated inside each chip of SAA7219, SAA7215, their unstableness might be caused by any cold soldering or defective chip. When replacing parts, be careful not to be injured by static electricity coming from a soldering iron. In addition, check for the state of assembly/ soldering, and wrong or inverse parts insertion.

| Classification | Basic Operation Check |
|---|---|

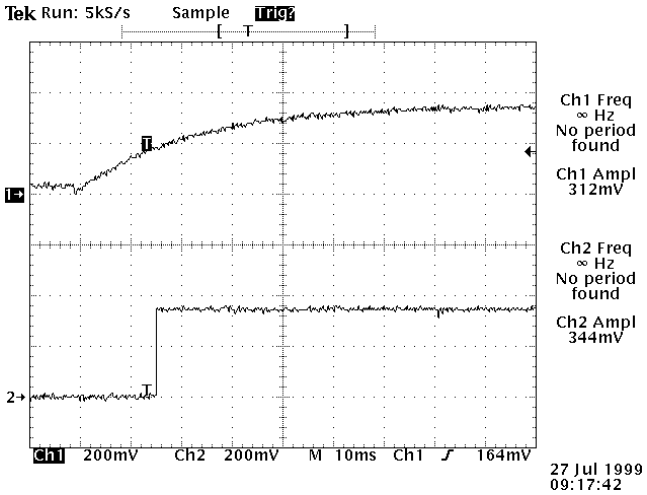
Item: SAA7219 RESET & SAA7215 RESET

Symptom: SAA7219 Doesn't Operate
SAA7215 Doesn't Operate

- Even though there is a little probability that any problem happens in this part, check at least the following Reset Timing is present.
- SAA7215 RESET uses SAA7219 PIO. Therefore, SAA7219 RESET follows SAA7219 RESET.

SAA7219 Reset ➔

SAA7215 Reset ➔




- Location of Measurement
  - SAA7219 Reset : See Schematic Diagram Page04/U8, Pin 3
  - SAA7215 Reset : See Schematic Diagram Page04/U2, Pin 12
- For your reference, SAA7219 Reset is commonly linked to FLASH.
- Cause & Countermeasure

  SAA7219 Reset Timing: Check any wrong insertion of Reset degauss or cold soldering exists.
  SAA7215 Reset abnormally operates: Check SAA7219 and takes appropriate actions.

+

| Classification | Basic Operation Check |
|---|---|

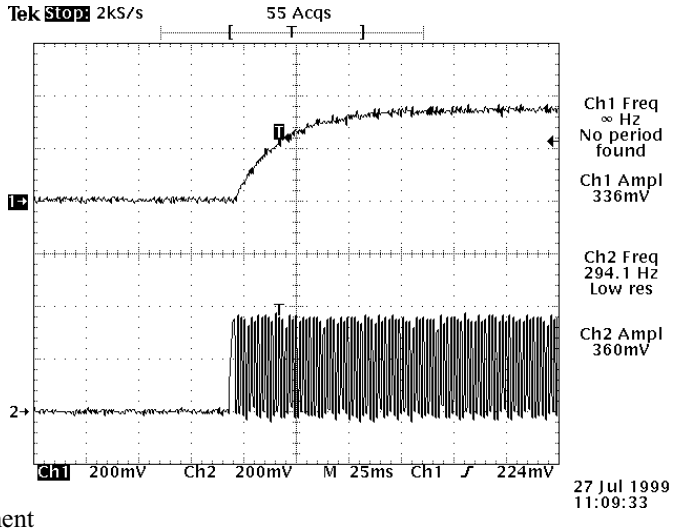
Item : System Reset & System Clock

Symptom: Power On Reset Doesn't Work
Can't Write in Flash Memory

- The System Clock 13.5MHz must be in stable condition during System Reset or Power On Reset. In Power On Reset, however, there were some cases where the clock couldn't be stable until the System Reset was unlocked because VCXO failed
- Check whether the following waveform is kept in Main Power Off and then Power On.

SAA7219 Reset →

13.5M Clock →




- Location of Measurement
  - SAA7219 Reset : See Schematic Diagram Page04/U8,Pin3
  - 13.5M Clock : See Schematic Diagram Page04/F1,Pin3

- Cause & Countermeasure

  The main cause is that VCXO fails. In this case, replace VCXO.

  For other cases, check for the state of assembly, soldering, etc.

| Classification | System Check |
|---|---|

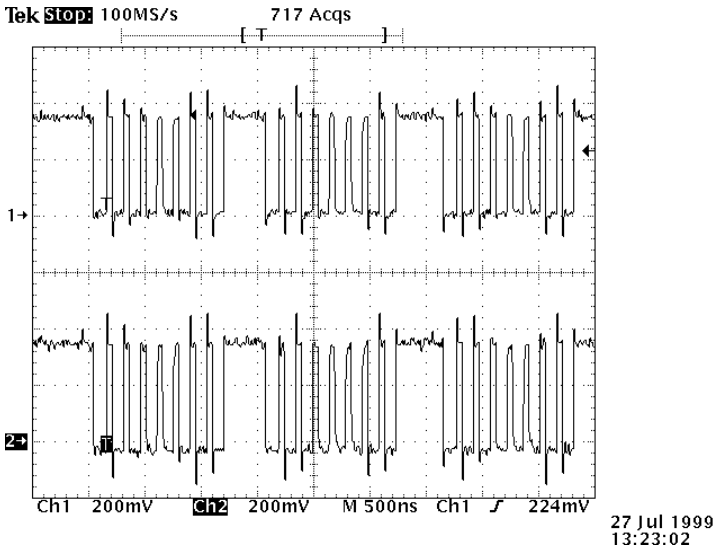
Item: FLASH 1

Symptom: Basic Check Items are OK but MPEG Doesn't Play

- If the system doesn't operate properly, even though nothing abnormal has been found after checking the basic check items, check FLASH1 that includes a program code. When the system operates normally, FLASH1 repeats control signals similar to the following.

FLASH1 CE# →

FLASH1 OE# →




- Location of Measurement

CE# : See Schematic Diagram Page05/U3,Pin26
OE# : See Schematic Diagram Page05/U3,Pin28

- Cause & Countermeasure

:

If the above signals are abnormal, check it is caused by cold soldering. If the abnormal signals are not caused by the cold soldering, check the basic check items. Check also both data and address buses.

Replacing chip must be the ultimate option.

| Classification | System Check |
|---|---|

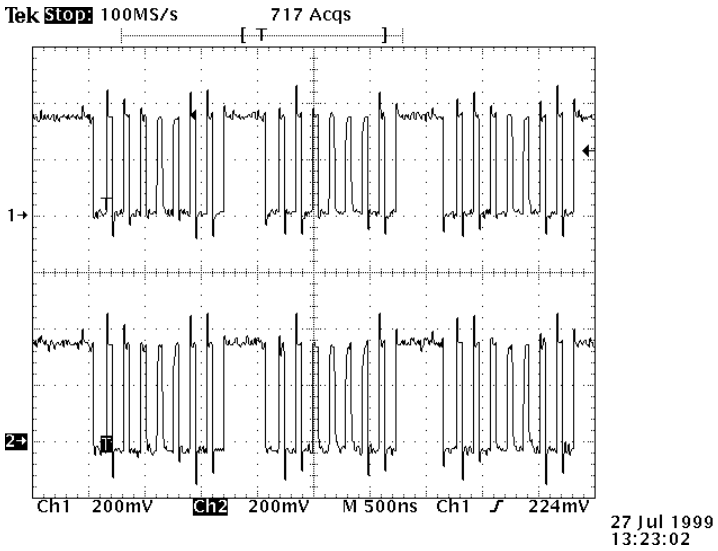
Item: FLASH 2

Symptom: Basic Check Items are OK but MPEG Doesn't Play

- If the system doesn't operate properly, even though nothing abnormal has been found after checking the basic check items, check FLASH2 that includes channel data and program constants. When the system operates normally, FLASH2 repeats control signals similar to the following.
- The following figure is similar to FLASH1 Timing.

FLASH2 CE# →

FLASH2 OE# →




- Location of Measurement

CE# : See Schematic Diagram Page06/U15,Pin26
OE# : See Schematic Diagram Page06/U15,Pin28

- Cause & Countermeasure

If the above signals are abnormal, check it is caused by cold soldering. If the abnormal signals are not caused by the cold soldering, check the basic check items. Check also both data and address buses.

Replacing chip must be the ultimate option

| Classification | System Check |
|---|---|

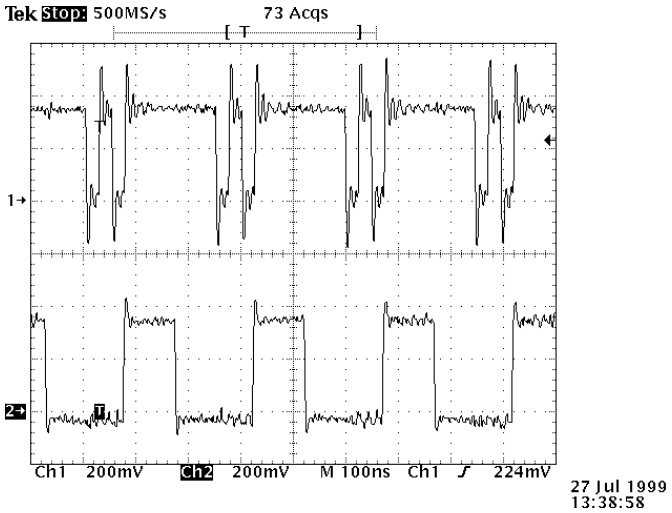
Item: MPEG GRAPHICS SDRAM

Symptom: Basic Check Items are OK but MPEG Doesn't Play

- If the system doesn't operate properly, even though nothing abnormal has been found after checking the basic check items, check MPEG GRAPHICS SDRAM (MAIN DATA & MPEG Graphics) of SAA7215.
- SAA7215 MPEG Graphics SDRAM can be selected when the SAA7219 CS_SDN signal is LOW. And SAA7219 ends the bus cycle after monitoring the DTACK signal. Therefore, the MPEG Graphics SDRAM can be considered to be normal if the following two signals repeat .

7215DTACK →

CS_SDN →




- Location of Measurement

7215DTACK : See Schematic Diagram Page08/U12,Pin203
CS_SDN : See Schematic Diagram Page08/U12,Pin202

- Cause & Countermeasure

If the above signals are abnormal, check both data and address buses. Check also any cold soldering exists.

Replacing chip must be the ultimate option

| Classification | MPEG & A/V Check Items |
|---|---|

Item: TS Stream

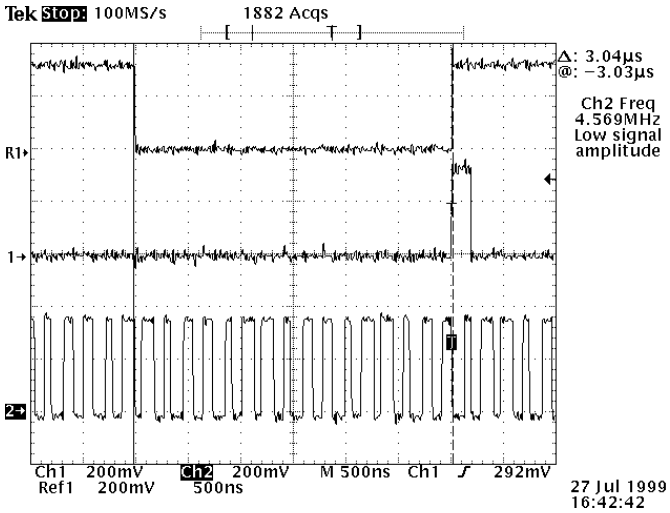
Symptom: Power On but System Doesn't Operate Properly

- The TS signal that is output from TDA8044 is input to SAA7219 via the resistance. At this time, check the signal is available.

TS Valid →

TS STR →

TS CLK →




- Location of Measurement

  TS VLD : See Schematic Diagram Page03/U4,Pin49 Page04/U2,Pin156
  TS STR : See Schematic Diagram Page03/U4,Pin50 Page04/U2,Pin155
  TS CLK : See Schematic Diagram Page03/U4,Pin28 Page04/U2,Pin154

- Cause & Countermeasure

  Check the TDA8044 signal is identical with the SAA7219 signal. If they are identical each other, check the resistance is normal.

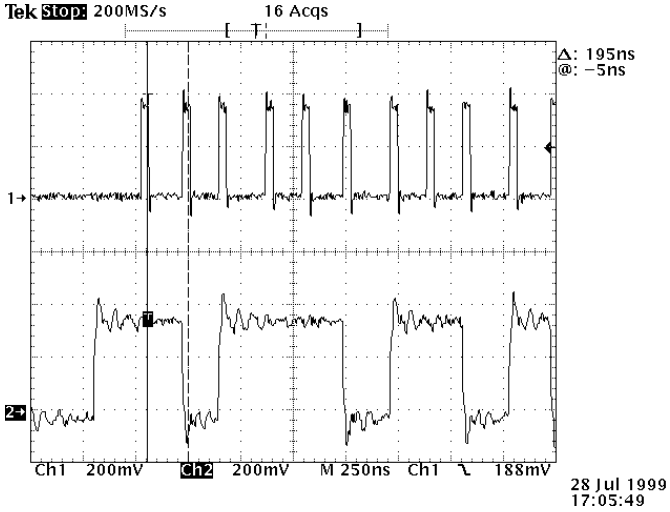
  Nevertheless, if MPEG doesn't play, check any signal error happened because of cold soldering on TS Data Line.

| Classification | A/V Check |
|---|---|
| Item: 7219 A/V Strobe | |
| Symptom: MPEG Doesn't Play | |

- You can know whether SAA7219 de-muxes PEG TS. A_STROBE, V_STROBE, AVD[7..0] are digital signals of A/V signal. Therefore, if you can check these signals, it means SAA7219 operates normally.

A_STROVE →

AVD0 →




- Location of Measurement

  A_STROVE : See Schematic Diagram Page04/U2,Pin94 Page08/U12,Pin164
  AVD0 : See Schematic Diagram Page04/U2,Pin103 Page08/U12,Pin155

- Cause & Countermeasure

  A_STROVE is almost identical with V_STROVE.

  AVD signals [7..0] are also similar to A_STROVE and V_STROVE.

Nevertheless, if MPEG doesn't play, check all of each 8 bit line AVD[0..7] to make sure the A/V MPEG TS data from TDA8044ADH is correct.

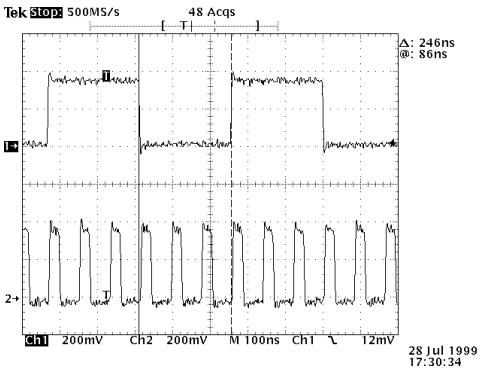
There are some cases where SAA7201doesn't operate because TDA8044 fails.

| Classification | MPEG & A/V Check |
|---|---|
| Item: No A/V Output | |
| Symptom: No Sound Signal Output | |

- Even though the system operates normally, if audio is not output through TV SCART, VCR SCART, check first the Digital Audio is input to UDA1320.
- If the Digital Audio signal is normal, check the presence of signal after tracking the channel of Analog Audio signal from the UDA1320 output stage to SCART.

DA_CLK →

DA_FSCLK →

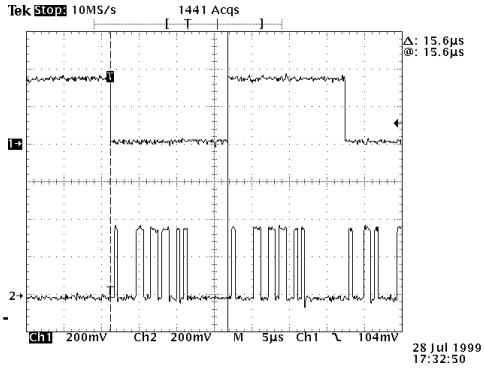



Location of Measurement:
See schematic diagram page 13/
U19,Pin1

Location of Measurement:
See schematic diagram page13/
U19,Pin6

DA_WS →

DA_DATA




Location of Measurement:
See schematic diagram page13/
U19,Pin2

Location of Measurement:
See schematic diagram page13/
U19,Pin3

- Cause & Countermeasure

  Since the disturbance of Audio Signal is sensitive to the value of R,C, check the state of soldering or the value is correct.

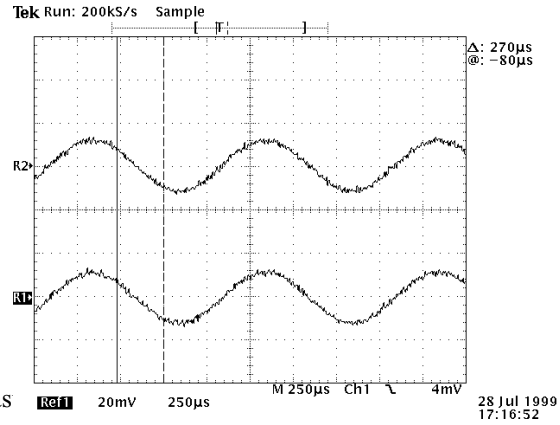
  The level of audio signal varies at each location on the schematic diagrams.

| Classification | MPEG & A/V Check |
|---|---|
| Item: DAC TDA1320 Sound Output | |
| Symptom: No Sound Signal Output | |

- When sound is not output through SCART, Phone Jack, check first TDA1320 (Audio DAC). .
- Since the output level and characteristics of audio are sensitive to the value of R,C, if the characteristic of a certain part fails, check the value of R,C.
- The following waveform is output when an 1KHz Tone Signal is received.

Audio Left →

Audio Right →




- Location of Meas

TAOL : See Schematic Diagram Page13/U19,Pin14
TAOR : See Schematic Diagram Page13/U19,Pin16

- Cause & Countermeasure

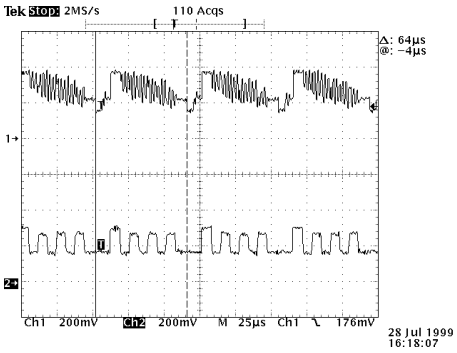
When the output from audio DAC is normal, track each circuit and check where the problem happens.

Since this item relates to Analog, it is considered that most of problems are caused by soldering and parts related failures.

| Classification | MPEG & A/V Check |
|---|---|
| Item: Video Output | |
| Symptom: No Video Signal Output | |

- Even though the system operates normally, if video is NOT output through TV SCART, VCR SCART, check the signal of the CXA2126 input port.
- CXA2126 includes CVBS, SVHS, R, G, B output. The following waveform is output when a 75% color bar signal is received.

CVBS →

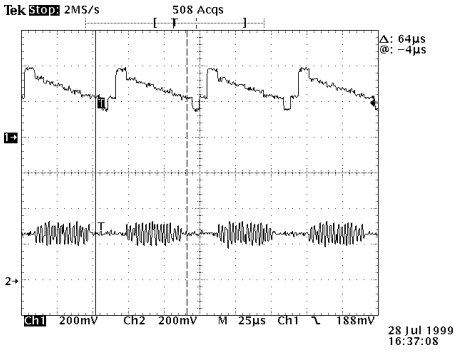



Location of Measurement:
See Schematic Diagram Page14/
U18,Pin49

Red →

Location of Measurement:
See Schematic Diagram Page14/
U18,Pin46

Y(Luminance) →




Location of Measurement:
See Schematic Diagram Page14/
U18,Pin49

C(Chrominance) →

Location of Measurement:
See Schematic Diagram Page14/
U18,Pin46

- Cause & Countermeasure

  If all outputs from U18 are normal, it means the associate circuits might fail. Measure the waveforms output from the circuits that are associated with the failed output port (SCART). And find where the problem happened and make appropriate countermeasures.

The level of output signal varies at each location on the schematic diagrams. For general cases, refer to the numerical values shown on the schematic diagrams.

| Classification | Channel Check |
|---|---|

Item: Troubleshooting Flow for Channel Part

Symptom: Items to be checked when troubleshooting the Channel Part

TUNER and TDA8044 are linked when locking. So check according to the linkage of signals to be controlled.

1. Check Point (See Schematic Diagram Pages 02,03)
   1) Check the internal operating power supply of TUNER is +5V.
      ( +4.75 ~ +5.25 V )
   2) Check the TUNER TUNING VOLTAGE (30V) and RIPPLE.
      ( +28.5 ~ 31V / MAX 50mV )
   3) Check the LNB POWER CONTROL signal and LNB POWER are fully output.
      ( LNB POWER CONTROL SIGNAL → EN, VSEL ).
      ( LNB POWER → LNBA )
   4) Check the 22KHz TONE waveform is fully output.
      ( Amplitude 400~800mV, Duty 45~55% )
   5) Check the voltage of TUNER OUTPUT I/Q and the waveform output from TUNER OUTPUT I/Q.
      (Check the voltage of TUNER OUTPUT I/Q is within 1.9 ~2.0 V and the waveform is about 600mVpp. )
   6) Check the power supply of TDA 8044 is 3.3V.
      ( 3.2V ~ 3.4V)
   7) Check TDA 8044 CLOCK (4.0625 MHz) is oscillated.
   8) When turning on the set, check I2C BUS LINE that is generated when initializing TUNER and TDA8044.
   9) Check 8044CLK and 8044VLD.
      ( CLK is about 5.4MHz and VLD is about 26KHz. The values can vary according to SYMBOL RATE.)
   10),11) Check going with the TS line.

Detailed description by each item (11 items) will be continued.

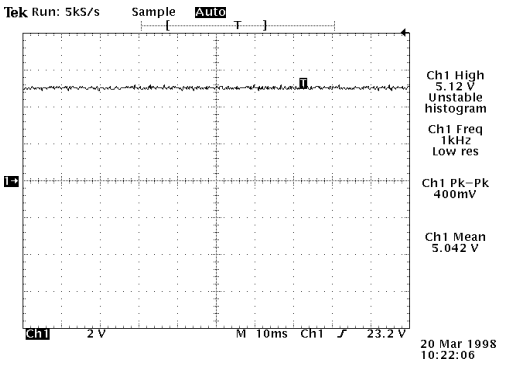
| Classification | Channel Check |
|---|---|

Item: 1,2) TUNER Operating Voltage & VT Voltage

Symptom: Locking Fails

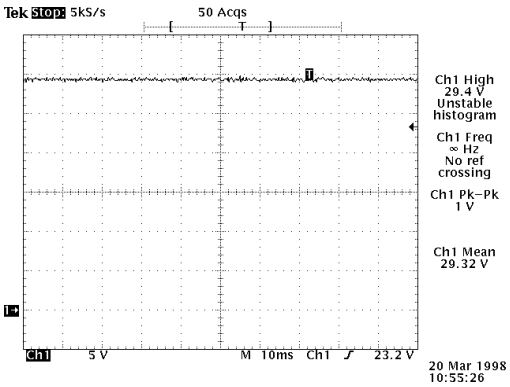
+5V is the internal operating voltage of TUNER. When RIPPLE or voltage fluctuates, it causes the fluctuation of the internal frequency of TUNER. When the TUNING VOLTAGE (30V) is abnormally LOW or RIPPLE is over 100 mV, +5V causes 479.5 MHz IF waveform noise by being parasitic on the local frequency that is generated inside Tuner.

TUNER(+5VT) →




Location of Measurement:
See Schematic Diagram
Page02/U1, Pin8

TUNER(+30V) →




Location of Measurement:
See Schematic Diagram
Page02/R11,Left

- Cause & Countermeasure

  Check the state of soldering and the input voltage of REG. IC. If necessary, replace 7805 and SMPS.

| Classification | Channel Check |
|---|---|

Item: 3) 13.5 V / 18V LNB Operating Voltage Fails

Symptom: Locking Fails

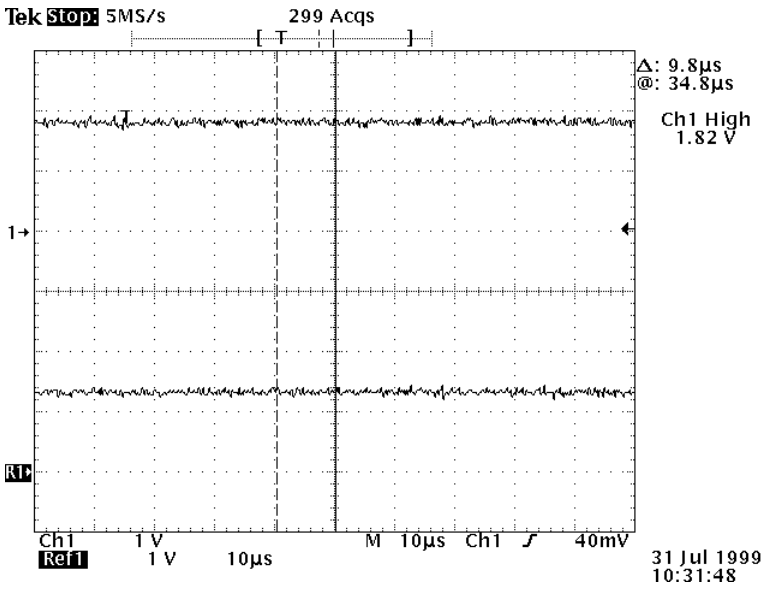
- 13V/18V is LNB internal driving power supply and which is supplied to LNB via Tuner Loop The voltage is used for the input power of the regulator inside LNB. In case of LNB DUAL POLA, the voltage is also used when switching HOR./ VER. POLA.

- LNB POWER CONTROL SIGNAL

  18V → VSEL(HIGH), EN(HIGH)
  13V → VSEL(LOW ), EN(HIGH)

LNB POWER(+18V) →

LNB POWER(+13V) →




- Location of Measurement
  LNB POWER : See Schematic Diagram Page02/U6,Pin3
  LNB_SEL : See Schematic Diagram Page02/U6.Pin4
  LNB_EN : See Schematic Diagram Page02/U6,Pin5

- Cause & Countermeasure

If something abnormal happens, check the input power of U2,LNBP15SP. If the input power is normal, replace the chip.

| Classification | Channel Check |
|---|---|

Item: 4,5) 22 kHz Tone & Carrier Voltage

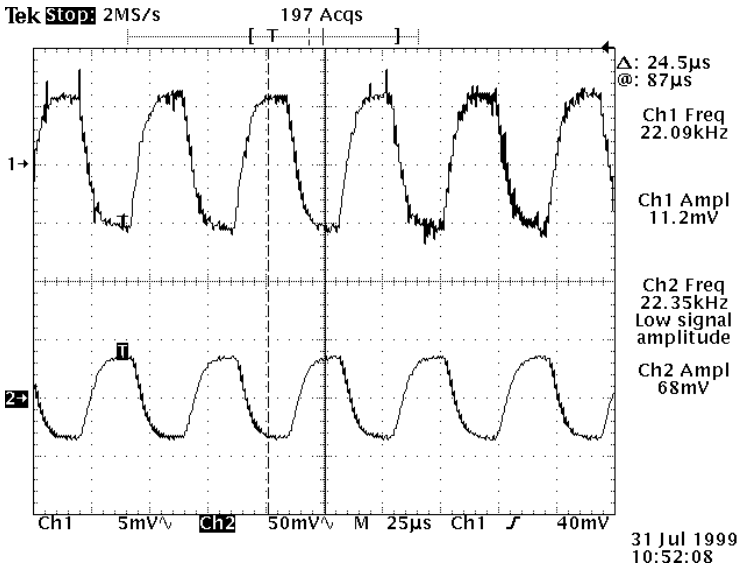
Symptom: Locking Fails

The 22 kHz TONE system is used in Europe. It selects and receives 950-1150 MHz (HIGH) & 1150-2150 MHz (LOW) BAND using the tuner input (because of too much channel information) and it selects and receives the LOCAL OSC inside LNB according to the presence of 22 kHz TONE.
The CARRIER_VCO voltage is used as the LOCAL OSC signal to extract the final I/Q signal by generating 479.5 MHz for QPSK demodulator inside the Tuner.

- The following waveform doesn't indicate the actual LNB LOAD. The waveform after loading must comply with the following specification: 400~800 mV AMPLITUDE, 45~55% +duty

22 kHz ( INPUT) →

22 kHz (OUTPUT) →




- Location of Measurement

  22 kHz (INPUT) : See Schematic Diagram Page02/U6,Pin9
  22 kHz (OUTPUT) : See Schematic Diagram Page02/U2,Pin3

- Cause & Countermeasure

  If the amplitude and duty of waveform fail, it might be caused by cold soldering and miss insertion. So check for cold soldering and miss insertion.

| Classification | Channel Check |
|---|---|

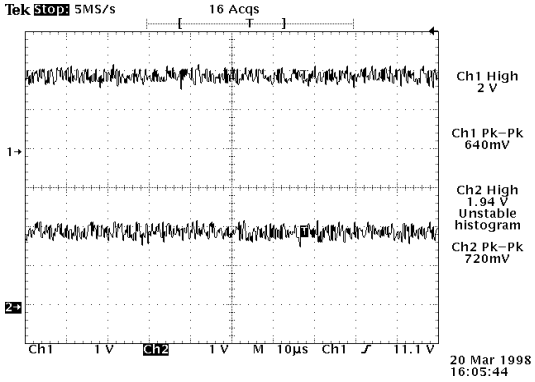
Item: 6,7) TUNER OUTPUT I/Q & TDA 8044 Operating Voltage

Symptom: Locking Fails

- The I/Q signal output from TUNER OUTPUT is an analog waveform passing QPSK DEMODULATOR inside the Tuner and it is used as the input of A/D converter located at the next stage. 3.3V that is fed to CHANNEL PART is separated according to PATTERN and the voltage is used as the driving power voltage of TDA8044.

- The I/Q waveform is the TUNER OUTPUT signal. The waveform is about 1.7V ~1.9V that is biased by TDA8044 and 600mVpp.

I →

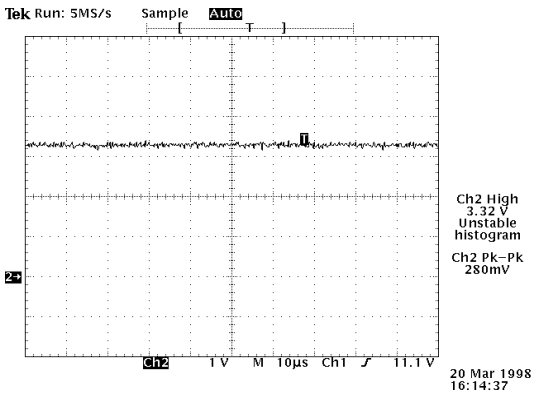



Location of Measurement:
See schematic diagram
Page02/U1,Pin17

Q →

Location of Measurmwnt
Page02/U1,Pin16

3.3V →




Location of Measurement:
See schematic diagram Page03/
All power supply of U4

(pins 64,65 = +5V for each)

- Cause & Countermeasure

  When the BAIS voltage is low or not output, check the power supply of TDA8044 and the associated degausses are properly soldered

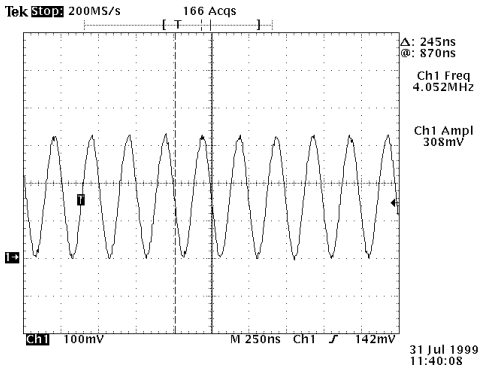
| Classification | Channel Check |
|---|---|

Item: 8,9) TDA8044 4.0625 MHz CLOCK & I2C BUS

Symptom: Locking Fails

- TDA8044 uses Clock Y1 (4.0625MHz). A/D Clock is generated from the Clock Y1 via an internal divider and it is used as an internal clock. Check the waveform generated from X-TAL is output.
- I2C BUS is generated from SAA72199 to control the Tuner and TDA8044. It is mainly used to set data when locking channel and to read status.

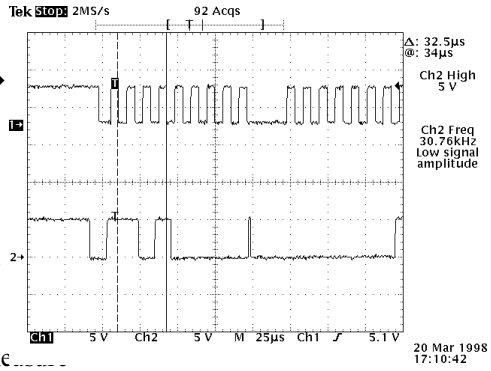
CLOCK (4.0625 MHz) →




Location of Measurement:
See schematic diagram
Page03/ Y1/Pins1,2

SDA0 →

SCL0 →




Location of Measurement:
See schematic diagram
Page03/ U4,Pin53

Location of Measurement:
See schematic diagram
Page03/ U4,Pin52

- Cause & Counterme...

If no waveform is output, check cold soldering and wrong insertion exist. When locking happens frequently, measure using the frequency counter (because X-TAL oscillation can be out of the specification (+/- 30ppm).

If no signal exists in I2C BUS LINE, re-solder the line. It usually happens because the associated pins are shorted or the system goes DOWN.

| Classification | Channel Check |
|---|---|

Item: 10, 11) TDA8044 Output Signal (1)

Symptom: Locking Fails.

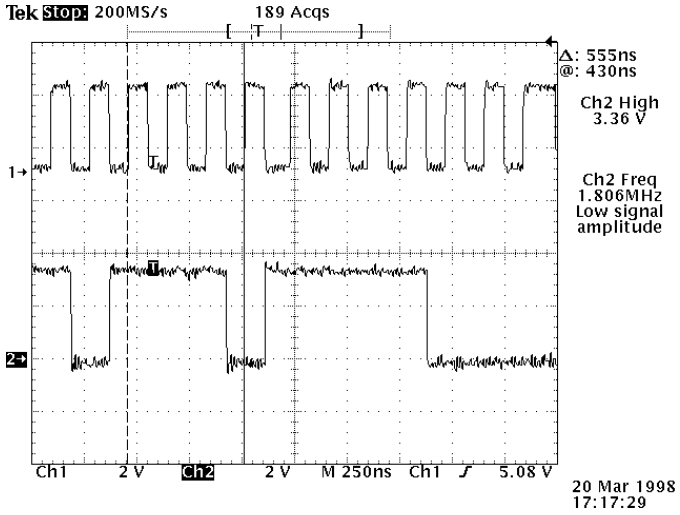
TDA8044 is divided into OUTPUT BIT CLOCK( 5.4 MHz ), VALID ( 25.8 kHz ), 8BIT DATA. The values can vary according to the set symbol rate and each signal is generated when the locking inside TDA8044 is fully done. The locking happens in the following sequence:

1. A/D CONVERTOR → 2. DE-PUNCTURING → 3. VITERBI
4. DE-INTERLEVING → 5. RS SOLOMOM → 6 DE-RANDOMIZER

Even though the status of TDA8044 must be read to make sure each step is locked, if TDA8044 pins 56,57,58 ( DEMOD LOCK, VITERBI, R-SOLOMOM) are 3.3V(HIGH), it means locking has been done.

TS CLOCK →

TS DATA →




- Location of Measurement
  TS CLOCK : See Schematic Diagram Page03/U4,Pin28
  TS DATA : See Schematic Diagram Page03/U4,Pins29 ~31,Pins33~35,Pin38,Pin45
  8044D[7..0]
- Cause & Countermeasure

TS DATA must be changed when BIT CLK POSITIVE-EDGE is done using TDA8044D[7..0].

BIT CLOCK( R26) and 8BIT DATA are output from TDA8044. The 8BIT DATA is synchronized by BIT CLOCK and then output.

When BIT CLOCK and DATA are not output, check the above items and replace TDA8044 after re-soldering. If TDA8044 DATA is correct but LOCKING is not well done, check the end part of 8Bit data LINE resistance is shorted.

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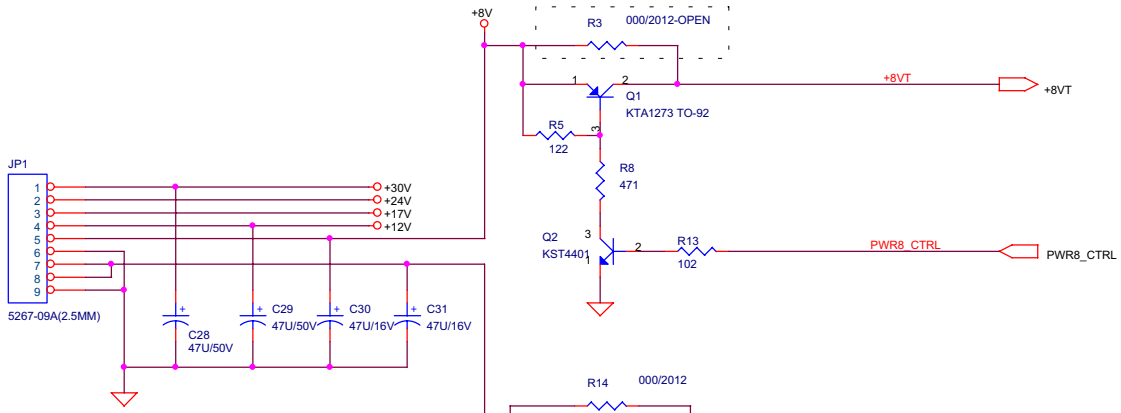


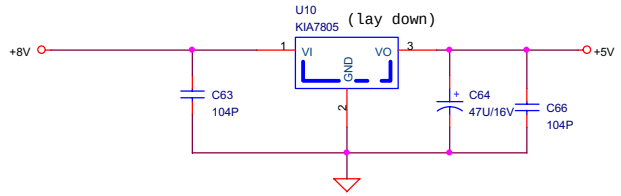


| | | |
|---|---|---|
| | F1-FOX | |
| Title | Main | |
| Size: Custom | Document Number: Power Connector | Rev: 1.0 |
| Date: Tuesday, April 25, 2000 | Sheet 1 of 16 | |

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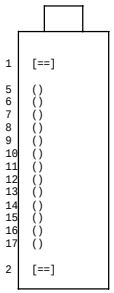
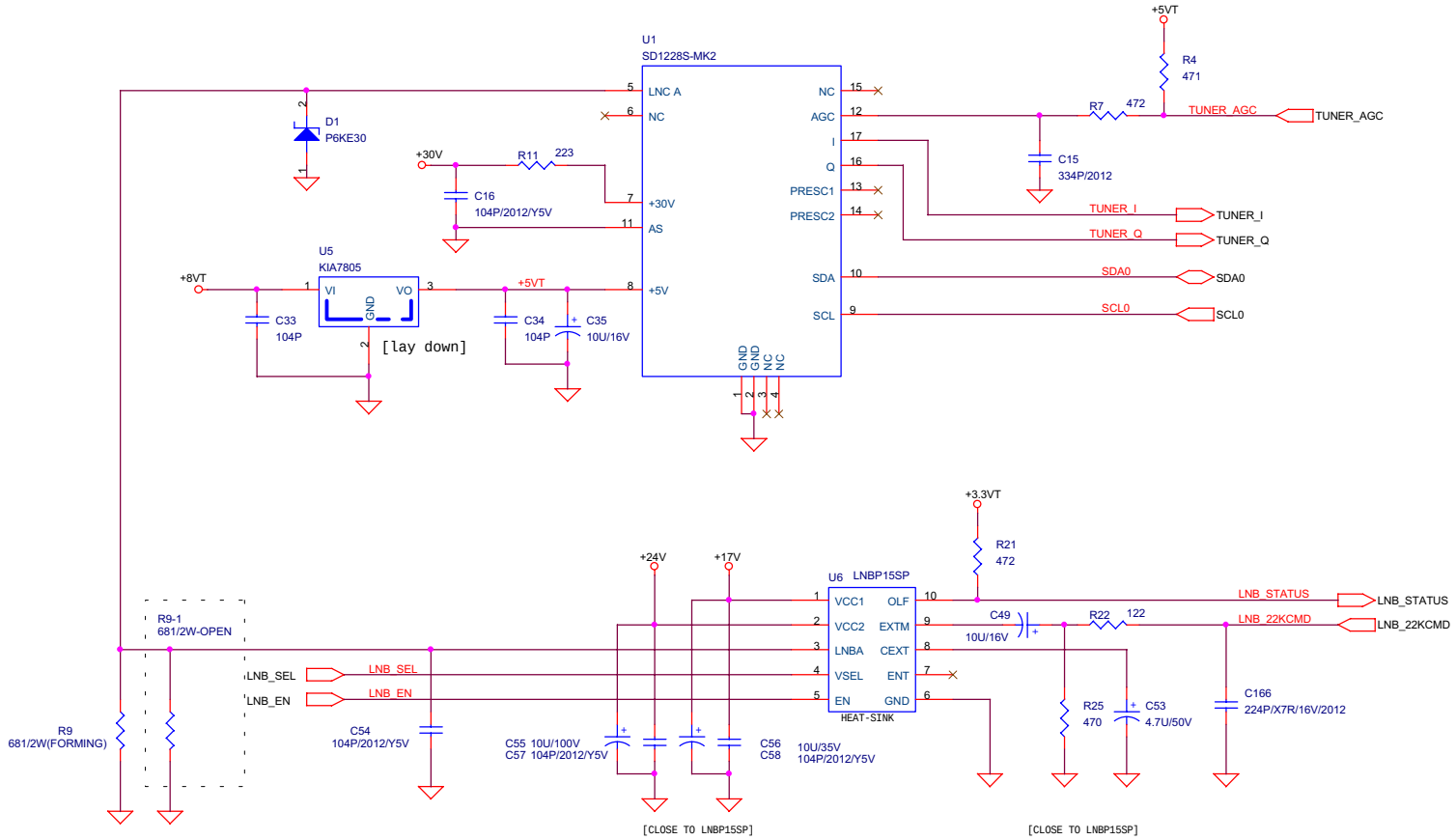
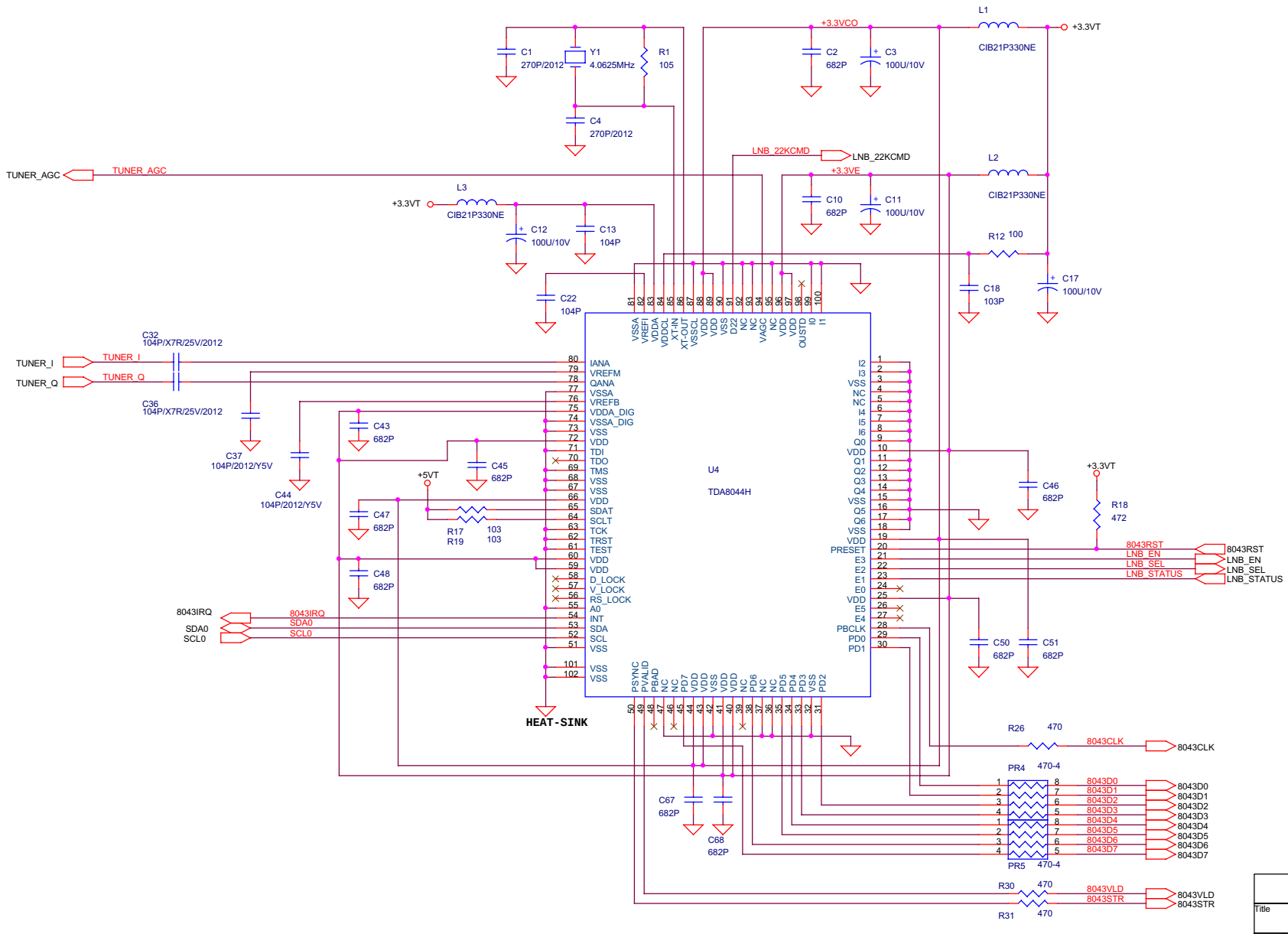


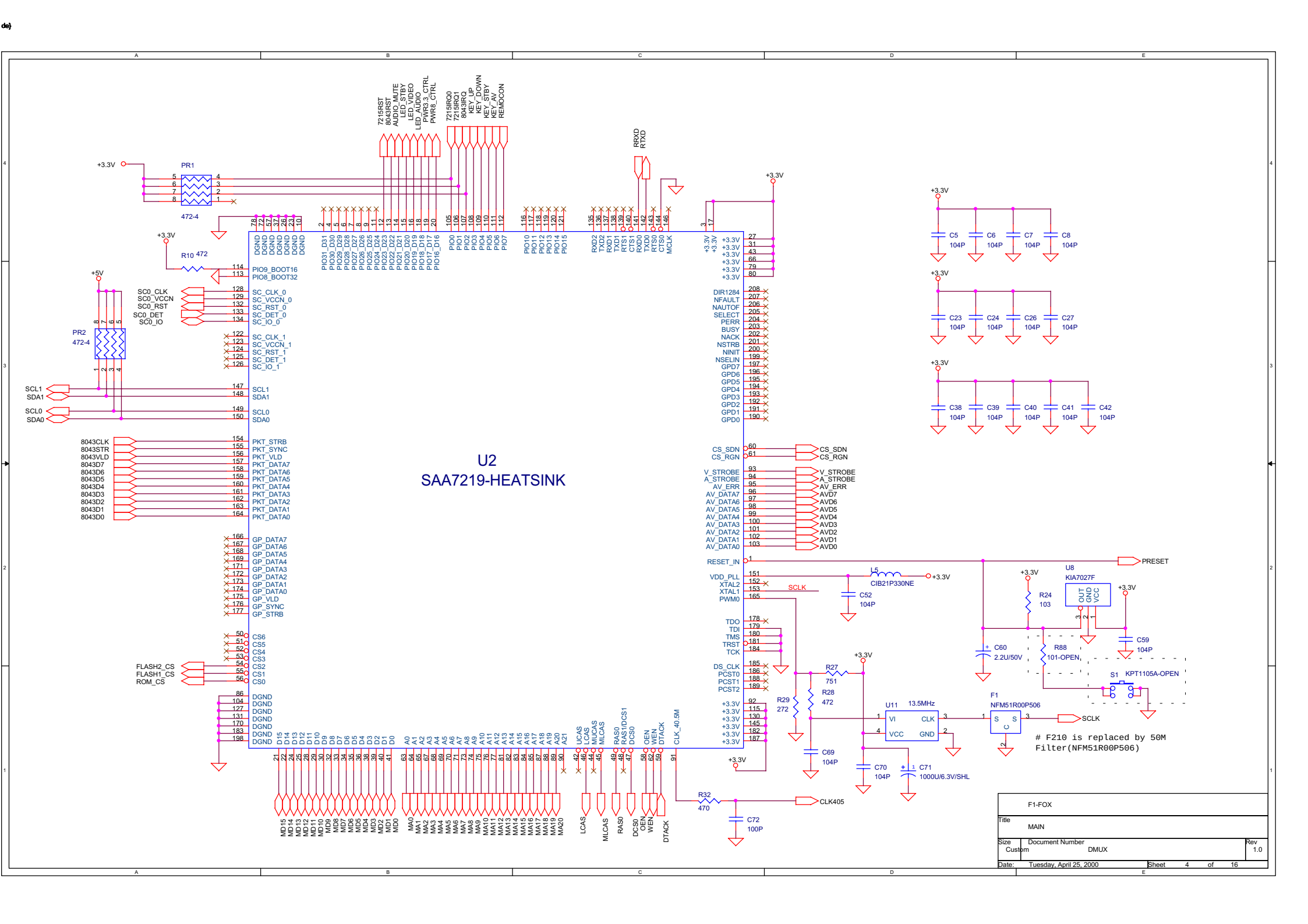

TN601 PIN ASSIGNMENT

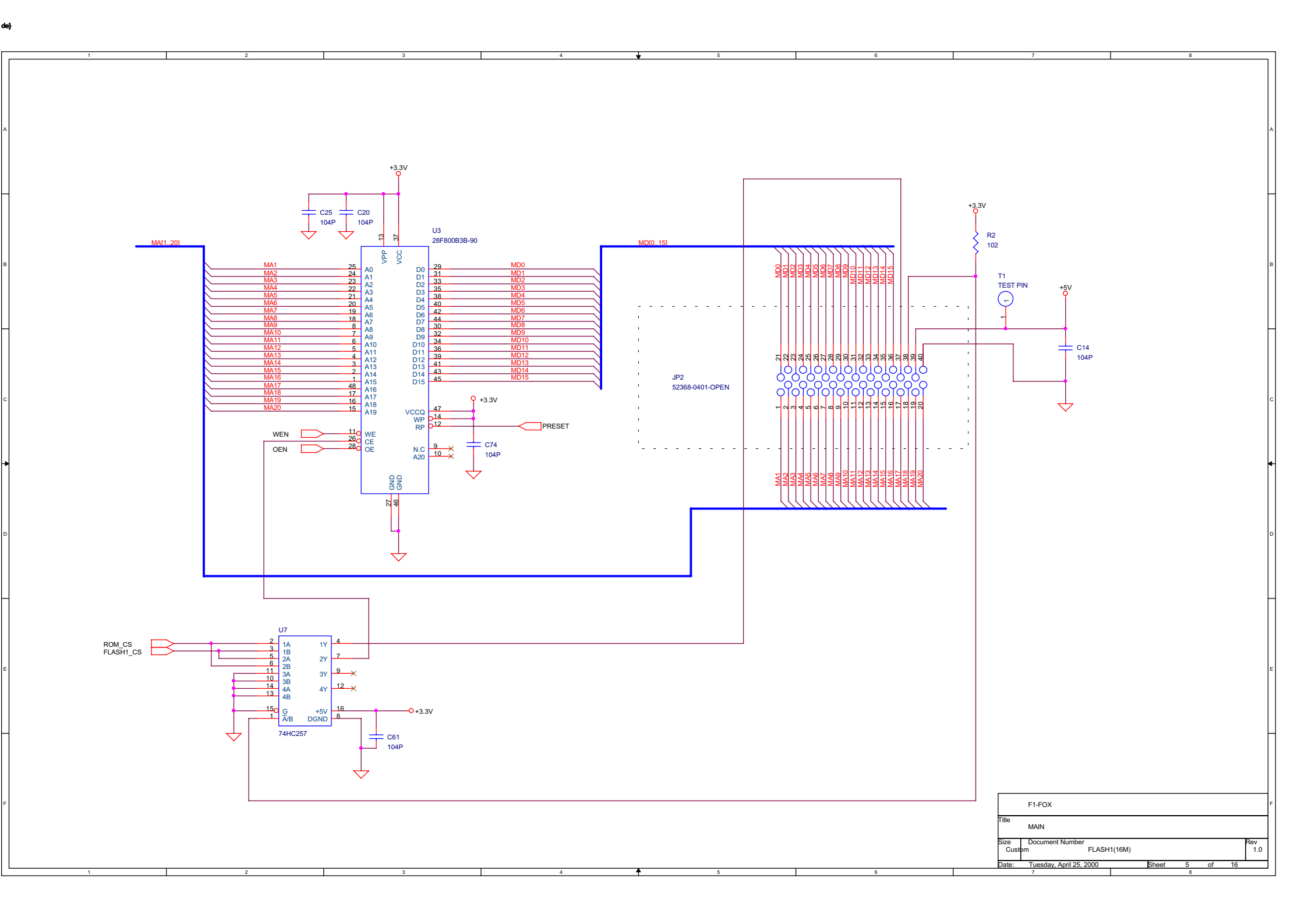



| | | |
|---|---|---|
| | F1-FOX | |
| Title | MAIN | |
| Size: Custom | Document Number: TUNER | Rev: 1.0 |
| Date: Tuesday, April 25, 2000 | Sheet 2 of 16 | |

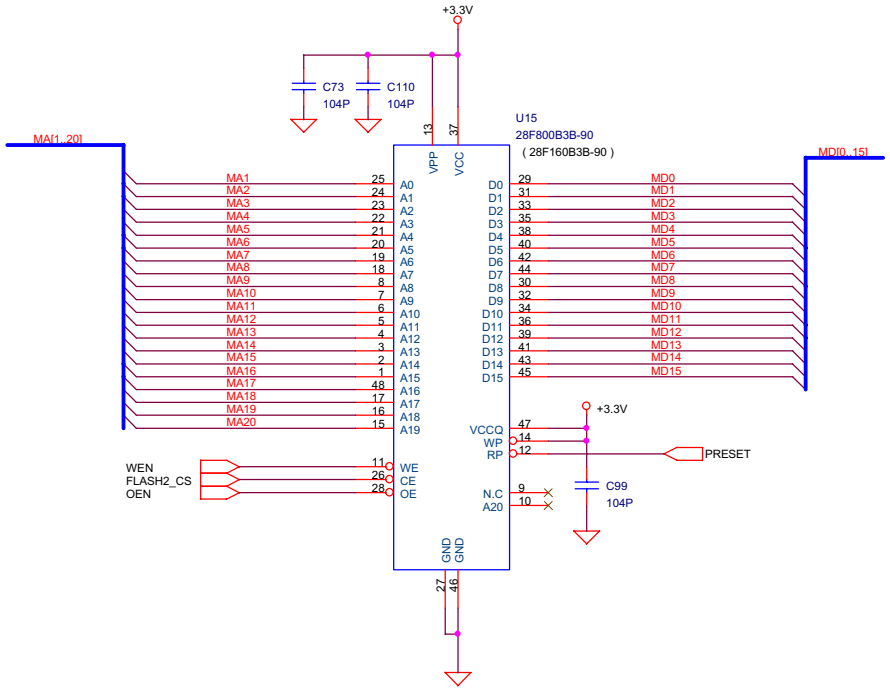



| | | |
|---|---|---|
| | F1-FOX | |
| Title | MAIN | |
| Size: Custom | Document Number: 8044 QPSK | Rev: 1.0 |
| Date: Tuesday, April 25, 2000 | Sheet 3 of 16 | |


U2
SAA7219-HEATSINK
PR1
472-4
PR2
472-4
R10 472
R24 103
R88 101-OPEN,
R27 751
R28 472
R29 272
R32 470
C5 104P
C6 104P
C7 104P
C8 104P
C23 104P
C24 104P
C26 104P
C27 104P
C38 104P
C39 104P
C40 104P
C41 104P
C42 104P
C52 104P
C59 104P
C60 2.2U/50V
C69 104P
C70 104P
C71 1000U/6.3V/SHL
C72 100P
L5 CIB21P330NE
U8 KIA7027F
U11 13.5MHz
S1 KPT1105A-OPEN
F1 NFM51R00P506
# F210 is replaced by 50M Filter(NFM51R00P506)
F1-FOX
MAIN
DMUX
Tuesday, April 25, 2000

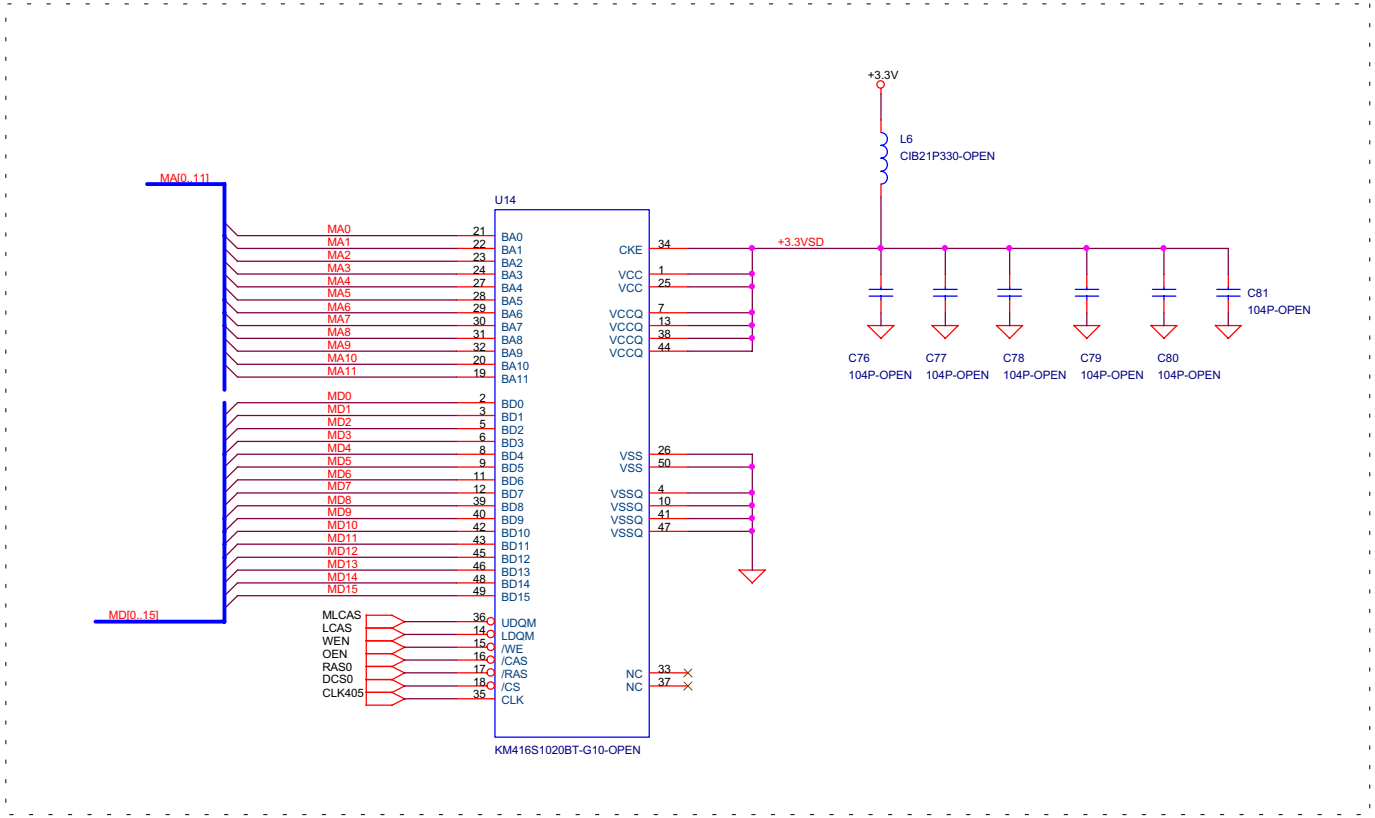

+3.3V
C25
104P
C20
104P
U3
28F800B3B-90
MA[1..20]
MD[0..15]
VPP
VCC
GND
GND
VCCQ
WP
RP
N.C
A20
WEN
OEN
PRESET
C74
104P
JP2
52368-0401-OPEN
R2
102
T1
TEST PIN
+5V
C14
104P
U7
74HC257
ROM_CS
FLASH1_CS
C61
104P
F1-FOX
MAIN
FLASH1(16M)
Tuesday, April 25, 2000
Sheet 5 of 16

de}

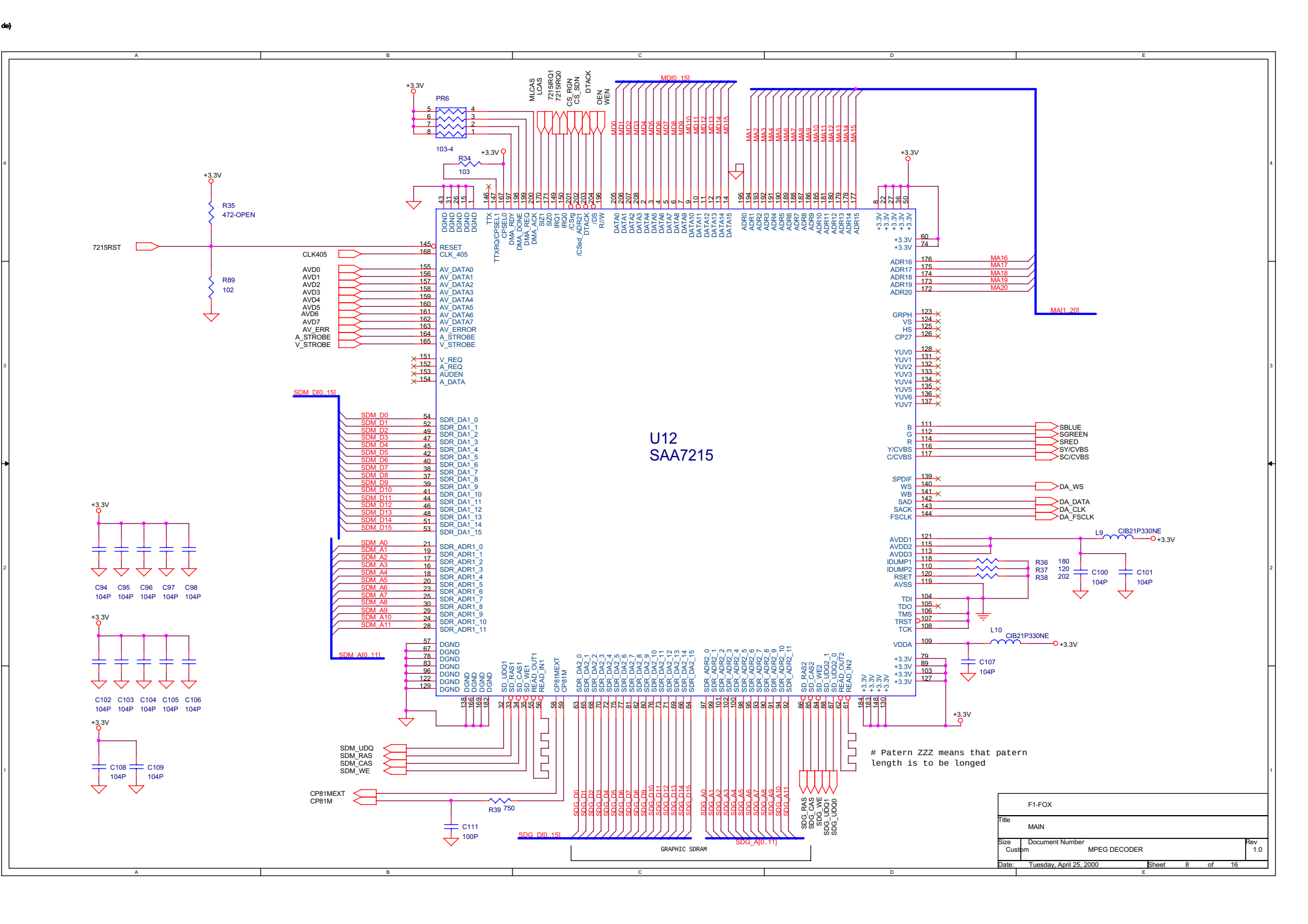



| | | | |
|---|---|---|---|
| | F1-FOX | | |
| Title | MAIN | | |
| Size | Document Number | | Rev |
| Custom | FLASH2(16M) | | 1.0 |
| Date: | Tuesday, April 25, 2000 | Sheet 6 of 16 | |

de}




| | | |
|---|---|---|
| F1-FOX | | |
| Title: MAIN | | |
| Size: Custom | Document Number: 16M SDRAM | Rev: 1.0 |
| Date: Thursday, May 18, 2000 | Sheet 7 of 16 | |


U12
SAA7215
PR6
103-4
R34
103
R35
472-OPEN
R89
102
7215RST
CLK405
RESET
CLK_405
AV_DATA0
AV_DATA1
AV_DATA2
AV_DATA3
AV_DATA4
AV_DATA5
AV_DATA6
AV_DATA7
AV_ERROR
A_STROBE
V_STROBE
V_REQ
A_REQ
AUDEN
A_DATA
MD[0..15]
MA[1..20]
SDM_DI[0..15]
SDM_A[0..11]
SDG_DI[0..15]
SDG_A[0..11]
SBLUE
SGREEN
SRED
SY/CVBS
SC/CVBS
DA_WS
DA_DATA
DA_CLK
DA_FSCLK
L9
CIB21P330NE
L10
CIB21P330NE
C94 104P
C95 104P
C96 104P
C97 104P
C98 104P
C102 104P
C103 104P
C104 104P
C105 104P
C106 104P
C108 104P
C109 104P
C100 104P
C101 104P
C107 104P
C111 100P
R36 180
R37 120
R38 202
R39 750
SDM_UDQ
SDM_RAS
SDM_CAS
SDM_WE
CP81MEXT
CP81M
SDG_RAS
SDG_CAS
SDG_WE
SDG_UDQ1
SDG_UDQ0
GRAPHIC SDRAM
# Patern ZZZ means that patern
length is to be longed
F1-FOX
Title
MAIN
Size
Custom
Document Number
MPEG DECODER
Rev
1.0
Date:
Tuesday, April 25, 2000
Sheet
8
of
16

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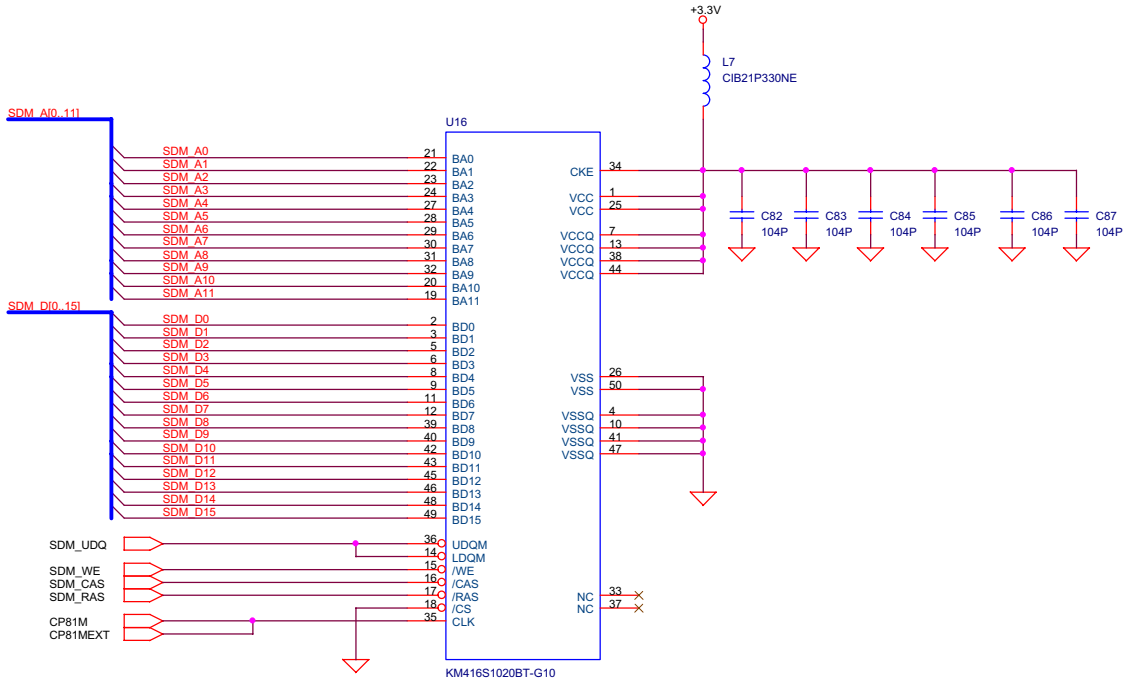


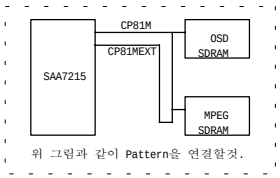


위 그림과 같이 Pattern을 연결할것.

| | | |
|---|---|---|
| F1-FOX | | |
| Title: MAIN | | |
| Size: Custom | Document Number: MPEG SDRAM | Rev: 1.0 |
| Date: Tuesday, April 25, 2000 | Sheet 9 of 16 | |

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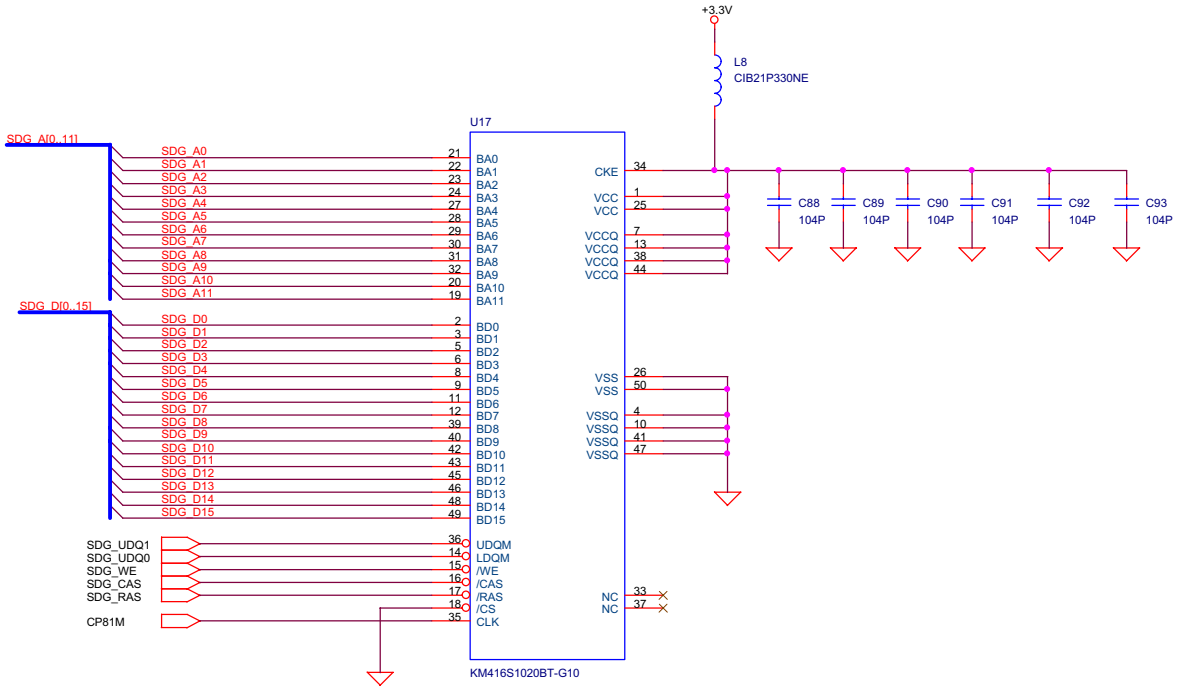


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|---|---|---|
| | F1-FOX | |
| Title | MAIN | |
| Size: Custom | Document Number: GRAPHIC SDRAM | Rev: 1.0 |
| Date: Thursday, May 18, 2000 | Sheet 10 of 16 | |

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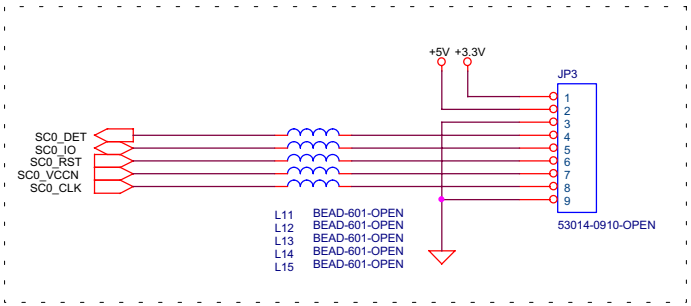


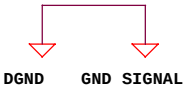


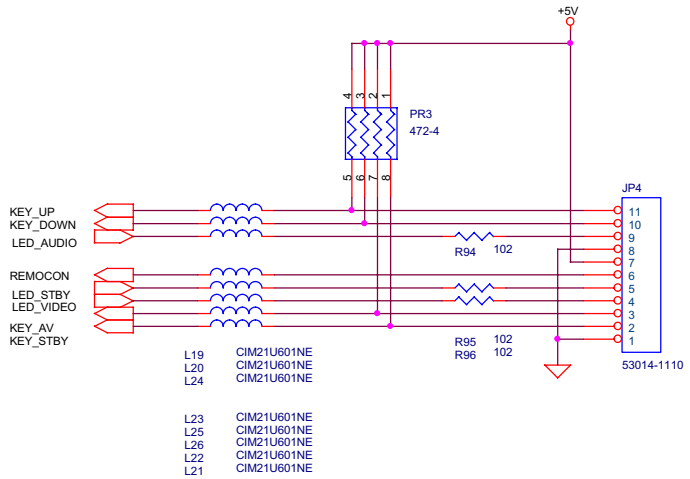


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|---|---|---|
| | F1-FOX | |
| Title | MAIN | |
| Size: Custom | Document Number: I/F CONNECT | Rev: 1.0 |
| Date: Tuesday, April 25, 2000 | Sheet 11 of 16 | |

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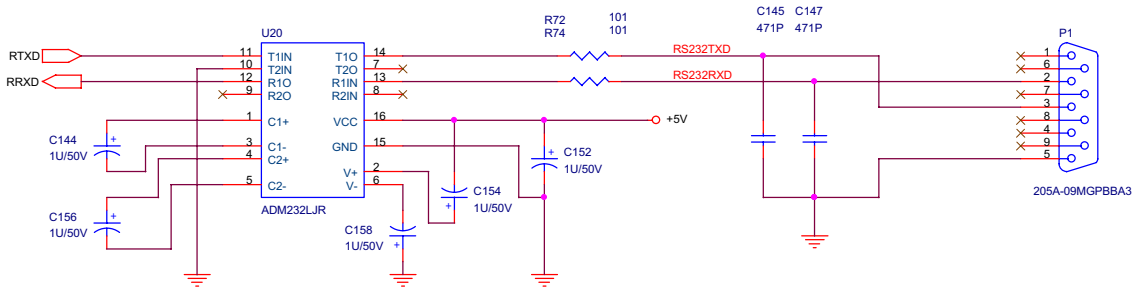
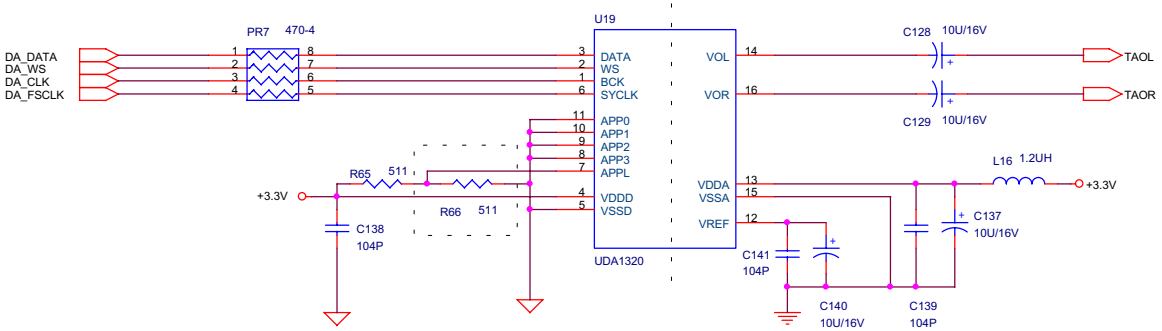
[ 9-Pin Serial port connector specification : Male-PC )

| Pin# | Name | Abs. | Direction |
|---|---|---|---|
| 1 | Data carrier detect | DCD | In |
| 2 | Receive data | Rx | In |
| 3 | Trasnmit data | Tx | Out |
| 4 | Data ternimal ready | DTR | Out |
| 5 | Signal ground | GND | |
| 6 | Data set ready | DSR | In |
| 7 | Request to send | RTS | OUT |
| 8 | Clear to send | CTS | In |
| 9 | Ring indicator | RI | In |

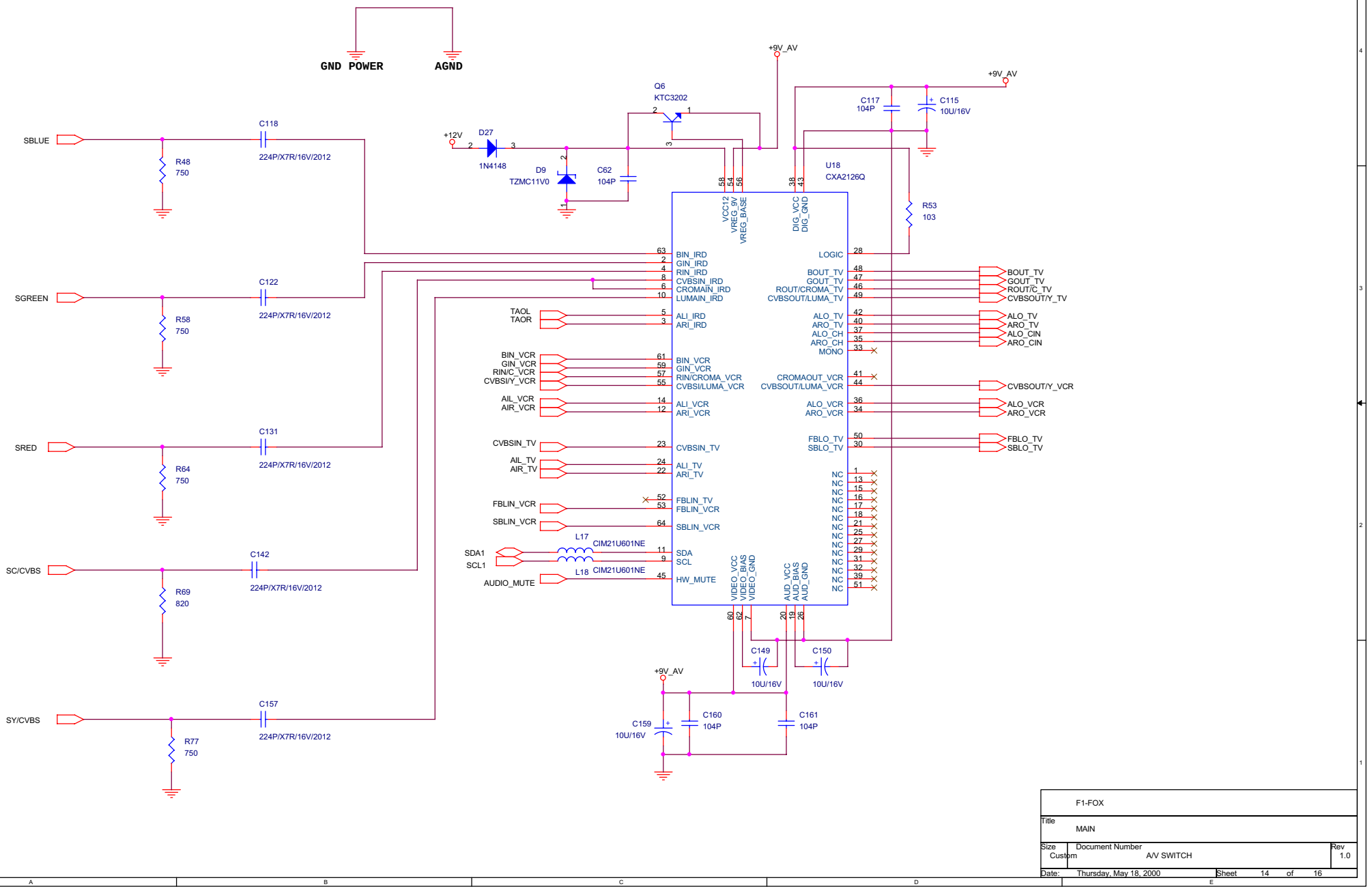



| | | |
|---|---|---|
| | F1-FOX | |
| Title | MAIN | |
| Size: Custom | Document Number: RS232/INTERNAL MODEM | Rev: 1.0 |
| Date: Tuesday, April 25, 2000 | Sheet 12 of 16 | |

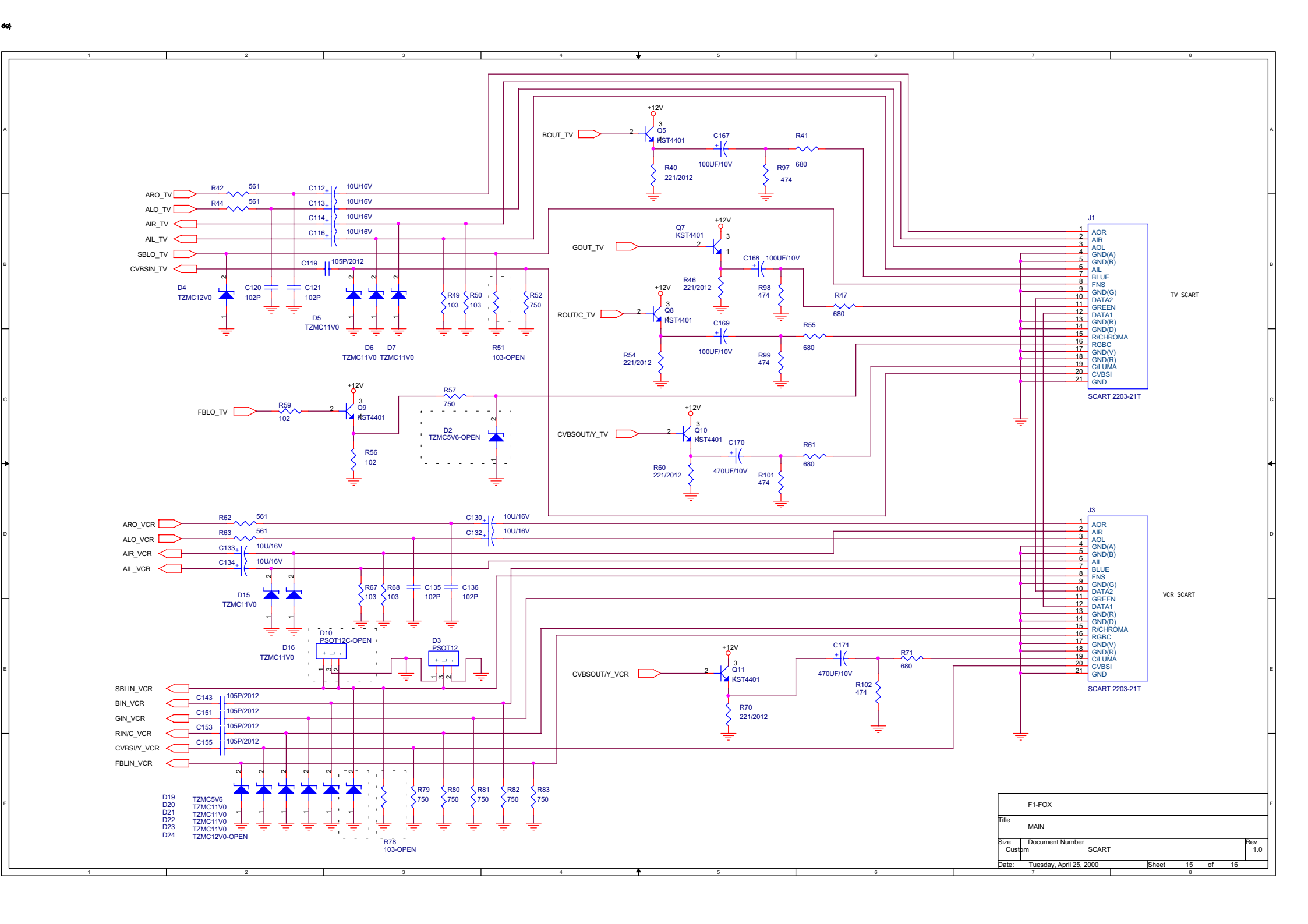



| MODE SETTING | |
|---|---|
| SAMPLING | 384fs |
| FORMAT | PHILIPS |

| | | |
|---|---|---|
| F1-FOX | | |
| Title: MAIN | | |
| Size: Custom | Document Number: AUDIO DAC | Rev: 1.0 |
| Date: Tuesday, April 25, 2000 | Sheet 13 of 16 | |




| | | |
|---|---|---|
| F1-FOX | | |
| Title: MAIN | | |
| Size: Custom | Document Number: A/V SWITCH | Rev: 1.0 |
| Date: Thursday, May 18, 2000 | Sheet 14 of 16 | |


ARO_TV
ALO_TV
AIR_TV
AIL_TV
SBLO_TV
CVBSIN_TV
R42 561
R44 561
C112 10U/16V
C113 10U/16V
C114 10U/16V
C116 10U/16V
C119 105P/2012
C120 102P
C121 102P
D4 TZMC12V0
D5 TZMC11V0
D6 TZMC11V0
D7 TZMC11V0
R49 103
R50 103
R51 103-OPEN
R52 750
BOUT_TV
GOUT_TV
ROUT/C_TV
+12V
Q5 KST4401
Q7 KST4401
Q8 KST4401
C167 100UF/10V
C168 100UF/10V
C169 100UF/10V
R40 221/2012
R41 680
R46 221/2012
R47 680
R54 221/2012
R55 680
R97 474
R98 474
R99 474
FBLO_TV
R59 102
Q9 KST4401
R57 750
D2 TZMC5V6-OPEN
R56 102
CVBSOUT/Y_TV
Q10 KST4401
C170 470UF/10V
R60 221/2012
R61 680
R101 474
J1
AOR
AIR
AOL
GND(A)
GND(B)
AIL
BLUE
FNS
GND(G)
DATA2
GREEN
DATA1
GND(R)
GND(D)
R/CHROMA
RGBC
GND(V)
GND(R)
C/LUMA
CVBSI
GND
SCART 2203-21T
TV SCART
ARO_VCR
ALO_VCR
AIR_VCR
AIL_VCR
R62 561
R63 561
C130 10U/16V
C132 10U/16V
C133 10U/16V
C134 10U/16V
D15 TZMC11V0
D16 TZMC11V0
R67 103
R68 103
C135 102P
C136 102P
D10 PSOT12C-OPEN
D3 PSOT12
CVBSOUT/Y_VCR
Q11 KST4401
C171 470UF/10V
R70 221/2012
R71 680
R102 474
J3
SCART 2203-21T
VCR SCART
SBLIN_VCR
BIN_VCR
GIN_VCR
RIN/C_VCR
CVBSI/Y_VCR
FBLIN_VCR
C143 105P/2012
C151 105P/2012
C153 105P/2012
C155 105P/2012
D19 TZMC5V6
D20 TZMC11V0
D21 TZMC11V0
D22 TZMC11V0
D23 TZMC11V0
D24 TZMC12V0-OPEN
R78 103-OPEN
R79 750
R80 750
R81 750
R82 750
R83 750
F1-FOX
Title
MAIN
Size
Custom
Document Number
SCART
Rev
1.0
Date: Tuesday, April 25, 2000
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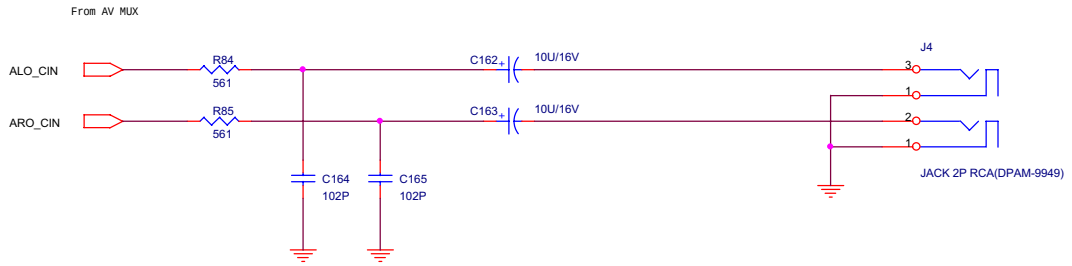


| | | |
|---|---|---|
| | F1-FOX | |
| Title | MAIN | |
| Size: Custom | Document Number: CINCH | Rev: 1.0 |
| Date: Tuesday, April 25, 2000 | Sheet 16 of 16 | |

# BOM List

**Model Name : F1-F0X**
**Model Code : 17-001**

| Code | Name | Q'ty | Unit | Location |
|---|---|---|---|---|
| **17-001** | **F1-F0X** | | | |
| 000-0098 | F-ASSY SET F1-F0X | 1.0 /1 | PCS | |
| 10701-12-001 | BOX CARTON Q,R,T-BOX | 1.0 /5 | PCS | |
| **000-0098** | **F-ASSY SET F1-F0X** | | | |
| 030-0052 | ASSY ACCESSARY F1-F0X | 1.0 /1 | PCS | |
| 040-0097 | ASSY SET F1-F0X | 1.0 /1 | PCS | |
| 10501-0660 | LABEL BAR-CODE (50X15, RIBBON) | 1.0 /1 | PCS | |
| 10601-10-001 | CUSHION PAD-PE F1-F0X | 2.0 /1 | PCS | |
| 10701-11-003 | BOX GIFT F1-F0X,F1-ACE | 1.0 /1 | PCS | |
| 10711-01-010 | BAG VINYL "A" Q/R/T-BOX(350*300*0.5t) | 1.0 /1 | PCS | |
| 10731-01-001 | SILICAGEL 3g | 1.0 /1 | PCS | |
| **030-0052** | **ASSY ACCESSARY F1-F0X** | | | |
| 01400-0028 | REMOCON F1-F0X,F1-ACE | 1.0 /1 | PCS | |
| 09900-0003 | BATTERY 1.5V, "AAA" | 2.0 /1 | PCS | |
| 10711-01-002 | BAG VINYL "B" | 1.0 /1 | PCS | |
| 10801-0600 | MANUAL F1-F0X/ENGLISH,GERMAN(HQF0XEG.300) | 1.0 /1 | PCS | |
| **040-0097** | **ASSY SET F1-F0X** | | | |
| 010-0123 | ASSY CPU B/D F1-F0X | 1.0 /1 | PCS | |
| 01300-0020 | CABLE POWER CORD (F1-F0X:KKP-419C/B-275,KLCE-2F 0.75) | 1.0 /1 | PCS | |
| 01403-0015 | POWER SMPS (DYS-32S,REV2.0) | 1.0 /1 | PCS | |
| 020-0124 | ASSY FRONT F1-F0X | 1.0 /1 | PCS | |
| 10021-04-002 | TOP COVER (Q,R,T-BOX) | 1.0 /1 | PCS | |
| 10031-08-001 | CASE BOTTOM F1-F0X(BACK,BUMPON,SPACER LOCKING ASSY) | 1.0 /1 | PCS | |
| 10501-0660 | LABEL BAR-CODE (50X15, RIBBON) | 1.0 /1 | PCS | |
| 1100300804 | SCREW T/T 2S P/H BLK (03*8) | 1.0 /1 | PCS | ASSY CPU B/D(RCA)+CASE BOTTOM(1EA) |
| 1115300504 | SCREW T/T 3S B/H BLK (03*5) | 5.0 /1 | PCS | CASE TOP+CASE BOTTOM(5EA) |
| 1115300602 | SCREW T/T 3S B/H NAT (03*6) | 7.0 /1 | PCS | ASSY CPU B/D+CASE BOTTOM(4EA),POWER SMPS+CASE BOTTOM(3EA) |
| 1211210002 | NUT UNF 3/8INCH*32 | 1.0 /1 | PCS | |
| 1231111002 | WASHER PAI10 | 1.0 /1 | PCS | |
| **010-0123** | **ASSY CPU B/D F1-F0X** | | | |
| 01404-0003 | TUNER SD1228S/MK2 | 1.0 /1 | PCS | U1 |

# BOM List

**Model Name : F1-FOX**
**Model Code : 17-001**

| Code | Name | Q'ty | Unit | Location |
|---|---|---|---|---|
| 00010-0031 | IC MPEG-2 SOURCE DECODER SAA7219(HS/C1)/SQFP208 | 1.0 /1 | PCS | U2 |
| 00013-0007 | IC FLASH MEMORY 8MB 28F800B3B-90/TSOP | 2.0 /1 | PCS | U3,15 |
| 00010-0029 | IC QPSK DEMODULATOR TDA8044AH/C2/QFP100 | 1.0 /1 | PCS | U4 |
| 00009-0001 | IC REGULATOR 7805/TO-220 | 2.0 /1 | PCS | U5,10 |
| 00018-0001 | IC LNB POWER SUPPLY LNBP15SP | 1.0 /1 | PCS | U6 |
| 00012-0016 | IC CMOS 74HC257/SOP | 1.0 /1 | PCS | U7 |
| 00099-0052 | IC VOLTAGE DETECTOR KIA7027AF/SOT-89 | 1.0 /1 | PCS | U8 |
| 00502-0002 | VCXO 13.5MHZ/15pF/DIP | 1.0 /1 | PCS | U11 |
| 00010-0030 | IC MPEG AVGD DECODER SAA7215(HS/C2)/SQFP208 | 1.0 /1 | PCS | U12 |
| 10081-11-001 | SHEET GLUE (26 X 26 X 0.5T) WITH 5302A (NITTO) | 1.0 /1 | PCS | U12 ACCESSARY |
| 10591-03-001 | HEAT SINK-L | 1.0 /1 | PCS | U12 ACCESSARY |
| 00004-0007 | IC SD-RAM K4S161622D/TSOP II | 2.0 /1 | PCS | U16,17 |
| 00099-0056 | IC A/V SWITCH CXA2126Q/QFP64 | 1.0 /1 | PCS | U18 |
| 00014-0007 | IC DAC UDA1320/SSOP16 | 1.0 /1 | PCS | U19 |
| 00017-0002 | IC RS232 DRIVER ADM232LJR | 1.0 /1 | PCS | U20 |
| 00106-0014 | CAP MULTI CERAMIC-CHIP 27pF/270p/50V/C0G/2012 | 2.0 /1 | PCS | C1,4 |
| 00106-0055 | CAP MULTI CERAMIC-CHIP 0.0068uF/682p/25V/X7R/1608 | 11.0 /1 | PCS | C2,10,43,45-48,50,51,67,68 |
| 00107-0083 | CAP ELE 100uF/10V/SSL | 7.0 /1 | PCS | C3,11,12,17,167,168,169 |
| 00106-0042 | CAP MULTI CERAMIC-CHIP 0.1uF/104p/25V/Y5V/1608 | 65.0 /1 | PCS | C5,6,7,8,13,14,20,22,23,24,25,26,27,33,34,38,39,40,41,42,52,59,61,62,63,66, 69,70,73,74,82,83,84,85,86,87,88,89,90,91,92,93,94,95,96,97,98,99,100,101,102, 103,104,105,106,107,108,109,110,117,138,139,141,160,161 |
| 00106-0093 | CAP MULTI CERAMIC-CHIP 0.33uF/334p/25V/Y5V/2012 | 1.0 /1 | PCS | C15 |
| 00106-0025 | CAP MULTI CERAMIC-CHIP 0.1uF/104p/50V/Y5V/2012 | 6.0 /1 | PCS | C16,37,44,54,57,58 |
| 00106-0053 | CAP MULTI CERAMIC-CHIP 0.01uF/103p/25V/X7R/1608 | 1.0 /1 | PCS | C18 |
| 00107-0067 | CAP ELE 47uF/50V/SSL | 2.0 /1 | PCS | C28,29 |
| 00107-0005 | CAP ELE 47uF/16V/SSL | 3.0 /1 | PCS | C30,31,64 |
| 00106-0002 | CAP MULTI CERAMIC-CHIP 0.1uF/104p/25V/X7R/2012 | 2.0 /1 | PCS | C32,36 |
| 00107-0057 | CAP ELE 10uF/16V/SSL | 20.0 /1 | PCS | C35,49,112,113,114,115,116,128,129,130,132,133,134,137,140,149,150,159,162,163 |
| 00107-0019 | CAP ELE 4.7uF/50V/SSL | 1.0 /1 | PCS | C53 |
| 00107-0087 | CAP ELE 10uF/50V/SSL | 2.0 /1 | PCS | C55,56 |
| 00107-0018 | CAP ELE 2.2uF/50V/SSL | 1.0 /1 | PCS | C60 |
| 00107-0078 | CAP ELE 1000uF/6.3V/SHL | 1.0 /1 | PCS | C71 |
| 00106-0048 | CAP MULTI CERAMIC-CHIP 10pF/100p/25V/C0G/1608 | 2.0 /1 | PCS | C72,111 |
| 00106-0092 | CAP MULTI CERAMIC-CHIP 0.22uF/224p/16V/X7R/2012 | 6.0 /1 | PCS | C118,122,131,142,157,166 |
| 00106-0081 | CAP MULTI CERAMIC-CHIP 1uF/105p/16V/Y5V/2012 | 5.0 /1 | PCS | C119,143,151,153,155 |
| 00106-0052 | CAP MULTI CERAMIC-CHIP 0.001uF/102p/25V/X7R/1608 | 6.0 /1 | PCS | C120,121,135,136,164,165 |
| 00107-0017 | CAP ELE 1uF/50V/SSL | 5.0 /1 | PCS | C144,152,154,156,158 |
| 00106-0057 | CAP MULTI CERAMIC-CHIP 470pF/471p/25V/C0G/1608 | 2.0 /1 | PCS | C145,147 |
| 00107-0000 | CAP ELE 470uF/10V/SSL | 2.0 /1 | PCS | C170,171 |

# BOM List

**Model Name : F1-FOX**
**Model Code : 17-001**

| Code | Name | Q'ty | Unit | Location |
|---|---|---|---|---|
| 00200-0095 | RES CHIP 1M, 5%, 1608 | 1.0 /1 | PCS | R1 |
| 00200-0094 | RES CHIP 1K, 5%, 1608 | 8.0 /1 | PCS | R2,13,56,59,89,94,95,96 |
| 00200-0088 | RES CHIP 470, 5%, 1608 | 2.0 /1 | PCS | R4,8 |
| 00200-0092 | RES CHIP 1.2K, 5%, 1608 | 2.0 /1 | PCS | R5,22 |
| 00200-0087 | RES CHIP 4.7K, 5%, 1608 | 5.0 /1 | PCS | R7,10,18,21,28 |
| 00205-0011 | RES METAL OXIDE 680, 2W, 5% (FORMING TYPE) | 1.0 /1 | PCS | R9 |
| 00200-0093 | RES CHIP 22K, 5%, 1608 | 1.0 /1 | PCS | R11 |
| 00200-0091 | RES CHIP 10, 5%, 1608 | 1.0 /1 | PCS | R12 |
| 00200-0000 | RES CHIP 0, 5%, 2012 | 1.0 /1 | PCS | R14 |
| 00200-0096 | RES CHIP 10K, 5%, 1608 | 9.0 /1 | PCS | R17,19,24,34,49,50,53,67,68 |
| 00200-0098 | RES CHIP 47, 5%, 1608 | 5.0 /1 | PCS | R25,26,30,31,32 |
| 00200-0113 | RES CHIP 750, 5%, 1608 | 1.0 /1 | PCS | R27 |
| 00200-0121 | RES CHIP 2.7K, 5%, 1608 | 1.0 /1 | PCS | R29 |
| 00200-0218 | RES CHIP 18, 5%, 1608 | 1.0 /1 | PCS | R36 |
| 00200-0219 | RES CHIP 12, 5%, 1608 | 1.0 /1 | PCS | R37 |
| 00200-0148 | RES CHIP 2K, 5%, 1608 | 1.0 /1 | PCS | R38 |
| 00200-0106 | RES CHIP 75, 5%, 1608 | 12.0 /1 | PCS | R39,48,52,57,58,64,77,79,80,81,82,83 |
| 00200-0019 | RES CHIP 220, 5%, 2012 | 5.0 /1 | PCS | R40,46,54,60,70 |
| 00200-0146 | RES CHIP 68, 5%, 1608 | 5.0 /1 | PCS | R41,47,55,61,71 |
| 00200-0225 | RES CHIP 560, 5%, 1608 | 6.0 /1 | PCS | R42,44,62,63,84,85 |
| 00200-0204 | RES CHIP 510, 5%, 1608 | 2.0 /1 | PCS | R65,66 |
| 00200-0228 | RES CHIP 82, 5%, 1608 | 1.0 /1 | PCS | R69 |
| 00200-0100 | RES CHIP 100, 5%, 1608 | 2.0 /1 | PCS | R72,74 |
| 00200-0229 | RES CHIP 470K, 5%, 1608 | 5.0 /1 | PCS | R97,98,99,101,102 |
| 00207-0005 | RES CHIP NETWORK 4.7K*4 | 3.0 /1 | PCS | PR1,2,3 |
| 00207-0006 | RES CHIP NETWORK 47*4 | 3.0 /1 | PCS | PR4,5,7 |
| 00207-0003 | RES CHIP NETWORK 10K*4 | 1.0 /1 | PCS | PR6 |
| 00305-0001 | TVS DIODE P6KE30 | 1.0 /1 | PCS | D1 |
| 00305-0002 | TVS DIODE PSOT12/SOT-23 | 1.0 /1 | PCS | D3 |
| 00301-0018 | DIODE ZENER TZM5242B(12V)/SOD80 | 1.0 /1 | PCS | D4 |
| 00301-0029 | DIODE ZENER TZM5241B(11V)/SOD80 | 10.0 /1 | PCS | D5,6,7,9,15,16,20,21,22,23 |
| 00301-0024 | DIODE ZENER TZM5232B(5.6V)/SOD80 | 1.0 /1 | PCS | D19 |
| 00304-0000 | DIODE SWITCHING 1N4148 | 1.0 /1 | PCS | D27 |
| 00401-0014 | TR NOMAL KTA1273/PNP/TO-92L | 1.0 /1 | PCS | Q1 |
| 00400-0007 | TR CHIP KST4401/NPN/SOT-23 | 7.0 /1 | PCS | Q2,5,7,8,9,10,11 |
| 00401-0013 | TR NOMAL KTC3202/NPN/TO-92 | 1.0 /1 | PCS | Q6 |
| 00500-0022 | VIBRATOR CRYSTAL 3rD OVERTONE 4.0625MHz/30PPM | 1.0 /1 | PCS | Y1 |
| 00999-0023 | CON SCART 2203-21T(B) | 2.0 /1 | PCS | J1,3 |
| 00901-0018 | JACK 2P RCA DPAM-9949 (W,R) | 1.0 /1 | PCS | J4 |

# BOM List

**Model Name : F1-FOX**
**Model Code : 17-001**

| Code | Name | Q'ty | Unit | Location |
|---|---|---|---|---|
| 00906-0019 | CON WAFER 5267-09A | 1.0 /1 | PCS | JP1 |
| 00906-0048 | CON WAFER 52368-0401 | 1.0 /1 | PCS | JP2 |
| 00906-0049 | CON WAFER 53014-1110 | 1.0 /1 | PCS | JP4 |
| 00999-0022 | CON D-SUB 9PIN (205A-09MGPBBA3) | 1.0 /1 | PCS | P1 |
| 01004-0077 | PCB CPU B/D Q-BOX REV 1.0 | 1.0 /1 | PCS | |
| 01103-0005 | POWER BEAD CIB21P330NE | 8.0 /1 | PCS | L1,2,3,5,7,8,9,10 |
| 01100-0002 | INDUCTOR 1.2uH/3PI/AXIAL | 1.0 /1 | PCS | L16 |
| 01103-0004 | CHIP BEAD-601 CIM21U601NE | 10.0 /1 | PCS | L17,18,19,20,21,22,23,24,25,26 |
| 01200-0003 | FILTER EMI NFM51R00P506 | 1.0 /1 | PCS | F1 |
| **020-0124** | **ASSY FRONT F1-FOX** | | | |
| 010-0147 | ASSY FRONT B/D T-BOX 992(basic) | 1.0 /1 | PCS | |
| 050-0082 | ASSY SUB FRONT F1-FOX | 1.0 /1 | PCS | |
| 1105300802 | SCREW T/T 2S B/H NAT (03*8) | 5.0 /1 | PCS | ASSY SUB FRONT+ASSY FRONT B/D(5EA) |
| **010-0147** | **ASSY FRONT B/D T-BOX 992(basic)** | | | |
| 00107-0068 | CAP ELE 47uF/16V/SSE/BULK | 1.0 /1 | PCS | C1 |
| 00104-0001 | CAP MULTI CERAMIC-A 0.1uF/104/+80~-20% | 1.0 /1 | PCS | C2 |
| 00203-0061 | RES CARBON 47, 1/4W, 5% | 2.0 /1 | PCS | R1,2 |
| 00203-0012 | RES CARBON 180,1/4W,5% | 3.0 /1 | PCS | R8-10 |
| 00401-0010 | TR NOMAL 2SC1741S/NPN/SPT | 3.0 /1 | PCS | Q1-3 |
| 00602-0009 | LED YELLOW SLY-3304/N | 1.0 /1 | PCS | D1 |
| 10131-03-001 | LED SPACER-2 SAT500IRD | 3.0 /1 | PCS | D1-3 |
| 00602-0008 | LED GREEN SLG-3304/N | 1.0 /1 | PCS | D2 |
| 00602-0007 | LED RED SLR-3304/N | 1.0 /1 | PCS | D3 |
| 00802-0001 | S/W TACT KPT-1115A/2pin/6*6(RADIAL) | 4.0 /1 | PCS | S1-4 |
| 01004-0081 | PCB FRONT REV 1.0 (Q/R/T-BOX) | 1.0 /1 | PCS | |
| 01301-0086 | HARNESS ASSY#86 (11PIN,80mm,FRONT:F1-FOX) | 1.0 /1 | PCS | JP1 |
| 09900-0042 | REMOCON SENSOR LTM-97AT-38W | 1.0 /1 | PCS | U1 |
| **050-0082** | **ASSY SUB FRONT F1-FOX** | | | |
| 10001-16-001 | PANEL FRONT F1-FOX | 1.0 /1 | PCS | |
| 10051-21-001 | KNOB POWER F1-FOX | 1.0 /1 | PCS | |
| 10051-22-001 | KNOB DIRECTION F1-FOX | 1.0 /1 | PCS | |
| 10071-11-001 | WINDOW F1-FOX | 1.0 /1 | PCS | |